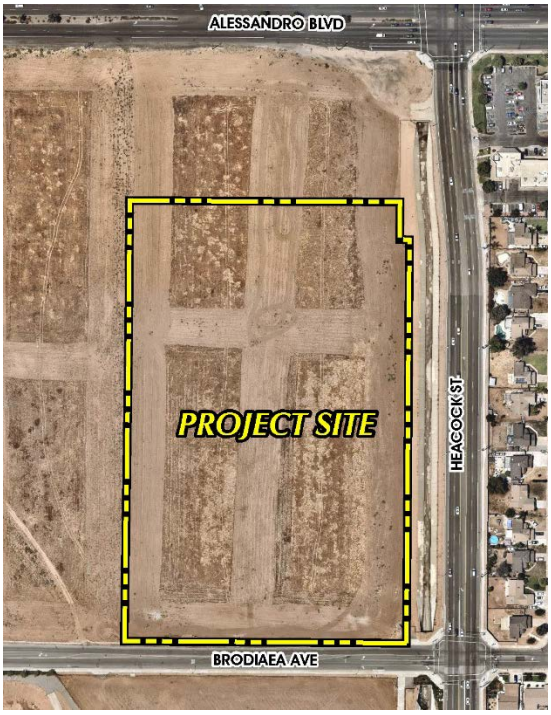
CEQA Initial Study

Brodiaea Commerce Center

Moreno Valley, California



Plot Plan (PEN17-0143)
Change of Zone (PEN17-0144)

Lead Agency
City of Moreno Valley
14177 Frederick Street
Moreno Valley, CA 92552

November 2017

CEQA Initial Study

Brodiaea Commerce Center

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14177 Frederick Street
Moreno Valley, CA 92552

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T&B Planning, Inc.
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Project Applicant
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Newport Beach, CA 92660

Lead Agency Discretionary Permits
Plot Plan (PEN17-0143)
Change of Zone (PEN17-0144)

November 2017

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List of Acronyms, Abbreviations, and Units of Measure

Acronym	Definition
AB 32	California Assembly Bill 32, Global Warming Solutions Act of 2006
AB 52	Assembly Bill 52
AB 939	Assembly Bill 939
amsl	Above Mean Sea Level
APN	Assessor's Parcel Number
ASTM	American Society for Testing and Materials
AQMP	Air Quality Management Plan
BMP	Best Management Practice
BP	Business Park
BPX	Business Park-Mixed Use
CalEEMod™	California Emissions Estimator Model
CALGreen	California Green Building Standards Code
Caltrans	California Department of Transportation
CCR	California Code of Regulations
CDC	California Department of Conservation
CEQA	California Environmental Quality Act
CIWMP	Countywide Integrated Waste Management Plan
CMP	Congestion Management Program
CZ	Change of Zone
DIF	Development Impact Fee
DPM	Diesel Particulate Matter
DTSC	Department of Toxic Substances Control
e.g.	"exempli gratia" which means "for example"
EIR	Environmental Impact Report
EMWD	Eastern Municipal Water District
EPA	Environmental Protection Agency
ESA	Environmental Site Assessment
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
GHG	Greenhouse Gas(es)
Gpd	Gallons per day
HCP	Habitat Conservation Plan

List of Acronyms, Abbreviations, and Units of Measure (Cont'd)

Acronym	Definition
I-215	Interstate 215
i.e.	"id est" which means "that is"
LI	Light Industrial
Mgpd	Million gallons per day
MND	Mitigated Negative Declaration
MSHCP	Multiple Species Habitat Conservation Plan
ND	Negative Declaration
NOP	Notice of Preparation
NPDES	National Pollution Discharge Elimination System
$PM_{2.5}$	Fine Particulate Matter (less than 2.5 micrometers in diameter)
PM_{10}	Particulate Matter (between 2.5 and 10 micrometers in diameter)
RCIT	Riverside County Information Technology
RWQCB	Regional Water Quality Control Board
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
s.f.	Square Foot or Square Feet
SKR	Stephens' Kangaroo Rat
SR-60	State Route 60
UBC	Uniform Building Code
USDA	United States Department of Agriculture
UWMP	Urban Water Management Plan
WQMP	Water Quality Management Plan

1.0 INTRODUCTION

1.1 Purpose and Scope of this CEQA Initial Study

The California Environmental Quality Act (CEQA) is a statewide environmental law contained in Public Resources Code Sections (§) §§ 21000-21177. CEQA applies to most public agency decisions to carry out, authorize, or approve actions that have the potential to adversely affect the environment. CEQA requires that public agencies analyze and acknowledge the environmental consequences of their discretionary actions and consider alternatives and mitigation measures that could avoid or reduce significant adverse impacts to the environment when avoidance or reduction is feasible. The CEQA compliance process also gives other public agencies and the general public an opportunity to comment on a proposed project's environmental effects.

This Initial Study evaluates the potential for the proposed Brodiaea Commerce Center project (the "Project") to adversely affect the physical environment. As part of the City of Moreno Valley's discretionary permit review process, the Project is required to undergo an initial environmental review pursuant to CEQA Guidelines § 15063. This Initial Study is a preliminary analysis prepared by the City of Moreno Valley Community Development Department, Planning Division, acting in its capacity as the CEQA Lead Agency, to determine the level of environmental review and scope of analysis that will be required for the Project. This Initial Study presents and substantiates the City of Moreno Valley's determination regarding the type of CEQA compliance document that will be prepared for the Project, which could consist of either an environmental impact report (EIR); mitigated negative declaration (MND); negative declaration (ND); addendum to a previously-prepared EIR; or a tiered analysis that relies on the findings and conclusions of a previously-prepared EIR. If the Initial Study concludes, based on substantial evidence in the City's records, that the Project has the *potential* to result in a significant effect on the environment that cannot be avoided, reduced, or mitigated to below stated thresholds of significance, the City of Moreno Valley is obligated to prepare an EIR.

This Initial Study is an informational document that provides the City of Moreno Valley, other public agencies, interested parties, and the public at-large with an objective assessment of the potential environmental impacts that could result from implementation of the proposed Project.

1.2 Potential Environmental Effects of the Proposed Project

The analysis presented in this Initial Study indicates that the proposed Project has the potential to result in one or more significant direct, indirect, and/or cumulatively considerable environmental effects to the following environmental subjects:

- Aesthetics
- Air Quality
- Biological Resources
- Cultural Resources
- Geology/Soils
- Greenhouse Gas Emissions
- Hazards/Hazardous Materials
- Hydrology/Water Quality
- Land Use/Planning
- Noise
- Transportation/Traffic
- Tribal Cultural Resources
- Utilities/Service Systems
- Mandatory Findings of Significance

Based on the analysis provided in the Environmental Checklist portion of this Initial Study, the proposed Project has the potential to result in significant effects on the environment for which feasible mitigation measures may not be available to reduce all of those effects to below thresholds of significance applied by the City of Moreno Valley. Accordingly, and pursuant to CEQA Guidelines § 15063(b)(1), an **Environmental Impact Report (EIR)** will be prepared for the Project and will focus on potential impacts to the environmental issue areas listed above.

2.0 PROJECT DESCRIPTION AND SETTING

2.1 Project Overview

The Project involves the development of one industrial warehouse on approximately 11.8 acres of land located in the western portion of the City of Moreno Valley, California. The discretionary approval requested from the City of Moreno Valley includes a Plot Plan (PEN17-043) and Change of Zone (PEN17-0144). Additional details regarding the Project site's location and environmental setting, and the proposed Project's physical and operational characteristics are included in Subsections 2.3 through 2.7, on the following pages.

2.2 Prior CEQA Review

The Project site is located within the geographical limits of the City of Moreno Valley General Plan. The General Plan EIR was approved by the City of Moreno Valley in 2006 and provides the fundamental basis for the City's land use and development policies. The City's General Plan designates the Project site for future development with Business Park/Light Industrial land uses (City of Moreno Valley, 2014). Implementation of the City's General Plan was the subject of previous environmental review under CEQA as part of a Program EIR (State Clearinghouse Number 200091075) certified by the City of Moreno Valley. The Program EIR contains information relevant to the Project site. Thus, the Program EIR for the City's General Plan is herein incorporated by reference pursuant to CEQA Guidelines § 15150 and is available for public review at the City of Moreno Valley Community Development Department, Planning Division.

2.3 Project Location

The Project site is located in the central portion of the City of Moreno Valley, Riverside County, California. The City of Moreno Valley is located north of the City of Perris, northwest of the City of Hemet, west of the City of Beaumont, east/southeast of the City of Riverside, and east of the unincorporated communities of Mead Valley and Woodcrest. As shown on Figure 2-1, *Regional Map,* the Project site is approximately 2.2 miles northeast of Interstate 215 (I-215), and approximately 1.7 miles south of State Route 60 (SR-60).

At the local scale, the Project site is located north of Brodiaea Avenue, west of Heacock Street, and approximately 325 feet south of Alessandro Boulevard (see Figure 2-2, *Vicinity Map*). The Project site includes Assessor Parcel Number (APN) 297-170-038 and a portion of APN 297-170-036.

2.4 Existing Condition of the Property

As shown on Figure 2-3, *USGS Topographic Map*, the Project site is relatively flat with elevations ranging from approximately 1,560 feet above mean sea level (amsl) in the northern portion of the site to approximately 1,550 feet amsl in the southern portion of the Project site. As shown on Figure 2-4, *Aerial Photograph*, the entire property contains vacant undeveloped land that is routinely disturbed (i.e., disced) and does not contain any structures.

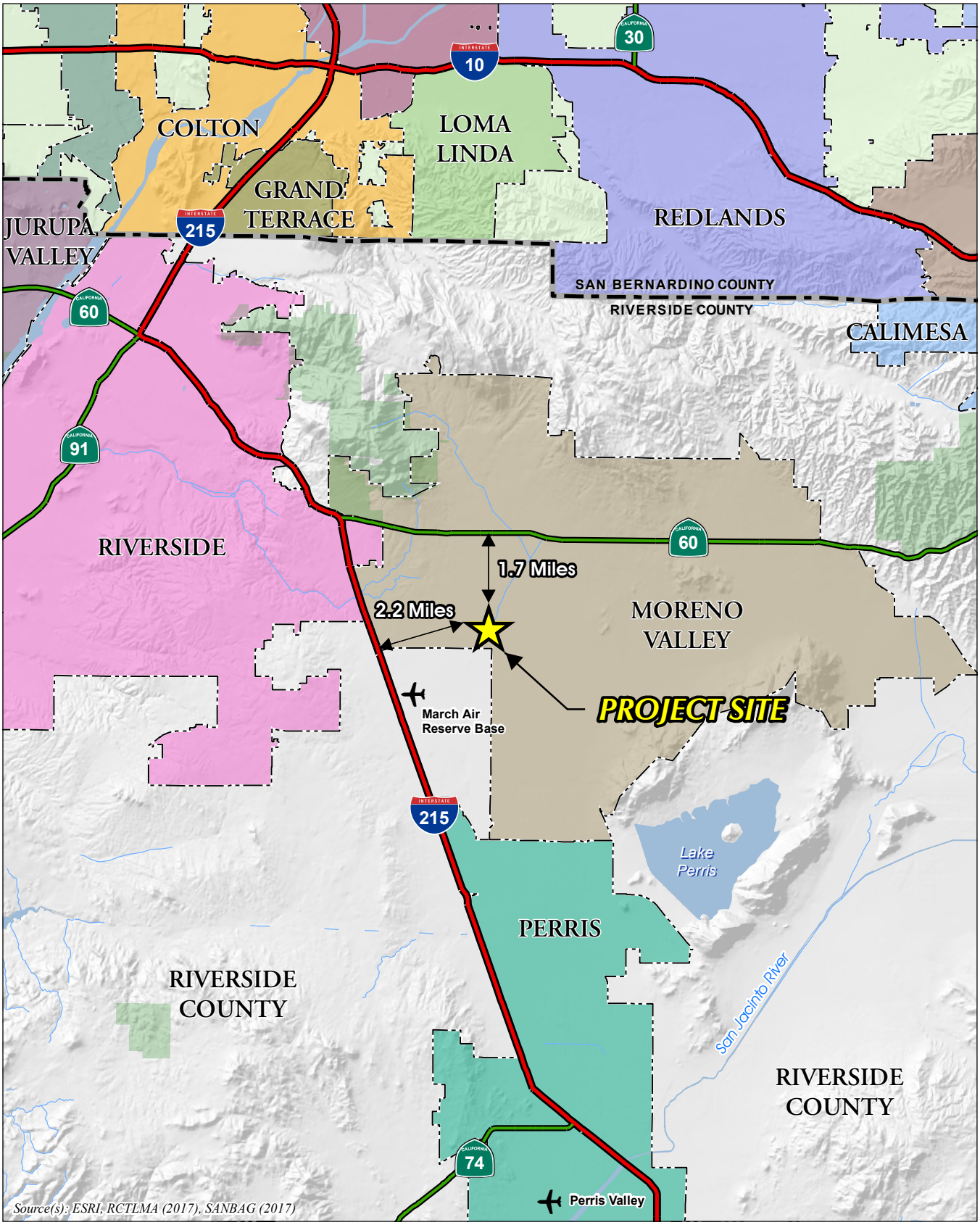


Figure 2-1

REGIONAL MAP

0 225 450 900 Feet

Figure 2-2

VICINITY MAP

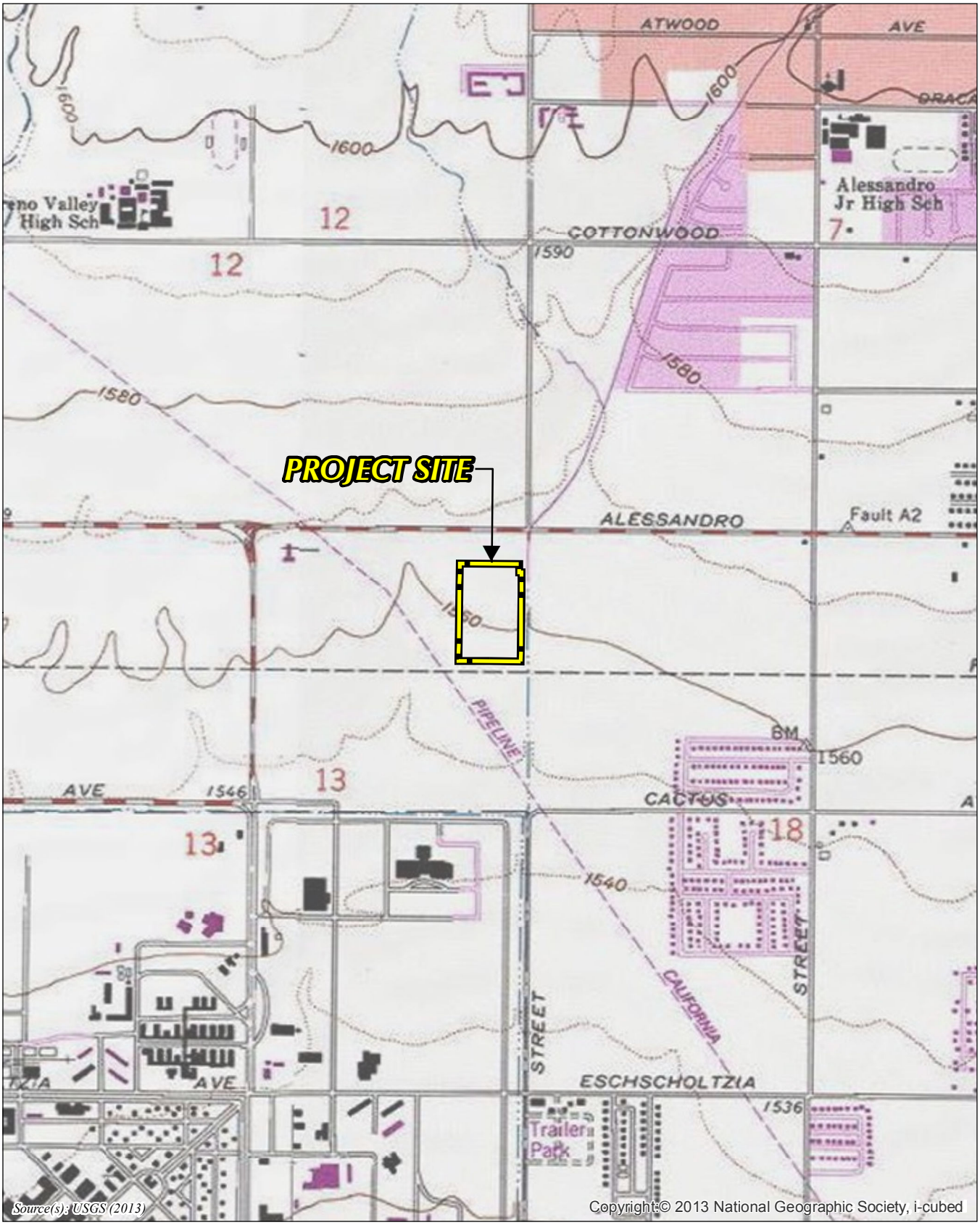


Figure 2-3

0 325 650 1,300 Feet

USGS TOPOGRAPHIC MAP

Figure 2-4

0 75 150 300 Feet

AERIAL PHOTOGRAPH

2.5 Environmental Setting and Surrounding Land Uses

The Project site is located in a mostly-developed portion of the City of Moreno Valley; the Project site is located at the interface between employment uses to the west and south (business park, distribution warehousing, e-commerce, and light industrial) and residential and commercial uses to the north and east. Land uses surrounding the Project site include the following:

North: An undeveloped, approximately four-acre property is located between the Project site and Alessandro Boulevard. Property located north of Alessandro Boulevard is occupied by neighborhood shopping centers, beyond which are residential land uses.

South: Property located south of the Project site (south of Brodiaea Avenue) includes vacant land and warehouses.

West: Property located west of the Project site is vacant and undeveloped, beyond which are two (2) warehouses, a motel, and small-scale commercial land uses.

East: Immediately east of the Project site and west of Heacock Street is a concrete-lined storm drain channel (Heacock Channel). Property located east of the Project site (east of Heacock Street) is developed with residential land uses and a neighborhood shopping center.

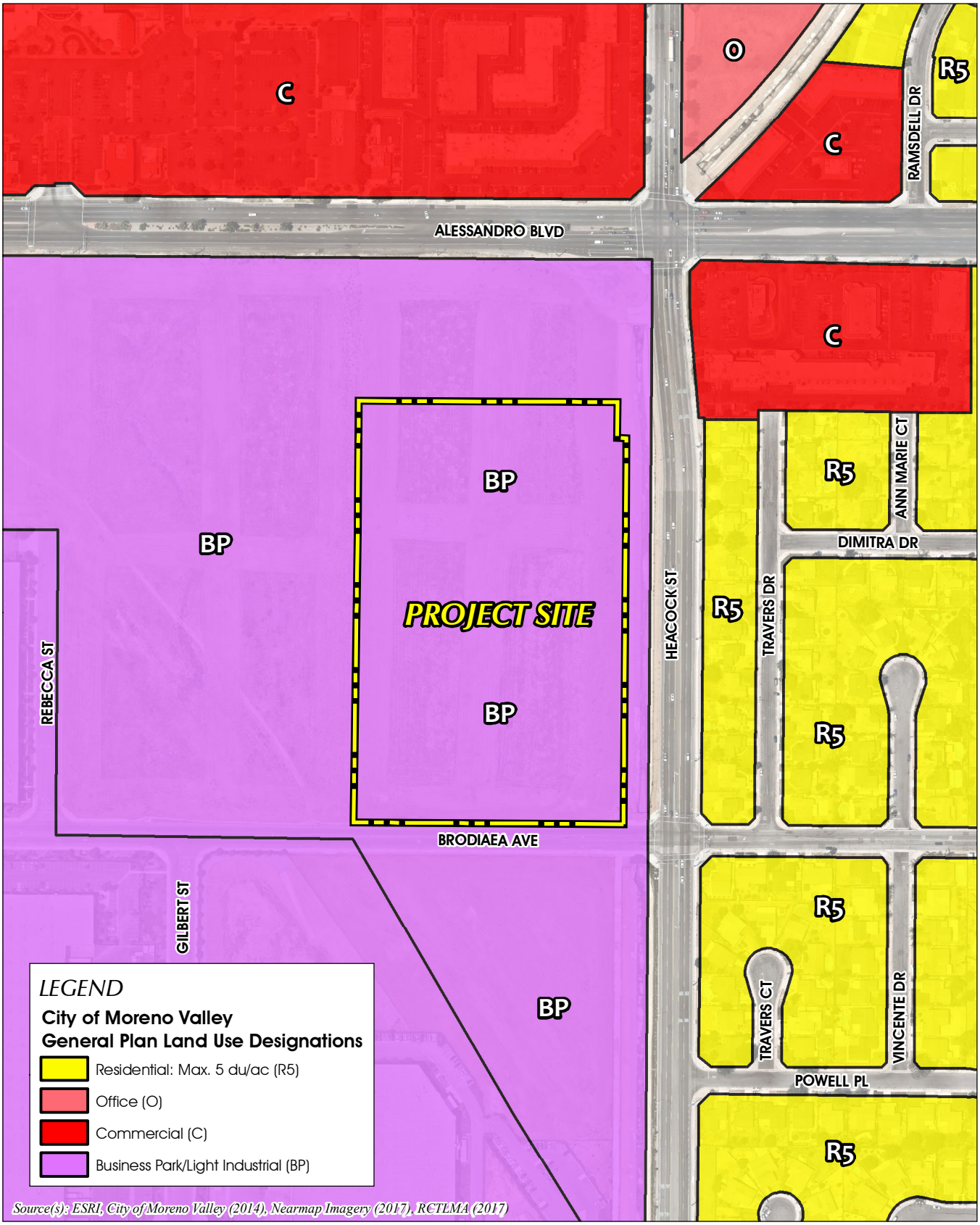
2.6 Existing General Plan Land Use Designations

The City of Moreno Valley General Plan is the prevailing long-range planning document that pertains to the Project site. The General Plan designates the entire Project site as "Business Park/Light Industrial" land use (refer to Figure 2-5, *Existing General Plan Land Use Designation*). According to the City's General Plan Policy 2.5.1, the "Business Park/Light Industrial" land use designation is intended "to provide manufacturing, research and development, warehousing and distribution, as well as office and commercial activities" (City of Moreno Valley, 2016, p. 9-7).

2.7 Existing Zoning Designations

The City of Moreno Valley Zoning Map applies a "Business Park-Mixed Use" (BPX) designation with the "Mixed-Use Neighborhood" (MUN) overlay to the northern, approximately 3.7 acres of the Project site (refer to Figure 2-6, *Existing Zoning Designations*). According to the City of Moreno Valley Municipal Code, the primary purpose of the BPX district is to provide locations for limited convenience commercial and business support services within close proximity to industrial and business park uses. The MUN overlay district provides an area for low-rise, mixed-use development that serves the needs of residents, visitors, and employees from the surrounding immediate neighborhood. (City of Moreno Valley, 2017)

The southern, approximately 8.1 acres of the Project site is designated by the City's Zoning Map as a "Business Park" (BP) zone (refer to Figure 2-6). According to the City's Zoning Ordinance, the purpose of the BP district is to provide for light industrial, research and development, office-based firms and limited supportive commercial in an attractive and pleasant working environment and a prestigious location (City of Moreno Valley, 2017).



0 75 150 300 Feet

Figure 2-5

EXISTING GENERAL PLAN LAND USE DESIGNATIONS

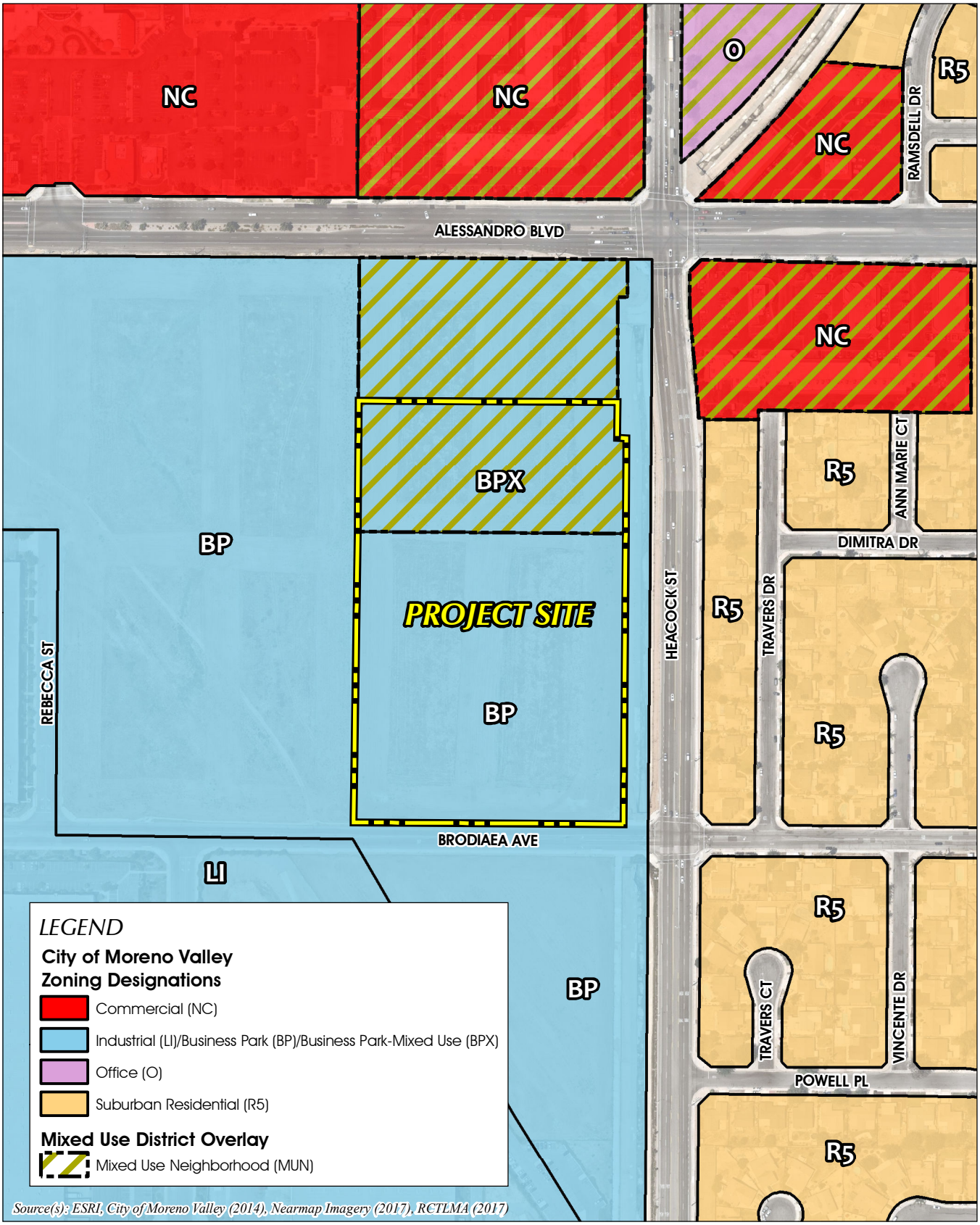


Figure 2-6

EXISTING ZONING DESIGNATIONS

2.8 Description of the Proposed Project

2.8.1 Proposed Entitlement Applications

The Project involves a proposed Plot Plan (PEN17-0143) and Change of Zone (PEN17-0144). The following sub-section summarizes the discretionary application that is under consideration by the City of Moreno Valley.

A. Plot Plan (PEN17-0143)

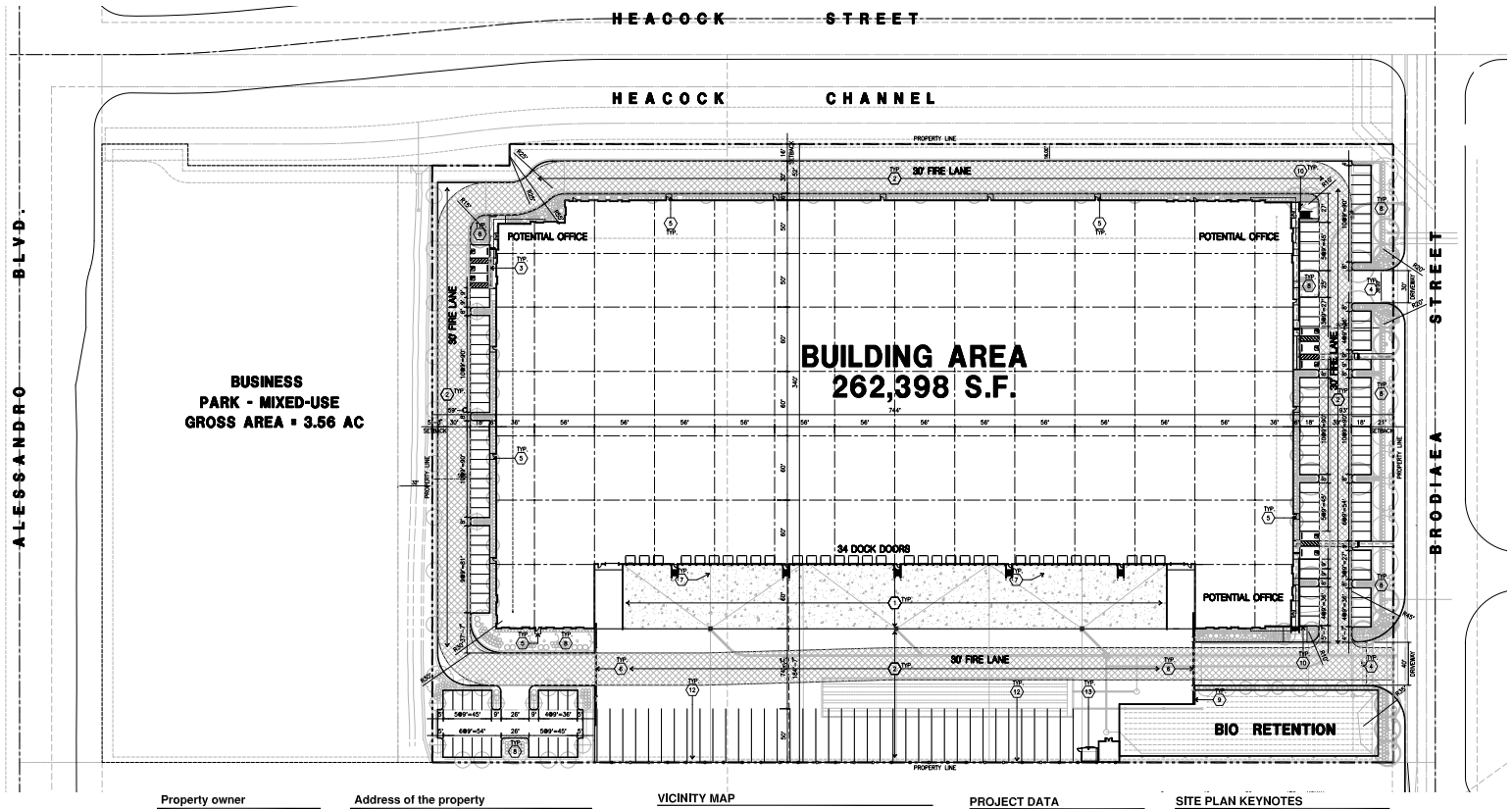
As shown on Figure 2-7, *Plot Plan (PEN17-0143)*, the Project Applicant proposes to construct a 262,398-square foot (s.f.) warehouse facility on the subject property. The proposed facility would contain 252,398 s.f. of warehouse space and 10,000 s.f. of office space. The office space would be located in the northeastern and southeastern corners of the building. Automobile parking would be provided on the north and south sides of the building; loading docks and truck parking areas are located on the west side of the building. Vehicular access to the Project site would be provided by two driveways at Brodiaea Street; the eastern driveway would be restricted to automobiles while the western driveway would be accessible to all vehicles. The Project also includes site improvements, such as storm water detention basin, ornamental landscaping, and utility infrastructure, as well as a bike path along the eastern boundary of the Project site.

B. Change of Zone (PEN17-0144)

The proposed Change of Zone (PEN17-0144) would amend the City of Moreno Valley Zoning Map to change the zoning designation for the Project site from "Business Park-Mixed Use with an overlay of Mixed Use Neighborhood" and "Business Park" to "Light Industrial," as shown on Figure 2-8, *Change of Zone (PEN17-0144)*. The "Light Industrial" zoning designation is intended "to provide for light manufacturing, light industrial, research and development, warehousing and distribution and multitenant industrial uses, as well as certain supporting administrative and professional offices and commercial uses on a limited basis" (City of Moreno Valley, 2017).

C. Other Discretionary Actions

This Initial Study addresses the potential environmental effects of the proposed Project, including all of the discretionary actions and approvals required to implement the Project, as well as subsequent construction and operational activities. The Project would require a discretionary approval from the City of Moreno Valley to adjust the lot lines for APNs 297-170-036 and 297-170-038 so that APN 297-170-038 would encompass the entirety of the 11.8-acre Project site and APN 297-170-036 would encompass the approximately four (4)-acre property located between the Project site's northern boundary and Alessandro Boulevard. Additionally, permits and approvals may be required from other public entities, including, but not limited to, permits that may be required from the Santa Ana Regional Water Quality Control Board (RWQCB) to connect a drainage outlet to the existing concrete-lined drainage channel (Heacock Channel) that abuts the Project site on the east.



Property owner

ALERE PROPERTY GROUP
100 BAYVIEW CIRCLE SUITE 310
NEWPORT BEACH, CA 92660
TEL: 949-509-5000
FAX: 949-509-5001
CONTACT: CLARK NEUHOFF

Applicant

ALERE PROPERTY GROUP
100 BAYVIEW CIRCLE SUITE 310
NEWPORT BEACH, CA 92660
TEL: 949-509-5000
FAX: 949-509-5001
CONTACT: CLARK NEUHOFF

Applicant's respresentative

HPA, INC.
18831 BARDEEN AVE SUITE 100
IRVINE CA 92612
TEL: 949-862-2125
CONTACT: JOCELYN WAN

Address of the property

SWC ALESSANDRO BOULEVARD AND HEACOCK STREET
MORENO VALLEY, CALIFORNIA

Assossor's Parcel Number

297-170-036-7 (AFFECTS LOT 1) AND 297-170-036-9 (AFFECTS LOT 8)

Legal descriptlon

THE LAND REFERRED TO HEREON IS SITUATED IN THE CITY OF MORENO VALLEY, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AND IS DESCRIBED AS FOLLOWS:

LOTS 1 AND 8, BLOCK 241, OF BEAR VALLEY AND ALESSANDRO DEVELOPMENT CO., IN THE CITY OF MORENO VALLEY, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AS PER MAP RECORDED IN BOOK 11, PAGE 10 OF MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF RIVERSIDE COUNTY.

EXCEPTING THEREFROM ALL THAT PORTION THEREOF AS GRANTED TO THE COUNTY OF RIVERSIDE, BY DEED RECORDED MAY 2, 1972 AS INSTRUMENT NOS. 56639 AND 56640 OF OFFICIAL RECORDS.

ALSO EXCEPTING THEREFROM THOSE PORTIONS THEREOF AS CONVEYED TO RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT, BY DEED RECORDED JANUARY 3, 1995 AS INSTRUMENT NO. 1006, OFFICIAL RECORDS.

Zoning

GENERAL PLAN DESIGNATION: BP-BUSINESS PARK/LIGHT INDUSTRIAL
ZONE DESIGNATION: BP-INDUSTRIAL/BUSINESS PARK (APN 297-170-036)
BPX-INDUSTRIAL/BUSINESS PARK (MIXED USE DISTRICT: MUN) (APN 297-170-036)

VICINITY MAP

PROJECT DATA

SITE AREA:	
site in s.f.	515,397 s.f.
site in acres	11.83 ac
BUILDING AREA	
Office	10,000 s.f.
Warehouse	252,398 s.f.
TOTAL	262,398 s.f.
COVERAGE (based on Gross area)	50.9%
AUTO PARKING REQUIRED	
Office: 1/225 s.f.	44 stalls
Whse: 1st 20,000 @ 1/1,000 s.f.	20 stalls
2nd 20,000 @ 1/2,000 s.f.	10 stalls
above 40,000 @ 1/4,000 s.f.	54 stalls
TOTAL	128 stalls
AUTO PARKING PROVIDED	
Standard (9' x 18')	120 stalls
Handicap (9'x18')	8 stalls
Total parking provided	128 stalls
TRAILER PARKING REQUIRED	
Trailer: 1 per dock door	34 doors
TRAILER PARKING PROVIDED	
Trailer (12' x 50')	37 stalls
ZONING ORDINANCE FOR CITY	
Zoning Designation - Business park (BP), (BPX)	
MAXIMUM BUILDING HEIGHT ALLOWED	
Height - no height requirement	
LANDSCAPE PROVIDED	63,144 s.f.
	12%
SETBACKS	
Front - 20'	
Side/Rear - 3'	
Street - 20'	

SITE PLAN KEYNOTES

1. HEAVY BROOM FINISH CONC. PAVEMENT.
2. ASPHALT CONCRETE (AC) PAVING
3. CONCRETE WALKWAY
4. DRIVEWAY APRONS TO BE CONSTRUCTED PER "L" DRAWINGS.
5. 5'-6"X5'-6"X4" MIN. THICK CONCRETE EXTERIOR LANDING PAD TYP. AT ALL EXTERIOR MAN DOORS TO LANDSCAPED AREAS. FINISH TO BE MEDIUM BROOM FINISH. SLOPE TO BE 1/4" - 1/2" MAX. PROVIDE WALK TO PUBLIC WAY OR DRIVE WAY W/ 1:20 MAX. AS REQ. BY CITY INSPECTOR.
6. 8' H PROVIDE METAL, MANUAL OPERATED GATES W/ KNOX-PAD LOCK PER FIRE DEPARTMENT STANDARDS PER DRIVEWAY.
7. EXTERIOR CONC. STAIR.
8. LANDSCAPE. SEE "L" DWGS.
9. CONCRETE TILT-UP SCREEN WALL
10. BIKE RACK.
11. APPROXIMATE LOCATION OF TRANSFORMER.
12. CHAIN LINK FENCE.
13. TRASH ENCLOSURE PER CITY STANDARD.

SITE LEGEND

- LANDSCAPED AREA
- CONCRETE PAVING SEE "C" DWGS. FOR THICKNESS
- STANDARD PARKING STALL (9' X 18')
- HANDICAP PARKING STALL (9' X 18')
- PROPERTY LINE
- PATH OF TRAVEL

Source(s): HPA (09-27-2017)

Figure 2-7

NOT TO SCALE

PLOT PLAN (PEN17-0143)

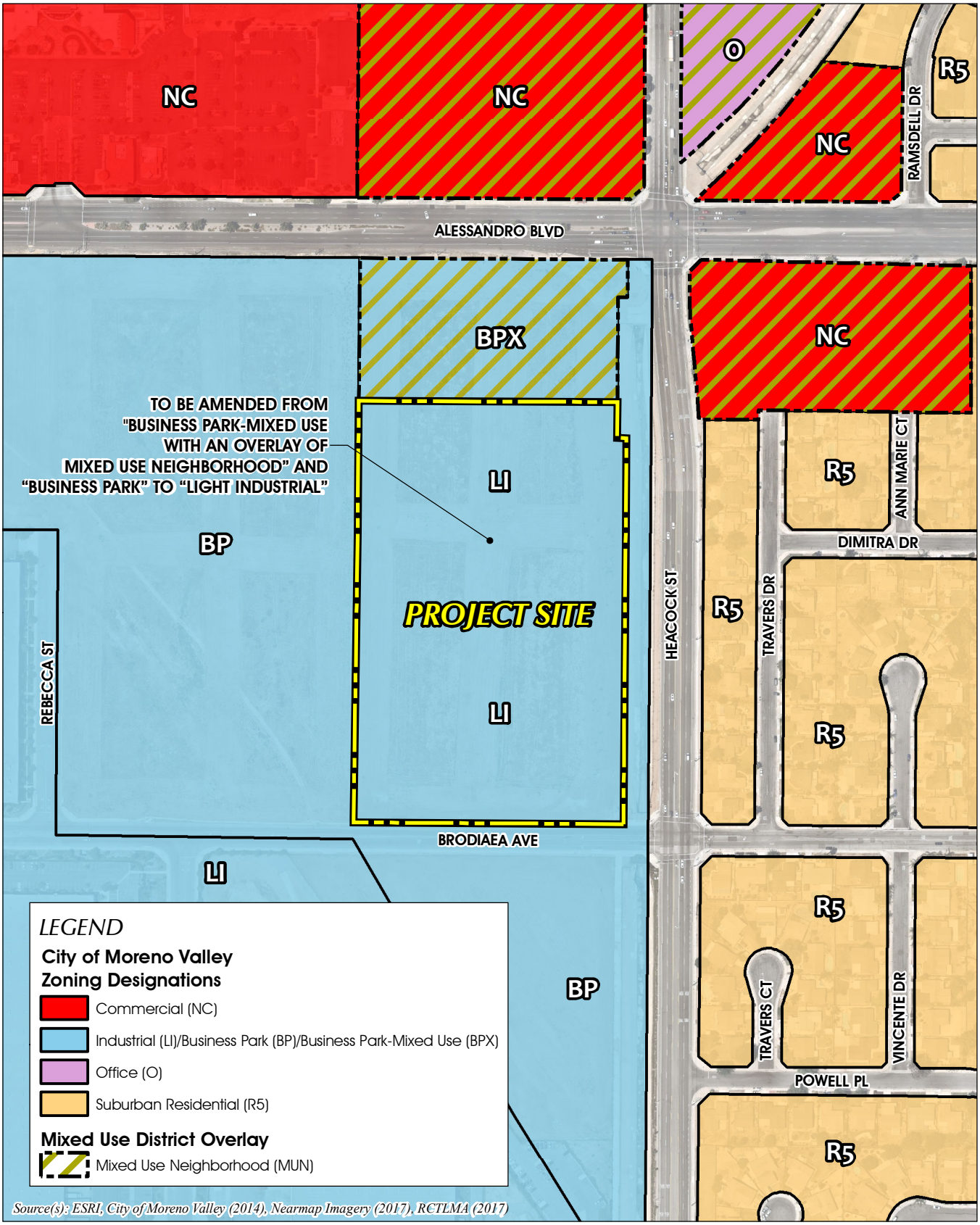


Figure 2-8

0 75 150 300 Feet

CHANGE OF ZONE (PEN17-0144)

3.0 ENVIRONMENTAL CHECKLIST AND ANALYSIS

Provided on the following pages is an Environmental Checklist, based on Appendix G of the State CEQA Guidelines. The Checklist evaluates the Project's potential to result in significant adverse effects to the physical environment. As concluded by the Checklist, the proposed Project has the potential to result in significant environmental effects for which feasible mitigation may not be available to reduce those effects below levels of significance. Accordingly, and pursuant to CEQA Guidelines § 15063(b)(1), an **Environmental Impact Report (EIR)** will be prepared for the Project.

INITIAL STUDY/
ENVIRONMENTAL CHECKLIST FORM
CITY OF MORENO VALLEY

1. **Project Title:** Brodiaea Commerce Center

2. **Lead Agency Name and Address:** City of Moreno Valley Community Development Department, Planning Division, 14177 Frederick Street, Moreno Valley, CA 92552

3. **Contact Person and Phone Number:** Julia Descoteaux, Associate Planner (951) 413-3209

4. **Project Location:** Southwest of Alessandro Boulevard and Heacock Street. Assessor Parcel Numbers (APNs): 297-170-036 and -038

5. **Project Sponsor's Name and Address:** Alere Property Group, LLC, 100 Bayview Circle, Suite 310, Newport Beach, CA 92660

6. **General Plan Designation:** Business Park/Light Industrial (BP)

7. **Zoning:** Business Park-Mixed Use with an overlay of Mixed Use Neighborhood (BPX), and Business Park (BP)

8. **Description of the Project:** The Project involves the construction and operation of a 262,398 s.f. warehouse building on an approximately 11.8-acre Project site located in the west-central portion of the City of Moreno Valley, Riverside County, California. Discretionary approvals requested from the City of Moreno Valley include a Change of Zone (PEN17-0144) and a Plot Plan (PEN17-0143).

9. **Surrounding Land Uses and Setting:** An undeveloped, approximately four-acre property is located between the Project site and Alessandro Boulevard. Property located to the north of the Project site (north of Alessandro Blvd) is occupied by commercial land uses, beyond which are residential land uses. To the south of the Project site (south of Brodiaea Avenue) includes vacant land and warehouses. Immediately east of the Project site and west of Heacock Street is a concrete-lined storm drain channel (Heacock Channel). Property located east of the Project site (east of Heacock Street) is developed with residential land uses and a neighborhood shopping center. Property located west of the Project site is vacant and undeveloped, beyond which are two (2) warehouses, a motel, and small-scale commercial land uses.

10. **Other public agencies whose approval is required:** The Project may require discretionary and/or administrative approvals from the Santa Ana Regional Water Quality Control Board and Riverside County Flood Control and Water Conservation District. Approvals from public agencies, if required, will be described in the required Environmental Impact Report.

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

The environmental factors checked below (☒) would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

☒	Aesthetics	☒	Hazards & Hazardous Materials	☐	Recreation
☐	Agricultural Resources and Forestry Resources	☒	Hydrology/Water Quality	☒	Transportation/Traffic
☒	Air Quality	☒	Land Use/Planning	☒	Tribal Cultural Resource
☒	Biological Resources	☐	Mineral Resources	☒	Utilities/Service Systems
☒	Cultural Resources	☒	Noise	☒	Mandatory Findings of Significance
☒	Geology/Soils	☐	Population/Housing		
☒	Greenhouse Gas Emissions	☐	Public Services		

Public Resources Code (PRC) § 21100(b)(3) and CEQA Guidelines § 15126.4 require EIRs to describe, where relevant, the wasteful, inefficient, and unnecessary consumption of energy caused by a project. Therefore, the State Resources Agency created Appendix F to the CEQA Guidelines. Appendix F is an advisory document that assists EIR preparers in determining whether a project will result in the inefficient, wasteful, and unnecessary consumption of energy. Thus, the EIR also will address the topic of energy conservation.

DETERMINATION: (To be completed by the Lead Agency)

On the basis of this initial evaluation:

I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.	☐
I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.	☐
I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.	☒
I find that the proposed project MAY have a "potential significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect (1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and (2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.	☐
I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.	☐

Signature

11/3/14
Date

Julia Descoteaux
Printed Name

EVALUATION OF ENVIRONMENTAL IMPACTS

1) A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g. the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g. the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).

2) All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.

3) Once the lead agency has determined that a particular physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.

4) "Negative Declaration: Potentially Significant Unless Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Significant Impact." The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level (mitigation measures from "Earlier Analysis," as described in (5) below, may be cross-referenced).

5) Earlier analysis may be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration. Section 15063 (c) (3) (d). In this case, a brief discussion should identify the following:

   (a) Earlier Analysis Used. Identify and state where they are available for review.

   (b) Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.

   (c) Mitigation Measures. For effects that are "Less than Significant with Mitigation Measures Incorporated," describe the mitigation measures which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.

6) Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g. general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.

7) Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.

8) This is only a suggested form, and lead agencies are free to use different formats; however, lead agencies should normally address the questions from this checklist that are relevant to a project's environmental effects in whatever format is selected.

9) The analysis of each issue should identify: (a) the significance criteria or threshold used to evaluate each question; and (b) the mitigation measure identified, if any, to reduce the impact to less than significance.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
I. AESTHETICS Would the project:				
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☒	☐
(Source: City of Moreno Valley, 2006) The Project site is located in the City of Moreno Valley, which lies on relatively flat and gently sloping topography. According to General Plan Figure 5.11-1, *Major Scenic Resources*, the Project site is not located within a view corridor for the Box Springs Mountains, Reche Canyon, the Badlands, or Mount Russell. (City of Moreno Valley, 2006, Figure 5.11-1) Due to intervening development and their distance and orientation in relation to the Project site, prominent, distinct views of the Box Springs Mountains, Reche Canyon area, Mount Russell, or the Badlands are not available from public viewing areas abutting the Project site under existing conditions. Accordingly, implementation of the proposed Project would not have a substantial adverse effect on a scenic vista, and less-than-significant impacts would occur.				
b) Substantially damage scenic resources, including, but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☒
(Source: Caltrans, 2017; Google Earth Pro, 2017) The Project site is not located within or adjacent to a scenic highway corridor and does not contain scenic resources, such as trees of scenic value, rock outcroppings, or historic buildings. There are no State-designated or eligible scenic highways within the vicinity of the Project site. (CalTrans, 2017) The nearest State-eligible scenic highway from the Project site is a segment of Interstate 215 located approximately 9.1 miles southeast of the Project site (CalTrans, 2017; Google Earth Pro, 2017). The Project site also is located approximately 1.5 miles south of State Route 60, which the City of Moreno Valley General Plan Figure 7-2 identifies as a "Scenic Route." (City of Moreno Valley, 2006, p. 5.11-1; Google Earth Pro, 2017) The Project's proposed physical features – one warehouse building with parking lots, truck yards, landscaping, etc. – would not be visible from either highway due to intervening development and distance. Accordingly, the Project site is not located within a state scenic highway corridor and implementation of the proposed Project would not have a substantial effect on scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway corridor. Thus, no impact would occur and no further analysis is required on this subject.				
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☒	☐	☐	☐
(Source: Project Application Materials, 2017) Implementation of the proposed Project would result in the visual conversion of the site from vacant land to a warehouse building with office space, parking spaces, drive aisles, utility infrastructure, landscaping, exterior lighting, and signage. The Project would be compatible with the size, scale, height, and aesthetic qualities of other industrial warehouse buildings planned and constructed in the vicinity of the Project site and would be required to comply with the applicable development standards and design guidelines contained in the Moreno Valley Zoning Ordinance. Regardless, a detailed evaluation of the proposed Project's potential to degrade the existing visual character or quality of the property or its surroundings is warranted and will be provided in the required EIR.				

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☒	☐	☐	☐

(Source: City of Moreno Valley, 2017)

City of Moreno Valley Municipal Code Section 9.16.280 includes design standards for outdoor lighting that apply to all development in the City (City of Moreno Valley, 2017). The Municipal Code lighting standards govern the placement and design of outdoor lighting fixtures to ensure adequate lighting for public safety while also minimizing light pollution and glare and precluding public nuisances (e.g., blinking/flashing lights, unusually high intensity or needlessly bright lighting). Although the proposed Project would be required to adhere to the applicable requirements of the City of Moreno Valley Municipal Code, the required EIR will nonetheless evaluate the Project's potential to produce substantial amounts of light or glare from artificial lighting sources that could adversely affect the day or nighttime views in the area.

II. AGRICULTURE AND FORESTRY RESOURCES

In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. Would the project:

a) Convert Prime Farmland, Unique Farmland or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency to non-agricultural use?	☐	☐	☐	☒

(Source: CDC, 2016a)

According to mapping information available from the California Department of Conservation's (CDC) Important Farmland Time Series Map, the Project contains "Urban and Built-Up Land" (CDC, 2016a). Accordingly, the Project site does not contain any lands mapped by the State Department of Conservation as Farmland, Unique Farmland, or Farmland of Statewide Importance. As such, the Project would not convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. No impact would occur and no further analysis is required on this subject.

b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒

(Source: City of Moreno Valley, 2006; CDC, 2016b)

The Project site is zoned for "Business Park Mixed Use with an overlay of Mixed Use Neighborhood" and "Business Park" land uses. There are no properties zoned for agricultural land uses in the Project vicinity. Therefore, implementation of the Project has no potential to conflict with existing zoning for agricultural use.

As disclosed in the City of Moreno Valley General Plan FEIR (and supported mapping information from the California Department of Conservation), no land within the City is under a Williamson Act Contract (CDC, 2016b). As such, no impact would occur.

c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as	☐	☐	☐	☒

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?				
(Source: City of Moreno Valley, 2006) The Project site is not zoned as forest land, timberland, or Timberland Production, nor is it surrounded by forest land, timberland, or Timberland Production land. There are no lands located within the City of Moreno Valley that are zoned for forest land, timberland, or timberland zoned Timberland Production. (City of Moreno Valley, 2006, Figure 5.8-1) Therefore, the Project has no potential to conflict with any areas currently zoned as forest, timberland, or Timberland Production and would not result in the rezoning of any such lands. As such, no impact would occur.				
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
(Source: City of Moreno Valley, 2006) The Project site does not contain a forest and is not designated as forest land; thus, the proposed Project would not result in the loss of forest land or the conversion of forest land to non-forest use (City of Moreno Valley, 2006, Figure 5.8-1). As such, no impact would occur.				
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	☒
(Source: CDC, 2016a) As previously discussed under Threshold II (a), the Project site is classified as "Urban and Built-Up Land" by the California Department of Conservation and does not meet the definition of Farmland (i.e., "Prime Farmland," "Unique Farmland," or "Farmland of Statewide Importance"). The Project site is undeveloped and contains no active agricultural uses under existing conditions. Accordingly, implementation of the Project would not convert areas on the subject property classified as Farmland to non-agricultural use. No impact would occur.				

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
III. AIR QUALITY Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☒	☐	☐	☐
(Source: SCAQMD, 2017) The Project site is located in the South Coast Air Basin. Air quality within the South Coast Air Basin is regulated by the South Coast Air Quality Management District (SCAQMD). Standards for air quality are documented in the SCAQMD's Air Quality Management Plan (AQMP). The proposed Project would emit pollutants into the Air Basin during short-term construction and long-term operational activities, as vehicles travel to and from the proposed industrial land uses. The pollutant levels emitted by the Project's construction and operational activities have the potential to exceed the daily significance thresholds established by the SCAQMD, thereby potentially conflicting with or obstructing implementation of the SCAQMD's AQMP. As such, an air quality technical report will be prepared and the required EIR will evaluate the proposed Project's potential to conflict with the adopted SCAQMD's AQMP.				
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation.	☒	☐	☐	☐
(Source: SCAQMD, 2017) Air quality within the South Coast Air Basin is regulated by the SCAQMD and standards for air quality are documented in the SCAQMD AQMP. Implementation of the proposed Project has the potential to violate daily air pollutant emission significance thresholds established by the SCAQMD's AQMP, particularly related to Project construction and mobile source emissions associated with the Project's long-term operation. Accordingly, an air quality technical report will be prepared and Project-related air emissions will be modeled using the SCAQMD's California Emissions Estimator Model (CalEEMod™). The purpose of this model is to calculate estimated construction-source and operational-source air quality emissions for criteria pollutants from direct and indirect sources. The required EIR will quantify the Project's expected pollutant levels and evaluate the proposed Project's potential to violate local air quality standards and/or contribute substantially to an existing or projected air quality violation.				
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☒	☐	☐	☐
(Source: SCAQMD, 2017) The South Coast Air Basin is a non-attainment area for various State and federal air quality standards, including State and federal ozone standards (1-hour and 8-hour) and particulate matter standards (PM_{10} and $PM_{2.5}$). Development of the Project site as proposed by the Project could cumulatively contribute to a net increase of criteria pollutants in the region. Therefore, the required EIR will address the Project's potential to result in a cumulatively considerable increase of pollutants for which the South Coast Air Basin is in non-attainment.				

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
d) Expose sensitive receptors to substantial pollutant concentrations?	☒	☐	☐	☐
(Source: SCAQMD, 2017; Google Earth Pro, 2017) The Project does not include any land uses that may be considered point source emitters. However, the Project has the potential to expose sensitive receptors located near the Project site and/or along its primary truck route(s) to diesel particulate matter (DPM) emissions from mobile sources (i.e., truck exhaust). Sensitive receptors in the Project area are limited to residential uses, including existing residential communities occurring east of the Project site. Due to the presence of sensitive receptors in the Project vicinity and the volume of truck traffic associated with the Project, there is the potential for the Project to expose nearby sensitive receptors to substantial pollutant concentrations associated with DPM. The EIR will evaluate the Project's potential to expose sensitive receptors to substantial pollutant concentrations.				
e) Create objectionable odors affecting a substantial number of people?	☒	☐	☐	☐
(Source: Project Application Materials, 2017) Any temporary odor impacts generated during Project-related construction activities, such as asphalt paving and the application of architectural coatings, would be short-term and cease upon completion of the construction phase of the Project. The industrial uses proposed for the Project site are not expected to involve uses or activities that generate substantial or noticeable amounts of odor during long-term operation. Nonetheless, the required EIR will evaluate the Project's potential to expose substantial numbers of people to objectionable odors during both near-term construction and long-term operation.				
IV. BIOLOGICAL RESOURCES Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U. S. Fish and Wildlife Service?	☒	☐	☐	☐
(Source: USDA, n.d.; Google Earth Pro, 2017) The Project site is vacant and undeveloped under existing conditions. However, the Project site has the potential to contain species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U. S. Fish and Wildlife Service. A qualified biologist will evaluate the site's existing biological resources and determine the presence or absence of any sensitive species. Sensitive animal species are expected to be limited. The results of the biological resources assessment(s) will be disclosed and evaluated in the required EIR.				
b) Have a substantially adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☒	☐	☐	☐

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
(Source: City of Moreno Valley, 2006; Google Earth Pro, 2017) Under existing conditions, the entire Project site is classified as "Field Cropland." Although field cropland does not contain any substantial native vegetation, these lands provide foraging grounds for raptorial bird and habitat for small mammal species. (City of Moreno Valley, 2006, p. 5.9-15, Figure 5.9-2) A qualified biologist will evaluate the Project's impact area to determine if the property contains riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service. The results of the biological resources assessment will be disclosed and evaluated in the required EIR.				
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☒	☐	☐	☐
(Source: Google Earth Pro, 2017) A qualified biologist will evaluate the Project's potential to impact federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.). The results of the biological resources assessment will be disclosed and evaluated in the required EIR.				
d) Interfere substantially with the movement of any resident or migratory fish or wildlife species or with established native resident migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☒	☐	☐	☐
(Source: City of Moreno Valley, 2006; RCA, 2003; Google Earth Pro, 2017) The Project site is disturbed and does not support a diversity of native wildlife. Paved roads, fencing, and developed land surrounding the Project site block terrestrial wildlife movement from all directions. Wildlife movement corridors in western Riverside County and the City of Moreno Valley are addressed by the conservation requirements specified in the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP), and the Project site is not identified for conservation as part of the MSHCP. Accordingly, the site is not considered to be a wildlife movement corridor. Notwithstanding, development of the Project site has some minimal potential to impact avian species that are protected by the federal Migratory Bird Treaty Act. The Project's potential to impact migratory birds during construction and long-term operation will be evaluated in the required EIR.				
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☒	☐
(Source: City of Moreno Valley, 2017; RCA, 2003) The City of Moreno Valley Municipal Code contains provisions for the protection of the Stephens' Kangaroo Rat pursuant to the Stephens' Kangaroo Rat HCP (refer to Title 8, Chapter 8.60 of the Municipal Code). The Project site is not located within an identified reserve area for the Stephens' Kangaroo Rat and the species has a low to moderate potential to occur on the Project site. In addition, the species was not observed during biological surveys of the Project site or the off-site improvement area. Accordingly, the Project is exempt from the focused survey requirements for the Stephens' Kangaroo				

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
Rat established by the City's Municipal Code. The Project Applicant is required to contribute a local development impact and mitigation fee, which requires a fee payment to assist the City in implementing the habitat conservation plan for the Stephens' Kangaroo Rat. With mandatory compliance with standard regulatory requirements (i.e., development impact and mitigation fee payment), the proposed Project would not conflict with any City policies or ordinances related to the protection of the Stephens' Kangaroo Rat. The City of Moreno Valley Municipal Code also contains provisions for the collection of mitigation fees to further the implementation of the Western Riverside County MSHCP (refer to Title 3, Chapter 3.48 of the Municipal Code). The Project Applicant is required to contribute a local mitigation fee, which requires a fee payment to assist the City in implementing the Western Riverside County MSHCP reserve system (including the acquisition, management, and long-term maintenance of sensitive habitat areas). With mandatory compliance with standard regulatory requirements (i.e., mitigation fee payment), the proposed Project would not conflict with any City policies or ordinances related to the mitigation fee program associated with Western Riverside County MSHCP. The City of Moreno Valley does not have any additional policies or ordinances in place to protect biological resources that are applicable to the Project.				
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Conservation Community Plan, or other approved local, regional, or state habitat conservation plan?	☒	☐	☐	☐
(Source: City of Moreno Valley, 2017; RCA, 2003; RCA, n.d.) The Project site is subject to the provisions of the Western Riverside County MSHCP. The proposed Project will be required to comply with City of Moreno Valley Municipal Code Title 3, Chapter 3.48, "Western Riverside County Multiple Species Habitat Conservation Plan Fee Program," which requires a per-acre local development mitigation fee to implement the MSHCP. The Project site is not located within one of the targeted conservation cells of the MSHCP. The Project site is, however, subject to the survey and conservation requirements of MSHCP Section 6.3.2 (Species Survey Requirements), which requires the preparation of a habitat assessment for the western burrowing owl. Pursuant to Section 6.3.2 of the MHSCP, a burrowing owl site assessment will be submitted for the Project site, and the findings of the site assessment will be evaluated in the required EIR to determine the Project's consistency with the MSHCP.				
V. CULTURAL RESOURCES Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?	☐	☐	☐	☒
(Source: City of Moreno Valley, 2006; Google Earth Pro, 2017) The Project site is undeveloped and contains no developed features (i.e., structures). As depicted on the City's General Plan FEIR Exhibit 5.10-1, *Locations of Listed Historic Resource Inventory Structures*, the Project site was not identified as containing a historic resource. Accordingly, the Project has no potential to impact a historical resource as defined by CEQA.				

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
b) Cause a substantial adverse change in the significance of an archaeological resources pursuant to Section 15064.5?	☒	☐	☐	☐

(Source: City of Moreno Valley, 2006; Google Earth Pro, 2017)

According to the Moreno Valley General Plan FEIR, the subject property is not a part of any known Native American village complex. Additionally, according to General Plan FEIR Figure 5.10-2, *Locations of Prehistoric Resources*, the Project site is not identified as a location of prehistoric sites. A majority of the prehistoric archaeological resources in the City of Moreno Valley are milling stations where bedrock metates (more or less flat grinding surfaces), commonly referred to as 'slicks,' and bedrock mortars are found. These resources "are generally situated around valley edges where suitable rock outcrops occur" (City of Moreno Valley, 2006, p. 5.10-6). The Project site is not located on a valley edge and does not contain any rock outcrops and, based on the information presented in the General Plan FEIR, does not have a high likelihood for the discovery of archaeological resources. However, a site-specific survey has not been conducted previously to evaluate the potential archaeological sensitivity of the Project site. A site-specific cultural resources assessment will be conducted by a professional archaeologist to determine likelihood for the presence/absence of archaeological resources to be located on or beneath the surface of the Project site. The results of the site-specific cultural resources assessment will be disclosed in the required EIR.

c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☒	☐	☐	☐

(Source: City of Moreno Valley, 2006; Riverside County, 2014; Google Earth Pro, 2017)

The Project site is identified by the City's General Plan FEIR Figure 5-10-3, *Paleontological Resource Sensitive Areas*, as having a "Low Potential" to contain unique paleontological resources but is identified by the County of Riverside General Plan as having a "high" potential to contain paleontological resources (City of Moreno Valley, 2006, Figure 5.10-3; Riverside County, 2014, Figure 4.9.3). During site excavation and/or grading activities that would occur on the property during Project construction activities, there is a potential to uncover fossils that may be buried beneath the surface of the site. The Project's potential to impact previously undiscovered paleontological resources beneath the surface of the site will be evaluated in the required EIR.

d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☐	☒	☐

(Source: Google Earth Pro, 2017)

The Project site does not contain a known cemetery. While not anticipated, in the unlikely event that human remains are discovered during Project grading or other ground disturbing activities, compliance with the applicable provisions of California Health and Safety Code § 7050.5 as well as Public Resources Code § 5097 *et. seq*. Mandatory compliance with these provisions of California state law would ensure that impacts to human remains, if unearthed during construction activities, would be appropriately treated and ensure that potential impacts are less than significant.

VI. GEOLOGY AND SOILS

Would the project:

a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury or death involving:

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
(i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☐	☒

(Source: City of Moreno Valley, 2006; Google Earth Pro, 2017)

There are no Alquist-Priolo Earthquake Fault Zones affecting the Project site. The nearest earthquake fault zone is the San Jacinto Fault, which occurs approximately 6.2 miles northeast of the Project site. (Google Earth Pro, 2017; City of Moreno Valley, 2006, Figure 5.6-2) Because there are no known faults located on the Project site, there is no potential that the proposed Project could expose people or structures to adverse effects related to ground rupture.

(ii) Strong seismic ground shaking?	☒	☐	☐	☐

(Source: City of Moreno Valley, 2006)

The Project site is located in a seismically active area of southern California and is expected to experience moderate to severe ground shaking during the lifetime of the proposed Project. The ground shaking risk is not considered substantially different than that of other similar properties in the southern California area. As a mandatory condition of Project approval, the City of Moreno Valley will require that the proposed structures be constructed in accordance with the California Green Building Standards Code (CALGreen), also known as California Code of Regulations (CCR), Title 24 and the City Building Code. CALGreen and City Building Code are designed to preclude significant adverse effects associated with strong seismic ground shaking. The future buildings and workers on the Project site have the potential to be exposed to strong seismic ground shaking associated with seismic events. The Project's potential to be subject to strong seismic ground shaking will be evaluated in the required EIR.

(iii) Seismic-related ground failure, including liquefaction?	☒	☐	☐	☐

(Source: City of Moreno Valley, 2006)

According to General Plan EIR Figure 5.6-2, *Seismic Hazards*, the Project site is not located in an area with the potential for liquefaction. To confirm this, a site-specific geotechnical study will be prepared for the Project site, which will evaluate the Project site's potential to be subject to seismic-related ground failure, including liquefaction. The results of the site-specific geotechnical evaluation will be disclosed in the required EIR.

(iv) Landslides?	☐	☐	☐	☒

(Source: Google Earth Pro, 2017)

The Project site is relatively flat, and contains no hillside or steep slopes on or in the vicinity (Google Earth Pro, 2017). Accordingly, the Project site is located in an area with a low potential for landslides. Additionally, grading in support of the Project is not anticipated to result in the creation of any new substantial slopes on-site that could be subject to landslide. Grading of the site would not pose a landslide threat to adjacent properties, future site workers, or the proposed buildings. Accordingly, the proposed Project would not create and would not be exposed to any risk of a landslide.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
(b) Result in substantial soil erosion or the loss of topsoil?	☒	☐	☐	☐

(Source: Project Application Materials, 2017)

Construction activities associated with the Project would involve earth movement and the exposure of soil, which would temporarily increase erosion susceptibility. In the long-term, development of the subject property would increase impervious surface cover and permanent landscaping on the Project site, thereby reducing the potential for erosion and loss of topsoil that currently occurs. The Project would be required to adhere to standard regulatory requirements, including, but not limited to, requirements imposed by the City of Moreno Valley's National Pollutant Discharge Elimination System (NPDES) Municipal Stormwater Permit (State Water Resources Control Board Order No. 2012-0011-DWQ) and a Project-specific Water Quality Management Plan (WQMP) that includes Best Management Practices (BMPs) to minimize water pollutants including sedimentation in stormwater runoff. The required EIR will evaluate the effectiveness of the Project's erosion-control measures and will determine whether the Project has the potential to result in substantial soil erosion and the loss of topsoil.

(c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☒	☐	☐	☐

(Source: Project Application Materials, 2017)

Refer to the discussion of Thresholds VI (a) (iii) and (iv) for a discussion of hazards associated with liquefaction and landslide hazards. As noted, landslide hazards are not anticipated to affect or result from the Project, and the required EIR will evaluate the site's potential for exposing future buildings on-site to liquefaction-related hazards. The Project site's potential for lateral spreading or collapse is currently unknown, but will be evaluated in a site-specific geotechnical evaluation. The site-specific geotechnical evaluation also will evaluate the Project site's potential for subsidence and liquefaction hazards. The required EIR will evaluate the proposed Project's potential to cause soil subsidence, lateral spreading, liquefaction, and collapse hazards, which could pose a threat to the future structures and workers on-site.

(d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☒	☐	☐	☐

(Source: Project Application Materials, 2017; USDA, n.d.)

According to USDA's Web Soil Survey, the Project site is underlain with Greenfield Sandy Loam and Monserate Sandy Loam, which all generally have a "Low" shrink swell potential (USDA, n.d.). The Project's geotechnical evaluation will evaluate the Project site's specific soil conditions and potential for containing expansive soils. The Project's potential to expose the future structure and workers on-site to hazards associated with expansive soils will be evaluated in the required EIR.

[Note: Threshold VI (d) is based on Appendix G of the CEQA Guidelines and references Table 18-1-B of the 1994 Uniform Building Code (UBC). This Table no longer exists. The Building Code currently in effect, the 2010 CBC, references ASTM D4829, a standard procedure for testing and evaluating the expansion index (or expansion potential) of soils established by ASTM International, which was formerly known as the American Society for Testing and Materials (ASTM).]

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
(e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☐	☒
(Source: Project Application Materials, 2017) The Project would not install any septic tanks or alternative waste water disposal systems. No impact would occur.				
VII. GREENHOUSE GAS EMISSIONS Would this project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☒	☐	☐	☐
(Source: Project Application Materials, 2017) Project-related construction and operational activities would emit air pollutants, several of which are regarded as greenhouse gasses (GHGs). A Project-specific GHG emissions report will be required to quantify such emissions. Because climate change is a global phenomenon and not limited to a specific locale such as the Project site and its immediate vicinity, emissions have the potential to be significant on a cumulatively considerable basis. The Project's GHG emissions will be analyzed against SCAQMD's recommended industrial threshold of 10,000 cubic metric tons of carbon monoxide equivalent (MTCO2e) emissions, as the threshold of significance. The proposed Project's potential to generate GHGs, either directly or indirectly, that could have a significant impact on the environment, will be analyzed in a Project-specific GHG analysis report and further analysis of Threshold VII (a) is required in a Project-specific EIR.				
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☒	☐	☐	☐
(Source: Project Application Materials, 2017; California Legislative Information, 2006) The proposed Project's potential to conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases will be analyzed in a Project-specific GHG analysis, the results of which will be discussed in a Project-specific EIR.				
VIII. HAZARDS AND HAZARDOUS MATERIALS Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use or disposal of hazardous materials?	☒	☐	☐	☐
(Source: Project Application Materials, 2017) The Project site consists of vacant, undeveloped land that is routinely disturbed (i.e., disced) and does not contain any structures. Because the Project site is vacant and undeveloped under existing conditions, no substantial hazards or hazardous materials are expected to be present on the Project site; regardless, a site-specific environmental assessment will be prepared for the proposed Project to determine the presence or absence of hazardous materials on the Project site. The results of the site-specific technical report will be disclosed and evaluated in the required EIR.				

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
During Project construction, a limited amount of hazardous materials would be transported to, stored, and used on the property (fuel, paint, etc.). During long-term operation of the Project, hazardous materials may be used and stored on the Project site. The EIR will evaluate the Project's potential to create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials during short-term construction and long-term operation.				
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☒	☐	☐	☐
(Source: Project Application Materials, 2017) See response to Threshold VIII (a), above.				
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒
(Source: Project Application Materials, 2017; Google Earth Pro, 2017; City of Moreno Valley, 2006) The nearest existing school facility is Creekside Elementary School, located approximately 0.4-mile north of the Project site (Google Earth Pro, 2017). According to the City of Moreno Valley General Plan, there are no school sites planned within 0.25 mile of the Project site (City of Moreno Valley, 2006, Figure PFS-1). Accordingly, the proposed Project has no potential to emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school. No impact would occur.				
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result would it create a significant hazard to the public or the environment?	☐	☐	☐	☒
(Source: Project Application Materials, 2017; DTSC, 2017) According to information provided by the Department of Toxic Substances Control, the Project site is not located on the list of hazardous materials sites pursuant to Government Code Section 65962.5 (DTSC, 2017). Accordingly, no impact would occur.				
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☒	☐
(Source: City of Moreno Valley, 2006; ALUC, 2010; Google Earth Pro, 2017) The Project site is located approximately 1.0 mile northeast of the March Air Reserve Base. According to City of Moreno Valley General Plan FEIR Figure 5.5-3, *City Areas Affected by Aircraft Hazard Zones*, and March Air Reserve Base/Inland Port Land Use Study Exhibit 2-14, *Accident Potential Zones*, the Project site is not located within an "Accident Potential				

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
Zone" or "Clear Zone" (i.e., high risk areas 3,000 feet from each end of the runway) (City of Moreno Valley, 2006, Figure 5.5-3; ALUC, 2010, Exhibit 2-14). Thus, because the Project site is not located in an area identified as an "Accident Potential Zone" or a "Clear Zone", implementation of the proposed Project would not result in a safety hazard for people living or working on the Project area and impacts would be less than significant.				
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
(Source: Google Earth Pro, 2017) There are no private airfields or airstrips in the vicinity of the Project site. Thus, there is no potential for the implementation of the Project to result in a safety hazard for people residing or working in the Project area. No impact would occur and no further analysis of this subject is required.				
g) Impair implementation of, or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
(Source: Project Application Materials, 2017) The Project site does not contain any emergency facilities nor does it serve as an emergency evacuation route. During construction and long-term operation, the proposed Project would be required to maintain adequate emergency access for emergency vehicles as required by the City. Because the proposed Project would not interfere with an adopted emergency response or evacuation plan, no impact would occur.				
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☐	☒
(Source: Project Application Materials, 2017, City of Moreno Valley, 2006) According to City of Moreno Valley General Plan FEIR Figure 5.5-2, *Floodplains and High Fire Hazard Areas*, the Project site is not located in an area of substantial or high fire risk (City of Moreno Valley, 2006, Figure 5.5-2). The Project site is located in an area that has been largely developed. No wildlands are located on or adjacent to the Project site and the Project site is largely devoid of vegetation and surrounded on all sides by developed properties, paved roads, and/or maintained sites. Thus, implementation of the proposed Project would not expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands. No impact would occur and no further analysis of this subject is required.				
IX. HYDROLOGY AND WATER QUALITY Would the project:				
a) Violate any water quality standards or waste discharge requirements?	☒	☐	☐	☐
(Source: Project Application Materials, 2017) Implementation of the Project would involve clearing, grading, paving, utility installation, building construction, and landscaping activities, which could result in the generation of water quality pollutants such as silt, debris, chemicals, paints, and other solvents with the potential to adversely affect water quality. As such, short-term water quality impacts				

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
have the potential to occur during construction of the Project in the absence of any protective or avoidance measures. Additionally, runoff from under post-development conditions could contain pollutants in the absence of protective or avoidance measures. The Project's potential to violate any water quality standards or waste discharge requirements during short-term construction and/or long-term operational activities will be fully analyzed in the required EIR.				
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☒	☐
(Source: Project Application Materials, 2017; City of Moreno Valley, 2006) Within the City of Moreno Valley, there are few domestic uses for groundwater due to salinity/water quality issues; therefore, the City primarily relies on imported water from the Eastern Municipal Water District (EMWD) for its domestic water supply. The Project does not propose the installation of any water wells that would directly extract groundwater; however, the increase in impervious surface cover that would occur with development of the site could reduce the amount of water percolating down into the underground aquifer that underlies the Project site and a majority of the City. However, and as noted in the City's General Plan FEIR (City of Moreno Valley, 2006, p. 5.7-12), "the impact of an incremental reduction in groundwater would not be significant as domestic water supplies are not reliant on groundwater as a primary source." With buildout of the Project, the local groundwater levels would not be adversely affected. As such, impacts to groundwater supplies and recharge would be less than significant.				
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	☒	☐	☐	☐
(Source: Project Applications Materials, 2017; City of Moreno Valley, 2006) The Project would alter the existing drainage pattern of the property and thereby has the potential to result in erosion. Stormwater runoff from the Project site would be discharged into the public storm drain system (which ultimately discharges to the Heacock Channel) and run-on from the vacant off-site parcel to the north would be discharged directly into the Heacock Channel, an existing concrete-lined channel located along the eastern boundary of the Project site. In the event the Project were to result in substantial erosion, then sediment from the Project site would have the potential to adversely affect downstream waterways. A site-specific hydrology study will be prepared for the Project to determine whether Project development would result in a measurable increase in water flows exiting the site under developed conditions (which could cause scour/erosion). Additionally, a site-specific WQMP also would be prepared that would identify structural control BMPs to reduce the Project's potential to result in increased erosion following development. The results of the required WQMP and site-specific hydrology study will be documented in the required EIR.				
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or	☒	☐	☐	☐

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
substantially increase the rate or surface runoff in a manner which would result in flooding on- or off site?				
(Source: Project Application Materials, 2017) As indicated under Threshold IX (c), a site-specific hydrology study will be prepared to evaluate whether the Project would result in a substantial change in the rate or amount of runoff exiting the site. An increase in the rate or amount of runoff from the site could result in increased potential for flooding on downstream properties. The results of the site-specific hydrology study will be documented in the required EIR.				
e) Create or contribute runoff which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☒	☐	☐	☐
(Source: Project Application Materials, 2017) As indicated under the analysis of Threshold IX (a), the Project's potential to result in additional sources of polluted runoff will be disclosed and evaluated in the required EIR. A site-specific hydrology study will be prepared for the Project that will identify a stormwater drainage system to convey runoff from the site in a manner consistent with City requirements. The required EIR will include a discussion and analysis of the Project's proposed storm drain improvements, and also will identify any impacts to the environment that may result from any necessary off-site improvements required in support of the Project's drainage system.				
f) Otherwise substantially degrade water quality?	☒	☐	☐	☐
(Source: Project Application Materials, 2017) Refer to Threshold IX (a), (c), and (d), above.				
g) Place housing within a 100-year floodplain, as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☒
(Source: Project Application Materials, 2017) The Project does not include housing. Therefore, there is no potential for housing to be located within a 100-year flood hazard zone and no impacts associated with housing placement would occur from implementing the proposed Project.				
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	☐	☐	☒
(Source: Project Application Materials, 2017; FEMA, 2008) According to applicable FEMA Flood Insurance Rate Map (FIRM) No. 06065C0761G, the Project site is located within "Zone X (unshaded)," which are areas determined to be outside the 500-year flood hazard area. (FEMA, 2008) As such, the proposed Project would not place structures within a 100-year flood hazard area that could impede or redirect flood flows and no impact would occur.				

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☐	☒
(Source: Project Application Materials, 2017; City of Moreno Valley, 2006; FEMA, 2008; Google Earth Pro, 2017) The nearest dam to the Project site is Lake Perris, located approximately 5.0 miles southeast of the Project site (Google Earth Pro, 2017). According to City of Moreno Valley General Plan FEIR Figure 5.5-2, *Floodplains and High Fire Hazard Areas*, the Project site is not located in an identified dam inundation area. There is no levee located within the vicinity of the Project site. According to applicable FEMA FIRM No. 06065C0761G, the Project site is located within "Zone X (unshaded)," which is not considered to be a flood hazard area (FEMA, 2008). Accordingly, there is no potential for the Project to expose people or structures to significant risk of loss, injury or death involving flooding, and no impact would occur.				
j) Inundation by seiche, tsunami, or mudflow?	☐	☐	☐	☒
(Source: Project Application Materials, 2017; Google Earth Pro, 2017) The Pacific Ocean is located over 40 miles southwest of the Project site; consequently, there is no potential for tsunamis to impact the Project. In addition, no steep hillsides subject to mudflow are located on or near the Project site. As mentioned in Threshold IX (i), the Project site is not located in an identified dam inundation area. Accordingly, the Project site has no potential to be impacted by seiches, mudflows, and/or tsunamis.				
X. LAND USE AND PLANNING Would the project:				
a) Physically divide an established community?	☐	☐	☐	☒
(Source: Project Application Materials, 2017; Google Earth Pro, 2017) The Project site consists of approximately 11.8 acres of vacant, undeveloped land that is routinely disturbed (i.e., disced) and does not contain any structures. The Project site does not provide access to established communities and would not isolate any established communities or residences from neighboring communities. Development and operation of the Project would not physically disrupt or divide the arrangement of an established community.				
b) Conflict with an applicable land use plan, policy or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☒	☐	☐	☐
(Source: Project Application Materials, 2017) Implementation of the Project would allow for the development of industrial land uses on the 11.8-acre Project site. Proposed CZ (PEN17-0144) would change the zoning designation for the Project site from "Business Park" and "Business Park Mixed-Use with an overlay of Mixed Neighborhood" to "Light Industrial." The required EIR will include an evaluation of the proposed Project's consistency with applicable plans, policies, and/or regulations adopted for the purpose of reducing or avoiding environmental effects.				

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	☒	☐	☐	☐

(Source: RCA, 2003; City of Moreno Valley, 2017)

As described under the response to Threshold IV (f), the Project site is subject to the provisions of the Western Riverside County MSHCP. The Project would be required to comply with City of Moreno Valley Municipal Code Title 3, Chapter 3.48, "Western Riverside County Multiple Species Habitat Conservation Plan Fee Program," which requires a per-acre local development mitigation fee to implement the MSHCP. The Project site is not located within one of the targeted conservation cells of the MSHCP. The Project site is, however, subject to the survey and conservation requirements of MSHCP Section 6.3.2 (Species Survey Requirements), which requires the preparation of a habitat assessment for the western burrowing owl. Pursuant to Section 6.3.2 of the MHSCP, a burrowing owl site assessment will be submitted for the Project site, and the findings of the site assessment will be evaluated in the required EIR to determine the Project's consistency with the MSHCP.

XI. MINERAL RESOURCES

Would the project:

a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒

(Source: City of Moreno Valley, 2006)

The Project site is not located within an area known to be underlain by regionally- or locally-important mineral resources or within an area that has the potential to be underlain by regionally- or locally-important mineral resources, as disclosed by the City's General Plan and the associated General Plan FEIR (City of Moreno Valley, 2006, p. 5.14-2). Accordingly, implementation of the proposed Project would not result in the loss of availability of a known mineral resource that would be of value to the region or the residents of the State of California. Accordingly, no further analysis of this subject is required.

b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	☒

(Source: City of Moreno Valley, 2006)

Please refer to the response to Threshold XI (a), above. No impact would occur and no further analysis of this subject is required.

XII. NOISE

Would the project result in:

a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☒	☐	☐	☐

(Source: Project Application Materials, 2017; City of Moreno Valley, 2017)

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
Project-related construction activities, as well as long-term operational activities (including on-site industrial warehouse operations and the projected increases in vehicular travel along area roadways), may expose persons in the vicinity of the Project site to noise levels in excess of standards established by the City's General Plan and Chapter 11.80, "Noise Regulation," of the City's Municipal Code. An acoustical analysis will be prepared and the required EIR will analyze the potential for the Project to expose people, on- or off-site, to noise levels in excess of established noise standards.				
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☒	☐	☐	☐
(Source: Project Application Materials, 2017) Construction activities on the Project site may produce groundborne vibration or groundborne noise levels during earthwork/grading and/or during the operation of heavy machinery. The required EIR will analyze the potential of the Project to expose persons to excessive groundborne vibration. Long-term operation of the proposed Project is not anticipated to result in perceptible levels of groundborne vibration or groundborne noise; regardless, the Project's EIR will also evaluate the proposed Project's potential to generate groundborne vibration and noise in the long-term.				
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☒	☐	☐	☐
(Source: Project Application Materials, 2017) Vehicular traffic associated with operation of the Project has the potential to cause an increase in ambient noise levels. In addition, on-site operational activities associated with proposed industrial activities have the potential to increase ambient noise levels. A site-specific acoustical study will be prepared for the proposed Project to identify potential increases in ambient noise and to analyze the potential for Project-related noise to increase ambient noise to a level that would be considered substantial and permanent compared to existing conditions. The results of the acoustical study will be summarized and incorporated into the required EIR.				
d) A substantially temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☒	☐	☐	☐
(Source: Project Application Materials, 2017) During Project-related construction activities, there could be a temporary or periodic increase in ambient noise levels in the Project vicinity above existing levels due to temporary construction traffic and the temporary and periodic operation of construction equipment. A site-specific acoustical study will be prepared for the Project to identify the potential for temporary or periodic increases in ambient noise levels that would be considered substantial compared to existing conditions. The results of the acoustical study will be summarized and incorporated into the required EIR.				
e) For a project located within an airport land use plan, or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☒	☐
(Source: City of Moreno Valley, 2006; Google Earth Pro, 2017)				

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
The Project site is located approximately 1.0-mile northeast of the March Air Reserve Base. According to General Plan Figure 5.4-1, *March Reserve Air Base Noise Impact Area*, the Project site is located outside of the 60 dBA CNEL noise contour and would not be subjected to excessive noise levels due to operations at the March Air Reserve Base. Because the Project site is not located within the March Air Reserve Base noise contours, the Project would not expose people residing or working in the Project area to excessive noise levels due to its location within two miles of a public airport. A less than significant impact would occur and no further analysis of this subject is required.				
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
(Source: Project Application Materials, 2017; Google Earth Pro, 2017) The Project site is not located near any private airfields or airstrips. Therefore, the proposed Project has no potential to expose people to excessive noise levels associated with operations at a private airstrip. No further analysis of this subject is required.				
XIII.POPULATION AND HOUSING Would the project:				
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☒	☐
(Source: Project Application Materials, 2017; City of Moreno Valley, 2014) The Project proposes to develop the subject property in accordance with the "Business Park/Light Industrial" land use designation applied to the site by the City of Moreno Valley General Plan Land Use Map (City of Moreno Valley, 2014). Accordingly, the proposed Project would not result in growth that was not already anticipated by the City of Moreno Valley General Plan and evaluated in the City of Moreno Valley General Plan FEIR. Furthermore, the Project site is served by existing public roadways, and utility infrastructure is already installed beneath public rights of way that abut the property. Accordingly, the Project and its required improvements would not induce direct or indirect substantial growth in the area. Impacts would be less than significant.				
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
(Source: Project Application Materials, 2017; Google Earth Pro, 2017) The Project site does not contain any residential structures under existing conditions. Accordingly, implementation of the Project would not displace substantial numbers of existing housing and would not necessitate the construction of replacement housing elsewhere. No impact would occur and no further analysis of this subject is required.				
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
(Source: Google Earth Pro, 2017)				

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

As described above under response to Threshold XIII (b), the Project site does not contain any residential structures; therefore, no people live on the subject property under existing conditions. Accordingly, implementation of the proposed Project would not displace substantial numbers of people and would not necessitate the construction of replacement housing elsewhere. No impact would occur and no further analysis of this subject is required.

XIV. PUBLIC SERVICES

Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered government facilities, need for new or physically altered government facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services?

a) Fire protection?	☐	☐	☒	☐

(Source: Project Application Materials, 2017; City of Moreno Valley, 2017; Google Earth Pro, 2017)

Fire protection services to the Project site are provided by the Moreno Valley Fire Department (MVFD). The Project site is served by the Kennedy Park Fire Station (Station No. 65), located at 15111 Indian Avenue, approximately 1.1 miles to the southeast of the Project site, and the Towngate Fire Station (Station No. 6), located at 22250 Eucalyptus Avenue, approximately 2.1 miles to the northwest of the Project site. Thus, the Project would be adequately served by fire protection services, and no new or expanded unplanned facilities would be required. The Project is required to comply with the provisions of the City of Moreno Valley's Development Impact Fee (DIF) Ordinance (Ordinance No. 695), which requires a fee payment that the City applies to the funding of public facilities, including fire protection facilities. Mandatory compliance with the DIF Ordinance would be required prior to the issuance of a building permit.

The Project also would feature a minimum of fire safety and fire suppression activities, including type of building construction, fire sprinklers, a fire hydrant system, and paved access.

Based on the foregoing, the proposed Project would receive adequate fire protection service and would not result in the need for new or physically altered fire protection facilities. Impacts to fire protection facilities would be less than significant.

b) Police protection?	☐	☐	☒	☐

(Source: Project Application Materials, 2017; City of Moreno Valley, 2017; Google Earth Pro, 2017)

The Project would introduce a new building structure and employees to the Project site, which would result in an incremental increase in demand for police protection services, but is not anticipated to require or result in the construction of new or physically altered police facilities. Furthermore, prior to the issuance of building permits, the Project Applicant would be required to comply with the provisions of Moreno Valley's Development Impact Fee (DIF) Ordinance (Ordinance No. 695), which requires a fee payment that the City applies to the funding of public facilities, including police protection facilities. Mandatory compliance with the DIF Ordinance would be required prior to the issuance of a building permit. Based on the foregoing, the proposed Project would receive adequate police protection service, and would not result in the need for new or physically altered fire protection facilities. Impacts to police protection facilities would therefore be less than significant.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
c) Schools?	☐	☐	☒	☐

(Source: Project Application Materials, 2017, California Legislative Information, 2017)

Development of the Project site as proposed by the Project would not create a direct demand for public school services, as the subject property would contain non-residential uses that would not generate any school-aged children requiring public education. The addition of employment-generating uses on the Project site would assist the City in achieving its goal to provide a better jobs/housing balance within the City and the larger western Riverside County region. The proposed Project is not expected to draw a substantial number of new residents to the region and would therefore not indirectly generate school-aged students requiring public education. Because the Project would not directly generate students and is not expected to indirectly draw students to the area, the Project would not cause or contribute to a need to construct new or physically altered public school facilities. Although the Project would not create a demand for additional public school services, the Project Applicant would be required to contribute development impact fees to the Val Verde Unified School District in compliance with California Senate Bill 50 (Greene), which allows school districts to collect fees from new developments to offset the costs associated with increasing school capacity needs. Mandatory payment of school fees would be required prior to the issuance of building permits. Impacts to public schools would be less than significant and no further analysis of this subject is required.

d) Parks?	☐	☐	☒	☐

(Source: Project Application Materials, 2017)

As discussed under Thresholds XV (a) and XV (b) below, the Project would not create a demand for public park facilities and would not result in the need to modify existing or construct new park facilities. Accordingly, implementation of the proposed Project would not adversely affect any park facility and impacts would be less than significant.

e) Other public facilities?	☐	☐	☐	☒

(Source: Project Application Materials, 2017)

The Project is not expected to result in a demand for other public facilities/services, including libraries, community recreation centers, post offices, and animal shelters. As such, implementation of the proposed Project would not adversely affect other public facilities or require the construction of new or modified public facilities and no impact would occur.

XV. RECREATION

a) Would the project increase the use of existing neighborhood or regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒

(Source: Project Application Materials, 2017)

The Project proposes to develop the Project site with industrial land uses. The Project does not propose any type of residential use or other land use that may generate a population that would increase the use of existing neighborhood and regional parks or other recreational facilities. Accordingly, implementation of the proposed Project would not result in the increased use or substantial physical deterioration of an existing neighborhood or regional park, thus, no impact would occur and no further analysis of this subject is required.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☐	☒
(Source: Project Application Materials, 2017) The Project proposes to develop the Project site with industrial land uses. The Project does not propose to construct any new on- or off-site recreation facilities. Additionally, the Project would not expand any existing off-site recreational facilities. Thus, environmental effects related to the construction or expansion of recreational facilities would not occur with implementation of the proposed Project. Thus, no impact would occur and no further analysis of this subject is required.				
XVI. TRANSPORTATION/TRAFFIC Would the project:				
a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	☒	☐	☐	☐
(Source: Project Application Materials, 2017) The proposed Project has the potential to adversely affect the performance of the local circulation system, on a direct and/or cumulatively considerable level. A site-specific traffic study will be prepared following the City of Moreno Valley Traffic Report Preparation Guidelines. The study will quantify the volume of vehicular traffic anticipated to travel to and from the Project site. The required EIR will disclose the findings of the site-specific traffic study and evaluate the Project's potential to conflict with applicable plans, ordinances, and policies that establish a minimum level of performance for the local circulation system.				
b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	☒	☐	☐	☐
(Source: Project Application Materials, 2017) Traffic generated by the proposed Project has the potential to impact the Riverside County Congestion Management Plan (CMP) roadway network. Potential effects to the CMP roadway system will be evaluated in a site-specific traffic study, and the results of this study will be used in the required EIR to determine the Project's consistency with the Riverside County CMP, including applicable level of service standards and travel demand/congestion management measures.				
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	☒

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
(Source: Project Application Materials, 2017; Google Earth Pro, 2017) The Project would not include an air travel component (i.e., helipad) and products transported to and from the Project site would not be done so by direct air. Accordingly, the Project would not have any effect on air traffic patterns, including an increase in traffic levels or a change in flight path location that results in substantial safety risks. As such, no impact would occur and additional analysis of this issue is not required.				
d) Substantially increase hazards to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g. farm equipment)?	☒	☐	☐	☐
(Source: Project Application Materials, 2017) All improvements planned as part of the Project would be in conformance with applicable City of Moreno Valley standards and would not result in any hazards due to a design feature. Regardless, the Project's required EIR will document the conditions of the existing and planned circulation system in the Project area and determine if the increase in traffic resulting from the Project would adversely affect any off-site roadway segment or intersection which may be unsafe, or may become unsafe with the addition of Project traffic.				
e) Result in inadequate emergency access?	☐	☐	☒	☐
(Source: Project Application Materials, 2017) During the course of the City of Moreno Valley's required review of the Project's applications, the Project's design will be reviewed to ensure that adequate access to and from the site and around the proposed buildings is provided for emergency vehicles. With required adherence to City of Moreno Valley requirements for emergency vehicle access, impacts are expected to be less than significant.				
f) Conflict with adopted policies or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	☐	☐	☒	☐
(Source: Project Application Materials, 2017; City of Moreno Valley, 2006; City of Moreno Valley, 2016; Google Earth Pro, 2017) The proposed Project would contain an industrial warehouse, which is a land use that is not likely to attract large volumes of pedestrian, bicycle, or transit traffic. Regardless, the Project is designed to comply with all applicable City of Moreno Valley alternative (non-vehicular) transportation policies. According to City of Moreno Valley General Plan Figure 9-4, *Bikeway Plan*, the Project site abuts Class I bikeways on Heacock Street (City of Moreno Valley, 2016, Figure 9-4). Class I bikeways are dedicated trails, separated from vehicular traffic (City of Moreno Valley, 2006, p. 5.2-13). The Project plans to construct a bike path along the Heacock Channel, and thus would not preclude the use of the planned Class I bicycle facility adjacent to the Project site. Furthermore, the Project's proposed bike path would be consistent with the Bicycle Master Plan, and impacts would be less than significant.				

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
XVII. TRIBAL CULTURAL RESOURCES Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:				
a) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code Section 5020.1(k)?	☒	☐	☐	☐
(Source: Project Application Materials, 2017) A site-specific cultural resources assessment will be conducted by a professional archaeologist to determine whether the Project site is listed or eligible for listing on a state or local register of historical resources as defined in Public Resources Code Section 5020.1(k). The results of the site-specific cultural resources assessment will be disclosed in the required EIR.				
b) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1? In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency will consider the significance of the resource to a California Native American tribe.	☒	☐	☐	☐
(Source: Project Application Materials, 2017) The provisions of Public Resources Code § 21074 were established pursuant to Assembly Bill 52 (AB 52). AB 52 applies to all development projects that have a notice of preparation (NOP) or a notice of negative declaration (ND) or mitigated negative declaration (MND) filed on or after July 1, 2015. Accordingly, the Project is subject to the provisions of AB 52. As part of the AB 52 consultation processes required by State law, the City of Moreno Valley will send notification of the proposed Project to Native American tribes with possible traditional or cultural affiliation to the area. The potential for the Project to cause a substantial adverse change in the significance of a tribal cultural resource will be evaluated in the required EIR.				
XVIII. UTILITIES AND SERVICE SYSTEMS.				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☒	☐
(Source: Project Application Materials, 2017) Wastewater service is provided to the Project site by Eastern Municipal Water District (EMWD). EMWD is required to operate all of its treatment facilities in accordance with the waste treatment and discharge standards and requirements set forth by the Santa Ana Regional Water Quality Control Board (RWQCB). The Project would not install or utilize septic systems or alternative wastewater treatment systems; therefore, the Project would have no potential to exceed applicable wastewater treatment requirements established by the RWQCB. Accordingly, impacts would be less than significant.				

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
b) Require or result in construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☒	☐	☐	☐
(Source: Project Application Materials, 2017) Domestic water and wastewater services are provided to the Project site by EMWD. The proposed Project would be required to construct water and wastewater conveyance facilities as necessary to serve the Project. Off-site improvements to utility lanes also may be necessary to provide adequate service to the site. The required EIR will describe the Project's proposed water and wastewater conveyance facilities, and will evaluate whether the construction of such facilities would result in significant environmental effects.				
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☒	☐	☐	☐
(Source: Project Application Materials, 2017) The proposed Project would be required to construct stormwater drainage facilities as necessary to serve Project stormwater flows. Off-site improvements to utility lines also may be necessary to increase capacity to convey Project stormwater flows. A site-specific hydrology study shall be prepared for the Project that will identify a stormwater drainage system to convey runoff from the site in a manner consistent with City requirements. The required EIR shall evaluate whether the construction or expansion of storm water drainage facilities as necessary to serve the Project would result in significant environmental effects.				
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☒	☐
(Source: EMWD, 2016b Project Application Materials, 2017) EMWD is responsible for supplying potable water to the Project site and its region. As discussed in the *2015 EMWD Urban Water Management Plan*, herein incorporated by reference as the "UWMP," which applies to and was adopted by the EMWD, adequate water supplies are projected to be available to meet the EMWD's estimated water demand through 2040 under normal, historic single-dry and historic multiple-dry year conditions (EMWD, 2016b, p. XV). EMWD forecasts for projected water demand are based on the population projections of the Southern California Association of Governments (SCAG), which rely on the adopted land use designations contained within the general plans that cover the geographic area within EMWD's service. Because the Project would be consistent with the City of Moreno Valley General Plan land use designation for the site, the water demand associated with the Project was considered in the demand anticipated by the 2015 UWMP and analyzed therein. As stated above, the EMWD expects to have adequate water supplies to meet all its demands until at least 2040; therefore, the EMWD has sufficient water supplies available to serve the Project from existing entitlements/resources and no new or expanded entitlements are needed. The Project's impact would be less than significant.				

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
e) Result in a determination by the wastewater treatment provider which serves or may serve the project determined that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☒	☐

(Source: EMWD, 2016a; Project Application Materials, 2017)

Wastewater generated by the Project would be treated by the EMWD, which operates the Moreno Valley Regional Water Reclamation Facility. Based upon EMWD's wastewater generation rate of 1,700 gallons per day (gpd) per acre for industrial light land uses, the proposed Project would generate approximately 20,094 gallons (0.020 million gallons per day) of wastewater per day (1,700 gpd per acre × 11.82 Project acres = 20,094 gpd). Under existing conditions, the Moreno Valley Regional Water Reclamation Facility has an excess treatment capacity of approximately 4.8 million gallons per day (mgpd). Implementation of the Project would utilize approximately 0.4% of the Moreno Valley Regional Water Reclamation Facility daily excess treatment capacity. (EMWD, 2016a). Accordingly, the Moreno Valley Regional Water Reclamation Facility has sufficient capacity to treat wastewater generated by the Project in addition to existing commitments. The Project would not create the need for any new or expanded wastewater facility (such as conveyance lines, treatment facilities, or lift stations). Because there is adequate capacity at existing treatment facilities to serve the Project's projected sewer demand, impacts would be less than significant.

f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☒	☐	☐	☐

(Source: Project Application Materials, 2017)

The Project would generate an incremental increase in solid waste volumes requiring off-site disposal during short-term construction and long-term operational activities. The required EIR will evaluate whether existing landfills have adequate capacity to accommodate the Project's planned increase in solid waste generation.

g) Comply with federal, state, and local statues and regulations related to solid waste?	☐	☐	☒	☐

(Source: CA Legislative Information, 2015; CA Legislative Information, 2011; CA Legislative Information, 2005)

The California Integrated Waste Management Act (AB 939), signed into law in 1989, established an integrated waste management system that focused on source reduction, recycling, composting, and land disposal of waste. In addition, the bill established a 50 percent waste reduction requirement for cities and counties by the year 2000, along with a process to ensure environmentally safe disposal of waste that could not be diverted. Per the requirements of the Integrated Waste Management Act, the Riverside County Board of Supervisors adopted the County of Riverside Countywide Integrated Waste Management Plan (CIWMP), which outlines the goals, policies, and programs the County and its cities implement to create an integrated and cost-effective waste management system that complies with the provisions of AB 939 and its diversion mandates. (CA Legislative Information, 2015)

In order to assist the City of Moreno Valley and the County of Riverside in achieving the mandated goals of the Integrated Waste Management Act, the Project's building user(s) would be required to work with future refuse haulers to develop and implement feasible waste reduction programs, including source reduction, recycling, and composting. Additionally, in accordance with the California Solid Waste Reuse and Recycling Act of 1991 (Cal Pub Res. Code § 42911), the Project is

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
required to provide adequate areas for collecting and loading recyclable materials where solid waste is collected. The collection areas are required to be shown on construction drawings and be in place before occupancy permits are issued. (CA Legislative Information, 2005) Additionally, in compliance with AB 341 (Mandatory Commercial Recycling Program), the future occupant(s) of the proposed Project would be required to arrange for recycling services, if the occupant generates four (4) or more cubic yards of solid waste per week (CA Legislative Information, 2011). The implementation of these mandatory requirements would reduce the amount of solid waste generated by the Project and diverted to landfills, which in turn will aid in the extension of the life of affected disposal sites. The Project would be required to comply with all applicable solid waste statutes and regulations; as such, impacts related to solid waste statutes and regulations would be less than significant.				
XIX.MANDATORY FINDINGS OF SIGNIFICANCE.				
a) Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?	☒	☐	☐	☐
(Source: Project Application Materials, 2017) The Project has the potential to substantially reduce the habitat of a wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory. The required EIR will evaluate the Project's potential to degrade the quality of the environment and/or result in substantial adverse effects to biological and cultural resources.				
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☒	☒	☐	☐
(Source: Project Application Materials, 2017) The Project site is located in the City of Moreno Valley, which has a number of ongoing development projects throughout the City, including logistics, e-commerce, industrial warehousing, residential, and commercial projects. Development of the Project site, in addition to concurrent construction and operation of other development projects in the area, has the potential to result in cumulatively considerable impacts, particularly with respect to the following issue areas: air quality, greenhouse gas emissions, noise, and transportation/traffic. The required EIR will evaluate the Project's potential to result in cumulatively considerable contributions to cumulatively significant impacts.				

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☒	☐	☐	☐

(Source: Project Application Materials, 2017)

The potential for the proposed Project to directly or indirectly affect human beings will be evaluated in the required EIR particularly with respect to the following issue areas: air quality, greenhouse gas emissions, and noise.

4.0 REFERENCES

This Initial Study was prepared by:

City of Moreno Valley
Julia Descoteaux, Associate Planner

T&B Planning, Inc.
Tracy Zinn, AICP, Principal
David Ornelas, Senior Project Manager
Eric Horowitz, GISP, Senior IT/GIS/Graphics Manager
Lauren Fujimori, Environmental Analyst

The following information sources were used during the preparation of this IS:

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Community Development Department
Planning Division
14177 Frederick Street
P. O. Box 88005
Moreno Valley CA 92552-0805
Telephone: 951.413-3206
FAX: 951.413-3210

Date: November 13, 2017

To: Responsible and Trustee Agencies/Interested Organizations and Individuals

Subject: **Notice of Preparation of a Draft Environmental Impact Report**

Lead Agency:

CITY OF MORENO VALLEY
Community Development Department
14177 Frederick Street
PO Box 88005
Moreno Valley, California 92552
(951) 413-3209
Contact: Julia Descoteaux

EIR Consulting Firm:

T&B PLANNING, INC.
17542 East 17th Street
Suite 100
Tustin, California 92780
(714) 505-6360
Contact: David Ornelas

This Notice of Preparation (NOP) describes the proposed Brodiaea Commerce Center project (the "Project") submitted to the City of Moreno Valley and the issues to be examined in an Environmental Impact Report (EIR) as required by the California Environmental Quality Act (CEQA). An Initial Study (IS) for the Project is on file at the City of Moreno Valley Community Development Department (address above) and on the City's website at http://www.moval.org. A copy of the IS also can be obtained by contacting Ms. Julia Descoteaux at (951) 413-3209.

Due to the time limits mandated by State law, your response must be sent at the earliest possible date, but no later than 30 days after receipt of this notice or December 13, 2017.

If you have comments on the scope of environmental analysis for the Project, please send your response to Ms. Julia Descoteaux at the City of Moreno Valley at the address listed above. Please include the name, phone number, and address of a contact person in your response.

Project Title: Brodiaea Commerce Center
(Plot Plan PEN17-0143, Change of Zone PEN17-0144)

Location: The Project site is located in the central portion of the City of Moreno Valley, Riverside County, California. The Project site is located north of Brodiaea Avenue, west of Heacock Street, and approximately 325 feet south of Alessandro Boulevard

Description: The proposed Project is described in the IS on file at the City of Moreno Valley Community Development Department and on the City's website at http://www.moval.org. The Project includes the following discretionary actions under consideration by the City of Moreno Valley:

1) **Plot Plan (PEN17-0143)** proposes to construct a 262,398-square foot (s.f.) warehouse facility on the Project site. The proposed facility would contain 252,398 s.f. of warehouse space and 10,000 s.f. of office space. Vehicular access to the Project site would be provided by two driveways along Brodiaea Street. The Project also includes site improvements, such as storm water detention basin, ornamental landscaping, and utility infrastructure.

2) **Change of Zone (PEN17-0144)** proposes to amend the City of Moreno Valley Zoning Map to change the zoning designation for the Project site from "Business Park-Mixed Use with an overlay of Mixed Use Neighborhood" and "Business Park" to "Light Industrial." The "Light Industrial" zoning designation allows light manufacturing, light industrial, research and development, warehousing and distribution and multitenant industrial uses, as well as certain supporting administrative and professional offices and commercial uses on a limited basis.

ENVIRONMENTAL ISSUES TO BE EVALUATED IN THE EIR

The initial environmental review of projects, such as the proposed Brodiaea Commerce Center project (the "Project"), is normally a three-step process governed by the California Environmental Quality Act (CEQA). The first step is for the lead agency, the City of Moreno Valley, to determine whether a project is exempt from CEQA review. The City has determined that this Project is not exempt from CEQA review. The typical second step is the preparation of an IS to determine the project's potential impacts on the environment. If the IS determines that the project has the potential to cause one or more significant environmental impacts, the usual third step is to determine whether or not an EIR must be prepared. In this case, the City of Moreno Valley has already determined that an EIR will need to be prepared based on the scale of the Project and its potential cause to significant environmental effects. Therefore, an EIR will be prepared to evaluate those potential significant effects.

This NOP and the accompanying IS evaluate submitted applications for a Plot Plan (PEN17-0143) and Change of Zone (PEN17-0144) to construct and operate a 262,398 s.f. warehouse building on an approximately 11.8-acre property. Based on the information presented in the IS, the following environmental issues will be evaluated in detail in the EIR for the proposed Project:

- Aesthetics
- Air Quality
- Biological Resources
- Cultural Resources
- Geology/Soils
- Greenhouse Gas Emissions
- Hazards/Hazardous Materials
- Hydrology/Water Quality
- Land Use/Planning
- Noise
- Transportation/Traffic
- Tribal Cultural Resources
- Utilities/Service Systems
- Mandatory Findings of Significance

The IS further describes the anticipated scope of the environmental analysis for each issue.

The EIR will address the short- and long-term effects of the Project on the environment. The EIR also will evaluate the potential for the Project to cause direct and indirect growth-inducing

impacts, as well as cumulative impacts. Alternatives to the proposed Project will be evaluated that may reduce or avoid environmental impacts that are determined to be significant in the EIR. A mitigation monitoring program will also be developed as required by Section (§) 15150 of the CEQA Guidelines.

The environmental determination in this NOP is subject to a 30-day public review period per Public Resources Code §21080.4 and CEQA Guidelines §15082. During the public review period, public agencies, interested organizations, and individuals have the opportunity to comment on the proposed Project and identify those environmental issues that have the potential to be affected by the Project and should be addressed further by the City of Moreno Valley in the EIR.

Please contact the Community Development Department at (951) 413-3209 if you have any questions.

Sincerely,

Julia Descoteaux
Associate Planner

Richard Sandzimier
Planning Official

Community Development Department
Planning Division
14177 Frederick Street
P. O. Box 88005
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RECEIVED
DEC 06 2017

Date: December 5, 2017

To: Responsible and Trustee Agencies/Interested Organizations and Individuals

Subject: **EXTENSION OF REVIEW PERIOD FOR THE NOTICE OF PREPARATION**

Notice of Preparation of a Draft Environmental Impact Report

Lead Agency:

CITY OF MORENO VALLEY
Community Development Department
14177 Frederick Street
PO Box 88005
Moreno Valley, California 92552
(951) 413-3209
Contact: Julia Descoteaux

EIR Consulting Firm:

T&B PLANNING, INC.
17542 East 17th Street
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Tustin, California 92780
(714) 505-6360
Contact: David Ornelas

This Notice of Preparation (NOP) includes an Initial Study (IS) that describes the proposed project and the issues to be examined in an Environmental Impact Report (EIR) as required by the California Environmental Quality Act (CEQA).

Due to the time limits mandated by State law, your response must be sent at the earliest possible date, but no later than 30 days after receipt of this notice or **January 5, 2018**.

Please send your response to Ms. Julia Descoteaux at the City of Moreno Valley address listed above. Please include the name, phone number, and address of a contact person in your response. If your agency or organization will be a responsible or trustee agency for this Project, please so indicate.

Project Title: Brodiaea Commerce Center
(Plot Plan PEN17-0143, Change of Zone PEN17-0144)

Location: The Project site is located in the central portion of the City of Moreno Valley, Riverside County, California. The Project site is located north of Brodiaea Avenue, west of Heacock Street, and approximately 325 feet south of Alessandro Boulevard.

Description: The proposed Project is described in the IS attached to this NOP. The Project includes the following discretionary actions under consideration by the City of Moreno Valley:

1) **Plot Plan (PEN17-0143)** proposes to construct a 262,398-square foot (s.f.) warehouse facility on the Project site. The proposed facility would contain

252,398 s.f. of warehouse space and 10,000 s.f. of office space. Vehicular access to the Project site would be provided by two driveways along Brodiaea Street. The Project also includes site improvements, such as storm water detention basin, ornamental landscaping, and utility infrastructure.

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ENVIRONMENTAL ISSUES TO BE EVALUATED IN THE EIR

The initial environmental review of projects, such as the proposed Brodiaea Commerce Center project (the "Project"), is normally a three-step process governed by the California Environmental Quality Act (CEQA). The first step is for the lead agency, the City of Moreno Valley, to determine whether a project is exempt from CEQA review. The City has determined that this Project is not exempt from CEQA review. The typical second step is the preparation of an IS to determine the project's potential impacts on the environment. If the IS determines that the project has the potential to cause one or more significant environmental impacts, the usual third step is to determine whether or not an EIR must be prepared. In this case, the City of Moreno Valley has already determined that an EIR will need to be prepared based on the scale of the Project and its potential to cause significant environmental effects. Therefore, an EIR will be prepared to evaluate those potential significant effects.

This NOP and the accompanying IS evaluate submitted applications for a Plot Plan (PEN17-0143) and Change of Zone (PEN17-0144) to construct and operate a 262,398 s.f. warehouse building on an approximately 11.8-acre property. Based on the information presented in the IS, the following environmental issues will be evaluated in detail in the EIR for the proposed Project:

- Aesthetics
- Air Quality
- Biological Resources
- Cultural Resources
- Geology/Soils
- Greenhouse Gas Emissions
- Hazards/Hazardous Materials
- Hydrology/Water Quality
- Land Use/Planning
- Noise
- Transportation/Traffic
- Tribal Cultural Resources
- Utilities/Service Systems
- Mandatory Findings of Significance

The IS further describes the anticipated scope of the analysis for each environmental issue.

The EIR will address the short- and long-term effects of the Project on the environment. The EIR also will evaluate the potential for the Project to cause direct and indirect growth-inducing impacts, as well as cumulative impacts. Alternatives to the proposed Project will be evaluated that may reduce or avoid environmental impacts that are determined to be significant in the EIR.

A mitigation monitoring program also will be developed as required by Section (§) 15150 of the CEQA Guidelines.

The environmental determination in this NOP is subject to a 30-day public review period per Public Resources Code §21080.4 and CEQA Guidelines §15082. During the public review period, public agencies, interested organizations, and individuals have the opportunity to comment on the proposed Project and identify those environmental issues that have the potential to be affected by the Project and should be addressed further by the City of Moreno Valley in the EIR.

Please contact the Community Development Department at (951) 413-3206 if you have any questions.

Julia Descoteaux
Associate Planner

From:	Kathleen Dale
To:	Julia Descoteaux
Subject:	Brodiaea Commerce Center Notice of Preparation - Comments
Date:	Tuesday, January 02, 2018 7:35:52 PM

Julia - I have reviewed the Notice of Completion form and Initial Study document posted to the City's website.

While it is encouraging to see the truck docks limited to the west side of the project site, furthest removed from the adjacent residential neighborhood, this project may nonetheless introduce additional diesel truck activity impacting sensitive receptors in the immediate area and along City streets serving the site.

The initial study indicates that technical studies will be prepared to evaluate air emissions, noise impacts, and traffic impacts of the proposed development. Given the likelihood that these technical studies will identify project-level or cumulative significant impacts upon sensitive receptors in the immediate area or along the serving transportation corridors, it is expected the forthcoming EIR must consider mitigation measures and alternatives that would reduce these impacts. Suggested mitigation measures and alternatives include: (1) land uses that are not truck-oriented, (3) restrictions on truck movement in and out of the project site, and (3) modification of the City's designated truck routes to minimize truck traffic through areas developed with sensitive receptors(particularly Heacock Street north of Iris Avenue).

Please notify me of any future environmental document releases and public hearings for this project.

Thank you,

Kathy Dale

JASON E. UHLEY
General Manager-Chief Engineer

1995 MARKET STREET
RIVERSIDE, CA 92501
951.955.1200
FAX 951.788.9965
www.rcflood.org

217891

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

RECEIVED
DEC 18 2017
CITY OF MORENO VALLEY
Planning Division

December 13, 2017

City of Moreno Valley
Community Development Department -
Planning Division
Post Office Box 88005
Moreno Valley, CA 92552-0805

Attention: Julia Descoteaux

Ladies and Gentlemen:

Re: PEN 17-0143
(Brodiaea Commerce Center)

The District does not normally recommend conditions for land divisions or other land use cases in incorporated cities. The District also does not plan check city land use cases, or provide State Division of Real Estate letters or other flood hazard reports for such cases. District comments/recommendations for such cases are normally limited to items of specific interest to the District including District Master Drainage Plan facilities, other regional flood control and drainage facilities which could be considered a logical component or extension of a master plan system and District Area Drainage Plan fees (development mitigation fees). In addition, information of a general nature is provided.

The District has not reviewed the proposed project in detail and the following comments do not in any way constitute or imply District approval or endorsement of the proposed project with respect to flood hazard, public health and safety or any other such issue:

- This project is located within the limits of the District's Sunnymead Area Drainage Plan for which drainage fees have been adopted; applicable fees should be paid by cashier's check or money order only to the Flood Control District or City prior to issuance of grading permits. Fees to be paid should be at the rate in effect at the time of issuance of the actual permit.

- The proposed project is adjacent to existing District facilities: Sunnymead MDP, Line F and Sunnymead MDP, Line B. An encroachment permit shall be obtained for any construction related activities occurring within District right of way or facilities. For further information, contact the District's Operations Engineering section at 951.955.1210.

- The District is a signatory to the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP). For purposes of procuring an encroachment permit from the District, the permit applicant will need to demonstrate that the portion of the project located within District rights of way, easements or facilities is consistent with the MSHCP. The MND should include a MSHCP consistency report with all of its supporting documents and provide adequate mitigation in accordance with all applicable MSHCP requirements.

GENERAL INFORMATION

The Santa Ana Regional Water Quality Control Board has issued a Municipal Separate Storm Sewer System (MS4) National Pollutant Discharge Elimination System (NPDES) Permit (R8-2010-0033) to the County of Riverside, Riverside County Flood Control and Water Conservation District and Incorporated Cities within the Santa Ana Watershed. Development projects within the Santa Ana Watershed may be required to prepare and implement a WQMP.

This project may require a National Pollutant Discharge Elimination System (NPDES) permit from the State Water Resources Control Board. Clearance for grading, recordation or other final approval should not be given until the City has determined that the project has been granted a permit or is shown to be exempt.

If this project involves a Federal Emergency Management Agency (FEMA) mapped floodplain, then the City should require the applicant to provide all studies, calculations, plans and other information required to meet FEMA requirements and should further require that the applicant obtain a Conditional Letter of Map Revision (CLOMR) prior to grading, recordation or other final approval of the project, and a Letter of Map Revision (LOMR) prior to occupancy.

If a natural watercourse or mapped floodplain is impacted by this project, the City should require the applicant to obtain a Section 1602 Agreement from the California Department of Fish and Game and a Clean Water Act Section 404 Permit from the U.S. Army Corps of Engineers, or written correspondence from these agencies indicating the project is exempt from these requirements. A Clean Water Act Section 401 Water Quality Certification may be required from the local California Regional Water Quality Control Board prior to issuance of the Corps 404 permit.

Very truly yours,

Mike M. Wong

MIKE WONG
Engineering Project Manager

c: Riverside County Planning Department
Attn: Kristi Lovelady

RM:sdh

DEPARTMENT OF TRANSPORTATION
DISTRICT 8
PLANNING (MS 722)
464 WEST 4th STREET, 6th Floor
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RECEIVED
NOV 29 2017
CITY OF MORENO VALLEY
Planning Division

Make Conservation
A California Way of Life.

November 22, 2017

City of Moreno Valley
Planning Department
Julia Descoteaux
14177 Frederick Street
Moreno Valley, CA 92552-0805

Brodiaea Commerce Center SCH#2017111042 (Riv 215 PM R36.02)

Ms. Descoteaux,

We have completed our initial review for the above mentioned proposal. The Project involves the development of one industrial warehouse on approximately 11.8 acres of land located in the western portion of the City of Moreno Valley, California. The discretionary approval requested from the City of Moreno Valley includes a Plot Plan (PEN17-043) and Change of Zone (PEN17-0144). Project site is located in the central portion of the City of Moreno Valley, Riverside County, California. The City of Moreno Valley is located north of the City of Perris, northwest of the City of Hemet, west of the City of Beaumont, east/southeast of the City of Riverside, and east of the unincorporated communities of Mead Valley and Woodcrest.

As the owner and operator of the State Highway System (SHS), it is our responsibility to coordinate and consult with local jurisdictions when proposed development may impact our facilities. Under the California Environmental Quality Act (CEQA), we are required to make recommendations to offset associated impacts with the proposed project. Although the project is under the jurisdiction of the City of Riverside due to the Project's potential impact to State facilities it is also subject to the policies and regulations that govern the SHS.

We recommend the following to be provided:

Traffic Study

- A Traffic Impact Study (TIS) is necessary to determine this proposed project's near-term and long-term impacts to the State facilities and to propose appropriate mitigation measures. The study should be based on Caltrans' *Guide for the Preparation of Traffic Impact Studies (TIS)* which is located at the following website:
  http://www.dot.ca.gov/hq/tpp/offices/ocp/igr_ceqa_files/tisguide.pdf
  Minimum contents of the traffic impact study are listed in Appendix "A" of the TIS guide.

- Traffic Impact further away from the project is typically not required because a project's potential impacts to the SHS dissipate to less than significant levels as traffic disperses throughout the transportation system.

- The data used in the TIS should not be more than 2 years old.

- The geographic area examined in the traffic study should include as a minimum all regionally significant arterial system segments and intersections, including State highway facilities where the project will add over 100 peak hour trips. State highway facilities that are experiencing noticeable delays should be analyzed in the scope of the traffic study for projects that add 50 to 100 peak hour trips.

- Traffic Analysis Scenarios should clearly be exhibited as exiting, existing + project, existing + project + cumulative, and existing + project + cumulative + ambient growth.

- Caltrans endeavors that any direct and cumulative impacts to the State highway system be eliminated or reduced to a level of insignificance pursuant to the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) standards.

- The LOS for operating State highway facilities is based upon Measures of Effectiveness (MOE) identified in the Highway Capacity Manual (HCM). Caltrans endeavors to maintain a target LOS at the transition between LOS "C" and LOS "D" on State highway facilities; however, Caltrans acknowledges that this may not always be feasible and recommends that the lead agency consult with Caltrans to determine the appropriate target LOS. If an existing State highway facility is operating at less than this target LOS, the existing MOE should be maintained. In general, the region-wide goal for an acceptable LOS on all freeways, roadway segments, and intersections is "D". For undeveloped or not densely developed locations, the goal may be to achieve LOS "C".

- Clearly indicate LOS with and without improvements.

- It is recommended that the Synchro Analysis includes all intersections from the Project site to the proposed study areas. A PHF of 0.92 in urban areas is recommended to be used in the Synchro Analysis.

- All freeway entrance and exit ramps where a proposed project will add a significant number of peak-hour trips that may cause any traffic queues to exceed storage capacities should be analyzed. If ramp metering is to occur, a ramp queue analysis for all nearby Caltrans metered on-ramps is required to identify the delay to motorists using the on-ramps and the storage necessary to accommodate the queuing. The effects of ramp metering should be analyzed in the traffic study. For metered freeway ramps, LOS does not apply. However, ramp meter delays above 15 minutes are considered excessive.

- Proposed improvements should be exhibited in preliminary drawings that indicate the LOS with improvements.

- Please submit 3 hard copies of all Traffic Impact Analysis documents and 2 cd's. Also where applicable provide 2 cd's of the Synchro Analysis file.

Prior to your submission for an Encroachment Permit, a follow-up Traffic Study Report letter will be required from the Department of Planning.

We appreciate the opportunity to offer comments concerning this project. If you have any questions regarding this letter, please contact Talvin Dennis at (909) 806-3957 or myself at (909) 383-4557 for assistance.

Sincerely,

MARK ROBERTS
Office Chief
Intergovernmental Review, Community and Regional Planning

South Coast
Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4178
(909) 396-2000 • www.aqmd.gov

SENT VIA USPS AND E-MAIL: December 5, 2017
Juliad@moval.org
Julia Descoteaux
City of Moreno Valley – Community Development Department
14177 Frederick Street
P.O. Box 88005
Moreno Valley, California 92552

Notice of Preparation of a Draft Environmental Impact Report for the Brodiaea Commerce Center (Plot Plan PEN17-0143, Change of Zone PEN17-0144)

The South Coast Air Quality Management District (SCAQMD) staff appreciates the opportunity to comment on the above-mentioned document. SCAQMD staff's comments are recommendations regarding the analysis of potential air quality impacts from the Proposed Project that should be included in the Draft Environmental Impact Report (EIR). Please send SCAQMD a copy of the Draft EIR upon its completion. Note that copies of the Draft EIR that are submitted to the State Clearinghouse are not forwarded to SCAQMD. Please forward a copy of the Draft EIR directly to SCAQMD at the address shown in the letterhead. **In addition, please send with the Draft EIR all appendices or technical documents related to the air quality, health risk, and greenhouse gas analyses and electronic versions of all air quality modeling and health risk assessment files[1]. These include emission calculation spreadsheets and modeling input and output files (not PDF files). Without all files and supporting documentation, SCAQMD staff will be unable to complete our review of the air quality analyses in a timely manner. Any delays in providing all supporting documentation will require additional time for review beyond the end of the comment period.**

Air Quality Analysis

SCAQMD adopted its California Environmental Quality Act (CEQA) Air Quality Handbook in 1993 to assist other public agencies with the preparation of air quality analyses. SCAQMD recommends that the Lead Agency use this Handbook as guidance when preparing its air quality analysis. Copies of the Handbook are available from SCAQMD's Subscription Services Department by calling (909) 396-3720. More guidance developed since this Handbook is also available on SCAQMD's website at: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/ceqa-air-quality-handbook-(1993). SCAQMD staff also recommends that the Lead Agency use the CalEEMod land use emissions software. This software has recently been updated to incorporate up-to-date state and locally approved emission factors and methodologies for estimating pollutant emissions from typical land use development. CalEEMod is the only software model maintained by the California Air Pollution Control Officers Association (CAPCOA) and replaces the now outdated URBEMIS. This model is available free of charge at: www.caleemod.com.

SCAQMD has also developed both regional and localized significance thresholds. SCAQMD staff requests that the Lead Agency quantify criteria pollutant emissions and compare the results to

[1] Pursuant to the CEQA Guidelines Section 15174, the information contained in an EIR shall include summarized technical data, maps, plot plans, diagrams, and similar relevant information sufficient to permit full assessment of significant environmental impacts by reviewing agencies and members of the public. Placement of highly technical and specialized analysis and data in the body of an EIR should be avoided through inclusion of supporting information and analyses as appendices to the main body of the EIR. Appendices to the EIR may be prepared in volumes separate from the basic EIR document, but shall be readily available for public examination and shall be submitted to all clearinghouses which assist in public review.

SCAQMD's CEQA regional pollutant emissions significance thresholds to determine air quality impacts. SCAQMD's CEQA regional pollutant emissions significance thresholds can be found here: http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf. In addition to analyzing regional air quality impacts, SCAQMD staff recommends calculating localized air quality impacts and comparing the results to localized significance thresholds (LSTs). LSTs can be used in addition to the recommended regional significance thresholds as a second indication of air quality impacts when preparing a CEQA document. Therefore, when preparing the air quality analysis for the Proposed Project, it is recommended that the Lead Agency perform a localized analysis by either using the LSTs developed by SCAQMD staff or performing dispersion modeling as necessary. Guidance for performing a localized air quality analysis can be found at: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/localized-significance-thresholds.

The Lead Agency should identify any potential adverse air quality impacts that could occur from all phases of the Proposed Project and all air pollutant sources related to the Proposed Project. Air quality impacts from both construction (including demolition, if any) and operations should be calculated. Construction-related air quality impacts typically include, but are not limited to, emissions from the use of heavy-duty equipment from grading, earth-loading/unloading, paving, architectural coatings, off-road mobile sources (e.g., heavy-duty construction equipment) and on-road mobile sources (e.g., construction worker vehicle trips, material transport trips). Operation-related air quality impacts may include, but are not limited to, emissions from stationary sources (e.g., boilers), area sources (e.g., solvents and coatings), and vehicular trips (e.g., on- and off-road tailpipe emissions and entrained dust). Air quality impacts from indirect sources, such as sources that generate or attract vehicular trips, should be included in the analysis.

In the event that the Proposed Project generates or attracts vehicular trips, especially heavy-duty diesel-fueled vehicles, it is recommended that the Lead Agency perform a mobile source health risk assessment. Guidance for performing a mobile source health risk assessment ("*Health Risk Assessment Guidance for Analyzing Cancer Risk from Mobile Source Diesel Idling Emissions for CEQA Air Quality Analysis*") can be found at: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/mobile-source-toxics-analysis. An analysis of all toxic air contaminant impacts due to the use of equipment potentially generating such air pollutants should also be included.

In addition, guidance on siting incompatible land uses (such as placing homes near freeways) can be found in the California Air Resources Board's *Air Quality and Land Use Handbook: A Community Health Perspective*, which can be found at: http://www.arb.ca.gov/ch/handbook.pdf. CARB's Land Use Handbook is a general reference guide for evaluating and reducing air pollution impacts associated with new projects that go through the land use decision-making process. Guidance[2] on strategies to reduce air pollution exposure near high-volume roadways can be found at: https://www.arb.ca.gov/ch/rd_technical_advisory_final.PDF.

SCAQMD Staff's Recommendation for Truck Trip Rates for High Cube Warehouse Projects

SCAQMD staff recommends the use of truck trip rates from the Institute of Transportation Engineers (ITE) for high cube warehouse projects located in SCAQMD (i.e. 1.68 average daily vehicle trips per 1,000 square feet and 0.64 average daily truck trips per 1,000 square feet). Consistent with CEQA Guidelines, the Draft EIR for the Proposed Project may use a non-default trip rate if there is substantial evidence indicating another rate is more appropriate for the air quality analysis.

[2] In April 2017, CARB published a technical advisory, *Strategies to Reduce Air Pollution Exposure Near High-Volume Roadways: Technical Advisory*, to supplement CARB's Air Quality and Land Use Handbook: A Community Health Perspective. This technical advisory is intended to provide information on strategies to reduce exposures to traffic emissions near high-volume roadways to assist land use planning and decision-making in order to protect public health and promote equity and environmental justice. The technical advisory is available at: https://www.arb.ca.gov/ch/landuse.htm.

For high cube warehouse projects, SCAQMD staff has been working on a Warehouse Truck Trip Study to better quantify trip rates associated with local warehouse and distribution projects, as truck emission represent more than 90 percent of air quality impacts from these projects. Details regarding this study can be found online here: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/high-cube-warehouse.

Mitigation Measures

In the event that the Proposed Project generates significant adverse air quality impacts, CEQA requires that all feasible mitigation measures that go beyond what is required by law be utilized during project construction and operation to minimize these impacts. Pursuant to CEQA Guidelines Section 15126.4 (a)(1)(D), any impacts resulting from mitigation measures must also be discussed. Several resources are available to assist the Lead Agency with identifying potential mitigation measures for the Proposed Project, including:

- Chapter 11 of SCAQMD's CEQA Air Quality Handbook
- SCAQMD's CEQA web pages available here: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/mitigation-measures-and-control-efficiencies
- SCAQMD's Rule 403 – Fugitive Dust, and the Implementation Handbook for controlling construction-related emissions and Rule 1403 – Asbestos Emissions from Demolition/Renovation Activities
- SCAQMD's Mitigation Monitoring and Reporting Plan (MMRP) for the 2016 Air Quality Management Plan (2016 AQMP) available here (starting on page 86): http://www.aqmd.gov/docs/default-source/Agendas/Governing-Board/2017/2017-mar3-035.pdf
- CAPCOA's *Quantifying Greenhouse Gas Mitigation Measures* available here: http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf

Additional mitigation measures for operational air quality impacts from mobile sources that the Lead Agency should consider in the Draft EIR may include the following:

- Require the use of 2010 and newer haul trucks (e.g., material delivery trucks and soil import/export). In the event that that 2010 model year or newer diesel haul trucks cannot be obtained, provide documentation as information becomes available and use trucks that meet EPA 2007 model year NOx emissions requirements[3], at a minimum. Additionally, consider other measures such as incentives, phase-in schedules for clean trucks, etc.
- Have truck routes clearly marked with trailblazer signs, so that trucks will not enter residential areas.
- Limit the daily number of trucks allowed at the Proposed Project to levels analyzed in the CEQA document. If higher daily truck volumes are anticipated to visit the site, the Lead Agency should commit to re-evaluating the Proposed Project through CEQA prior to allowing this land use or higher activity level.
- Provide electric vehicle (EV) Charging Stations (see the discussion below regarding EV charging stations).
- Should the Proposed Project generate significant regional emissions, the Lead Agency should require mitigation that requires accelerated phase-in for non-diesel powered trucks. For example, natural gas trucks, including Class 8 HHD trucks, are commercially available today. Natural gas trucks can provide a substantial reduction in health risks, and may be more financially feasible

[3] Based on a review of the California Air Resources Board's diesel truck regulations, 2010 model year diesel haul trucks should have already been available and can be obtained in a successful manner for the project construction California Air Resources Board. March 2016. Available at: http://www.truckload.org/tca/files/ccLibraryFiles/Filename/000000003422/California-Clean-Truck-and-Trailer-Update.pdf (See slide #23).

today due to reduced fuel costs compared to diesel. In the Final CEQA document, the Lead Agency should require a phase-in schedule for these cleaner operating trucks to reduce any significant adverse air quality impacts. SCAQMD staff is available to discuss the availability of current and upcoming truck technologies and incentive programs with the Lead Agency.

- Trucks that can operate at least partially on electricity have the ability to substantially reduce the significant NOx impacts from this project. Further, trucks that run at least partially on electricity are projected to become available during the life of the project as discussed in the 2016-2040 Regional Transportation Plan/Sustainable Communities Strategy (2016-2040 RTP/SCS)[4]. It is important to make this electrical infrastructure available when the project is built so that it is ready when this technology becomes commercially available. The cost of installing electrical charging equipment onsite is significantly cheaper if completed when the project is built compared to retrofitting an existing building. Therefore, SCAQMD staff recommends the Lead Agency require the Proposed Project and other plan areas that allow truck parking to be constructed with the appropriate infrastructure to facilitate sufficient electric charging for trucks to plug-in. Similar to the City of Los Angeles requirements for all new projects, SCAQMD staff recommends that the Lead Agency require at least 5% of all vehicle parking spaces (including for trucks) include EV charging stations[5]. Further, electrical hookups should be provided at the onsite truck stop for truckers to plug in any onboard auxiliary equipment. At a minimum, electrical panels should appropriately sized to allow for future expanded use.
- Design the industrial building such that entrances and exits are such that trucks are not traversing past neighbors or other sensitive receptors.
- Design the industrial building such that any check-in point for trucks is well inside the Proposed Project site to ensure that there are no trucks queuing outside of the facility.
- Design the industrial building to ensure that truck traffic within the Proposed Project site is located away from the property line(s) closest to its residential or sensitive receptor neighbors.
- Restrict overnight parking in residential areas.
- Establish overnight parking within the industrial building where trucks can rest overnight.
- Establish area(s) within the Proposed Project site for repair needs.
- Develop, adopt and enforce truck routes both in and out of city, and in and out of facilities.
- Create a buffer zone of at least 300 meters (roughly 1,000 feet), which can be office space, employee parking, greenbelt, etc. between the Proposed Project and sensitive receptors.

Additional mitigation measures for operational air quality impacts from other area sources that the Lead Agency should consider in the Draft EIR may include the following:

- Maximize use of solar energy including solar panels; installing the maximum possible number of solar energy arrays on the building roofs and/or on the Project site to generate solar energy for the facility.
- Maximize the planting of trees in landscaping and parking lots.
- Use light colored paving and roofing materials.
- Utilize only Energy Star heating, cooling, and lighting devices, and appliances.
- Install light colored "cool" roofs and cool pavements.
- Require use of electric or alternatively fueled sweepers with HEPA filters.
- Use of water-based or low VOC cleaning products.

[4] Southern California Association of Governments. http://scagrtpscs.net/Pages/FINAL2016RTPSCS.aspx.
[5] City of Los Angeles. http://ladbs.org/LADBSWeb/LADBS_Forms/Publications/LAGreenBuildingCodeOrdinance.pdf.

Alternatives

In the event that the Proposed Project generates significant adverse air quality impacts, CEQA requires the consideration and discussion of alternatives to the project or its location which are capable of avoiding or substantially lessening any of the significant effects of the project. The discussion of a reasonable range of potentially feasible alternatives, including a "no project" alternative, is intended to foster informed decision-making and public participation. Pursuant to CEQA Guidelines Section 15126.6(d), the Draft EIR shall include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the Proposed Project.

Permits

In the event that the Proposed Project requires a permit from SCAQMD, SCAQMD should be identified as a responsible agency for the Proposed Project. For more information on permits, please visit SCAQMD webpage at: http://www.aqmd.gov/home/permits. Questions on permits can be directed to SCAQMD's Engineering and Permitting staff at (909) 396-3385.

Data Sources

SCAQMD rules and relevant air quality reports and data are available by calling SCAQMD's Public Information Center at (909) 396-2039. Much of the information available through the Public Information Center is also available at SCAQMD's webpage at: http://www.aqmd.gov.

SCAQMD staff is available to work with the Lead Agency to ensure that project air quality impacts are accurately evaluated and any significant impacts are mitigated where feasible. If you have any questions regarding this letter, please contact me at lsun@aqmd.gov or call me at (909) 396-3308.

Sincerely,

Lijin Sun

Lijin Sun, J.D.
Program Supervisor, CEQA IGR
Planning, Rule Development & Area Sources

LS
LAC171115-02
Control Number

LOZEAU DRURY LLP

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Via Email and U.S. Mail

December 6, 2017

Julia Descoteaux, Associate Planner
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Richard Sandzimier, Planning
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14177 Frederick Street
Moreno Valley, CA 92553
richardsa@moval.org

Re: CEQA and Land Use Notice Request for the Brodiaea Commerce Center, SCH2017111042

Dear Ms. Descoteaux, Mr. Brock, Ms. Jacquez-Nares, and Mr. Sandzimier:

I am writing on behalf of the Laborers International Union of North America, Local Union 1184 and its members living in Riverside County and/or the City of Moreno Valley ("LiUNA"), regarding the Brodiaea Commerce Center, aka SCH2017111042, Plot Plan (PEN17-0143), and Change of Zone (PEN17-0144) including all actions related or referring to the proposed development and construction of a 262,398 sf warehouse facility located on 11.8 acres at the cross of Brodiaea Ave and Heacock St on Parcel nos: 297-170-036, and 297-170-038, in the City of Moreno Valley ("Project").

We hereby request that the City of Moreno Valley ("City") send by electronic mail, if possible or U.S. Mail to our firm at the address below notice of any and all actions or hearings related to activities undertaken, authorized, approved, permitted, licensed, or certified by the City and any of its subdivisions, and/or supported, in whole or in part, through contracts, grants, subsidies, loans or other forms of assistance from the City including, but not limited to the following:

- Notice of any public hearing in connection with the Project as required by California Planning and Zoning Law pursuant to Government Code Section 65091.

- Any and all notices prepared for the Project pursuant to the California Environmental Quality Act ("CEQA"), including, but not limited to:

- Notices of any public hearing held pursuant to CEQA.
- Notices of determination that an Environmental Impact Report ("EIR") is required for a project, prepared pursuant to Public Resources Code Section 21080.4.
- Notices of any scoping meeting held pursuant to Public Resources Code Section 21083.9.
- Notices of preparation of an EIR or a negative declaration for a project, prepared pursuant to Public Resources Code Section 21092.
- Notices of availability of an EIR or a negative declaration for a project, prepared pursuant to Public Resources Code Section 21152 and Section 15087 of Title 14 of the California Code of Regulations.
- Notices of approval and/or determination to carry out a project, prepared pursuant to Public Resources Code Section 21152 or any other provision of law.
- Notices of approval or certification of any EIR or negative declaration, prepared pursuant to Public Resources Code Section 21152 or any other provision of law.
- Notices of determination that a project is exempt from CEQA, prepared pursuant to Public Resources Code section 21152 or any other provision of law.
- Notice of any Final EIR prepared pursuant to CEQA.
- Notice of determination, prepared pursuant to Public Resources Code Section 21108 or Section 21152.

Please note that we are requesting notices of CEQA actions and notices of any public hearings to be held under any provision of Title 7 of the California Government Code governing California Planning and Zoning Law. **This request is filed pursuant to Public Resources Code Sections 21092.2 and 21167(f), and Government Code Section 65092**, which requires agencies to mail such notices to any person who has filed a written request for them with the clerk of the agency's governing body.

Please send notice by electronic mail, if possible or U.S. Mail to:

Richard Drury
Theresa Rettinghouse
Lozeau Drury LLP
410 12th Street, Suite 250
Oakland, CA 94607
510 836-4200
richard@lozeaudrury.com
theresa@lozeaudrury.com

Please call if you have any questions. Thank you for your attention to this matter.

Sincerely,

Theresa Rettinghouse

Theresa Rettinghouse
Paralegal
Lozeau | Drury LLP

STATE OF CALIFORNIA
NATIVE AMERICAN HERITAGE COMMISSION
Environmental and Cultural Department
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691
Phone (916) 373-3710

Edmund G. Brown Jr., Governor

RECEIVED
DEC 0 4 2017
CITY OF MORENO VALLEY
Planning Division

November 17, 2017

Julia Descoteaux
City of Moreno Valley
14177 Frederick Street
Moreno Valley, CA 92552-0805

Sent via e-mail: juliad@moval.org

RE: SCH# 2017111042; Brodiaea Commerce Center Project; Riverside County, California

Dear Ms. Descoteaux:

The Native American Heritage Commission has received the Notice of Preparation (NOP) for Draft Environmental Impact Report for the project referenced above. The California Environmental Quality Act (CEQA) (Pub. Resources Code § 21000 et seq.), specifically Public Resources Code section 21084.1, states that a project that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment. (Pub. Resources Code § 21084.1; Cal. Code Regs., tit.14, § 15064.5 (b) (CEQA Guidelines Section 15064.5 (b)). If there is substantial evidence, in light of the whole record before a lead agency, that a project may have a significant effect on the environment, an environmental impact report (EIR) shall be prepared. (Pub. Resources Code § 21080 (d); Cal. Code Regs., tit. 14, § 15064 subd. (a)(1) (CEQA Guidelines § 15064 (a)(1)). In order to determine whether a project will cause a substantial adverse change in the significance of a historical resource, a lead agency will need to determine whether there are historical resources with the area of project effect (APE).

CEQA was amended significantly in 2014. Assembly Bill 52 (Gatto, Chapter 532, Statutes of 2014) (AB 52) amended CEQA to create a **separate category of cultural resources**, "tribal cultural resources" (Pub. Resources Code § 21074) and provides that a project with an effect that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment (Pub. Resources Code § 21084.2). Please reference California Natural Resources Agency (2016) "Final Text for tribal cultural resources update to Appendix G: Environmental Checklist Form," http://resources.ca.gov/ceqa/docs/ab52/Clean-final-AB-52-App-G-text-Submitted.pdf. Public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource. (Pub. Resources Code § 21084.3 (a)). **AB 52 applies to any project for which a notice of preparation or a notice of negative declaration or mitigated negative declaration is filed on or after July 1, 2015.** If your project involves the adoption of or amendment to a general plan or a specific plan, or the designation or proposed designation of open space, on or after March 1, 2005, it may also be subject to Senate Bill 18 (Burton, Chapter 905, Statutes of 2004) (SB 18). **Both SB 18 and AB 52 have tribal consultation requirements**. If your project is also subject to the federal National Environmental Policy Act (42 U.S.C. § 4321 et seq.) (NEPA), the tribal consultation requirements of Section 106 of the National Historic Preservation Act of 1966 (154 U.S.C. 300101, 36 C.F.R. § 800 et seq.) may also apply.

The NAHC recommends **lead agencies consult with all California Native American tribes** that are traditionally and culturally affiliated with the geographic area of your proposed project as early as possible in order to avoid inadvertent discoveries of Native American human remains and best protect tribal cultural resources. Below is a brief summary of portions of AB 52 and SB 18 as well as the NAHC's recommendations for conducting cultural resources assessments. **Consult your legal counsel about compliance with AB 52 and SB 18 as well as compliance with any other applicable laws**.

AB 52

AB 52 has added to CEQA the additional requirements listed below, along with many other requirements:

1. Fourteen Day Period to Provide Notice of Completion of an Application/Decision to Undertake a Project: Within fourteen (14) days of determining that an application for a project is complete or of a decision by a public agency to undertake a project, a **lead agency** shall provide formal notification to a designated contact of, or tribal representative of, traditionally and culturally affiliated California Native American tribes that have requested notice, to be accomplished by at least one written notice that includes:
   - **a.** A brief description of the project.
   - **b.** The lead agency contact information.
   - **c.** Notification that the California Native American tribe has 30 days to request consultation. (Pub. Resources Code § 21080.3.1 (d)).
   - **d.** A "California Native American tribe" is defined as a Native American tribe located in California that is on the contact list maintained by the NAHC for the purposes of Chapter 905 of Statutes of 2004 (SB 18). (Pub. Resources Code § 21073).

2. Begin Consultation Within 30 Days of Receiving a Tribe's Request for Consultation and Before Releasing a Negative Declaration, Mitigated Negative Declaration, or Environmental Impact Report: A **lead agency** shall begin the consultation process within 30 days of receiving a request for consultation from a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project. (Pub. Resources Code § 21080.3.1, subds. (d) and (e)) and prior to the release of a negative declaration, mitigated negative declaration or environmental impact report. (Pub. Resources Code § 21080.3.1(b)).
   - **a.** For purposes of AB 52, "consultation shall have the same meaning as provided in Gov. Code § 65352.4 (SB 18). (Pub. Resources Code § 21080.3.1 (b)).

3. Mandatory Topics of Consultation If Requested by a Tribe: The following topics of consultation, if a tribe requests to discuss them, are mandatory topics of consultation:
   - **a.** Alternatives to the project.
   - **b.** Recommended mitigation measures.
   - **c.** Significant effects. (Pub. Resources Code § 21080.3.2 (a)).

4. Discretionary Topics of Consultation: The following topics are discretionary topics of consultation:
   - **a.** Type of environmental review necessary.
   - **b.** Significance of the tribal cultural resources.
   - **c.** Significance of the project's impacts on tribal cultural resources.
   - **d.** If necessary, project alternatives or appropriate measures for preservation or mitigation that the tribe may recommend to the lead agency. (Pub. Resources Code § 21080.3.2 (a)).

5. Confidentiality of Information Submitted by a Tribe During the Environmental Review Process: With some exceptions, any information, including but not limited to, the location, description, and use of tribal cultural resources submitted by a California Native American tribe during the environmental review process shall not be included in the environmental document or otherwise disclosed by the lead agency or any other public agency to the public, consistent with Government Code sections 6254 (r) and 6254.10. Any information submitted by a California Native American tribe during the consultation or environmental review process shall be published in a confidential appendix to the environmental document unless the tribe that provided the information consents, in writing, to the disclosure of some or all of the information to the public. (Pub. Resources Code § 21082.3 (c)(1)).

6. Discussion of Impacts to Tribal Cultural Resources in the Environmental Document: If a project may have a significant impact on a tribal cultural resource, the lead agency's environmental document shall discuss both of the following:
   - **a.** Whether the proposed project has a significant impact on an identified tribal cultural resource.
   - **b.** Whether feasible alternatives or mitigation measures, including those measures that may be agreed to pursuant to Public Resources Code section 21082.3, subdivision (a), avoid or substantially lessen the impact on the identified tribal cultural resource. (Pub. Resources Code § 21082.3 (b)).

7. Conclusion of Consultation: Consultation with a tribe shall be considered concluded when either of the following occurs:
   a. The parties agree to measures to mitigate or avoid a significant effect, if a significant effect exists, on a tribal cultural resource; or
   b. A party, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached. (Pub. Resources Code § 21080.3.2 (b)).

8. Recommending Mitigation Measures Agreed Upon in Consultation in the Environmental Document: Any mitigation measures agreed upon in the consultation conducted pursuant to Public Resources Code section 21080.3.2 shall be recommended for inclusion in the environmental document and in an adopted mitigation monitoring and reporting program, if determined to avoid or lessen the impact pursuant to Public Resources Code section 21082.3, subdivision (b), paragraph 2, and shall be fully enforceable. (Pub. Resources Code § 21082.3 (a)).

9. Required Consideration of Feasible Mitigation: If mitigation measures recommended by the staff of the lead agency as a result of the consultation process are not included in the environmental document or if there are no agreed upon mitigation measures at the conclusion of consultation, or if consultation does not occur, and if substantial evidence demonstrates that a project will cause a significant effect to a tribal cultural resource, the lead agency shall consider feasible mitigation pursuant to Public Resources Code section 21084.3 (b). (Pub. Resources Code § 21082.3 (e)).

10. Examples of Mitigation Measures That, If Feasible, May Be Considered to Avoid or Minimize Significant Adverse Impacts to Tribal Cultural Resources:
    a. Avoidance and preservation of the resources in place, including, but not limited to:
        i. Planning and construction to avoid the resources and protect the cultural and natural context.
        ii. Planning greenspace, parks, or other open space, to incorporate the resources with culturally appropriate protection and management criteria.
    b. Treating the resource with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource, including, but not limited to, the following:
        i. Protecting the cultural character and integrity of the resource.
        ii. Protecting the traditional use of the resource.
        iii. Protecting the confidentiality of the resource.
    c. Permanent conservation easements or other interests in real property, with culturally appropriate management criteria for the purposes of preserving or utilizing the resources or places.
    d. Protecting the resource. (Pub. Resource Code § 21084.3 (b)).
    e. Please note that a federally recognized California Native American tribe or a nonfederally recognized California Native American tribe that is on the contact list maintained by the NAHC to protect a California prehistoric, archaeological, cultural, spiritual, or ceremonial place may acquire and hold conservation easements if the conservation easement is voluntarily conveyed. (Civ. Code § 815.3 (c)).
    f. Please note that it is the policy of the state that Native American remains and associated grave artifacts shall be repatriated. (Pub. Resources Code § 5097.991).

11. Prerequisites for Certifying an Environmental Impact Report or Adopting a Mitigated Negative Declaration or Negative Declaration with a Significant Impact on an Identified Tribal Cultural Resource: An environmental impact report may not be certified, nor may a mitigated negative declaration or a negative declaration be adopted unless one of the following occurs:
    a. The consultation process between the tribes and the lead agency has occurred as provided in Public Resources Code sections 21080.3.1 and 21080.3.2 and concluded pursuant to Public Resources Code section 21080.3.2.
    b. The tribe that requested consultation failed to provide comments to the lead agency or otherwise failed to engage in the consultation process.
    c. The lead agency provided notice of the project to the tribe in compliance with Public Resources Code section 21080.3.1 (d) and the tribe failed to request consultation within 30 days. (Pub. Resources Code § 21082.3 (d)).

    This process should be documented in the Cultural Resources section of your environmental document.

The NAHC's PowerPoint presentation titled, "Tribal Consultation Under AB 52: Requirements and Best Practices" may be found online at: http://nahc.ca.gov/wp-content/uploads/2015/10/AB52TribalConsultation_CalEPAPDF.pdf

SB 18

SB 18 applies to local governments and requires **local governments** to contact, provide notice to, refer plans to, and consult with tribes prior to the adoption or amendment of a general plan or a specific plan, or the designation of open space. (Gov. Code § 65352.3). Local governments should consult the Governor's Office of Planning and Research's "Tribal Consultation Guidelines," which can be found online at: https://www.opr.ca.gov/docs/09_14_05_Updated_Guidelines_922.pdf

Some of SB 18's provisions include:

1. Tribal Consultation: If a local government considers a proposal to adopt or amend a general plan or a specific plan, or to designate open space it is required to contact the appropriate tribes identified by the NAHC by requesting a "Tribal Consultation List." If a tribe, once contacted, requests consultation the local government must consult with the tribe on the plan proposal. **A tribe has 90 days from the date of receipt of notification to request consultation unless a shorter timeframe has been agreed to by the tribe.** (Gov. Code § 65352.3 (a)(2)).
2. No Statutory Time Limit on SB 18 Tribal Consultation. There is no statutory time limit on SB 18 tribal consultation.
3. Confidentiality: Consistent with the guidelines developed and adopted by the Office of Planning and Research pursuant to Gov. Code section 65040.2, the city or county shall protect the confidentiality of the information concerning the specific identity, location, character, and use of places, features and objects described in Public Resources Code sections 5097.9 and 5097.993 that are within the city's or county's jurisdiction. (Gov. Code § 65352.3 (b)).
4. Conclusion of SB 18 Tribal Consultation: Consultation should be concluded at the point in which:
    a. The parties to the consultation come to a mutual agreement concerning the appropriate measures for preservation or mitigation; or
    b. Either the local government or the tribe, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached concerning the appropriate measures of preservation or mitigation. (Tribal Consultation Guidelines, Governor's Office of Planning and Research (2005) at p. 18).

Agencies should be aware that neither AB 52 nor SB 18 precludes agencies from initiating tribal consultation with tribes that are traditionally and culturally affiliated with their jurisdictions before the timeframes provided in AB 52 and SB 18. For that reason, we urge you to continue to request Native American Tribal Contact Lists and "Sacred Lands File" searches from the NAHC. The request forms can be found online at: http://nahc.ca.gov/resources/forms/

NAHC Recommendations for Cultural Resources Assessments

To adequately assess the existence and significance of tribal cultural resources and plan for avoidance, preservation in place, or barring both, mitigation of project-related impacts to tribal cultural resources, the NAHC recommends the following actions:

1. Contact the appropriate regional California Historical Research Information System (CHRIS) Center (http://ohp.parks.ca.gov/?page_id=1068) for an archaeological records search. The records search will determine:
    a. If part or all of the APE has been previously surveyed for cultural resources.
    b. If any known cultural resources have been already been recorded on or adjacent to the APE.
    c. If the probability is low, moderate, or high that cultural resources are located in the APE.
    d. If a survey is required to determine whether previously unrecorded cultural resources are present.

2. If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.
    a. The final report containing site forms, site significance, and mitigation measures should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum and not be made available for public disclosure.

b. The final written report should be submitted within 3 months after work has been completed to the appropriate regional CHRIS center.

3. Contact the NAHC for:
   a. A Sacred Lands File search. Remember that tribes do not always record their sacred sites in the Sacred Lands File, nor are they required to do so. A Sacred Lands File search is not a substitute for consultation with tribes that are traditionally and culturally affiliated with the geographic area of the project's APE.
   b. A Native American Tribal Consultation List of appropriate tribes for consultation concerning the project site and to assist in planning for avoidance, preservation in place, or, failing both, mitigation measures.

4. Remember that the lack of surface evidence of archaeological resources (including tribal cultural resources) does not preclude their subsurface existence.
   a. Lead agencies should include in their mitigation and monitoring reporting program plan provisions for the identification and evaluation of inadvertently discovered archaeological resources per Cal. Code Regs., tit. 14, section 15064.5(f) (CEQA Guidelines section 15064.5(f)). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American with knowledge of cultural resources should monitor all ground-disturbing activities.
   b. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the disposition of recovered cultural items that are not burial associated in consultation with culturally affiliated Native Americans.
   c. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the treatment and disposition of inadvertently discovered Native American human remains. Health and Safety Code section 7050.5, Public Resources Code section 5097.98, and Cal. Code Regs., tit. 14, section 15064.5, subdivisions (d) and (e) (CEQA Guidelines section 15064.5, subds. (d) and (e)) address the processes to be followed in the event of an inadvertent discovery of any Native American human remains and associated grave goods in a location other than a dedicated cemetery.

Please contact me if you need any additional information at gayle.totton@nahc.ca.gov.

Sincerely,

Gayle Totton, M.A., PhD.
Associate Governmental Program Analyst
(916) 373-3714

cc: State Clearinghouse

Department of Toxic Substances Control

Matthew Rodriquez
Secretary for
Environmental Protection

Barbara A. Lee, Director
5796 Corporate Avenue
Cypress, California 90630

Edmund G. Brown Jr.
Governor

December 1, 2017

RECEIVED
DEC 06 2017
CITY OF MORENO VALLEY
Planning Division

Ms. Julia Descoteaux
City of Moreno Valley
14177 Frederick Street
Moreno Valley, California 92552
juliad@moval.org

NOTICE OF PREPARATION (NOP) FOR AN ENVIRONMENTAL IMPACT REPORT (EIR) FOR BRODIAEA COMMERCE PROJECT (SCH# 2017111042)

Dear Ms. Descoteaux:

The Department of Toxic Substances Control (DTSC) has reviewed the subject NOP. The following project description is stated in the NOP: "The Project Applicant proposes to construct a 262,398-square foot (s.f.) warehouse facility on the subject property. The proposed facility would contain 252,398 s.f. of warehouse space and 10,000 s.f. of office space. The office space would be located in the northeastern and southeastern corners of the building. Automobile parking would be provided on the north and south sides of the building; loading docks and truck parking areas are located on the west side of the building."

Based on the review of the submitted document, DTSC has the following comments:

1. The EIR should identify and determine whether current or historic uses at the project site may have resulted in any release of hazardous wastes/substances. A Phase I Environmental Site Assessment may be appropriate to identify any recognized environmental conditions.

2. If there are any recognized environmental conditions in the project area, then proper investigation, sampling and remedial actions overseen by the appropriate regulatory agencies should be conducted prior to the new development or any construction.

3. If the project plans include discharging wastewater to a storm drain, you may be required to obtain an NPDES permit from the overseeing Regional Water Quality Control Board (RWQCB).

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4. If the proposed project involves the demolition of existing structures, lead-based paints or products, mercury, and asbestos containing materials (ACMs) should be addressed in accordance with all applicable and relevant laws and regulations.

5. If the site was used for agricultural or related activities, residual pesticides may be present in onsite soil. DTSC recommends investigation and mitigation, as necessary, to address potential impact to human health and environment from residual pesticides.

6. DTSC recommends evaluation, proper investigation and mitigation, if necessary, of onsite areas with current or historic PCB-containing transformers.

7. If the project development involves soil export/import, proper evaluation is required. If soil contamination is suspected or observed in the project area, then excavated soil should be sampled prior to export/disposal. If the soil is contaminated, it should be disposed of properly in accordance with all applicable and relevant laws and regulations. In addition, if imported soil was used as backfill onsite and/or backfill soil will be imported, DTSC recommends proper evaluation/sampling as necessary to ensure the backfill material is free of contamination.

8. If during construction/demolition of the project, soil and/or groundwater contamination is suspected, construction/demolition in the area should cease and appropriate health and safety procedures should be implemented. If it is determined that contaminated soil and/or groundwater exist, the PEIR should identify how any required investigation and/or remediation will be conducted and the appropriate government agency to provide regulatory oversight.

If you have any questions regarding this letter, please contact me at (714) 484-5380 or email at Johnson.Abraham@dtsc.ca.gov.

Sincerely,

Johnson P. Abraham
Project Manager
Brownfields Restoration and School Evaluation Branch
Brownfields and Environmental Restoration Program – Cypress

kl/sh/ja

cc: See next page.

cc: Governor's Office of Planning and Research (via e-mail)
State Clearinghouse
P.O. Box 3044
Sacramento, California 95812-3044
State.clearinghouse@opr.ca.gov

Mr. Dave Kereazis (via e-mail)
Office of Planning & Environmental Analysis
Department of Toxic Substances Control
Dave.Kereazis@dtsc.ca.gov

Mr. Shahir Haddad, Chief (via e-mail)
Schools Evaluation and Brownfields Cleanup
Brownfields and Environmental Restoration Program - Cypress
Shahir.Haddad@dtsc.ca.gov

CEQA# 2017111042

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December 13, 2017

VIA EMAIL

Ms. Julia Descoteaux
City of Moreno Valley
14177 Frederick Street
Moreno Valley, CA 92552
juliad@moval.org

Re: Notice of Preparation for the Brodiaea Commerce Center

Dear Ms. Descoteaux:

This law firm represents the Southwest Regional Council of Carpenters (Southwest Carpenters) and submits this letter on the above referenced project on its behalf.

Southwest Carpenters represents 50,000 union carpenters in six states, including Southern California and has a keen interest on the environmental impacts of development projects, such as the Brodiaea Commerce Center. The City of Moreno Valley (City) prepared an Initial Study for the Brodiaea Commerce Center (Project) and concluded that the Project may have a significant effect on the environment warranting preparation of an Environmental Impact Report (EIR). The comments below focus on specific environmental concerns that Southwest Carpenters has on this Project. These comments should not be interpreted as being exhaustive by any means, but are simply preliminary concerns based on the Initial Study. Southwest Carpenters look forward to reviewing the EIR and its full discussion of environmental impacts, including alternatives and mitigations.

The Project includes construction and operation of a 262,398-square foot warehouse building on an approximately 11.8-acre site located within the City. The Project is requesting discretionary approvals from the City, including a zoning change from "Business Park" with a Mixed-Use Neighborhood overlay to "Light Industrial." The Initial Study found that the following environmental factors could be affected by the Project:

- Aesthetics
- Air Quality
- Biological Resources
- Cultural Resources

- Geology/Soils
- Greenhouse Gas Emissions
- Hazards & Hazardous Materials
- Hydrology/Water Quality
- Land Use/Planning
- Noise
- Transportation/Traffic
- Tribal Cultural Resource
- Utilities/Service Systems

Southwest Carpenters' specific concerns regarding some of these potential impacts are detailed below.

Aesthetics

Given that a zoning change is proposed, the EIR should specifically explain the development standards and design guidelines in the Moreno Valley Zoning Ordinance that apply to this Project and how the proposed Project will satisfy such standards and guidelines. The Initial Study states that the Project may result in a potentially significant impact to the existing visual character or quality of the site and its surrounding. The EIR should establish the existing baseline that will allow the public to determine the current visual character of the site and how the Project will impact the quality of the site. The EIR should also discuss the proposed Project's impacts to aesthetics compared to development under existing zoning.

The Initial Study stated that the Project would be required to adhere to the provisions in the City's Municipal Code pertaining to design standards for outdoor lighting. Given that the Project is a large warehouse project, the EIR should explain the proposed design of the proposed project and analyze how the proposal will adhere to standards for outdoor lighting to ensure adequate lighting for public safety, while minimizing light pollution in a manner that complies with the City's design standards.

Agriculture and Forestry Resources

While the Initial Study found that the Project has no potential to conflict with existing zoning for agricultural use, the document states that the entire Project site is classified as "Field Cropland." The EIR should explain why a site that is classified as "Field Cropland" is not considered a site for agricultural use. The Initial Study did not disclose information about whether there is any soil contamination from any preexisting agricultural use and Southwest

Carpenters takes any potential environmental impact to worker safety seriously. The EIR should disclose any pertinent information as to past agricultural use of the site.

Air Quality

The Initial Study found that the proposed Project has the potential to (1) conflict with or obstruct implementation of the South Coast Air Quality Management District's Air Quality Management Plan (AQMP); (2) violate or contribute substantially to an existing or projected air quality violation; (3) result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under applicable federal or state ambient air quality standards; (4) expose sensitive receptors to substantial pollutant concentrations; and, (5) create objectionable odors affecting a substantial number of people.

The Initial Study relies on the South Coast Air Quality Management District's AQMP to set a significance threshold regarding air quality. The EIR should set forth in plain language the quantitative significance threshold for air quality that it is relying on to assess the Project's impacts. Specifically, the EIR should explain how both the Project's short-term construction and operational activities will impact the daily significance thresholds established by the South Coast Air Quality Management District as well as how the Project's long-term operational activities, including vehicle miles traveled, might impact the Air Quality Management District's significance thresholds. While the EIR sets forth to prepare an air quality technical report, the EIR should digest and summarize the technical report's findings to produce a summary in plain language as to how the Project may impact the Air Quality Management District's implementation of the AQMP.

In addition, the Initial Study states that Project-related air emissions will be modeled to calculate estimated construction-source and operational-source air quality emissions for criteria pollutants from direct and indirect sources. The South Coast Air Basin is a non-attainment area for various state and federal air quality standards. The Initial Study lists federal ozone and particulate matter as examples of standards that are currently in non-attainment. The EIR should contain an exhaustive discussion of all criteria pollutants for which the South Coast Air Basin is non-attainment and quantify the Project's anticipated pollutant emissions. In addition, the EIR should evaluate how such emissions may result in a considerable net increase of any criteria pollutant. The EIR should evaluate the Project's anticipated pollutant emissions and how such projected impact may expose sensitive receptors, i.e., residential communities, to substantial pollutant concentrations.

Finally, given the region's persistent air quality woes, the EIR must analyze the cumulative impacts of this Project. The dire status of air quality in the City and region means that even greater care and attention is needed to analyze the direct and cumulative impacts of this Project.

Indeed, in an analogous case,

> the significance of an activity depends upon the setting. (Guidelines § 15064, subd. (b)). The relevant question to be addressed in the EIR is not the relative amount of precursors emitted by the project when compared with preexisting emissions, but whether any additional amount of precursor emissions should be considered significant in light of the serious nature of the ozone problems in this air basin.

Kings County Farm Bureau v. City of Hanford (1990) 221 Cal.App.3d 692, 718. "Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time." CEQA Guidelines § 15355.

Biological Resources

If the EIR establishes that the site has the potential to contain a sensitive or special status species pursuant to applicable plans, policies, and regulations, the EIR should detail how the Project will avoid impacts to such species. The Initial Study states that the Project site is not identified for conservation as part of the Western Riverside County Multiple Species Habitat Conservation Plan (MSCHP) and therefore not considered to be a wildlife movement corridor. The EIR should specify how the MSCHP interfaces with this project and why the site is not a wildlife movement corridor by virtue of the MSCHP. The EIR also states that the MSCHP requires preparation of a habitat assessment for the western burrowing owl. The EIR should expand on the findings of any such habitat assessment and document any feasible actions that the City may take to ameliorate impacts to the western burrowing owl. Finally, while the Initial Study states that payment of mitigation fees to the MSCHP is required, the EIR should not neglect discussion of actual impact on any sensitive or special status species as a matter of public disclosure. To the extent that development of the Project site will impact protected species under the federal Migratory Bird Treaty Act, the EIR should set forth which species may be impacted and how the Project will seek to minimize and avoid such impacts.

Geology and Soils

The Initial Study also found that the Project is proposed to be located in a seismically active area of Southern California. While the City will require that the proposed structures be constructed in accordance with Building Code standards, including Green Building Code

standards, the EIR should also set forth how such structures will be impacted by the geotechnical hazards associated with the area. The EIR should explain with specificity how the Project proposes to mitigate the impact associated with strong seismic ground shaking especially as it pertains to future buildings and safety of workers on the Project site. The EIR should summarize the findings of the geotechnical study that will be conducted for the Project site. The discussion should include any pertinent regulations including City ordinances which detail applicable standards for ground movement and other geotechnical evaluation.

Greenhouse Gas Emissions

The City must consider in its greenhouse gas analysis:

(1) The extent to which the project may increase or reduce greenhouse gas emissions as compared to the existing environmental setting;
(2) Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project
(3) The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions. Such requirements must be adopted by the relevant public agency through a public review process and must reduce or mitigate the project's incremental contribution of greenhouse gas emissions…

Center for Biological Diversity v. Department of Fish & Wildlife (2015) 62 Cal.4th 204, 217. A cursory discussion of the Project's impacts against SCAQMD's recommended industrial threshold would be insufficient to disclose to the public the Project's greenhouse gas impact.

Hazards and Hazardous Materials

The nearest school, Creekside Elementary School, is located less than half a mile away from the Project site. While the Project may not emit hazardous emissions within one-quarter mile of an existing or proposed school, the Project does propose to transport, store, and use hazardous materials on site. The EIR should discuss how storage of hazardous materials on a long-term basis as a part of Project operation will not create a significant hazard to the public or environment, and the EIR should disclose what kind of materials would be allowed to be stored in the warehouse site, and what kind of materials, if any, would not be allowed. The EIR should summarize the site-specific environmental assessment that will be prepared as a part of this EIR process.

Hydrology and Water Quality

The Initial Study discloses that the Project would alter the existing drainage pattern of the property. The EIR should disclose whether the public storm drain system, to which the stormwater runoff from the Project site would be discharged, has enough capacity for such discharge and how the increase in impervious surface area would impact any stormwater runoff. The site-specific hydrology study should analyze the current capacity of the public storm drain system and whether the increase in water flows existing the site would affect existing capacity levels in addition to impacts to erosion and flooding potential downstream.

Land Use and Planning

The Project also proposes to change the zoning designation of the Project site from "Business Park" with an overlay of Mixed Neighborhood to "Light Industrial." The EIR should explain how the change in zoning comports with the City's General Plan policies and whether any impacts would be created from the zoning change itself. The EIR should comprehensively evaluate the proposed Project's consistency with the proposed zoning change, as well as all other pertinent City plans, policies, and ordinances.

The EIR should explain the full applicability of the Western Riverside County Multiple Species Habitat Conservation Plan Fee Program to this Project, including the City's Ordinance implementing the MSHCP's fee program. To the extent a burrowing owl site assessment is required to be prepared, the EIR should set forth all feasible mitigation measures in the event that the site reveals burrowing owl habitat. The EIR should explain how the Project is consistent with the MSHCP.

Traffic

The Initial Study states that the proposed Project has the potential to adversely impact the local traffic circulation, on a direct or cumulatively considerable level. Any traffic study conducted for the Project should set forth both the current baseline of traffic volume, level of service, or any other pertinent baseline information as to current circulation levels. The EIR should quantify the project increase in total vehicle miles traveled and indicate where levels of service will decline. The EIR should discuss all applicable ordinances and policies that determine the threshold of significance for traffic in the area, and disclose how the Project may impact such thresholds. The Initial Study also revealed that traffic generated by the Project has the potential to impact the Riverside County Congestion Management Plan roadway network.

The EIR should analyze whether the Project is consistent with such regional management plan and the current state of this management plan.

Conclusion

The Southwest Carpenters looks forward to commenting on the EIR when the draft document is released for public review. These initial comments pertaining to the Initial Study's preliminary findings are not exhaustive and highlight the initial suite of environmental concerns of the Southwest Carpenters. In preparing the EIR, the lead agency should propose clear and achievable measures that will successfully mitigate impacts to a less than significant level.

We look forward to reviewing the draft EIR when it is released, and request being forwarded all other notices and documents pertaining to this Project. Thank you for your consideration of these comments.

Very truly yours,
WITTWER PARKIN LLP

William P. Parkin

cc: Client

Board of Education
Cleveland Johnson, President
Gary E. Baugh, Ed.S, Vice President
Susan Smith, Clerk
Jesus M. Holguin
Evan Morgan

Superintendent of Schools
Martinrex Kedziora, Ed.D.

Moreno Valley Unified School District

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951-571-7500
www.mvusd.net

The mission of Moreno Valley Unified School District is to ensure all students graduate high school prepared to successfully enter into higher education and/or pursue a viable career path.

December 6, 2017

CEIVED
1 1 2017

CITY OF MORENO VALLEY
Community Development Department
14177 Frederick Street
P.O. Box 88005
Moreno Valley, CA 92552

Attn: Julia Descoteaux

Subject: Response to NOP of a Draft EIR
Brodiaea Commerce Center
(Plot Plan PEN17-0143, Change of Zone 17-0144)

The Moreno Valley U.S.D. Facilities Department has reviewed the draft EIR for the above subject project. As we do not know the full intent of the developer for this project, we stipulate that we need to sit down with the developer of this project to vet out our concerns to come to a mutual agreement. In the meantime, we have the following preliminary comments.

(1) To avoid any impact to our school sites, we request that no routes to and from the proposed building pass by any school site. If this cannot be avoided, we request that anticipated routes and frequencies of travel by our school sites be submitted to the Moreno Valley Unified School District for our review and evaluation of impact from pollution, noise, and/or traffic.

(2) The Moreno Valley Unified School District requests that we reserve the right to seek mitigation for added costs to school facilities including, but not limited to, HVAC filtration, window and door sound insulation, and modifications to street widening and on-site drop-off zones.

It is our concern that there may be direct impacts to the two closest school sites to the proposed project: Badger Springs Middle School and Serrano Elementary School.

(3) With regard to the zone change to "Light Industrial" to allow for warehousing use, the Moreno Valley Unified School District requests that the City of Moreno Valley to defer the zone change and approve the project on an interim basis under a "Conditional Use" permit. This way the Moreno Valley Unified School District could actually measure the project's impact to our schools before a permanent zone change and project approval occurred.

(4) Correction needs to be made to whom developer impact fees are to be paid. Correction should name Moreno Valley Unified School District to receive developer impact fees (not Vale Verde Unified School District).

Thank you for the opportunity to respond to the DEIR on this project.

Best Regards,

Samer Alzubaidi
Director, Facilities Planning and Development
MORENO VALLEY U.S.D.
13911 Perris Blvd., Building A
Moreno Valley, CA 92553

/cla

STATE OF CALIFORNIA

GOVERNOR'S OFFICE *of* PLANNING AND RESEARCH

STATE CLEARINGHOUSE AND PLANNING UNIT

EDMUND G. BROWN JR.
GOVERNOR

KEN ALEX
DIRECTOR

Notice of Preparation

November 13, 2017

RECEIVED
NOV 16 2017
CITY OF MORENO VALLEY
Planning Division

To: Reviewing Agencies

Re: Brodiaea Commerce Center
SCH# 2017111042

Attached for your review and comment is the Notice of Preparation (NOP) for the Brodiaea Commerce Center draft Environmental Impact Report (EIR).

Responsible agencies must transmit their comments on the scope and content of the NOP, focusing on specific information related to their own statutory responsibility, within 30 days of receipt of the NOP from the Lead Agency. This is a courtesy notice provided by the State Clearinghouse with a reminder for you to comment in a timely manner. We encourage other agencies to also respond to this notice and express their concerns early in the environmental review process.

Please direct your comments to:

Julia Descoteaux
City of Moreno Valley
14177 Frederick Street
Moreno Valley, CA 92552-0805

with a copy to the State Clearinghouse in the Office of Planning and Research. Please refer to the SCH number noted above in all correspondence concerning this project.

If you have any questions about the environmental document review process, please call the State Clearinghouse at (916) 445-0613.

Sincerely,

Scott Morgan
Director, State Clearinghouse

Attachments
cc: Lead Agency

1400 10th Street P.O. Box 3044 Sacramento, California 95812-3044
(916) 445-0613 FAX (916) 323-3018 www.opr.ca.gov

Document Details Report
State Clearinghouse Data Base

SCH# 2017111042
Project Title Brodiaea Commerce Center
Lead Agency Moreno Valley, City of

Type NOP Notice of Preparation

Description Project proposes to develop a 262,398-sf warehouse facility on the project site. The project also includes site improvements, such as parking/loading areas, exterior lighting, storm water detention basin, ornamental landscaping, and utility infrastructure. Project would require a change of zone to change the property's zoning designation from business park mixed use with an overlay of mixed use neighborhood and business park to light industrial.

Lead Agency Contact

Name Julia Descoteaux
Agency City of Moreno Valley
Phone (951) 413-3209 **Fax**
email
Address 14177 Frederick Street
City Moreno Valley **State** CA **Zip** 92552-0805

Project Location

County Riverside
City Moreno Valley
Region
Cross Streets Brodiaea Ave and Heacock St
Lat / Long 33° 54' 54" N / 117° 14' 42" W
Parcel No. 297-170-036, -038
Township 3S **Range** 4W **Section** 13 **Base** SB

Proximity to:

Highways SR 60
Airports March Air Res. Base
Railways
Waterways
Schools MV USD
Land Use PLU: Vacant/undeveloped, Z&GP: Light industrial/business park

Project Issues Aesthetic/Visual; Air Quality; Archaeologic-Historic; Biological Resources; Drainage/Absorption; Geologic/Seismic; Noise; Toxic/Hazardous; Traffic/Circulation; Landuse; Cumulative Effects; Other Issues

Reviewing Agencies Resources Agency; Department of Parks and Recreation; Department of Water Resources; Department of Fish and Wildlife, Region 6; Office of Emergency Services, California; Native American Heritage Commission; Caltrans, Division of Aeronautics; California Highway Patrol; Caltrans, District 8; Air Resources Board, Major Industrial Projects; Resources, Recycling and Recovery; Department of Toxic Substances Control; Regional Water Quality Control Board, Region 8

Date Received 11/13/2017 **Start of Review** 11/13/2017 **End of Review** 12/12/2017

Note: Blanks in data fields result from insufficient information provided by lead agency.

Print Form

Appendix C

2017111042

Notice of Completion & Environmental Document Transmittal

Mail to: State Clearinghouse, P.O. Box 3044, Sacramento, CA 95812-3044 (916) 445-0613
For Hand Delivery/Street Address: 1400 Tenth Street, Sacramento, CA 95814

SCH #

Project Title: Brodiaea Commerce Center

Lead Agency: City of Moreno Valley
Contact Person: Julia Descoteaux
Mailing Address: 14177 Frederick Street
Phone: (951) 413-3209
City: Moreno Valley
Zip: 92552
County: Riverside

Project Location: County: Riverside
City/Nearest Community: Moreno Valley
Cross Streets: Brodiaea Ave. and Heacock St.
Zip Code: 92552
Longitude/Latitude (degrees, minutes and seconds): 33 ° 54 ′ 54 ″ N / 117 ° 14 ′ 42 ″ W
Total Acres: 11.8
Assessor's Parcel No.: 297-170-036 & 297-170-038
Section: 13
Twp.: 3S
Range: 4W
Base: San Bern.
Within 2 Miles: State Hwy #: State Route 60
Waterways: n/a
Airports: March Air Res. Base
Railways: n/a
Schools: MV Unified School Dist.

Document Type:

CEQA:
- [x] NOP
- [ ] Early Cons
- [ ] Neg Dec
- [ ] Mit Neg Dec
- [ ] Draft EIR
- [ ] Supplement/Subsequent EIR (Prior SCH No.) _____
- Other: _____
- [ ] NOI
- [ ] EA
- [ ] Draft EIS
- [ ] FONSI

Other:
- [ ] Joint Document
- [ ] Final Document
- [ ] Other: _____

Governor's Office of Planning & Research
NOV 13 2017
STATE CLEARINGHOUSE

Local Action Type:

- [ ] General Plan Update
- [ ] General Plan Amendment
- [ ] General Plan Element
- [ ] Community Plan
- [ ] Specific Plan
- [ ] Master Plan
- [ ] Planned Unit Development
- [x] Site Plan
- [x] Rezone
- [ ] Prezone
- [ ] Use Permit
- [ ] Land Division (Subdivision, etc.)
- [ ] Annexation
- [ ] Redevelopment
- [ ] Coastal Permit
- [ ] Other: _____

Development Type:

- [ ] Residential: Units _____ Acres _____
- [ ] Office: Sq.ft. _____ Acres _____ Employees _____
- [ ] Commercial: Sq.ft. _____ Acres _____ Employees _____
- [x] Industrial: Sq.ft. 262,398 Acres 11.8 Employees _____
- [ ] Educational: _____
- [ ] Recreational: _____
- [ ] Water Facilities: Type _____ MGD _____
- [ ] Transportation: Type _____
- [ ] Mining: Mineral _____
- [ ] Power: Type _____ MW _____
- [ ] Waste Treatment: Type _____ MGD _____
- [ ] Hazardous Waste: Type _____
- [ ] Other: _____

Project Issues Discussed in Document:

- [x] Aesthetic/Visual
- [ ] Agricultural Land
- [x] Air Quality
- [x] Archeological/Historical
- [x] Biological Resources
- [ ] Coastal Zone
- [x] Drainage/Absorption
- [ ] Economic/Jobs
- [ ] Fiscal
- [ ] Flood Plain/Flooding
- [ ] Forest Land/Fire Hazard
- [x] Geologic/Seismic
- [ ] Minerals
- [x] Noise
- [ ] Population/Housing Balance
- [ ] Public Services/Facilities
- [ ] Recreation/Parks
- [ ] Schools/Universities
- [ ] Septic Systems
- [ ] Sewer Capacity
- [ ] Soil Erosion/Compaction/Grading
- [ ] Solid Waste
- [x] Toxic/Hazardous
- [x] Traffic/Circulation
- [ ] Vegetation
- [x] Water Quality
- [ ] Water Supply/Groundwater
- [ ] Wetland/Riparian
- [ ] Growth Inducement
- [x] Land Use
- [x] Cumulative Effects
- [x] Other: Greenhouse Gas

Present Land Use/Zoning/General Plan Designation:

Present Land Use: Vacant/Undeveloped, Present Zoning & General Plan: Light Industrial/Business Park

Project Description: *(please use a separate page if necessary)*

Project proposes to develop a 262,398-square-foot warehouse facility on the Project site. The Project also includes site improvements, such as parking/loading areas, exterior lighting, storm water detention basin, ornamental landscaping, and utility infrastructure. Project would require a Change of Zone to change the property's zoning designation from "Business Park-Mixed Use with an overlay of Mixed Use Neighborhood" and "Business Park" to "Light Industrial."

Note: The State Clearinghouse will assign identification numbers for all new projects. If a SCH number already exists for a project (e.g. Notice of Preparation or previous draft document) please fill in.

Revised 2010

NOP Distribution List

County: Riverside OR

SCH# 2017111042

Resources Agency

- [x] **Resources Agency**
  Nadell Gayou
  - [ ] **Dept. of Boating & Waterways**
    Denise Peterson
  - [ ] **California Coastal Commission**
    Allyson Hitt
  - [ ] **Colorado River Board**
    Lisa Johansen
  - [ ] **Dept. of Conservation**
    Crina Chan
  - [ ] **Cal Fire**
    Dan Foster
  - [ ] **Central Valley Flood Protection Board**
    James Herota
  - [ ] **Office of Historic Preservation**
    Ron Parsons
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  Environmental Stewardship Section
  - [ ] **S.F. Bay Conservation & Dev't. Comm.**
    Steve Goldbeck
  - [x] **Dept. of Water Resources**
    Resources Agency
    Nadell Gayou

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  Environmental Services Division
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- [ ] **Fish & Wildlife Region 1E**
  Laurie Harnsberger
- [ ] **Fish & Wildlife Region 2**
  Jeff Drongesen
- [ ] **Fish & Wildlife Region 3**
  Craig Weightman
- [ ] **Fish & Wildlife Region 4**
  Julie Vance
- [ ] **Fish & Wildlife Region 5**
  Leslie Newton-Reed
  Habitat Conservation Program
- [x] **Fish & Wildlife Region 6**
  Tiffany Ellis
  Habitat Conservation Program
- [ ] **Fish & Wildlife Region 6 I/M**
  Heidi Calvert
  Inyo/Mono, Habitat Conservation Program
- [ ] **Dept. of Fish & Wildlife M**
  William Paznokas
  Marine Region

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- [ ] **California Department of Education**
  Lesley Taylor
- [x] **OES (Office of Emergency Services)**
  Monique Wilber
- [ ] **Food & Agriculture**
  Sandra Schubert
  Dept. of Food and Agriculture
- [ ] **Dept. of General Services**
  Cathy Buck
  Environmental Services Section
- [ ] **Housing & Comm. Dev.**
  CEQA Coordinator
  Housing Policy Division

Independent Commissions,Boards

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  Erik Vink
- [ ] **Delta Stewardship Council**
  Anthony Navasero
- [ ] **California Energy Commission**
  Eric Knight
- [x] **Native American Heritage Comm.**
  Debbie Treadway
- [ ] **Public Utilities Commission**
  Supervisor
- [ ] **Santa Monica Bay Restoration**
  Guangyu Wang
- [ ] **State Lands Commission**
  Jennifer Deleong
- [ ] **Tahoe Regional Planning Agency (TRPA)**
  Cherry Jacques

Cal State Transportation Agency CalSTA

- [x] **Caltrans - Division of Aeronautics**
  Philip Crimmins
- [ ] **Caltrans – Planning HQ LD-IGR**
  Christian Bushong
- [x] **California Highway Patrol**
  Suzann Ikeuchi
  Office of Special Projects

Dept. of Transportation

- [ ] **Caltrans, District 1**
  Rex Jackman
- [ ] **Caltrans, District 2**
  Marcelino Gonzalez
- [ ] **Caltrans, District 3**
  Eric Federicks – South
  Susan Zanchi - North
- [ ] **Caltrans, District 4**
  Patricia Maurice
- [ ] **Caltrans, District 5**
  Larry Newland
- [ ] **Caltrans, District 6**
  Michael Navarro
- [ ] **Caltrans, District 7**
  Dianna Watson
- [x] **Caltrans, District 8**
  Mark Roberts
- [ ] **Caltrans, District 9**
  Gayle Rosander
- [ ] **Caltrans, District 10**
  Tom Dumas
- [ ] **Caltrans, District 11**
  Jacob Armstrong
- [ ] **Caltrans, District 12**
  Maureen El Harake

Cal EPA

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- [ ] **Airport & Freight**
  Jack Wursten
  - [ ] **Transportation Projects**
    Nesamani Kalandiyur
  - [x] **Industrial/Energy Projects**
    Mike Tollstrup
- [x] **California Department of Resources, Recycling & Recovery**
  Sue O'Leary
- [ ] **State Water Resources Control Board**
  Regional Programs Unit
  Division of Financial Assistance
- [ ] **State Water Resources Control Board**
  Cindy Forbes – Asst Deputy
  Division of Drinking Water
- [ ] **State Water Resources Control Board**
  Div. Drinking Water #_____
- [ ] **State Water Resources Control Board**
  Student Intern, 401 Water Quality Certification Unit
  Division of Water Quality
- [ ] **State Water Resouces Control Board**
  Phil Crader
  Division of Water Rights
- [x] **Dept. of Toxic Substances Control**
  CEQA Tracking Center
- [ ] **Department of Pesticide Regulation**
  CEQA Coordinator

Regional Water Quality Control Board (RWQCB)

- [ ] **RWQCB 1**
  Cathleen Hudson
  North Coast Region (1)
- [ ] **RWQCB 2**
  Environmental Document Coordinator
  San Francisco Bay Region (2)
- [ ] **RWQCB 3**
  Central Coast Region (3)
- [ ] **RWQCB 4**
  Teresa Rodgers
  Los Angeles Region (4)
- [ ] **RWQCB 5S**
  Central Valley Region (5)
  - [ ] **RWQCB 5F**
    Central Valley Region (5)
    Fresno Branch Office
  - [ ] **RWQCB 5R**
    Central Valley Region (5)
    Redding Branch Office
- [ ] **RWQCB 6**
  Lahontan Region (6)
  - [ ] **RWQCB 6V**
    Lahontan Region (6)
    Victorville Branch Office
- [ ] **RWQCB 7**
  Colorado River Basin Region (7)
- [x] **RWQCB 8**
  Santa Ana Region (8)
- [ ] **RWQCB 9**
  San Diego Region (9)

- [ ] **Other** _____
  _____
  _____
- [ ] _____
  Conservancy

Last Updated 11/06/17

Brodiaea Commerce Center

AIR QUALITY IMPACT ANALYSIS

CITY OF MORENO VALLEY

PREPARED BY:

Haseeb Qureshi, MES
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(949) 336-5987

Alyssa Tamase
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(949) 336-5988

FEBRUARY 12, 2018

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LIST OF ABBREVIATED TERMS

(1)	Reference
µg/m3	Microgram per Cubic Meter
AADT	Annual Average Daily Trips
AQIA	Air Quality Impact Analysis
AQMD	Air Quality Management District
AQMP	Air Quality Management Plan
ARB	California Air Resources Board
BACMs	Best Available Control Measures
BMPs	Best Management Practices
CAA	Federal Clean Air Act
CAAQS	California Ambient Air Quality Standards
CalEEMod	California Emissions Estimator Model
Caltrans	California Department of Transportation
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CO	Carbon Monoxide
DPM	Diesel Particulate Matter
EPA	Environmental Protection Agency
LST	Localized Significance Threshold
MMs	Mitigation Measures
NAAQS	National Ambient Air Quality Standards
NO2	Nitrogen Dioxide
NOx	Oxides of Nitrogen
Pb	Lead
PM10	Particulate Matter 10 microns in diameter or less
PM2.5	Particulate Matter 2.5 microns in diameter or less
PPM	Parts Per Million
Project	Brodiaea Commerce Center
ROG	Reactive Organic Gases
SCAB	South Coast Air Basin
SCAQMD	South Coast Air Quality Management District
SIPs	State Implementation Plans
SRA	Source Receptor Area

TAC	Toxic Air Contaminant
TIA	Traffic Impact Analysis
TOG	Total Organic Gases
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compounds

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EXECUTIVE SUMMARY

CONSTRUCTION-SOURCE EMISSIONS

REGIONAL IMPACTS

For regional emissions, the Project would not exceed the numerical thresholds of significance established by the South Coast Air Quality Management District (SCAQMD) for any criteria pollutants after implementation of applicable Best Available Control Measures (BACMs) and mitigation measure (MM), MM AQ-1. Therefore, a less than significant impact would occur for Project-related construction-source emissions and no mitigation measures are required.

LOCALIZED IMPACTS

For localized emissions, the Project would not exceed the SCAQMD's localized significance threshold for any criteria pollutant. Therefore, a less than significant impact would occur and no mitigation measures are required.

Project construction-source emissions would not conflict with the applicable Air Quality Management Plan (AQMP).

ODORS

Established requirements addressing construction equipment operations, and construction material use, storage, and disposal requirements act to minimize odor impacts that may result from construction activities. Moreover, construction-source odor emissions would be temporary, short-term, and intermittent in nature and would not result in persistent impacts that would affect substantial numbers of people. Potential construction-source odor impacts are therefore considered less-than-significant.

OPERATIONAL-SOURCE EMISSIONS

REGIONAL IMPACTS

For regional emissions, the Project would exceed the numerical thresholds of significance established by the SCAQMD for emissions of NO_x. No feasible mitigation measures or project design features beyond those already identified exist that would reduce these emissions to levels that are less-than-significant. Project operational-source NOx emissions exceedances of applicable SCAQMD regional thresholds are therefore considered significant and unavoidable. Moreover, and as also discussed previously, more than 92 percent of all operational-source emissions (by weight) would be generated by Project mobile sources (traffic). Neither the Project Applicant nor the Lead Agency (City of Moreno Valley) can substantively or materially affect reductions in Project mobile-source emissions beyond what is already required herein. Therefore, Project operational-source NOx emissions exceedances of applicable SCAQMD regional thresholds would be considered significant and unavoidable.

LOCALIZED IMPACTS

For localized emissions, the Project would not exceed the numerical thresholds established by the SCAQMD for any criteria pollutants. The proposed Project would not result in a significant CO "hotspot" as a result of Project related traffic during ongoing operations.

Project operational-source emissions would not conflict with the applicable AQMP.

ODORS

Substantial odor-generating sources include land uses such as agricultural activities, feedlots, wastewater treatment facilities, landfills or various heavy industrial uses. The Project does not propose any such uses or activities that would result in potentially significant operational-source odor impacts. Potential sources of operational odors generated by the Project would include disposal of miscellaneous refuse. Moreover, SCAQMD Rule 402 acts to prevent occurrences of odor nuisances (1). Consistent with City requirements, all Project-generated refuse would be stored in covered containers and removed at regular intervals in compliance with solid waste regulations. Potential operational-source odor impacts are therefore considered less-than-significant.

1 INTRODUCTION

This report presents the results of the air quality impact analysis (AQIA) prepared by Urban Crossroads, Inc., for the proposed Brodiaea Commerce Center ("Project"). The purpose of this AQIA is to evaluate the potential impacts to air quality associated with construction and operation of the proposed Project, and recommend measures to mitigate impacts considered potentially significant in comparison to thresholds established by the South Coast Air Quality Management District (SCAQMD).

1.1 SITE LOCATION

The proposed Brodiaea Commerce Center site is located on the northwest corner of Heacock St. and Brodiaea Ave. in the City of Moreno Valley. The Project site is bounded by business park-designated land use. The March Air Reserve Base/Inland Port Airport (MARB/IPA) is located approximately one mile west of the Project site, and the Interstate 215 (I-215) Freeway is located roughly two miles to the west of the Project site.

1.2 STUDY AREA

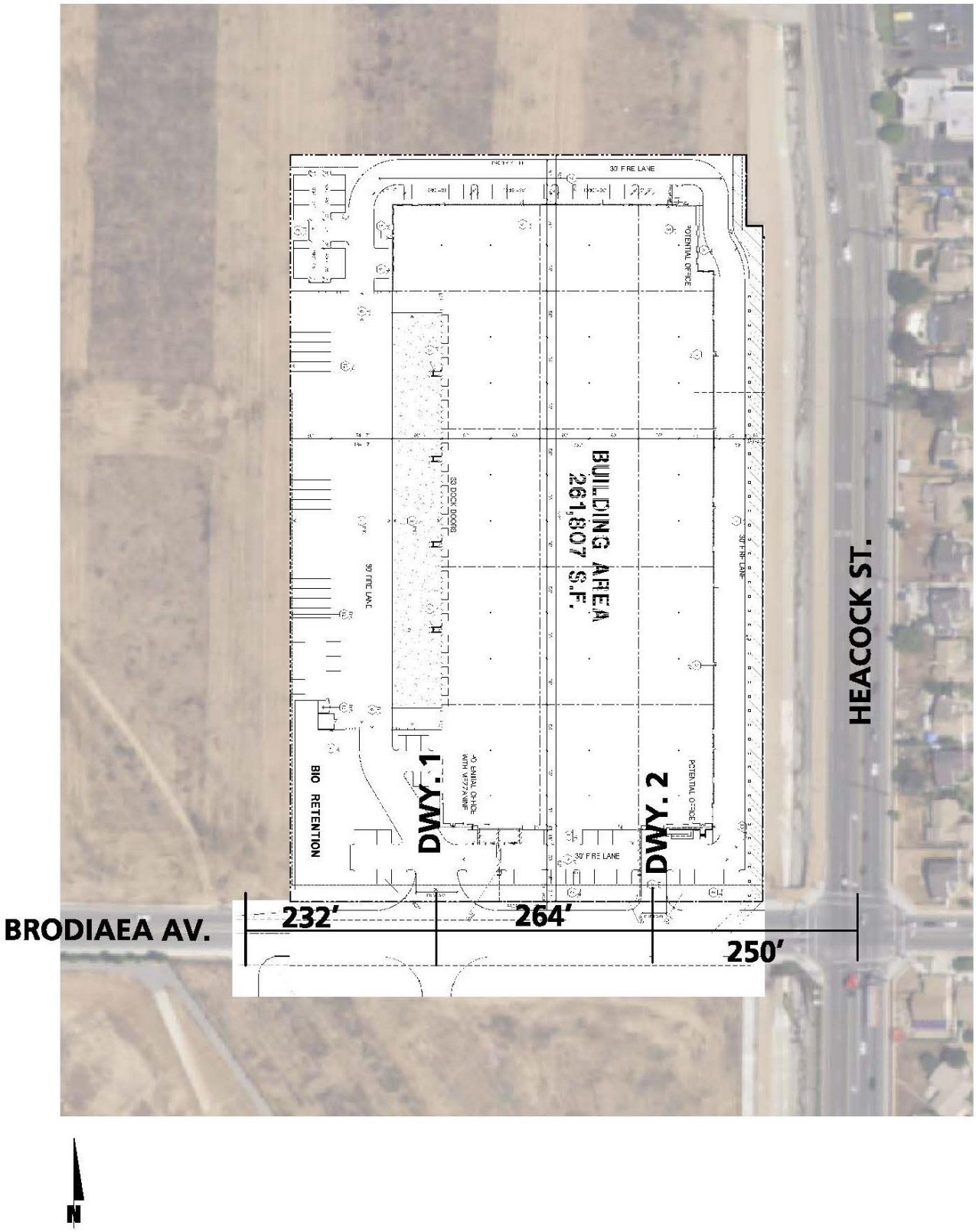
The Project site is currently vacant. The City of Moreno Valley's General Plan Land Use designation for the Project site is Business Park/Light Industrial (BP/LI). The land uses and development proposed by the Project are permitted/conditionally permitted under the Project site's current BP/LI Land Use designations. The Project is proposed to consist of a 262,398 square-foot (sf) high-cube warehouse/distribution center use within a single building. As such, the Project's land uses and development are permitted/conditionally permitted under the City General Plan Land Use designations. The Project site is zoned Business Park-Mixed Use (MPX) with the "Mixed-Use Neighborhood" (MUN) overlay. The Project would change the zoning for this area to Light Industrial (LI).

1.2 PROJECT DESCRIPTION

The Project is proposed to consist of a 262,398 square-foot (sf) high-cube warehouse/distribution center use within a single building, as shown on Exhibit 1-A. The current site plan shows a total square footage of 261,807 sf, however, the higher square footage was evaluated for the purposes of this analysis in an effort to conduct a conservative analysis. The Project is anticipated to have an Opening Year of 2019[1.]

[1] The Traffic Impact Analysis (TIA) prepared for the Project evaluates an Opening Year of 2022 since the City of Moreno Valley traffic study guidelines require the Opening Year to be a minimum of 5 years from baseline (2017) conditions. Utilizing a 2019 Opening Year for purposes of this AQIA would generate more emissions than if the Project utilized a 2022 Opening Year consistent with the traffic study because as the analysis year increases, vehicle emission factors would decrease as a result of emissions regulations becoming more stringent. Utilizing a 2019 Opening Year for purposes of the AQIA herein represents a conservative estimate of emissions compared to if a 2022 Opening Year, consistent with the traffic study, were utilized.

EXHIBIT 1-A – SITE PLAN



As part of the Project's design, all on-site indoor and outdoor cargo handling equipment (CHE) (including yard trucks, hostlers, yard goats, pallet jacks, forklifts, and other on-site equipment) will be powered by non-combustion engines (e.g. electric). Since there are no exhaust emissions associated with the equipment, for purposes of the Project, emissions associated with yard trucks and forklifts are not included in the emissions totals.

1.3 CONSTRUCTION-SOURCE AIR POLLUTANT EMISSIONS MITIGATION MEASURES

1.3.1 MONITORING OF AND COMPLIANCE WITH STANDARD REGULATORY REQUIREMENTS/BEST AVAILABLE CONTROL MEASURES (BACMS)

Measures listed below (or equivalent language) shall appear on all Project grading plans, construction specifications and bid documents, and the City shall ensure such language is incorporated prior to issuance of any development permits. City monitoring of construction activities shall be conducted to ensure mitigation compliance.

SCAQMD Rules that are currently applicable during construction activity for this Project include but are not limited to: Rule 1113 (Architectural Coatings) (2); Rule 431.2 (Low Sulfur Fuel) (3); Rule 403 (Fugitive Dust) (4); and Rule 1186 / 1186.1 (Street Sweepers) (5). In order to facilitate monitoring and compliance, applicable SCAQMD regulatory requirements are summarized below.

BACM AQ-1

The following measures shall be incorporated into Project plans and specifications as implementation of Rule 403.

- All clearing, grading, earth-moving, or excavation activities shall cease when winds exceed 25 mph per SCAQMD guidelines in order to limit fugitive dust emissions.
- The contractor shall ensure that all disturbed unpaved roads and disturbed areas within the Project are watered, with complete coverage of disturbed areas, at least three (3) times daily during dry weather; preferably in the mid-morning, afternoon, and after work is done for the day.
- The contractor shall ensure that traffic speeds on unpaved roads and Project site areas are reduced to 15 miles per hour or less

BACM AQ-2

Plans, specifications, and contract documents shall note that a sign shall be posted on-site stating that construction workers shall not idle diesel engines in excess of five (5) minutes (6).

MM AQ-1

Only "Low-Volatile Organic Compounds" paints (no more than 50 gram/liter of VOC) and/or High Pressure Low Volume (HPLV) applications consistent with South Coast Air Quality Management District Rule 1113 shall be used.

1.4 OPERATIONAL-SOURCE AIR POLLUTANT EMISSIONS MITIGATION MEASURES

MM AQ-2:

Prior to the issuance of building permits, the Project applicant shall ensure that the Project is designed to achieve efficiency equal to or exceeding then incumbent (2016 or later) California Building Code Title 24 requirements.

MM AQ-3:

To reduce water consumption and the associated energy-usage, the Project will be designed to comply with the mandatory reductions in indoor water usage contained in the incumbent CalGreen Code (7) and any mandated reduction in outdoor water usage contained in the City's water efficient landscape requirements. Additionally, the Project shall implement the following:

- Landscaping palette emphasizing drought tolerant plants;
- Use of water-efficient irrigation techniques;
- U.S. EPA Certified WaterSense labeled or equivalent faucets, high-efficiency toilets (HETs), and water-conserving shower heads.

MM AQ-4:

The Project will reduce vehicle miles traveled and emissions associated with by implementing the following measures:

- Pedestrian and bicycle connections shall be provided to surrounding areas consistent with the City's General Plan.
- Implement a voluntary trip reduction program, for which all employees shall be eligible to participate.

MM AQ-5:

The truck access gates and loading docks within the truck court on the Project site shall be posted with signs which state:

a) Truck drivers shall turn off engines when not in use;

b) Diesel delivery trucks servicing the Project shall not idle for more than five (5) minutes[1]; and

c) Telephone numbers of the building facilities manager and the CARB to report violations.

MM AQ-6:

- Site design shall allow for trucks to check-in within the facility area to prevent queuing of trucks outside the facility.[2]

[1] While restricted idling is required per MM HRA-1, the analysis presented here takes no quantified credit or reduction in emissions for restricted idling, and reflects an assumed 15-minute "worst case" idling condition.
[2] As above, no quantified credit or reduction in emissions is taken for site design requirements reflected in MM HRA-2

- Signs shall be posted in loading dock areas that instruct truck drivers to shut down the engine after 300 seconds of continuous idling operation once the vehicle is stopped, the transmission is set to "neutral" or "park", and the parking brake is engaged (8).

1.5 EVALUATION OF APPLICABILITY OF SCAQMD-RECOMMENDED MITIGATION MEASURES

The South Coast Air Quality Management District (SCAQMD) typically provides a comment letter on the Notice of Preparation for CEQA documents. The SCAQMD's comment letters include a reference to several sources to consider for purposes of mitigating significant air quality impacts. The following table evaluates the applicability of the SCAQMD's recommended measures.

TABLE 1-1: APPLICABILITY OF SCAQMD-RECOMMENDED MITIGATION MEASURES

Mitigation Measure	Applicability
Chapter 11 of the SCAQMD *CEQA Air Quality Handbook* (Construction)	The applicable mitigation measures listed in Chapter 11 (Tables 11-2, 11-3, and 11-4) of the SCAQMD *CEQA Air Quality Handbook* have been reviewed. The Project would not have a significant impact during construction activity therefore no additional mitigation measures are required.
Chapter 11 of the SCAQMD *CEQA Air Quality Handbook* (Operations)	The applicable mitigation measures listed in Chapter 11 (Tables 11-6c and 11-7c) of the SCAQMD *CEQA Air Quality Handbook* have been reviewed. Some of the mitigation measures recommended here are already included in the Project, specifically: MM AQ-2 through MM AQ-6 are generally consistent with several measures recommended by SCAQMD. However, none of the additional mitigation measures beyond those identified above would reduce the significant VOC or NOx impact to less than significant levels. It should be noted the SCAQMD *CEQA Air Quality Handbook* has not been updated since 2003. Additionally, several of the measures listed provide a negligible NOx reduction, with a number of them designated by SCAQMD as having no quantified benefit or negligible benefit. Therefore implementation of these measures would not avoid or substantially lessen mobile source NOx emissions attributable to the project.

Mitigation Measure	Applicability
SCAQMD CEQA Web Pages (Fugitive Dust)	With application of BACMs and recommended MMs, the Project would not have a significant impact for construction or operational related PM10 or PM2.5 emissions. Therefore, no additional mitigation measures are required to reduce fugitive dust emissions.
SCAQMD CEQA Web Pages (Greenhouse Gases)	Same as "CAPCOA's *Quantifying Greenhouse Gas Mitigation Measures"* discussion. See below.
SCAQMD CEQA Web Pages (Harbor Craft, Locomotives, Ocean Going Vessels)	The following mitigation measures are not applicable to the proposed Project. It is not expected that the Project would include the use of a harbor craft, locomotives, or ocean going vessels.
SCAQMD CEQA Web Pages (Off-Road Engines)	Mitigation measures that would apply to off-road engines have been reviewed. Notwithstanding, implementation of these measures would not avoid or substantially lessen mobile source NOx emissions attributable to the project. Additionally, the project Applicant as part of its project design will require on-site cargo handling equipment to be electric.
SCAQMD CEQA Web Pages (On-Road Engines)	The California Air Resources Board (CARB) has worked closely with the U.S. Environmental Protection Agency (U.S. EPA), engine and vehicle manufacturers, and other interested parties to reduce emissions from heavy-duty diesel vehicles in California, through a combination of measures including regulations requiring the use of ultra-low sulfur diesel fuel, new emission standards, restrictions on idling, addition of post-combustion filter and catalyst equipment, and retrofits for diesel truck fleets. These programs are expected to result in significant reductions in particulate matter (PM), nitrous oxides (NOX), volatile organic compounds (VOC), and carbon oxide (CO) emissions as they are fully implemented. Under the Truck and Bus Regulation, adopted by CARB in 2008, all diesel truck fleets operating in California are required to adhere to an aggressive schedule for upgrading and replacing heavy-duty truck engines. Pursuant to such regulation, older, heavier trucks, i.e., those with pre-2000 year engines and a gross vehicle weight rating (GVWR) greater than 26,000 pounds are already required to have installed a PM filter and must be replaced with a 2010 engine between 2015 and 2020, depending on the model year. By 2015, all heavier pre-1994 trucks must be upgraded to 2010 engines and newer trucks are

Mitigation Measure	Applicability
	thereafter required to be replaced over the next eight years. Older, more polluting trucks are required to be replaced first, while trucks that already have relatively clean 2007-2009 engines are not required to be replaced until 2023. Lighter trucks (those with a GVWR of 14,001 to 26,000 pounds) must adhere to a similar schedule, and will all be replaced by 2020. Further, nearly all trucks that are not required under the Truck and Bus Regulation to be replaced by 2015 are required to be upgraded with a PM filter by that date. Therefore, most heavy-duty trucks entering the project site will meet or exceed U.S. EPA 2007 and 2010 emission standards within a relatively short period of time after the project becomes operational in 2017, and all such trucks entering the property will meet or exceed such standards by 2023. Federal and state agencies regulate and enforce vehicle emission standards. It is not feasible for the City of Moreno Valley staff to effectively enforce a prohibition on trucks from entering the property that are otherwise permitted to operate in California and access other properties in the County, region, and state. And, even if the County were to apply such a restriction, it would merely cause warehouse operators using truck fleets older than 2007/2010 to locate in another location in the South Coast Air Basin where the restriction does not apply, thereby resulting in no improvement to regional air quality. Further if a truck that did not meet this requirement were to attempt access to the stie and be denied, there would be more idling emissions and travel emissions associated with that truck. Additionally, SCAQMD has made similar comments in the past however the examples SCAQMD has provided on other projects do not demonstrate successful implementation of the measures. More specifically: Banning Gateway [Business Park] (City of Banning) demonstrates that limiting trucks to 2010 compliant engines can render a project unmarketable and unattractive to tenants. Based on information supplied to us by the proponents of this project, SCAQMD implored the Banning City Council to apply a condition to this project limiting trucks to 2010 or better CARB compliant engines. The City relented and applied the condition. However, over the course of several years, the project's proponents have found that the project is not marketable with that condition applied and that no perspective tenants will take the project with that condition The project's proponents have been in discussions with the City of Banning

Mitigation Measure	Applicability
	and SCAQMD attempting to get relief from the condition, however an outcome is unknown at this time. Thus, it is our understanding that the AQMD is fully aware that a 2010 or better engine restriction was not feasible for the Banning Gateway project to implement and that this condition is generally problematic and infeasible for speculative builders of warehouse projects to practically implement. In conclusion, this prior example cited by the AQMD is not an example of a successfully implemented mitigation measure. In fact, it is an example of the measure's unacceptability in the marketplace and how it can render a project unviable.
CAPCOA's *Quantifying Greenhouse Gas Mitigation Measures*	All feasible and applicable mitigation measures listed in the Energy, Water, and Transportation sections (as shown in Chart 6-1 and Chart 6-2 of the CAPCOA document) have been applied to the analysis. However these measures are aimed at reducing GHG emissions and implementation of these measures would not avoid or substantially lessen mobile source NOx emissions attributable to the project.
SCAQMD Rule 403	As stated in Section 1.3 and identified in BACM AQ-1 the Project would need to comply with applicable SCAQMD Rules including, but not limited to Rule 403.
SCAQMD's Guidance Document for addressing Air Quality Issues in General Plans and Local Planning	These measures are not applicable to the proposed Project because the measures listed are aimed towards local governments as a guidance to reduce community exposure to source-specific air pollution impacts.

2 AIR QUALITY SETTING

This section provides an overview of the existing air quality conditions in the Project area and region.

2.1 SOUTH COAST AIR BASIN

The Project site is located in the South Coast Air Basin (SCAB) within the jurisdiction of SCAQMD (9). The SCAQMD was created by the 1977 Lewis-Presley Air Quality Management Act, which merged four county air pollution control bodies into one regional district. Under the Act, the SCAQMD is responsible for bringing air quality in areas under its jurisdiction into conformity with federal and state air quality standards. As discussed above, the Project site is located within the South Coast Air Basin, a 6,745-square mile subregion of the SCAQMD, which includes portions of Los Angeles, Riverside, and San Bernardino Counties, and all of Orange County. The larger South Coast district boundary includes 10,743 square miles.

The SCAB is bound by the Pacific Ocean to the west and the San Gabriel, San Bernardino, and San Jacinto Mountains to the north and east. The Los Angeles County portion of the Mojave Desert Air Basin is bound by the San Gabriel Mountains to the south and west, the Los Angeles / Kern County border to the north, and the Los Angeles / San Bernardino County border to the east. The Riverside County portion of the Salton Sea Air Basin is bound by the San Jacinto Mountains in the west and spans eastward up to the Palo Verde Valley.

2.2 REGIONAL CLIMATE

The regional climate has a substantial influence on air quality in the SCAB. In addition, the temperature, wind, humidity, precipitation, and amount of sunshine influence the air quality.

The annual average temperatures throughout the SCAB vary from the low to middle 60s (degrees Fahrenheit). Due to a decreased marine influence, the eastern portion of the SCAB shows greater variability in average annual minimum and maximum temperatures. January is the coldest month throughout the SCAB, with average minimum temperatures of 47°F in downtown Los Angeles and 36°F in San Bernardino. All portions of the SCAB have recorded maximum temperatures above 100°F.

Although the climate of the SCAB can be characterized as semi-arid, the air near the land surface is quite moist on most days because of the presence of a marine layer. This shallow layer of sea air is an important modifier of SCAB climate. Humidity restricts visibility in the SCAB, and the conversion of sulfur dioxide to sulfates is heightened in air with high relative humidity. The marine layer provides an environment for that conversion process, especially during the spring and summer months. The annual average relative humidity within the SCAB is 71 percent along the coast and 59 percent inland. Since the ocean effect is dominant, periods of heavy early morning fog are frequent and low stratus clouds are a characteristic feature. These effects decrease with distance from the coast.

More than 90 percent of the SCAB's rainfall occurs from November through April. The annual average rainfall varies from approximately nine inches in Riverside to fourteen inches in downtown Los Angeles. Monthly and yearly rainfall totals are extremely variable. Summer rainfall usually consists of widely scattered thunderstorms near the coast and slightly heavier shower activity in the eastern portion of the SCAB with frequency being higher near the coast.

Due to its generally clear weather, about three-quarters of available sunshine is received in the SCAB. The remaining one-quarter is absorbed by clouds. The ultraviolet portion of this abundant radiation is a key factor in photochemical reactions. On the shortest day of the year there are approximately 10 hours of possible sunshine, and on the longest day of the year there are approximately 14 1/2 hours of possible sunshine.

The importance of wind to air pollution is considerable. The direction and speed of the wind determines the horizontal dispersion and transport of the air pollutants. During the late autumn to early spring rainy season, the SCAB is subjected to wind flows associated with the traveling storms moving through the region from the northwest. This period also brings five to ten periods of strong, dry offshore winds, locally termed "Santa Anas" each year. During the dry season, which coincides with the months of maximum photochemical smog concentrations, the wind flow is bimodal, typified by a daytime onshore sea breeze and a nighttime offshore drainage wind. Summer wind flows are created by the pressure differences between the relatively cold ocean and the unevenly heated and cooled land surfaces that modify the general northwesterly wind circulation over southern California. Nighttime drainage begins with the radiational cooling of the mountain slopes. Heavy, cool air descends the slopes and flows through the mountain passes and canyons as it follows the lowering terrain toward the ocean. Another characteristic wind regime in the SCAB is the "Catalina Eddy," a low level cyclonic (counterclockwise) flow centered over Santa Catalina Island which results in an offshore flow to the southwest. On most spring and summer days, some indication of an eddy is apparent in coastal sections.

In the SCAB, there are two distinct temperature inversion structures that control vertical mixing of air pollution. During the summer, warm high-pressure descending (subsiding) air is undercut by a shallow layer of cool marine air. The boundary between these two layers of air is a persistent marine subsidence/inversion. This boundary prevents vertical mixing which effectively acts as an impervious lid to pollutants over the entire SCAB. The mixing height for the inversion structure is normally situated 1,000 to 1,500 feet above mean sea level.

A second inversion-type forms in conjunction with the drainage of cool air off the surrounding mountains at night followed by the seaward drift of this pool of cool air. The top of this layer forms a sharp boundary with the warmer air aloft and creates nocturnal radiation inversions. These inversions occur primarily in the winter, when nights are longer and onshore flow is weakest. They are typically only a few hundred feet above mean sea level. These inversions effectively trap pollutants, such as NOX and CO from vehicles, as the pool of cool air drifts seaward. Winter is therefore a period of high levels of primary pollutants along the coastline.

2.3 WIND PATTERNS AND PROJECT LOCATION

The distinctive climate of the Project area and the SCAB is determined by its terrain and geographical location. The Basin is located in a coastal plain with connecting broad valleys and low hills, bounded by the Pacific Ocean in the southwest quadrant with high mountains forming the remainder of the perimeter.

Wind patterns across the south coastal region are characterized by westerly and southwesterly on-shore winds during the day and easterly or northeasterly breezes at night. Winds are characteristically light although the speed is somewhat greater during the dry summer months than during the rainy winter season.

2.4 EXISTING AIR QUALITY

Existing air quality is measured at established SCAQMD air quality monitoring stations. Monitored air quality is evaluated and in the context of ambient air quality standards. These standards are the levels of air quality that are considered safe, with an adequate margin of safety, to protect the public health and welfare. National Ambient Air Quality Standards (NAAQS) and California Ambient Air Quality Standards (CAAQS) currently in effect, as well health effects of each pollutant regulated under these standards are shown in Table 2-1 (10) (11).

The determination of whether a region's air quality is healthful or unhealthful is determined by comparing contaminant levels in ambient air samples to the state and federal standards presented in Table 2-1. The air quality in a region is considered to be in attainment by the state if the measured ambient air pollutant levels for O3, CO, SO2, NO2, PM10, and PM2.5 are not equaled or exceeded at any time in any consecutive three-year period; and the federal standards (other than O3, PM10, PM2.5, and those based on annual averages or arithmetic mean) are not exceeded more than once per year. The O3 standard is attained when the fourth highest eight-hour concentration in a year, averaged over three years, is equal to or less than the standard. For PM10, the 24 hour standard is attained when 99 percent of the daily concentrations, averaged over three years, are equal to or less than the standard.

TABLE 2-1: AMBIENT AIR QUALITY STANDARDS (1 OF 2)

Ambient Air Quality Standards						
Pollutant	**Averaging Time**	**California Standards [1]**		**National Standards [2]**		
		Concentration [3]	**Method [4]**	**Primary [3,5]**	**Secondary [3,6]**	**Method [7]**
Ozone (O_3)[8]	1 Hour	0.09 ppm (180 µg/m^3)	Ultraviolet Photometry	—	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 µg/m^3)		0.070 ppm (137 µg/m^3)		
Respirable Particulate Matter (PM10)[9]	24 Hour	50 µg/m^3	Gravimetric or Beta Attenuation	150 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m^3		—		
Fine Particulate Matter (PM2.5)[9]	24 Hour	—	—	35 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m^3	Gravimetric or Beta Attenuation	12.0 µg/m^3	15 µg/m^3	
Carbon Monoxide (CO)	1 Hour	20 ppm (23 mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	35 ppm (40 mg/m^3)	—	Non-Dispersive Infrared Photometry (NDIR)
	8 Hour	9.0 ppm (10 mg/m^3)		9 ppm (10 mg/m^3)	—	
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		—	—	
Nitrogen Dioxide (NO_2)[10]	1 Hour	0.18 ppm (339 µg/m^3)	Gas Phase Chemiluminescence	100 ppb (188 µg/m^3)	—	Gas Phase Chemiluminescence
	Annual Arithmetic Mean	0.030 ppm (57 µg/m^3)		0.053 ppm (100 µg/m^3)	Same as Primary Standard	
Sulfur Dioxide (SO_2)[11]	1 Hour	0.25 ppm (655 µg/m^3)	Ultraviolet Fluorescence	75 ppb (196 µg/m^3)	—	Ultraviolet Flourescence; Spectrophotometry (Pararosaniline Method)
	3 Hour	—		—	0.5 ppm (1300 µg/m^3)	
	24 Hour	0.04 ppm (105 µg/m^3)		0.14 ppm (for certain areas)[11]	—	
	Annual Arithmetic Mean	—		0.030 ppm (for certain areas)[11]	—	
Lead[12,13]	30 Day Average	1.5 µg/m^3	Atomic Absorption	—	—	High Volume Sampler and Atomic Absorption
	Calendar Quarter	—		1.5 µg/m^3 (for certain areas)[12]	Same as Primary Standard	
	Rolling 3-Month Average	—		0.15 µg/m^3		
Visibility Reducing Particles[14]	8 Hour	See footnote 14	Beta Attenuation and Transmittance through Filter Tape	**No National Standards**		
Sulfates	24 Hour	25 µg/m^3	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m^3)	Ultraviolet Fluorescence			
Vinyl Chloride[12]	24 Hour	0.01 ppm (26 µg/m^3)	Gas Chromatography			

See footnotes on next page …

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TABLE 2-1: AMBIENT AIR QUALITY STANDARDS (2 OF 2)

1. California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, and particulate matter (PM10, PM2.5, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

2. National standards (other than ozone, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM10, the 24 hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 $\mu g/m^3$ is equal to or less than one. For PM2.5, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact the U.S. EPA for further clarification and current national policies.

3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

4. Any equivalent measurement method which can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard may be used.

5. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

6. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

7. Reference method as described by the U.S. EPA. An "equivalent method" of measurement may be used but must have a "consistent relationship to the reference method" and must be approved by the U.S. EPA.

8. On October 1, 2015, the national 8-hour ozone primary and secondary standards were lowered from 0.075 to 0.070 ppm.

9. On December 14, 2012, the national annual PM2.5 primary standard was lowered from 15 $\mu g/m^3$ to 12.0 $\mu g/m^3$. The existing national 24-hour PM2.5 standards (primary and secondary) were retained at 35 $\mu g/m^3$, as was the annual secondary standard of 15 $\mu g/m^3$. The existing 24-hour PM10 standards (primary and secondary) of 150 $\mu g/m^3$ also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.

10. To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the national 1-hour standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the national 1-hour standard to the California standards the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.

11. On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

    Note that the 1-hour national standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the 1-hour national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.

12. The ARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

13. The national standard for lead was revised on October 15, 2008 to a rolling 3-month average. The 1978 lead standard (1.5 $\mu g/m^3$ as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

14. In 1989, the ARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

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2.5 REGIONAL AIR QUALITY

The SCAQMD monitors levels of various criteria pollutants at 30 monitoring stations throughout the air district. In 2015, the federal and state ambient air quality standards (NAAQS and CAAQS) were exceeded on one or more days for ozone, PM10, and PM2.5 at most monitoring locations (12). No areas of the SCAB exceeded federal or state standards for NO2, SO2, CO, sulfates or lead. See Table 2-2 for attainment designations for the SCAB (13). Appendix 2.1 provides geographic representation of the state and federal attainment status for applicable criteria pollutants within the SCAB.

TABLE 2-2: ATTAINMENT STATUS OF CRITERIA POLLUTANTS IN THE SOUTH COAST AIR BASIN (SCAB)

Criteria Pollutant	State Designation	Federal Designation
Ozone - 1hour standard	Nonattainment	Nonattainment ("extreme")
Ozone - 8 hour standard	Nonattainment	Nonattainment ("extreme")
PM_{10}	Nonattainment	Attainment (Maintenance)
$PM_{2.5}$	Nonattainment	Nonattainment ("serious")
Carbon Monoxide	Attainment	Attainment (Maintenance)
Nitrogen Dioxide	Attainment	Unclassifiable/Attainment
Sulfur Dioxide	Attainment	Unclassifiable/Attainment
Lead[2]	Attainment	Nonattainment (Partial)

Source: State/Federal designations were taken from http://www.arb.ca.gov/desig/adm/adm.htm
Note: See Appendix 2.1 for a detailed map of State/National Area Designations within the South Coast Air Basin

2.6 LOCAL AIR QUALITY

Relative to the Project site, the nearest long-term air quality monitoring site for Ozone (O_3) and Particulate Matter ≤ 10 Microns (PM_{10}) is the South Coast Air Quality Management District Perris monitoring station (SRA 24), located approximately 8.4 miles south of the Project site (14). Data for Carbon Monoxide (CO), Nitrogen Dioxide (NO_2), and Ultra-Fine Particulates ($PM_{2.5}$) was obtained from the Metropolitan Riverside County 3 monitoring station (SRA 23), located approximately 11.5 miles northwest Project site, respectively. It should be noted that the Metropolitan Riverside County 3 and Lake Elsinore monitoring stations were utilized in lieu of the Perris monitoring station only where data was not available from the nearest monitoring site.

The most recent three (3) years of data available is shown on Table 2-3 and identifies the number of days ambient air quality standards were exceeded for the study area, which is was considered to be representative of the local air quality at the Project site (12) (15). Additionally, data for SO2 has been omitted as attainment is regularly met in the South Coast Air Basin and few monitoring stations measure SO2 concentrations.

[2] The Federal nonattainment designation for lead is only applicable towards the Los Angeles County portion of the SCAB.

TABLE 2-3: PROJECT AREA AIR QUALITY MONITORING SUMMARY 2014-2016

POLLUTANT	STANDARD	YEAR		
		2014	2015	2016
Ozone (O_3)				
Maximum 1-Hour Concentration (ppm)		0.117	0.124	0.131
Maximum 8-Hour Concentration (ppm)		0.094	0.102	0.098
Number of Days Exceeding State 1-Hour Standard	> 0.09 ppm	16	25	23
Number of Days Exceeding State 8-Hour Standard	> 0.07 ppm	63	50	56
Number of Days Exceeding Federal 1-Hour Standard	> 0.12 ppm	0	0	1
Number of Days Exceeding Federal 8-Hour Standard	> 0.07 ppm	59	49	55
Carbon Monoxide (CO)				
Maximum 1-Hour Concentration (ppm)		2.0	2.5	1.9
Maximum 8-Hour Concentration (ppm)		2.4	1.7	1.4
Nitrogen Dioxide (NO_2)*				
Maximum 1-Hour Concentration (ppm)		0.058	0.068	0.065
Annual Arithmetic Mean Concentration (ppm)		0.014	0.013	0.014
Particulate Matter ≤ 10 Microns (PM_{10})				
Maximum 24-Hour Concentration (µg/m^3)		87	74	76
Annual Arithmetic Mean (µg/m^3)		35.1	30.3	32.2
Number of Samples		60	57	57
Number of Samples Exceeding State Standard	> 50 µg/m^3	6	3	5
Particulate Matter ≤ 2.5 Microns ($PM_{2.5}$)*				
Maximum 24-Hour Concentration (µg/m^3)		73.6	56.6	45.6
Annual Arithmetic Mean (µg/m^3)		14.5	13.3	14.0
Number of Samples Exceeding Federal 24-Hour Standard	> 35 µg/m^3	9	17	6

-- = data not available from SCAQMD or ARB; *Data from the Riverside County 2 monitoring station is only available up to year 2014. As such, data from the Lake Elsinore monitoring station is used for the year 2015 and 2016.

Criteria pollutants are pollutants that are regulated through the development of human health based and/or environmentally based criteria for setting permissible levels. Criteria pollutants, their typical sources, and effects are identified below:

- Carbon Monoxide (CO): Is a colorless, odorless gas produced by the incomplete combustion of carbon-containing fuels, such as gasoline or wood. CO concentrations tend to be the highest during the winter morning, when little to no wind and surface-based inversions trap the pollutant at ground levels. Because CO is emitted directly from internal combustion engines, unlike ozone, motor vehicles operating at slow speeds are the primary source of CO in the Basin. The highest ambient CO concentrations are generally found near congested transportation corridors and intersections.
- Sulfur Dioxide (SO2): Is a colorless, extremely irritating gas or liquid. It enters the atmosphere as a pollutant mainly as a result of burning high sulfur-content fuel oils and coal and from chemical

processes occurring at chemical plants and refineries. When SO2 oxidizes in the atmosphere, it forms sulfates (SO4). Collectively, these pollutants are referred to as sulfur oxides (SOX).

- Nitrogen Oxides (Oxides of Nitrogen, or NOx): Nitrogen oxides (NOx) consist of nitric oxide (NO), nitrogen dioxide (NO2) and nitrous oxide (N2O) and are formed when nitrogen (N2) combines with oxygen (O2). Their lifespan in the atmosphere ranges from one to seven days for nitric oxide and nitrogen dioxide, to 170 years for nitrous oxide. Nitrogen oxides are typically created during combustion processes, and are major contributors to smog formation and acid deposition. NO2 is a criteria air pollutant, and may result in numerous adverse health effects; it absorbs blue light, resulting in a brownish-red cast to the atmosphere and reduced visibility. Of the seven types of nitrogen oxide compounds, NO2 is the most abundant in the atmosphere. As ambient concentrations of NO2 are related to traffic density, commuters in heavy traffic may be exposed to higher concentrations of NO2 than those indicated by regional monitors.
- Ozone (O3): Is a highly reactive and unstable gas that is formed when volatile organic compounds (VOCs) and nitrogen oxides (NOX), both byproducts of internal combustion engine exhaust, undergo slow photochemical reactions in the presence of sunlight. Ozone concentrations are generally highest during the summer months when direct sunlight, light wind, and warm temperature conditions are favorable to the formation of this pollutant.
- PM10 (Particulate Matter less than 10 microns): A major air pollutant consisting of tiny solid or liquid particles of soot, dust, smoke, fumes, and aerosols. The size of the particles (10 microns or smaller, about 0.0004 inches or less) allows them to easily enter the lungs where they may be deposited, resulting in adverse health effects. PM10 also causes visibility reduction and is a criteria air pollutant.
- PM2.5 (Particulate Matter less than 2.5 microns): A similar air pollutant consisting of tiny solid or liquid particles which are 2.5 microns or smaller (which is often referred to as fine particles). These particles are formed in the atmosphere from primary gaseous emissions that include sulfates formed from SO2 release from power plants and industrial facilities and nitrates that are formed from NOX release from power plants, automobiles and other types of combustion sources. The chemical composition of fine particles highly depends on location, time of year, and weather conditions. PM2.5 is a criteria air pollutant.
- Volatile Organic Compounds (VOC): Volatile organic compounds are hydrocarbon compounds (any compound containing various combinations of hydrogen and carbon atoms) that exist in the ambient air. VOCs contribute to the formation of smog through atmospheric photochemical reactions and/or may be toxic. Compounds of carbon (also known as organic compounds) have different levels of reactivity; that is, they do not react at the same speed or do not form ozone to the same extent when exposed to photochemical processes. VOCs often have an odor, and some examples include gasoline, alcohol, and the solvents used in paints. Exceptions to the VOC designation include: carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate. VOCs are a criteria pollutant since they are a precursor to O3, which is a criteria pollutant. The SCAQMD uses the terms VOC and ROG (see below) interchangeably.
- Reactive Organic Gases (ROG): Similar to VOC, Reactive Organic Gases (ROG) are also precursors in forming ozone and consist of compounds containing methane, ethane, propane, butane, and longer chain hydrocarbons, which are typically the result of some type of combustion/decomposition process. Smog is formed when ROG and nitrogen oxides react in the presence of sunlight. ROGs are a criteria pollutant since they are a precursor to O3, which is a criteria pollutant. The SCAQMD uses the terms ROG and VOC (see previous) interchangeably.

- Lead (Pb): Lead is a heavy metal that is highly persistent in the environment. In the past, the primary source of lead in the air was emissions from vehicles burning leaded gasoline. As a result of the removal of lead from gasoline, there have been no violations at any of the SCAQMD's regular air monitoring stations since 1982. Currently, emissions of lead are largely limited to stationary sources such as lead smelters. It should be noted that the Project is not anticipated to generate a quantifiable amount of lead emissions. Lead is a criteria air pollutant.

Health Effects of Air Pollutants

Ozone

Individuals exercising outdoors, children, and people with preexisting lung disease, such as asthma and chronic pulmonary lung disease, are considered to be the most susceptible sub-groups for ozone effects. Short-term exposure (lasting for a few hours) to ozone at levels typically observed in Southern California can result in breathing pattern changes, reduction of breathing capacity, increased susceptibility to infections, inflammation of the lung tissue, and some immunological changes. Elevated ozone levels are associated with increased school absences. In recent years, a correlation between elevated ambient ozone levels and increases in daily hospital admission rates, as well as mortality, has also been reported. An increased risk for asthma has been found in children who participate in multiple sports and live in communities with high ozone levels.

Ozone exposure under exercising conditions is known to increase the severity of the responses described above. Animal studies suggest that exposure to a combination of pollutants that includes ozone may be more toxic than exposure to ozone alone. Although lung volume and resistance changes observed after a single exposure diminish with repeated exposures, biochemical and cellular changes appear to persist, which can lead to subsequent lung structural changes.

Carbon Monoxide

Individuals with a deficient blood supply to the heart are the most susceptible to the adverse effects of CO exposure. The effects observed include earlier onset of chest pain with exercise, and electrocardiograph changes indicative of decreased oxygen supply to the heart. Inhaled CO has no direct toxic effect on the lungs, but exerts its effect on tissues by interfering with oxygen transport and competing with oxygen to combine with hemoglobin present in the blood to form carboxyhemoglobin (COHb). Hence, conditions with an increased demand for oxygen supply can be adversely affected by exposure to CO. Individuals most at risk include fetuses, patients with diseases involving heart and blood vessels, and patients with chronic hypoxemia (oxygen deficiency) as seen at high altitudes.

Reduction in birth weight and impaired neurobehavioral development have been observed in animals chronically exposed to CO, resulting in COHb levels similar to those observed in smokers. Recent studies have found increased risks for adverse birth outcomes with exposure to elevated CO levels; these include pre-term births and heart abnormalities.

Particulate Matter

A consistent correlation between elevated ambient fine particulate matter (PM10 and PM2.5) levels and an increase in mortality rates, respiratory infections, number and severity of asthma attacks and the number of hospital admissions has been observed in different parts of the United States and various areas around the world. In recent years, some studies have reported an association between long-term exposure to air pollution dominated by fine particles and increased mortality, reduction in life-span, and an increased mortality from lung cancer.

Daily fluctuations in PM2.5 concentration levels have also been related to hospital admissions for acute respiratory conditions in children, to school and kindergarten absences, to a decrease in respiratory lung volumes in normal children, and to increased medication use in children and adults with asthma. Recent studies show lung function growth in children is reduced with long term exposure to particulate matter.

The elderly, people with pre-existing respiratory or cardiovascular disease, and children appear to be more susceptible to the effects of high levels of PM10 and PM2.5.

Nitrogen Dioxide

Population-based studies suggest that an increase in acute respiratory illness, including infections and respiratory symptoms in children (not infants), is associated with long-term exposure to NO2 at levels found in homes with gas stoves, which are higher than ambient levels found in Southern California. Increase in resistance to air flow and airway contraction is observed after short-term exposure to NO2 in healthy subjects. Larger decreases in lung functions are observed in individuals with asthma or chronic obstructive pulmonary disease (e.g., chronic bronchitis, emphysema) than in healthy individuals, indicating a greater susceptibility of these sub-groups.

In animals, exposure to levels of NO2 considerably higher than ambient concentrations results in increased susceptibility to infections, possibly due to the observed changes in cells involved in maintaining immune functions. The severity of lung tissue damage associated with high levels of ozone exposure increases when animals are exposed to a combination of ozone and NO2.

Sulfur Dioxide

A few minutes of exposure to low levels of SO2 can result in airway constriction in some asthmatics, all of whom are sensitive to its effects. In asthmatics, increase in resistance to air flow, as well as reduction in breathing capacity leading to severe breathing difficulties, are observed after acute exposure to SO2. In contrast, healthy individuals do not exhibit similar acute responses even after exposure to higher concentrations of SO2.

Animal studies suggest that despite SO2 being a respiratory irritant, it does not cause substantial lung injury at ambient concentrations. However, very high levels of exposure can cause lung edema (fluid accumulation), lung tissue damage, and sloughing off of cells lining the respiratory tract.

Some population-based studies indicate that the mortality and morbidity effects associated with fine particles show a similar association with ambient SO2 levels. In these studies, efforts to

separate the effects of SO2 from those of fine particles have not been successful. It is not clear whether the two pollutants act synergistically or one pollutant alone is the predominant factor.

Lead

Fetuses, infants, and children are more sensitive than others to the adverse effects of Pb exposure. Exposure to low levels of Pb can adversely affect the development and function of the central nervous system, leading to learning disorders, distractibility, inability to follow simple commands, and lower intelligence quotient. In adults, increased Pb levels are associated with increased blood pressure.

Pb poisoning can cause anemia, lethargy, seizures, and death; although it appears that there are no direct effects of Pb on the respiratory system. Pb can be stored in the bone from early age environmental exposure, and elevated blood Pb levels can occur due to breakdown of bone tissue during pregnancy, hyperthyroidism (increased secretion of hormones from the thyroid gland) and osteoporosis (breakdown of bony tissue). Fetuses and breast-fed babies can be exposed to higher levels of Pb because of previous environmental Pb exposure of their mothers.

Odors

The science of odor as a health concern is still new. Merely identifying the hundreds of VOCs that cause odors poses a big challenge. Offensive odors can potentially affect human health in several ways. First, odorant compounds can irritate the eye, nose, and throat, which can reduce respiratory volume. Second, studies have shown that the VOCs that cause odors can stimulate sensory nerves to cause neurochemical changes that might influence health, for instance, by compromising the immune system. Finally, unpleasant odors can trigger memories or attitudes linked to unpleasant odors, causing cognitive and emotional effects such as stress.

2.7 REGULATORY BACKGROUND

2.7.1 FEDERAL REGULATIONS

The U.S. EPA is responsible for setting and enforcing the NAAQS for O3, CO, NOx, SO2, PM10, and lead (10). The U.S. EPA has jurisdiction over emissions sources that are under the authority of the federal government including aircraft, locomotives, and emissions sources outside state waters (Outer Continental Shelf). The U.S. EPA also establishes emission standards for vehicles sold in states other than California. Automobiles sold in California must meet the stricter emission requirements of the CARB.

The Federal Clean Air Act (CAA) was first enacted in 1955, and has been amended numerous times in subsequent years (1963, 1965, 1967, 1970, 1977, and 1990). The CAA establishes the federal air quality standards, the NAAQS, and specifies future dates for achieving compliance (16). The CAA also mandates that states submit and implement State Implementation Plans (SIPs) for local areas not meeting these standards. These plans must include pollution control measures that demonstrate how the standards will be met.

The 1990 amendments to the CAA that identify specific emission reduction goals for areas not meeting the NAAQS require a demonstration of reasonable further progress toward attainment

and incorporate additional sanctions for failure to attain or to meet interim milestones. The sections of the CAA most directly applicable to the development of the Project site include Title I (Non-Attainment Provisions) and Title II (Mobile Source Provisions). Title I provisions were established with the goal of attaining the NAAQS for the following criteria pollutants O3, NO2, SO2, PM10, CO, PM2.5, and lead. The NAAQS were amended in July 1997 to include an additional standard for O3 and to adopt a NAAQS for PM2.5. Table 3-1 (previously presented) provides the NAAQS within the basin.

Mobile source emissions are regulated in accordance with Title II provisions. These provisions require the use of cleaner burning gasoline and other cleaner burning fuels such as methanol and natural gas. Automobile manufacturers are also required to reduce tailpipe emissions of hydrocarbons and nitrogen oxides (NOx). NOx is a collective term that includes all forms of nitrogen oxides (NO, NO2, NO3) which are emitted as byproducts of the combustion process.

2.7.2 CALIFORNIA REGULATIONS

The CARB, which became part of the California EPA in 1991, is responsible for ensuring implementation of the California Clean Air Act (AB 2595), responding to the federal CAA, and for regulating emissions from consumer products and motor vehicles. The California CAA mandates achievement of the maximum degree of emissions reductions possible from vehicular and other mobile sources in order to attain the state ambient air quality standards by the earliest practical date. The CARB established the CAAQS for all pollutants for which the federal government has NAAQS and, in addition, establishes standards for sulfates, visibility, hydrogen sulfide, and vinyl chloride. However at this time, hydrogen sulfide and vinyl chloride are not measured at any monitoring stations in the SCAB because they are not considered to be a regional air quality problem. Generally, the CAAQS are more stringent than the NAAQS (11) (10).

Local air quality management districts, such as the SCAQMD, regulate air emissions from stationary sources such as commercial and industrial facilities. All air pollution control districts have been formally designated as attainment or non-attainment for each CAAQS.

Serious non-attainment areas are required to prepare air quality management plans that include specified emission reduction strategies in an effort to meet clean air goals. These plans are required to include:

- Application of Best Available Retrofit Control Technology to existing sources;
- Developing control programs for area sources (e.g., architectural coatings and solvents) and indirect sources (e.g. motor vehicle use generated by residential and commercial development);
- A District permitting system designed to allow no net increase in emissions from any new or modified permitted sources of emissions;
- Implementing reasonably available transportation control measures and assuring a substantial reduction in growth rate of vehicle trips and miles traveled;
- Significant use of low emissions vehicles by fleet operators;
- Sufficient control strategies to achieve a five percent or more annual reduction in emissions or 15 percent or more in a period of three years for ROGs, NOx, CO and PM10. However, air basins may

use alternative emission reduction strategy that achieves a reduction of less than five percent per year under certain circumstances.

2.7.3 AIR QUALITY MANAGEMENT PLANNING

Currently, the NAAQS and CAAQS are exceeded in most parts of the SCAB. In response, the SCAQMD has adopted a series of Air Quality Management Plans (AQMPs) to meet the state and federal ambient air quality standards (17). AQMPs are updated regularly in order to more effectively reduce emissions, accommodate growth, and to minimize any negative fiscal impacts of air pollution control on the economy. A detailed discussion on the AQMP and Project consistency with the AQMP is provided in Section 3.8.

2.8 REGIONAL AIR QUALITY IMPROVEMENT

The Project is within the jurisdiction of the SCAQMD. In 1976, California adopted the Lewis Air Quality Management Act which created SCAQMD from a voluntary association of air pollution control districts in Los Angeles, Orange, Riverside, and San Bernardino counties. The geographic area of which SCAQMD consists is known as the Basin. SCAQMD develops comprehensive plans and regulatory programs for the region to attain federal standards by dates specified in federal law. The agency is also responsible for meeting state standards by the earliest date achievable, using reasonably available control measures.

SCAQMD rule development through the 1970s and 1980s resulted in dramatic improvement in Basin air quality. Nearly all control programs developed through the early 1990s relied on (i) the development and application of cleaner technology; (ii) add-on emission controls, and (iii) uniform CEQA review throughout the Basin. Industrial emission sources have been significantly reduced by this approach and vehicular emissions have been reduced by technologies implemented at the state level by CARB.

As discussed above, the SCAQMD is the lead agency charged with regulating air quality emission reductions for the entire Basin. SCAQMD created AQMPs which represent a regional blueprint for achieving healthful air on behalf of the 16 million residents of the South Coast Basin. The remarkable historical improvement in air quality since the 1970's is the direct result of Southern California's comprehensive, multiyear strategy of reducing air pollution from all sources as outlined in its Air Quality Management Plans (AQMPs) and by utilizing uniform CEQA review throughout the Basin.

The 2012 AQMP states, "the remarkable historical improvement in air quality since the 1970's is the direct result of Southern California's comprehensive, multiyear strategy of reducing air pollution from all sources as outlined in its AQMPs," (18). Ozone, NOx, VOC, and CO have been decreasing in the Basin since 1975 and are projected to continue to decrease through 2020 (19). These decreases result primarily from motor vehicle controls and reductions in evaporative emissions. Although vehicle miles traveled in the Basin continue to increase, NOx and VOC levels are decreasing because of the mandated controls on motor vehicles and the replacement of older polluting vehicles with lower-emitting vehicles. NOx emissions from electric utilities have also decreased due to use of cleaner fuels and renewable energy. Ozone contour maps show that the number of days exceeding the national 8-hour standard has decreased between 1997 and 2007.

In the 2007 period, there was an overall decrease in exceedance days compared with the 1997 period. The overall trends of PM10 and PM2.5 in the air (not emissions) show an overall improvement since 1975. Direct emissions of PM10 have remained somewhat constant in the Basin and direct emissions of PM2.5 have decreased slightly since 1975. Area wide sources (fugitive dust from roads, dust from construction and demolition, and other sources) contribute the greatest amount of direct particulate matter emissions.

Ozone levels in the SCAB have decreased substantially over the last 30 years as shown in Table 2-4 (20). Today, the maximum measured concentrations are approximately one-third of concentrations within the late 70's.

As with other pollutants, the most recent PM10 statistics also show overall improvement as illustrated in Table 2-5. During the period for which data are available, the 24-hour national annual average decreased by approximately 50 percent, from 103.7 µg/m³ in 1989 to 52.3 µg/m³ in 2016. Although the values in the late 1990's show some variability, this is probably due to meteorology rather than a change in emissions. Despite the overall decrease, ambient concentrations still exceed the State annual and 24-hour PM10 standards. Similar to the ambient concentrations, the calculated number of days above the 24-hour PM10 standards has also shown an overall drop. During 1995, there were 25 calculated days above the national standard. The most recent report to include information on the number of days above the national standard was in 2015, in which there were 6.6 calculated national standard exceedance days (21).

Table 2-6 shows the most recent 24-hour average $PM_{2.5}$ concentrations (national) in the SCAB from 1999 through 2016. Overall, the annual average concentrations have decreased by almost 51 percent. The calculated number of days above the national standard also decreased, from about 88 days in 1999 to about 7 days in 2016. The SCAB is currently designated as nonattainment for the State and national $PM_{2.5}$ standards.

While the 2012 AQMP PM2.5 attainment demonstration and the 2015 associated supplemental SIP submission indicated that attainment of the 24-hour standard was predicted to occur by the end of 2015, it could not anticipate the effect of the ongoing drought on the measured PM2.5. The 2006 to 2010 base period used for the 2012 attainment demonstration had near-normal rainfall. While the trend of PM2.5- equivalent emission reductions continued through 2015, the severe drought conditions contributed to the PM2.5 increases observed after 2012. As a result of the disrupted progress toward attainment of the federal 24-hour PM2.5 standard, SCAQMD submitted a request and the U.S. EPA approved, in January 2016, a "bump up" to the nonattainment classification from "moderate" to "serious," with a new attainment deadline as soon as practicable, but not beyond December 31, 2019.

The most recent CO concentrations in the SCAB 1986 are shown in Table 2-7 (22). CO concentrations in the SCAB have decreased markedly — a total decrease of more about 80 percent in the peak 8-hour concentration since 1986. The number of exceedance days has also declined. The entire SCAB is now designated as attainment for both the state and national CO standards. Ongoing reductions from motor vehicle control programs should continue the downward trend in ambient CO concentrations.

TABLE 2-4: SOUTH COAST AIR BASIN OZONE TREND

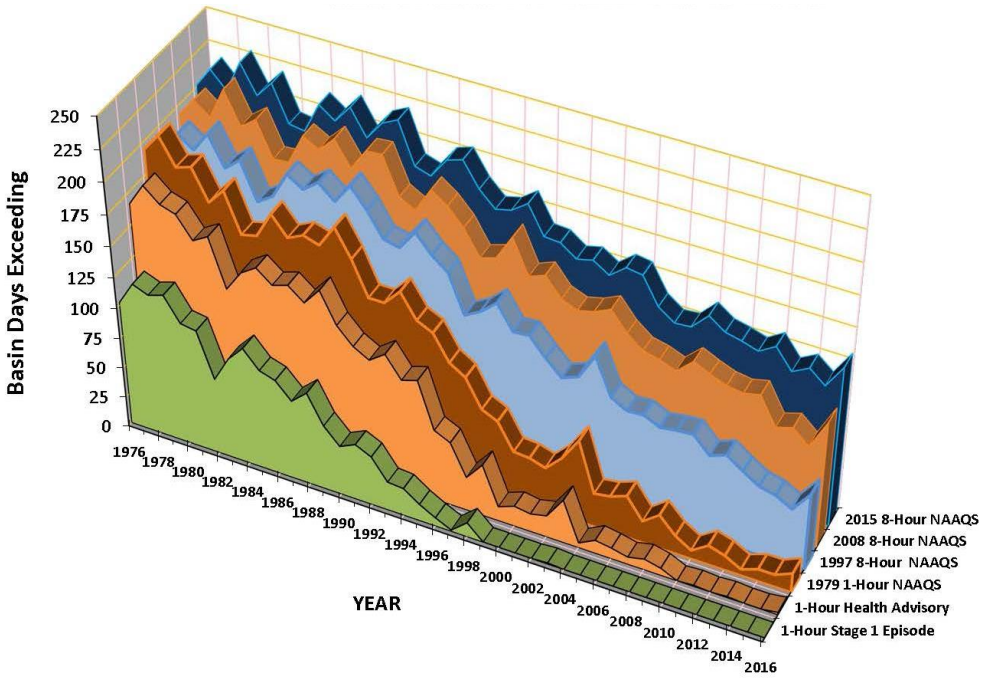


TABLE 2-5: SOUTH COAST AIR BASIN PM_{10} TREND

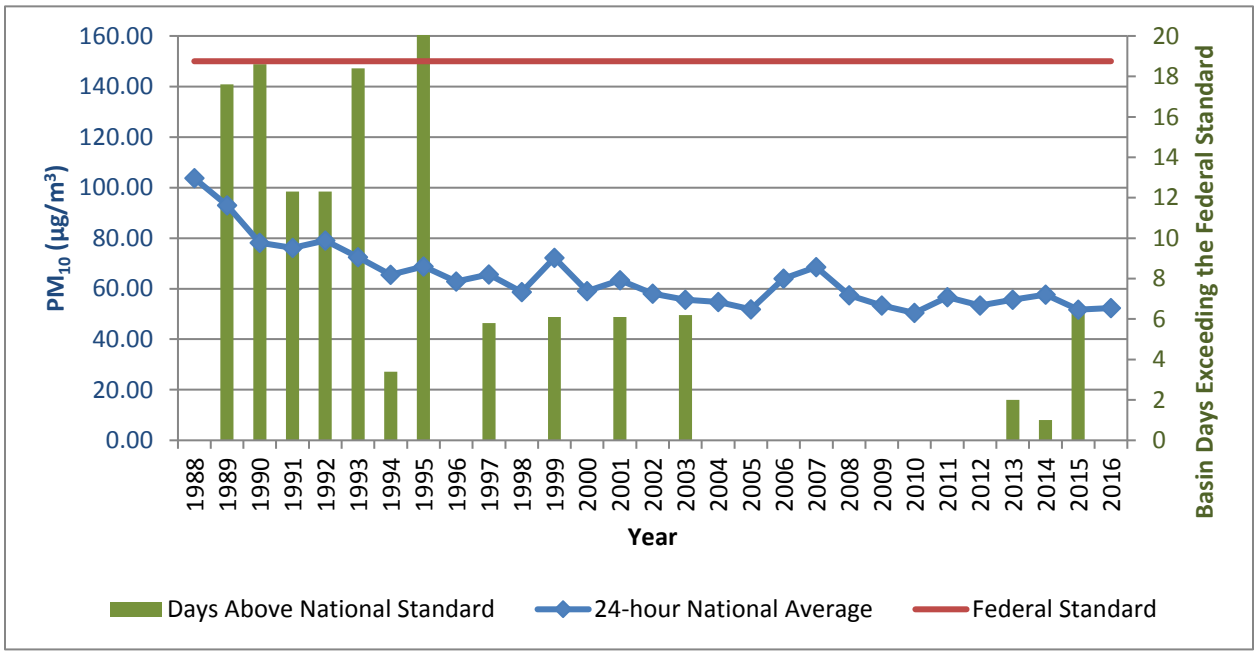


TABLE 2-6: SOUTH COAST AIR BASIN $PM_{2.5}$ TREND

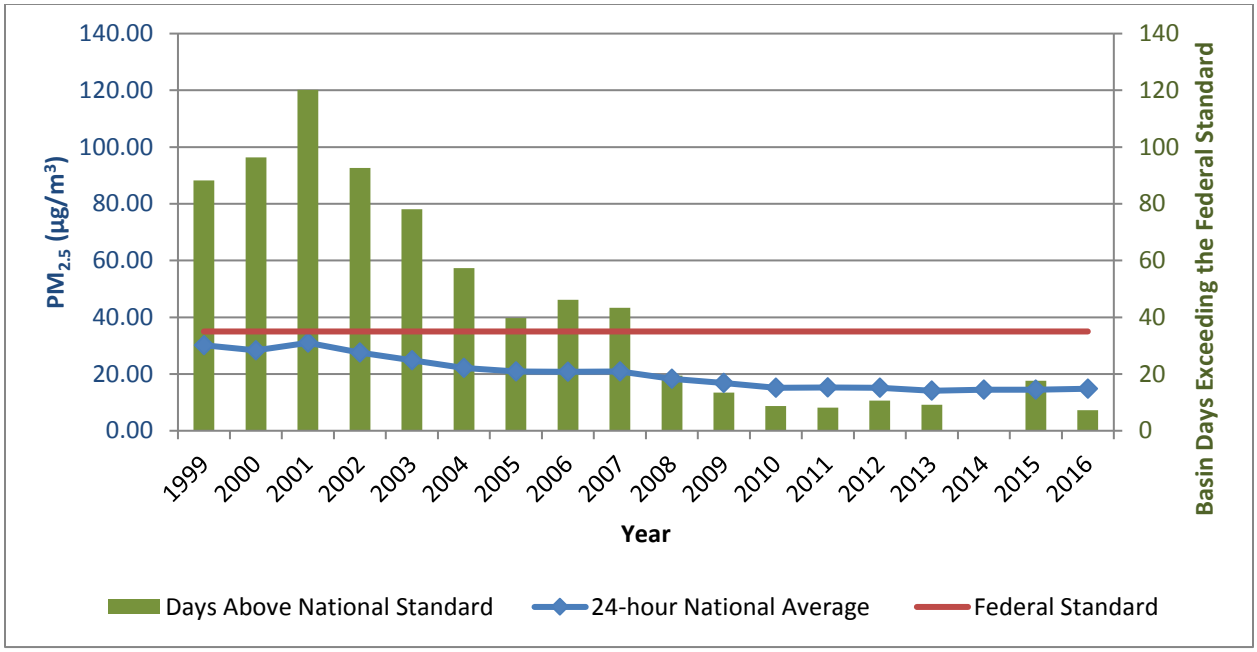
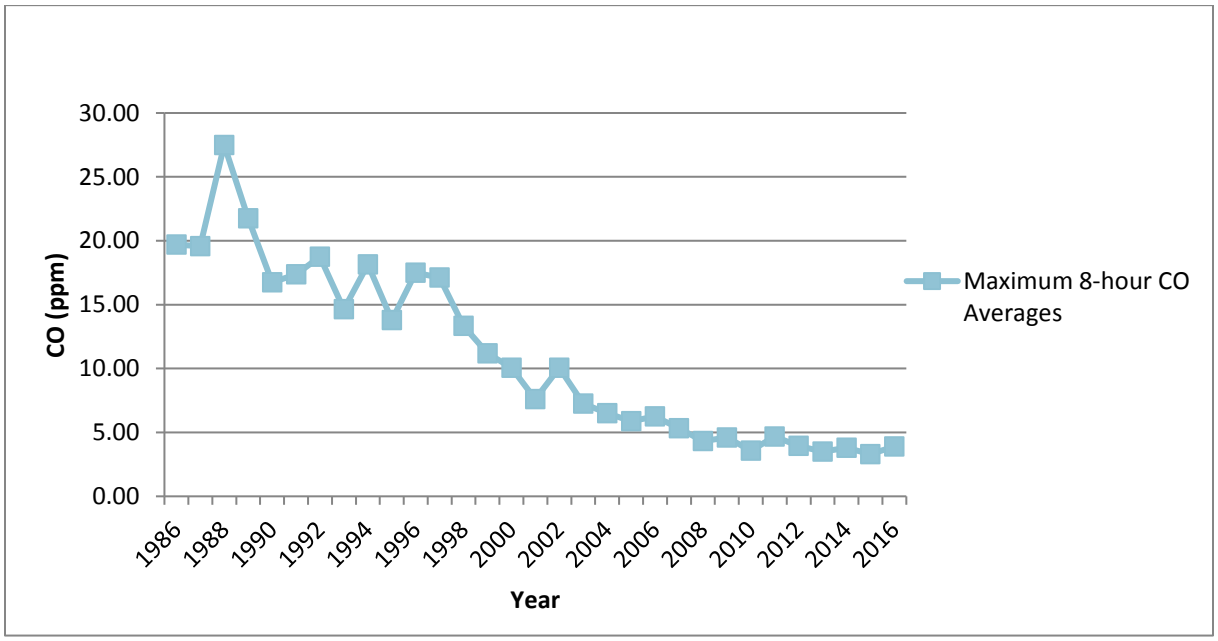


TABLE 2-7: SOUTH COAST AIR BASIN CARBON MONOXIDE TREND



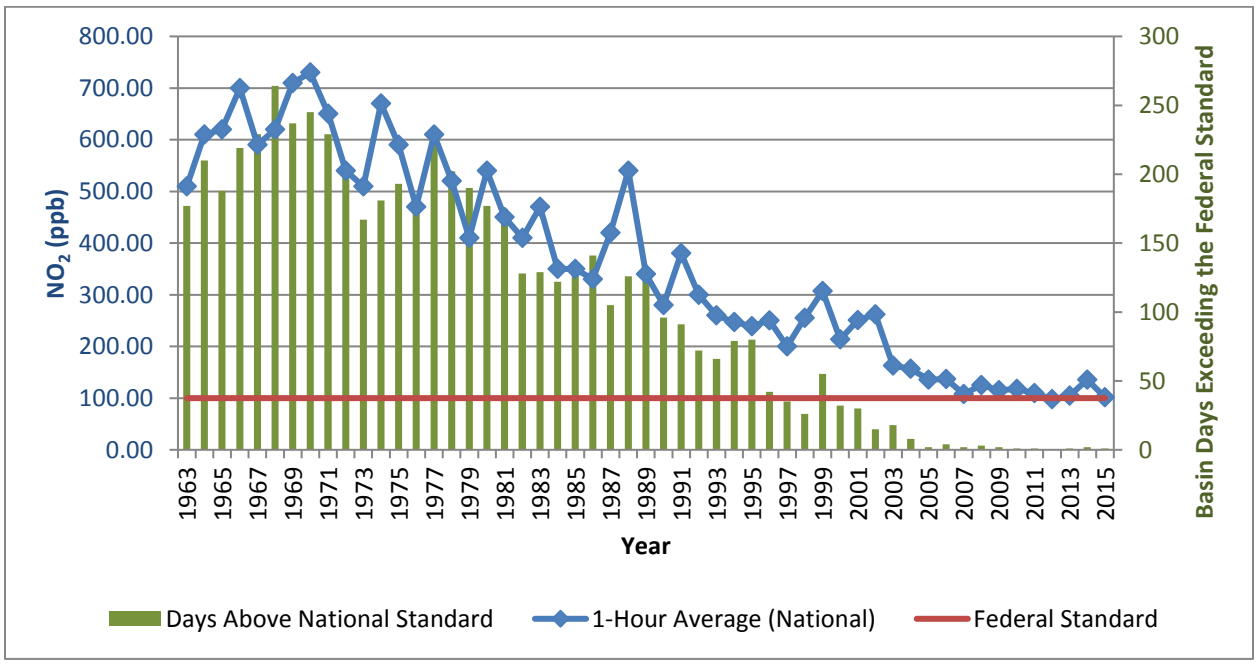
Part of the control process of the SCAQMD's duty to greatly improve the air quality in the Basin is the uniform CEQA review procedures required by SCAQMD's CEQA Handbook (23). The single threshold of significance used to assess Project direct and cumulative impacts has in fact "worked" as evidenced by the track record of the air quality in the Basin dramatically improving

over the course of the past decades. As stated by the SCAQMD the District's thresholds of significance are based on factual and scientific data and are therefore appropriate thresholds of significance to use for this Project.

The most recent NO_2 data for the SCAB is shown in Table 2-8 (22). Over the last 50 years, NO_2 values have decreased significantly; the peak 1-hour average for 2013 was almost 74 percent lower than what it was during 1963. The SCAB attained the State 1-hour NO_2 standard in 1994, bringing the entire State into attainment. A new state annual average standard of 0.030 parts per million was adopted by the ARB in February 2007 (24). The new standard is just barely exceeded in the South Coast. NO_2 is formed from NO_x emissions, which also contribute to ozone. As a result, the majority of the future emission control measures will be implemented as part of the overall ozone control strategy. Many of these control measures will target mobile sources, which account for more than three-quarters of California's NO_x emissions. These measures are expected to bring the South Coast into attainment of the State annual average standard.

The American Lung Association website includes data collected from State air quality monitors that are used to compile an annual State of the Air report. These reports have been published over the last 13 years. The latest State of the Air Report compiled for the Basin was in 2010 (25). As noted in this report, air quality in the Basin has significantly improved in terms of both pollution levels and high pollution days over the past three decades. The area's average number of high ozone days dropped from 189.5 day per year in the initial 2000 State of the Air report (1996–1998) to 141.8 in the 2006–2008 report. The region has seen dramatic reduction in particle pollution since the initial State of the Air report (25).

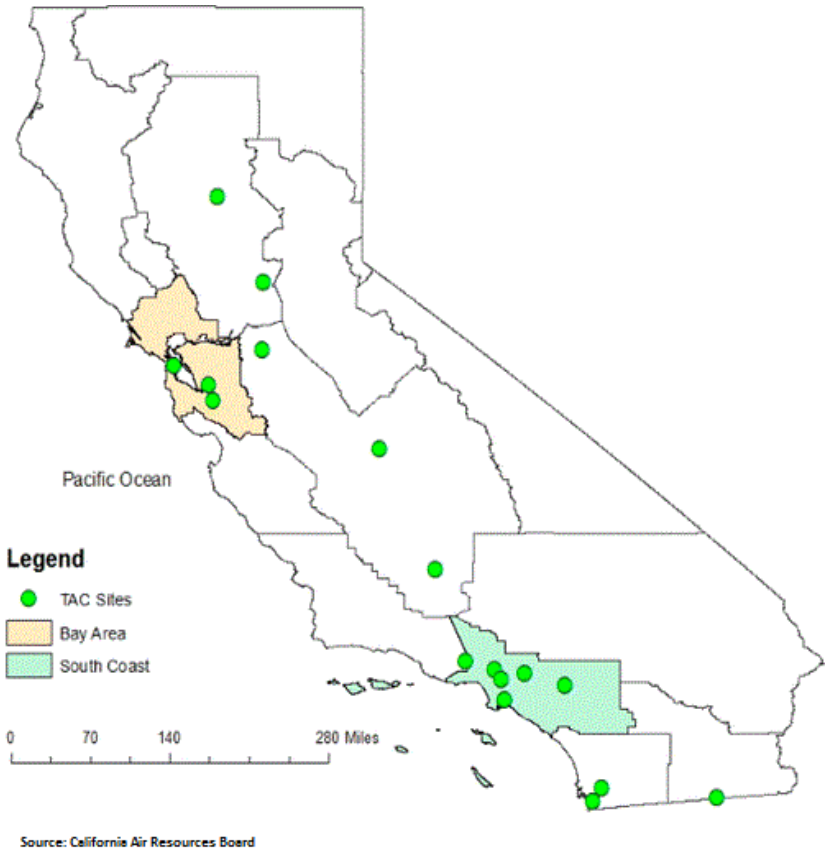
TABLE 2-8: SOUTH COAST AIR BASIN NITROGEN DIOXIDE TREND



TOXIC AIR CONTAMINANTS (TACS) TRENDS

In 1984, as a result of public concern for exposure to airborne carcinogens, the CARB adopted regulations to reduce the amount of air toxic contaminant emissions resulting from mobile and area sources, such as cars, trucks, stationary products, and consumer products. According to the *Ambient and Emission Trends of Toxic Air Contaminants in California* journal article which was prepared for CARB, results show that between 1990-2012, ambient concentration and emission trends for the seven TACs responsible for most of the known cancer risk associated with airborne exposure in California have declined significantly (26). The seven TACs studied shown below include those that are derived from mobile sources: diesel particulate matter (DPM), benzene, and 1,3-butadiene; those that are derived from stationary sources: perchloroethylene and hexavalent chromium; and those derived from photochemical reactions of emitted VOCs: formaldehyde and acetaldehyde[3]. TACs data was gathered at monitoring sites from both the Bay Area and South Coast Air Basins, as shown on Exhibit 2-A; Several of the sites in the SCAB include Reseda, Compton, Rubidoux, Burbank, and Fontana. The decline in ambient concentration and emission trends of these TACs are a result of various regulations CARB has implemented to address cancer risk.

EXHIBIT 2-A: CALIFORNIA TOXIC AIR CONTAMINANT SITES



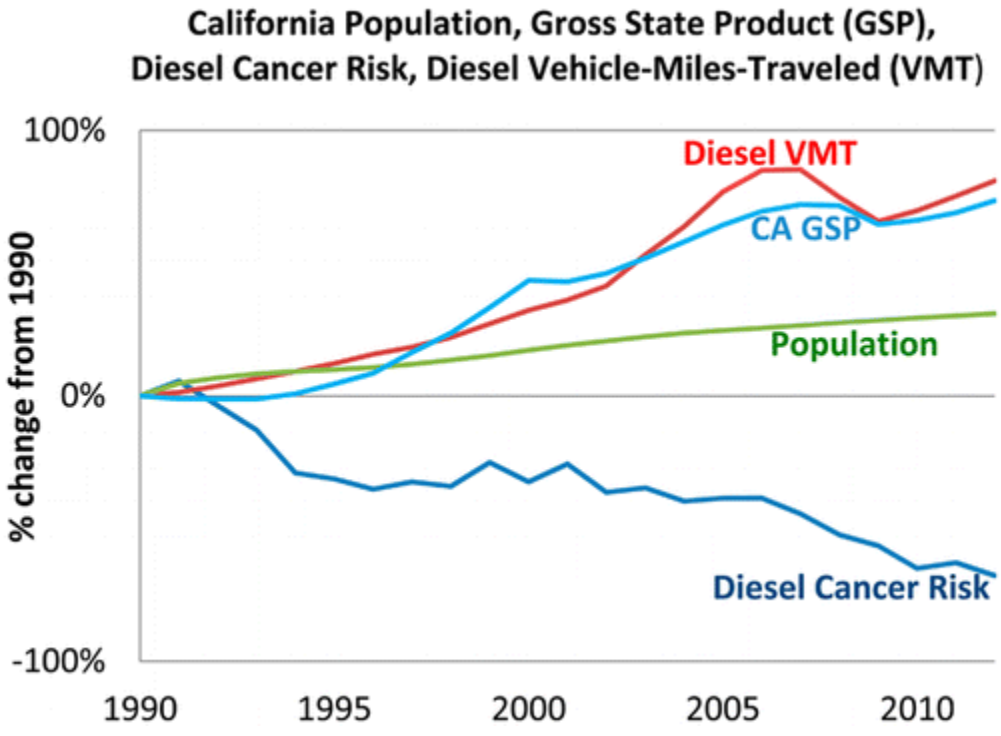
[3] It should be noted that ambient DPM concentrations are not measured directly. Rather, a surrogate method using the coefficient of haze (COH) and elemental carbon (EC) is used to estimate DPM concentrations.

Mobile Source TACs

The CARB introduced two programs that aimed at reducing mobile emissions for light and medium duty vehicles through vehicle emissions controls and cleaner fuel. Since 1996, light-duty vehicles sold in California are equipped with California's second-generation On-Board Diagnostic (OBD-II) system as a result of about half of total car emissions stemming from emissions control device malfunctions. CARB's phase II Reformulated Gasoline (RFG-2) regulation, adopted in 1996, also led to a reduction of mobile source emissions. Through such regulations, benzene levels declined 88% from 1990-2012. 1,3-Butadiene concentrations also declined 85% from 1990-2012 as a result of the motor vehicle regulations (26).

In 2000, CARB's Diesel Risk Reduction Plan (DRRP) recommended the replacement and retrofit of diesel-fueled engines and the use of ultra-low-sulfur (<15ppm) diesel fuel. As a result of these measures, DPM concentrations have declined 68%, even though the state's population increased 31% and the amount of diesel vehicles miles traveled increased 81%, as shown on Exhibit 2-B. With the implementation of these diesel-related control regulations, ARB expects a DPM decline of 71% for 2000-2020.

EXHIBIT 2-B: DIESEL PARTICULATE MATTER AND DIESEL VEHICLE MILES TREND



Source: California Air Resources Board

Stationary Source TACs

Various regulations led to a decrease in perchloroethylene and hexavalent chromium, with a 92% and 86% decline, respectively. By 1993, several local air districts required dry cleaning businesses to use a carbon absorber and refrigerated condenser, as well as, dry-to-dry machines and closed-

looped machines instead of vented transfer machines. Starting in 2003, California provided financial incentives for dry cleaners to use other solvents and soon after, the CARB banned the use of perchloroethylene in automotive products, aerosol coatings, and most consumer products. In 2007, CARB's dry cleaning regulation was amended to require phase-out of perchloroethylene machines by 2023, which would further reduce emissions to minimal levels (26).

Hexavalent chromium emissions began to decline in 1988 with the ARB-regulated regulations contributing to more than 97% emission reduction within four years. The various regulations include prohibiting the use of hexavalent chromium in cooling towers (1989), in motor vehicle and mobile equipment coatings (2001), and in thermal spraying operations (2005). By 2005, hexavalent chromium emissions were 99.97% less than in 1987, far exceeding expectations. In 2006, hexavalent chromium emissions were further reduced with the 2006 ARB regulation requiring add-on air pollution control devices and chemical fume suppressants.

Secondary TACs

Between 1996-2012, ambient concentrations of formaldehyde and acetaldehyde declined 22% and 21%, respectively. The decline in these TACs are attributed from increasingly stringent motor vehicle exhaust emission standards, vehicle fleet turnover, fuel reformulation, and the switch from MTBE (formaldehyde precursor) to ethanol in gasoline (26).

As previously discussed, ambient and emissions levels of TACs have reduced significantly from 1990-2012. The overall declining trend in TACs is expected to continue in California from implementation of toxic air controls.

DIESEL REGULATIONS

The CARB and the Ports of Los Angeles and Long Beach have adopted several iterations of regulations for diesel trucks that are aimed at reducing diesel particulate matter (DPM). More specifically, the CARB Drayage Truck Regulation (27), the CARB statewide On-road Truck and Bus Regulation (28), and the Ports of Los Angeles and Long Beach "Clean Truck Program" (CTP) require accelerated implementation of "clean trucks" into the statewide truck fleet (29). In other words, older more polluting trucks will be replaced with newer, cleaner trucks as a function of these regulatory requirements.

Moreover, the average statewide DPM emissions for Heavy Duty Trucks (HHDT), in terms of grams of DPM generated per mile traveled, will dramatically be reduced due to the aforementioned regulatory requirements.

Diesel emissions identified in this analysis would therefore overstate future DPM emissions since not all the regulatory requirements are reflected in the modeling.

CANCER RISK TRENDS

Based on information available from CARB, overall cancer risk throughout the basin has had a declining trend since 1990. In 1998, following an exhaustive 10-year scientific assessment process, the State of California Air Resources Board (ARB) identified particulate matter from

diesel-fueled engines as a toxic air contaminant. The SCAQMD initiated a comprehensive urban toxic air pollution study, called MATES-II (for Multiple Air Toxics Exposure Study). Diesel particulate matter (DPM) accounts for more than 70 percent of the cancer risk.

In 2008 the SCAQMD prepared an update to the MATES-II study, referred to as MATES-III. MATES-III estimates the average excess cancer risk level from exposure to TACs is an approximately 17% decrease in comparison to the MATES-II study.

Nonetheless, the SCAQMD's most recent in-depth analysis of the toxic air contaminants and their resulting health risks for all of Southern California was from the *Multiple Air Toxics Exposure Study in the South Coast Air Basin, MATES IV,"* which shows that cancer risk has decreased more than 55% between MATES III (2005) and MATES IV (2012) (25).

MATES-IV study represents the baseline health risk for a cumulative analysis. MATES-IV calculated cancer risks based on monitoring data collected at ten fixed sites within the South Coast Air Basin (SCAB). None of the fixed monitoring sites are within the local area of the Project site. However, MATES-IV has extrapolated the excess cancer risk levels throughout the basin by modeling the specific grids. MATES-IV modeling predicted an excess cancer risk of 568.32 in one million for the Project area. DPM is included in this cancer risk along with all other TAC sources. DPM accounts for 68% of the total risk shown in MATES-IV. Cumulative Project generated TACs are limited to DPM.

2.9 EXISTING PROJECT SITE AIR QUALITY CONDITIONS

The Project site is currently vacant and as such, existing air quality conditions at the Project site would generally reflect ambient monitored conditions previously presented previously at Table 2-3.

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3 PROJECT AIR QUALITY IMPACT

3.1 INTRODUCTION

The Project has been evaluated to determine if it will violate an air quality standard or contribute to an existing or projected air quality violation. Additionally, the Project has been evaluated to determine if it will result in a cumulatively considerable net increase of a criteria pollutant for which the SCAB is non-attainment under an applicable federal or state ambient air quality standard. The significance of these potential impacts is described in the following section.

3.2 STANDARDS OF SIGNIFICANCE

The SCAQMD has developed regional and localized significance thresholds for regulated pollutants, as summarized at Table 3-1 (30). The SCAQMD's CEQA Air Quality Significance Thresholds (March 2015) indicate that any projects in the SCAB with daily emissions that exceed any of the indicated thresholds should be considered as having an individually and cumulatively significant air quality impact.

TABLE 3-1: MAXIMUM DAILY EMISSIONS THRESHOLDS[A]

Pollutant	Construction	Operations
Regional Thresholds		
NOx	100 lbs/day	55 lbs/day
VOC	75 lbs/day	55 lbs/day
PM10	150 lbs/day	150 lbs/day
PM2.5	55 lbs/day	55 lbs/day
SOx	150 lbs/day	150 lbs/day
CO	550 lbs/day	550 lbs/day
Lead	3 lbs/day	3 lbs/day
Localized Thresholds		
NOx	256 lbs/day (site preparation) 273 lbs/day (grading)	203 lbs/day
CO	1,803 lbs/day (site preparation) 1,962 lbs/day (grading)	1,733 lbs/day
PM10	33 lbs/day (site preparation) 37 lbs/day (grading)	4 lbs/day
PM2.5	8 lbs/day (site preparation) 9 lbs/day (grading)	2 lbs/day

[A]: Based on SCAQMD Air Quality Significance Thresholds, March 2015

3.3 CALIFORNIA EMISSIONS ESTIMATOR MODEL™ EMPLOYED TO ESTIMATE AQ EMISSIONS

Land uses such as the Project affect air quality through construction-source and operational-source emissions.

On October 17, 2017, the SCAQMD in conjunction with the California Air Pollution Control Officers Association (CAPCOA) and other California air districts, released the latest version of the California Emissions Estimator Model™ (CalEEMod™) v2016.3.2. The purpose of this model is to calculate construction-source and operational-source criteria pollutant (NO_x, VOC, PM_{10}, $PM_{2.5}$, SO_x, and CO) and greenhouse gas (GHG) emissions from direct and indirect sources; and quantify applicable air quality and GHG reductions achieved from mitigation measures (31). Accordingly, the latest version of CalEEMod™ has been used for this Project to determine construction and operational air quality emissions. Output from the model runs for both construction and operational activity are provided in Appendix 3.1 through Appendix 3.4.

3.4 CONSTRUCTION EMISSIONS

Construction activities associated with the Project will result in emissions of CO, VOCs, NOx, SOx, PM10, and PM2.5. Construction related emissions are expected from the following construction activities:

- Site Preparation
- Grading
- Building Construction
- Paving
- Architectural Coating

Construction is expected to commence in May 2018 and will last through July 2019. The duration of construction activity was estimated based on information provided by the client and a 2019 opening year. The construction schedule utilized in the analysis, shown in Table 3-2, represents a "worst-case" analysis scenario should construction occur any time after the respective dates since emission factors for construction decrease as time passes and the analysis year increases due to emission regulations becoming more stringent.[4] A detailed summary of construction, shown in Table 3-3, was estimated based on information provided by the client. The site-specific construction fleet may vary due to specific project needs at the time of construction. The duration of construction activity and associated equipment both represent a reasonable approximation of the expected construction fleet as required per CEQA guidelines. Please refer to specific detailed modeling inputs/outputs contained in Appendix 3.1 of this analysis.

Dust is typically a major concern during rough grading activities. Because such emissions are not amenable to collection and discharge through a controlled source, they are called "fugitive emissions". Fugitive dust emissions rates vary as a function of many parameters (soil silt, soil

[4] As shown in the California Emissions Estimator Model (CalEEMod) User's Guide Version 2016.3, Table 3.4 "OFFROAD Equipment Emission Factors" as the analysis year increases, emission factors for the same equipment pieces decrease due to the natural turnover of older equipment being replaced by newer less polluting equipment and new regulatory requirements.

moisture, wind speed, area disturbed, number of vehicles, depth of disturbance or excavation, etc.). The CalEEMod model was utilized to calculate fugitive dust emissions resulting from this phase of activity. It is our understanding the Project will be balanced (will not require import/export of soil).

Construction emissions for construction worker vehicles traveling to and from the Project site, as well as vendor trips (construction materials delivered to the Project site) were estimated based on information from the applicant and the CalEEMod model.

OFF-SITE UTILITY AND INFRASTRUCTURE IMPROVEMENTS

Construction emissions associated with off-site utility and infrastructure improvements may occur, however at this time, a specific schedule of off-site utility and infrastructure improvements is unknown. However, impacts associated with these expected activities are not expected to exceed the emissions identified for Project-related construction activities. As such, no impacts beyond what has already been identified in this report are expected to occur.

TABLE 3-2: CONSTRUCTION DURATION

Phase Name	Start Date	End Date	Days
Site Preparation	05/01/2018	05/14/2018	10
Grading	05/15/2018	06/25/2018	30
Building Construction	06/26/2018	05/13/2019	230
Paving	05/14/2019	06/10/2019	20
Architectural Coating	06/11/2019	07/08/2019	20

TABLE 3-3: CONSTRUCTION EQUIPMENT ASSUMPTIONS

Activity	Equipment	Number	Hours Per Day
Site Preparation	Crawler Tractors	4	8
	Rubber Tired Dozers	3	8
Grading	Crawler Tractors	2	8
	Excavators	2	8
	Graders	1	8
	Rubber Tired Dozer	1	8
	Scrapers	2	8
Building Construction	Cranes	1	8
	Crawler Tractors	3	8
	Forklifts	3	8
	Generator Sets	1	8
	Welders	1	8
Paving	Pavers	2	8
	Paver Equipment	2	8
	Rollers	2	8
Architectural Coating	Air Compressors	1	8

3.4.1 CONSTRUCTION EMISSIONS SUMMARY

Impacts without mitigation assume compliance with applicable SCAQMD Rules. The SCAQMD Rules that are currently applicable during construction activity for this Project include but are not limited to: Rule 1113 (Architectural Coatings) (2); Rule 431.2 (Low Sulfur Fuel) (3); Rule 403 (Fugitive Dust) (4); and Rule 1186 / 1186.1 (Street Sweepers) (5). As such, credit for Rule 403(BACM AQ-1) have been taken.

Impacts without Mitigation

The estimated maximum daily construction emissions without mitigation are summarized on Table 3-4. Detailed construction model outputs are presented in Appendix 3.1. Under the assumed scenarios, emissions resulting from the Project construction would exceed criteria pollutant thresholds established by the SCAQMD for emissions of VOCs.

TABLE 3-4: MAXIMUM DAILY PEAK CONSTRUCTION EMISSIONS SUMMARY (WITHOUT MITIGATION)

Year	Emissions (pounds per day)					
	VOC	NOx	CO	SOx	PM10	PM2.5
2018	5.96	71.36	36.64	0.09	20.10	11.67
2019	125.72	50.10	30.49	0.09	4.85	2.57
Maximum Daily Emissions	**125.72**	**71.36**	**36.64**	**0.09**	**20.10**	**11.67**
SCAQMD Regional Threshold	75	100	550	150	150	55
Threshold Exceeded?	**YES**	**NO**	**NO**	**NO**	**NO**	**NO**

Impacts with Mitigation

The estimated maximum daily construction emissions with mitigation are summarized on Table 3-5. Detailed construction model outputs are presented in Appendix 3.1. After implementation of MM AQ-1, Project construction-source emissions would not exceed the applicable SCAQMD thresholds for emissions of VOCs. Therefore, a less than significant impact would occur with implementation of applicable regulatory requirements, MM AQ-1.

TABLE 3-5: MAXIMUM DAILY PEAK CONSTRUCTION EMISSIONS SUMMARY (WITH MITIGATION)

Year	Emissions (pounds per day)					
	VOC	NOx	CO	SOx	PM10	PM2.5
2018	5.96	71.36	36.64	0.09	9.08	5.61
2019	63.15	50.10	30.49	0.09	4.85	2.57
Maximum Daily Emissions	**63.15**	**71.36**	**36.64**	**0.09**	**9.08**	**5.61**
SCAQMD Regional Threshold	75	100	550	150	150	55
Threshold Exceeded?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

3.5 OPERATIONAL EMISSIONS

Operational activities associated with the proposed Project will result in emissions of VOC, NOX, CO, SOX, PM10, and PM2.5. Operational emissions would be expected from the following primary sources:

- Area Source Emissions
- Energy Source Emissions
- Mobile Source Emissions
- On-Site Equipment Emissions

3.5.1 AREA SOURCE EMISSIONS

<u>Architectural Coatings</u>

Over a period of time the buildings that are part of this Project will be subject to emissions resulting from the evaporation of solvents contained in paints, varnishes, primers, and other

surface coatings as part of Project maintenance. The emissions associated with architectural coatings were calculated using the CalEEMod model.

Consumer Products

Consumer products include, but are not limited to detergents, cleaning compounds, polishes, personal care products, and lawn and garden products. Many of these products contain organic compounds which when released in the atmosphere can react to form ozone and other photochemically reactive pollutants. The emissions associated with use of consumer products were calculated based on defaults provided within the CalEEMod model.

Landscape Maintenance Equipment

Landscape maintenance equipment would generate emissions from fuel combustion and evaporation of unburned fuel. Equipment in this category would include lawnmowers, shedders/grinders, blowers, trimmers, chain saws, and hedge trimmers used to maintain the landscaping of the Project. The emissions associated with landscape maintenance equipment were calculated based on assumptions provided in the CalEEMod model.

3.5.2 ENERGY SOURCE EMISSIONS

Combustion Emissions Associated with Natural Gas and Electricity

Electricity and natural gas are used by almost every project. Criteria pollutant emissions are emitted through the generation of electricity and consumption of natural gas. However, because electrical generating facilities for the Project area are located either outside the region (state) or offset through the use of pollution credits (RECLAIM) for generation within the SCAB, criteria pollutant emissions from offsite generation of electricity is generally excluded from the evaluation of significance and only natural gas use is considered. The emissions associated with natural gas use were calculated using the CalEEMod model.

3.5.3 MOBILE SOURCE EMISSIONS

Vehicles

Project-related operational air quality impacts derive predominantly from mobile sources. In this regard, approximately 92 percent (by weight) of all Project operational-source emissions would be generated by mobile sources (vehicles). Neither the Project Applicant nor the City has any regulatory control over these tail pipe emissions. Rather, vehicle tail pipe source emissions are regulated by CARB and USEPA. As summarized previously herein, as the result of CARB and USEPA actions, Basin-wide vehicular-source emissions have been reduced dramatically over the past years and are expected to further decline as clean vehicle and fuel technologies improve.

Project mobile source air quality impacts are dependent on both overall daily vehicle trip generation and the effect of the Project on peak hour traffic volumes and traffic operations in the vicinity of the Project. The Project related operational air quality impacts derive primarily from vehicle trips generated by the Project. Trip characteristics available from the report, Brodiaea Commerce Center Traffic Impact Analysis (Urban Crossroads) 2018 were utilized in this

analysis (32). It should be noted that the Project's traffic study presents the total Project vehicle trips in terms of Passenger Car Equivalents (PCEs) in an effort to recognize and acknowledge the effects of heavy vehicles at the study area intersections. Notwithstanding, for purposes of the air quality study, the PCE trips were not used. Rather, to more accurately estimate and model vehicular-source emissions, the actual number of vehicles, by vehicle classification (e.g., passenger cars (including light trucks), heavy trucks) were used in the analysis.

ITE land use code 152 (High-Cube Warehousing) has been used to derive site specific trip generation. High-cube warehouse/distribution centers (ITE Land Use Code 152) are a unique land use type within the larger, more generalized industrial land use category. ITE's most recent edition of the Trip Generation manual (ITE 9th Edition), published in 2012, defines "high-cube warehouses" as "…used for storage of materials, goods and merchandise prior to their distribution to retail outlets, distribution centers or other warehouses. These facilities are typically characterized by ceiling heights of at least 24 feet with small employment counts due to a high level of mechanization." The average square footage for the sites surveyed for high-cube warehouse/distribution center (Land Use 152) use is above 500,000 square feet. The number of sites observed in the compilation of this data ranges from 57-70 sites of which more than 20 sites exceed 1,000,000 square feet in gross floor area. The weighted average daily trip generation rate for high-cube warehouse (Land Use 152) use is 1.68 trips per thousand square feet (TSF). Total vehicle mix percentages were also obtained from the ITE Trip Generation manual in conjunction with the South Coast Air Quality Management District's (SCAQMD) recommended truck mix, by axle type (33). The SCAQMD is currently recommending the use of the ITE Trip Generation manual in conjunction with their truck mix by axle-type to better quantify trip rates associated with local warehouse and distribution projects, as truck emission represent more than 90 percent of air quality impacts from these projects. This recommended procedure has been utilized for the purposes of this analysis in effort to be consistent with other technical studies being prepared for the Project. The percentage of trucks has been determined from the table shown on page 267 of the ITE *Trip Generation* manual. As shown on page 267, the truck trip generation rate for weekday daily traffic is 0.64 or 38.1% of the total traffic. Trip generation for heavy trucks was further broken down by truck type (or axle type). The total truck percentage is comprised of 3 different truck types: 2-axle, 3-axle, and 4+-axle trucks. For the purposes of this analysis, the percentage of trucks, by axle type, were obtained from the SCAQMD interim recommended truck mix. The SCAQMD has recently performed surveys of existing facilities and compiled the data to provide interim guidance on the mix of heavy trucks for these types of high-cube warehousing/distribution facilities.

3.5.3.1 Trip Length

Background

A technical deficiency inherent in calculating the projected vehicle emissions associated with any project is related to the estimation of trip length and vehicle miles traveled (VMT). VMT for a given project is calculated by the total number of vehicle trips to/from the Project x average trip length. This method of estimating VMT for use in calculating vehicle emissions likely results in the over-estimation and double-counting of emissions because, for a distribution warehouse center such as the Project, the land use is likely to attract (divert) existing vehicle trips that are

already on the circulation system as opposed to generating new trips. In this regard, the Project would, to a large extent, redistribute existing mobile-source emissions rather than generate additional emissions within the Basin. As such, the estimation of the Brodiaea Commerce Center Project's vehicular-source emissions are likely overstated in that no credit for, or reduction in, emissions is assumed based on diversion of existing trips.

Provided below is a summary of the VMT recommendations of the SCAQMD and SCAG, followed by a description of the methodology used to calculate the VMT rates used in this AQIA.

SCAQMD Recommendation

In the last five years, the SCAQMD has provided numerous comments on the trip length for warehouse/distribution and industrial land use projects (34). The SCAQMD asserts that the model-default trip length in CalEEMod™ and the URBan EMISsions (URBEMIS) 2007 model (version 9.2.4) would underestimate emissions. The SCAQMD asserts that for warehouse, distribution center, and industrial land use projects, most of the heavy-duty trucks would be hauling consumer goods, often from the Ports of Long Beach and Los Angeles (POLA and POLB) and/or to destinations outside of California. The SCAQMD states that for this reason, the CalEEMod™ and the URBan EMISsions model default trip length (approximately 12.6 miles) would not be representative of activities at like facilities. The SCAQMD generally recommends the use of a 40-mile one-way trip length.

Southern California Association of Government (SCAG) Heavy Duty Truck Model

SCAG is comprised of six counties (Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura) and 190 cities in Southern California, and is the organization charged with addressing and resolving short- and long-term regional policy issues. The SCAG region also consists of 14 sub-regional entities recognized by the Regional Council as partners in the regional policy planning process. The SCAG region has more than 19 million residents and encompasses more than 38,000 square miles, representing the largest and most diverse region in the country.

SCAG maintains a regional transportation model. In its most recent (2008) transportation validation for the 2003 Regional Model, SCAG indicates the average internal truck trip length for the SCAG region is 5.92 miles for Light Duty Trucks, 13.06 miles for Medium Duty Trucks, and 24.11 miles for Heavy Duty Trucks.

Approach for Analysis of the Project

Trip lengths and VMT estimates employed in this AQIA report generate vehicular-source emissions that would represent a maximum impact scenario. Other CEQA compliance documents for similar land use projects within the region have utilized these same or similar estimates. Though the VMT analyzed in this analysis may differ from the Project's traffic impact analysis, to maintain analytic consistency and establish the maximum impact scenario noted above, the following approach has been utilized in calculating emissions associated with vehicles accessing the Project. This approach is consistent with professional industry practice (35) (36) (37).

For passenger car trips, the CalEEMod default for a one-way trip length of 16.6 miles was assumed. For heavy duty trucks, an average trip length was derived from distances from the Project site to the far edges of the South Coast Air Basin (SCAB) as follows.

- Project site to the Port of Los Angeles/Long Beach: 80 miles;
- Project site to East on State Route 60: 30 miles;
- Project site to San Diego County line: 60 miles;
- Project site to Inland Empire: 50 miles;
- Project site to Perris destinations: 10 miles;
- Project site to Moreno Valley destinations: 10 miles;

Assuming that 50% of all delivery trips will travel to and from the Project and the Port of Los Angeles/Long Beach, 10% go East on the State Route 60, 20% go to San Diego, 10% go to the Inland Empire, 5% go to Perris destinations and the remainder as Moreno Valley destinations. The average truck trip length is calculated as 61 miles.

Two separation model runs were utilized in order to more accurately model emissions resulting from vehicle operations. The first run analyzed passenger car emissions, which incorporated a default trip length of 16.6 miles for passenger cars and a fleet mix of 100% Light-Duty-Auto vehicles (LDA). The second run analyzed truck emissions, which incorporated an average truck trip length of 61 miles. A fleet mix of 22.03% LHD, 17.66% MHD, and 60.31% HHD was used for High-Cube Warehouse. The estimated emissions resulting from vehicle operations are summarized in Table 3-6 (presented later in this report.) Detailed emission calculations are provided in Appendix 3.3.

Fugitive Dust Related to Vehicular Travel

Vehicles traveling on paved roads would be a source of fugitive emissions due to the generation of road dust inclusive of tire wear particulates. The emissions estimates for travel on paved roads were calculated using the CalEEMod model.

3.5.4 On-Site Equipment Emissions

As part of the Project's design, all on-site indoor and outdoor cargo handling equipment (CHE) (including yard trucks, hostlers, yard goats, pallet jacks, forklifts, and other on-site equipment) will be powered by non-combustion engines (e.g. electric). Since there are no exhaust emissions associated with the equipment, for purposes of the Project, emissions associated with yard trucks and forklifts are not included in the emissions totals.

3.5.5 Operational Emissions Summary

Operational-source emissions are summarized on Table 3-6. As indicated, the Project would exceed regional thresholds of significance established by the SCAQMD for emissions of NOx. No feasible mitigation measures or project design features beyond those already identified exist that would reduce these emissions to levels that are less-than-significant. Project operational-source NOx emissions exceedances of applicable SCAQMD regional thresholds are therefore considered

significant and unavoidable. Moreover, and as also discussed previously, more than 92 percent of all operational-source emissions (by weight) would be generated by Project mobile sources (traffic). Neither the Project Applicant nor the Lead Agency (City of Moreno Valley) can substantively or materially affect reductions in Project mobile-source emissions beyond what is already required herein. Therefore, Project operational-source NOx emissions exceedances of applicable SCAQMD regional thresholds would be considered significant and unavoidable.

TABLE 3-6: SUMMARY OF OPERATIONAL EMISSIONS (WITHOUT MITIGATION)

Operational Activities – Summer Scenario	**Emissions (pounds per day)**					
	VOC	**NO_x**	**CO**	**SO_x**	**PM_{10}**	**$PM_{2.5}$**
Area Source	5.98	4.90E-04	0.05	0.00	1.90E-04	1.90E-04
Energy Source	0.02	0.14	0.12	8.60E-04	0.01	0.01
Mobile (Trucks)	3.16	86.06	24.09	0.29	9.74	3.18
Mobile (Passenger Cars)	0.43	0.65	9.32	0.03	3.46	0.93
On-Site Equipment	0.20	1.88	1.75	2.31E-03	0.13	0.12
Total Maximum Daily Emissions	**9.77**	**88.73**	**35.32**	**0.33**	**13.35**	**4.25**
SCAQMD Regional Threshold	55	55	550	150	150	55
Threshold Exceeded?	**NO**	**YES**	**NO**	**NO**	**NO**	**NO**
Operational Activities – Winter Scenario	**Emissions (pounds per day)**					
	VOC	**NO_x**	**CO**	**SO_x**	**PM_{10}**	**$PM_{2.5}$**
Area Source	5.98	4.90E-04	0.05	0.00	1.90E-04	1.90E-04
Energy Source	0.02	0.14	0.12	8.60E-04	0.01	0.01
Mobile (Trucks)	3.18	88.85	24.41	0.29	9.74	3.18
Mobile (Passenger Cars)	0.39	0.70	8.29	0.03	3.46	0.93
On-Site Equipment	0.20	1.88	1.75	2.31E-03	0.13	0.12
Total Maximum Daily Emissions	**9.76**	**91.58**	**34.62**	**0.32**	**13.35**	**4.25**
SCAQMD Regional Threshold	55	55	550	150	150	55
Threshold Exceeded?	**NO**	**YES**	**NO**	**NO**	**NO**	**NO**

3.6 LOCALIZED SIGNIFICANCE- CONSTRUCTION ACTIVITY

BACKGROUND ON LOCALIZED SIGNIFICANCE THRESHOLD (LST) DEVELOPMENT

The analysis makes use of methodology included in the SCAQMD *Final Localized Significance Threshold Methodology* (Methodology) (38). The SCAQMD has established that impacts to air quality are significant if there is a potential to contribute or cause localized exceedances of the federal and/or state ambient air quality standards (NAAQS/CAAQS). Collectively, these are referred to as Localized Significance Thresholds (LSTs).

The significance of localized emissions impacts depends on whether ambient levels in the vicinity of any given project are above or below State standards. In the case of CO and NO2, if ambient levels are below the standards, a project is considered to have a significant impact if project

emissions result in an exceedance of one or more of these standards. If ambient levels already exceed a state or federal standard, then project emissions are considered significant if they increase ambient concentrations by a measurable amount. This would apply to PM10 and PM2.5; both of which are non-attainment pollutants.

The SCAQMD established LSTs in response to the SCAQMD Governing Board's Environmental Justice Initiative I-4[5]. LSTs represent the maximum emissions from a project that will not cause or contribute to an exceedance of the most stringent applicable federal or state ambient air quality standard at the nearest residence or sensitive receptor. The SCAQMD states that lead agencies can use the LSTs as another indicator of significance in its air quality impact analyses.

LSTs were developed in response to environmental justice and health concerns raised by the public regarding exposure of individuals to criteria pollutants in local communities. To address the issue of localized significance, the SCAQMD adopted LSTs that show whether a project would cause or contribute to localized air quality impacts and thereby cause or contribute to potential localized adverse health effects. The analysis makes use of methodology included in the SCAQMD *Final Localized Significance Threshold Methodology* (LST Methodology) (39).

APPLICABILITY OF LSTS FOR THE PROJECT

For this Project, the appropriate Source Receptor Area (SRA) for the LST analysis is the Perris monitoring station (SRA 24). LSTs apply to carbon monoxide (CO), nitrogen dioxide (NO2), particulate matter ≤ 10 microns (PM10), and particulate matter ≤ 2.5 microns (PM2.5). The SCAQMD produced look-up tables for projects less than or equal to 5 acres in size.

In order to determine the appropriate methodology for determining localized impacts that could occur as a result of Project-related construction, the following process is undertaken:

- CalEEMod is utilized to determine the maximum daily on-site emissions that will occur during construction activity.
- The SCAQMD's Fact Sheet for Applying CalEEMod to Localized Significance Thresholds (40) is used to determine the maximum site acreage that is actively disturbed based on the construction equipment fleet and equipment hours as estimated in CalEEMod.
- If the total acreage disturbed is less than or equal to five acres per day, then the SCAQMD's screening look-up tables are utilized to determine if a Project has the potential to result in a significant impact. The look-up tables establish a maximum daily emissions threshold in pounds per day that can be compared to CalEEMod outputs.
- If the total acreage disturbed is greater than five acres per day then LST impacts are appropriately evaluated through dispersion modeling.

EMISSIONS CONSIDERED

SCAQMD's Methodology clearly states that "off-site mobile emissions from the Project should NOT be included in the emissions compared to LSTs (41)." Therefore, for purposes of the

5 The purpose of SCAQMD's Environmental Justice program is to ensure that everyone has the right to equal protection from air pollution and fair access to the decision-making process that works to improve the quality of air within their communities. Further, the SCAQMD defines Environmental Justice as "…equitable environmental policymaking and enforcement to protect the health of all residents, regardless of age, culture, ethnicity, gender, race, socioeconomic status, or geographic location, from the health effects of air pollution."

construction LST analysis only emissions included in the CalEEMod "on-site" emissions outputs were considered.

MAXIMUM DAILY DISTURBED-ACREAGE

Table 3-7 is used to determine the maximum daily disturbed-acreage during site grading for purposes of modeling localized emissions. Based on Table 3-7, the proposed Project could actively disturb approximately 3.5 acres per day during the site preparation phase and 4 acres per day during the grading phase of construction.

TABLE 3-7 : MAXIMUM DAILY DISTURBED-ACREAGE

Construction Phase	Equipment Type	Equipment Quantity	Acres graded per 8-hour day	Operating Hours per Day	Acres graded per day
Site Preparation	Rubber Tired Dozers	3	0.5	8	1.5
	Crawler Tractors	4	0.5	8	2.0
	Graders	0	0.5	8	0
	Scrapers	0	1	8	0
Total acres graded per day during Site Preparation					3.5
Construction Phase	**Equipment Type**	**Equipment Quantity**	**Acres graded per 8-hour day**	**Operating Hours per Day**	**Acres graded per day**
Grading	Rubber Tired Dozers	1	0.5	8	0.5
	Crawler Tractors	2	0.5	8	1
	Graders	1	0.5	8	0.5
	Scrapers	2	1	8	2
Total acres graded per day during Grading					4

Sensitive Receptors

Some people are especially sensitive to air pollution and are given special consideration when evaluating air quality impacts from projects. These groups of people include children, the elderly, persons with preexisting respiratory or cardiovascular illness, and athletes and others who engage in frequent exercise. Structures that house these persons or places where they gather to exercise are defined as "sensitive receptors". The nearest sensitive receptor is an existing residential home located approximately 54.25 meters/178 feet east of the Project site.

To assess the potential for long-term operational and short-term construction noise impacts, the following seven receptor locations, as shown on Exhibit 8-A, were identified as representative locations for analysis. Sensitive receptors are generally defined as locations where people reside or where the presence of unwanted sound could otherwise adversely affect the use of the land. Representative sensitive receptors in the Project study area include single-family residential homes, a motel, and a church.

R1: Located approximately 1,507 feet west of the Project site, R1 represents an existing Motel 7 on Alessandro Boulevard.

R2: Location R2 represents existing residential homes located roughly 1,055 feet north of the Project site west of Heacock Street.

R3: Location R3 represents the existing Oasis Community Church located north of the Project site at approximately 474 feet on Alessandro Boulevard.

R4: Located approximately 831 feet northeast of the Project site, R4 represents existing residential homes on Ramsdell Drive.

R5: Location R5 represents existing residential homes located roughly 180 feet east of the Project site across Heacock Street.

R6: Location R6 represents the existing residential homes situated east of the Project site at approximately 178 feet across Heacock Street.

R7: Location R7 represents the existing residential homes situated southeast of the Project site at approximately 229 feet on Brodiaea Avenue.

EXHIBIT 8-A: RECEIVER LOCATIONS

CONSTRUCTION-SOURCE EMISSIONS LST ANALYSIS

Since the total acreage disturbed is less than five acres per day for the site preparation and grading phase of construction, the SCAQMD's screening look-up tables are utilized in determining impacts. A 54.25-meter receptor distance is conservatively utilized as a screening threshold to determine the LSTs for emissions of CO, NO2, PM10, and PM2.5.

Table 3-8 identifies the localized impacts at the nearest receptor location in the vicinity of the Project. Outputs from the model runs for construction LSTs are provided in Appendix 3.1. It should be noted that credit for BACMs AQ-1 and AQ-2 has been taken. As shown, localized construction emissions would not exceed the applicable SCAQMD LSTs for any criteria pollutants. Therefore, a less than significant impact is expected.

TABLE 3-8: LOCALIZED SIGNIFICANCE SUMMARY OF CONSTRUCTION

On-Site Site Preparation Emissions	**Emissions (pounds per day)**			
	NO_x	**CO**	**PM_{10}**	**$PM_{2.5}$**
Maximum Daily Emissions	**37.68**	**13.13**	**8.88**	**5.56**
SCAQMD Localized Threshold	256	1,803	33	8
Threshold Exceeded?	**NO**	**NO**	**NO**	**NO**
On-Site Grading Emissions	**Emissions (pounds per day)**			
	NO_x	**CO**	**PM_{10}**	**$PM_{2.5}$**
Maximum Daily Emissions	**71.27**	**35.73**	**6.70**	**4.12**
SCAQMD Localized Threshold	273	1,962	37	9
Threshold Exceeded?	**NO**	**NO**	**NO**	**NO**

3.7 LOCALIZED SIGNIFICANCE – LONG-TERM OPERATIONAL ACTIVITY

Generally, the maximum acreage would be the Project's building square footage, which is approximately 262,398 square feet, or 6.02 acres. However, for the purposes of this analysis, and as a conservative measure, the SCAQMD look-up tables of 5-acres are used to determine localized significance thresholds for operational activity. Although the project site is greater than 5 acres, the LST lookup tables can be used to show that even if the daily emissions from all project operations were emitted on a 5-acre site (and therefore concentrated over a smaller area which would result in greater site adjacent concentrations), the impacts would be less than significant. Table 3-9 shows the calculated emissions for the Project's operational activities compared with the applicable LSTs. The LST analysis includes on-site sources only; however, the CalEEMod outputs do not separate on-site and off-site emissions from mobile sources. In an effort to establish a maximum potential impact scenario for analytic purposes, the emissions shown on Table 3-9 represent all on-site Project-related stationary (area) sources and five percent (5%) of the Project-related mobile sources. Considering that the weighted trip length used in CalEEMod™ for the Project is approximately 16.6 miles for passenger cars and 61.0 miles for trucks, 5% of this total would represent an on-site travel distance of approximately 0.83 mile 4,383 feet for each passenger car and approximately 3.05 miles/ 16,104 feet for each truck. Thus the 5% assumption

is conservative and would tend to overstate the actual impact. Modeling based on these assumptions demonstrates that even within broad encompassing parameters, Project operational-source emissions would not exceed applicable LSTs.

As previously noted, a 54.25-meter receptor distance is utilized to determine the LSTs for emissions of CO, NO2, PM10, and PM2.5.

LOCALIZED THRESHOLDS FOR OPERATIONAL ACTIVITY

Applicable localized thresholds from the SCAQMD's mass-rate LST lookup tables for a five-acre project site are as follows:

- NOx: 203 pounds per day;
- CO: 1,733 pounds per day.
- PM_{10}: 4 pounds per day; or
- $PM_{2.5}$: 2 pounds per day.

If emissions exceed the applicable LSTs for the Project site, then additional dispersion modeling needs to be conducted to determine if there is an actual exceedance of the AAQS.

TABLE 3-9: LOCALIZED SIGNIFICANCE OPERATIONS SUMMARY

Peak Operational Emissions	Emissions (pounds per day)			
	NOx	CO	PM10	PM2.5
Maximum Daily Emissions	**4.57**	**1.93**	**0.68**	**0.22**
SCAQMD Localized Threshold	203	1,733	4	2
Threshold Exceeded?	**NO**	**NO**	**NO**	**NO**

As shown on Table 3-9 operational emissions will not exceed the LST thresholds for the nearest sensitive receptor. Therefore, the Project will have a less than significant localized impact during operational activity.

3.8 CO "HOT SPOT" ANALYSIS

As discussed below, the Project would not result in potentially adverse CO concentrations or "hot spots." Further, detailed modeling of Project-specific carbon monoxide (CO) "hot spots" is not needed to reach this conclusion.

An adverse CO concentration, known as a "hot spot", would occur if an exceedance of the state one-hour standard of 20 ppm or the eight-hour standard of 9 ppm were to occur. At the time of the 1993 Handbook, the SCAB was designated nonattainment under the California AAQS and National AAQS for CO (42).

It has long been recognized that CO hotspots are caused by vehicular emissions, primarily when idling at congested intersections. In response, vehicle emissions standards have become increasingly stringent in the last twenty years. Currently, the allowable CO emissions standard in California is a maximum of 3.4 grams/mile for passenger cars (there are requirements for certain

vehicles that are more stringent). With the turnover of older vehicles, introduction of cleaner fuels, and implementation of increasingly sophisticated and efficient emissions control technologies, CO concentration in the SCAB is now designated as attainment, as previously noted in Table 2-2. Also, CO concentrations in the Project vicinity have steadily declined, as indicated by historical emissions data presented previously at Table 2-3.

To establish a more accurate record of baseline CO concentrations affecting the SCAB, a CO "hot spot" analysis was conducted in 2003 for four busy intersections in Los Angeles at the peak morning and afternoon time periods. This "hot spot" analysis did not predict any violation of CO standards, as shown on Table 3-10.

Based on the SCAQMD's 2003 AQMP and the 1992 Federal Attainment Plan for Carbon Monoxide (1992 CO Plan), peak carbon monoxide concentrations in the SCAB were a result of unusual meteorological and topographical conditions and not a result of traffic volumes and congestion at a particular intersection. As evidence of this, for example, 9.3 ppm 8-hr CO concentration measured at the Long Beach Blvd. and Imperial Hwy. intersection (highest CO generating intersection within the "hot spot" analysis), only 0.7 ppm was attributable to the traffic volumes and congestion at this intersection; the remaining 8.6 ppm were due to the ambient air measurements at the time the 2003 AQMP was prepared (42). In contrast, the ambient 8-hr CO concentration within the Project study area is estimated at 1.4 ppm—1.6 ppm (please refer to previous Table 2-3). Therefore, even if the traffic volumes for the proposed Project were double or even triple of the traffic volumes generated at the Long Beach Blvd. and Imperial Hwy. intersection, coupled with the on-going improvements in ambient air quality, the Project would not be capable of resulting in a CO "hot spot" at any study area intersections.

Traffic volumes generating the CO concentrations for the "hot spot" analysis, shown on Table 3-11. The busiest intersection evaluated was that at Wilshire Blvd. and Veteran Ave., which has a daily traffic volume of approximately 100,000 vehicles per day. The 2003 AQMP estimated that the 1-hour concentration for this intersection was 4.6 ppm; this indicates that, should the daily traffic volume increase four times to 400,000 vehicles per day, CO concentrations (4.6 ppm x 4= 18.4 ppm) would still not likely exceed the most stringent 1-hour CO standard (20.0 ppm).[6] At buildout of the Project, the highest average daily trips on a segment of road would be 58,100 daily trips on Cactus Avenue west of Gilbert Street which is lower than the highest daily traffic volumes generated at the busiest intersection in the CO "hot spot" analysis (32).

The proposed Project considered herein would not produce the volume of traffic required to generate a CO "hot spot" either in the context of the 2003 Los Angeles hot spot study, as shown on Table 3-12. Therefore, CO "hot spots" are not an environmental impact of concern for the proposed Project. Localized air quality impacts related to mobile-source emissions would therefore be less than significant.

6 Based on the ratio of the CO standard (20.0 ppm) and the modeled value (4.6 ppm).

TABLE 3-10: CO MODEL RESULTS

Intersection Location	Carbon Monoxide Concentrations (ppm)		
	Morning 1-hour	Afternoon 1-hour	8-hour
Wilshire-Veteran	4.6	3.5	4.2
Sunset-Highland	4	4.5	3.9
La Cienega-Century	3.7	3.1	5.8
Long Beach-Imperial	3	3.1	9.3

TABLE 3-11: TRAFFIC VOLUMES FOR INTERSECTIONS EVALUATED IN AQMP

Intersection Location	Peak Traffic Volumes (vph)				
	Eastbound (AM/PM)	Westbound (AM/PM)	Southbound (AM/PM)	Northbound (AM/PM)	Total (AM/PM)
Wilshire-Veteran	4,954/2,069	1,830/3,317	721/1,400	560/933	8,062/7,719
Sunset-Highland	1,417/1,764	1,342/1,540	2,304/1,832	1,551/2,238	6,614/5,374
La Cienega-Century	2,540/2,243	1,890/2,728	1,384/2,029	821/1,674	6,634/8,674
Long Beach-Imperial	1,217/2,020	1,760/1,400	479/944	756/1,150	4,212/5,514

TABLE 3-12: PROJECT STUDY AREA PEAK HOUR TRAFFIC VOLUMES

Intersection Location	Peak Traffic Volumes (vph)				
	Northbound (AM/PM)	Southbound (AM/PM)	Eastbound (AM/PM)	Westbound (AM/PM)	Total (AM/PM)
Gilbert St./Brodiaea Ave.	57/38	0/0	63/146	197/162	317/346
Gilbert St./Cactus Ave.	0/0	46/40	2,026/3,964	3,293/1,891	5,365/5,895
Heacock St./Alessandro Blvd.	1,127/1,071	1,022/1,379	1,131/2,386	2,336/1,921	5,616/6,757
Heacock St./Brodiaea Ave.	1,140/922	1,097	76/164	183/143	2,038/2,326

Source: Brodiaea Commerce Center Traffic Impact Analysis (Urban Crossroads, Inc., 2018).

3.9 AIR QUALITY MANAGEMENT PLANNING

The Project site is located within the SCAB, which is characterized by relatively poor air quality. The SCAQMD has jurisdiction over an approximately 10,743 square-mile area consisting of the four-county Basin and the Los Angeles County and Riverside County portions of what use to be referred to as the Southeast Desert Air Basin. In these areas, the SCAQMD is principally responsible for air pollution control, and works directly with the Southern California Association of Governments (SCAG), county transportation commissions, local governments, as well as state and federal agencies to reduce emissions from stationary, mobile, and indirect sources to meet state and federal ambient air quality standards.

Currently, these state and federal air quality standards are exceeded in most parts of the Basin. In response, the SCAQMD has adopted a series of Air Quality Management Plans (AQMPs) to meet the state and federal ambient air quality standards. AQMPs are updated regularly in order to more effectively reduce emissions, accommodate growth, and to minimize any negative fiscal impacts of air pollution control on the economy.

In March 2017, the AQMD released the Final 2016 AQMP. The 2016 AQMP continues to evaluate current integrated strategies and control measures to meet the NAAQS, as well as, explore new and innovative methods to reach its goals. Some of these approaches include utilizing incentive programs, recognizing existing co-benefit programs from other sectors, and developing a strategy with fair-share reductions at the federal, state, and local levels (43). Similar to the 2012 AQMP, the 2016 AQMP incorporates scientific and technological information and planning assumptions, including the 2016 RTP/SCS and updated emission inventory methodologies for various source categories (44). The Project's consistency with the AQMP will be determined using the 2016 AQMP is discussed below:

Criteria for determining consistency with the AQMP are defined in Chapter 12, Section 12.2 and Section 12.3 of the SCAQMD's CEQA Air Quality Handbook (1993) (23). These indicators are discussed below:

- Consistency Criterion No. 1: The proposed Project will not result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations, or delay the timely attainment of air quality standards or the interim emissions reductions specified in the AQMP.

Construction Impacts

The violations that Consistency Criterion No. 1 refers to are the CAAQS and NAAQS. CAAQS and NAAQS violations would occur if localized significance thresholds (LSTs) or regional significance thresholds were exceeded. The Project would not exceed the applicable LST thresholds or regional significance thresholds for construction activity. Therefore, the Project would not conflict with the AQMP according to this criterion.

Operational Impacts

The Project would not exceed the applicable LST thresholds for operational activity. Therefore, the Project would not conflict with the AQMP according to this criterion.

On the basis of the preceding discussion, the Project is consistent with the first criterion.

- Consistency Criterion No. 2: The Project will not exceed the assumptions in the AQMP based on the years of Project build-out phase.

Overview

The 2016 AQMP demonstrates that the applicable ambient air quality standards can be achieved within the timeframes required under federal law. Growth projections from local general plans adopted by cities in the district are provided to the Southern California Association of Governments (SCAG), which develops regional growth forecasts, which are then used to develop

future air quality forecasts for the AQMP. Development consistent with the growth projections in City of Moreno Valley General Plan Update is considered to be consistent with the AQMP.

Construction Impacts

Peak day emissions generated by construction activities are largely independent of land use assignments, but rather are a function of development scope and maximum area of disturbance. Irrespective of the site's land use designation, development of the site to its maximum potential would likely occur, with disturbance of the entire site occurring during construction activities.

Operational Impacts

The Project site is currently vacant. The City of Moreno Valley's General Plan Land Use designation for the Project site is Business Park/Light Industrial (BP/LI). The land uses and development proposed by the Project are permitted/conditionally permitted under the Project site's current BP/LI Land Use designations. The Project is proposed to consist of a 262,398 square-foot (sf) high-cube warehouse/distribution center use within a single building. As such, the Project's land uses and development are permitted/conditionally permitted under the City General Plan Land Use designations. The Project site is zoned Business Park-Mixed Use (MPX) with the "Mixed-Use Neighborhood" (MUN) overlay. The Project would change the zoning for this area to Light Industrial (LI)..

On the basis of the preceding discussion, the Project is determined to be consistent with the second criterion.

AQMP Consistency Conclusion

The Project would not result in or cause NAAQS or CAAQS violations. The Project's proposed land use designation for the subject site is permitted/conditionally permitted in the adopted City General Plan. The Project is therefore consistent with the AQMP.

3.10 POTENTIAL IMPACTS TO SENSITIVE RECEPTORS

The potential impact of Project-generated air pollutant emissions at sensitive receptors has also been considered. Sensitive receptors can include uses such as long term health care facilities, rehabilitation centers, and retirement homes. Residences, schools, playgrounds, child care centers, and athletic facilities can also be considered as sensitive receptors.

Results of the LST analysis indicate that, with application of mitigation, the Project will not exceed the SCAQMD localized significance thresholds during construction. Therefore, sensitive receptors would not be exposed to substantial pollutant concentrations during Project construction.

Results of the LST analysis indicate that the Project will not exceed the SCAQMD localized significance thresholds during operational activity. Further Project traffic would not create or result in a CO "hotspot." Therefore, sensitive receptors would not be exposed to substantial pollutant concentrations as the result of Project operations.

3.11 ODORS

Substantial odor-generating sources include land uses such as agricultural activities, feedlots, wastewater treatment facilities, landfills or various heavy industrial uses. The Project does not propose any such uses or activities that would result in potentially significant operational-source odor impacts. Potential sources of operational odors generated by the Project would include disposal of miscellaneous commercial refuse. Consistent with City requirements, all Project-generated refuse would be stored in covered containers and removed at regular intervals in compliance with solid waste regulations, thereby precluding substantial generation of odors due to temporary holding of refuse on-site Moreover, SCAQMD Rule 402 acts to prevent occurrences of odor nuisances (1).

3.12 CUMULATIVE IMPACTS

The Project area is designated as an extreme non-attainment area for ozone, and a non-attainment area for PM_{10}, $PM_{2.5}$, and lead.

The AQMD has published a report on how to address cumulative impacts from air pollution: *White Paper on Potential Control Strategies to Address Cumulative Impacts from Air Pollution* (45). In this report the AQMD clearly states (Page D-3):

"…the AQMD uses the same significance thresholds for project specific and cumulative impacts for all environmental topics analyzed in an Environmental Assessment or EIR. The only case where the significance thresholds for project specific and cumulative impacts differ is the Hazard Index (HI) significance threshold for toxic air contaminant (TAC) emissions. The project specific (project increment) significance threshold is HI > 1.0 while the cumulative (facility-wide) is HI > 3.0. It should be noted that the HI is only one of three TAC emission significance thresholds considered (when applicable) in a CEQA analysis. The other two are the maximum individual cancer risk (MICR) and the cancer burden, both of which use the same significance thresholds (MICR of 10 in 1 million and cancer burden of 0.5) for project specific and cumulative impacts.

Projects that exceed the project-specific significance thresholds are considered by the SCAQMD to be cumulatively considerable. This is the reason project-specific and cumulative significance thresholds are the same. Conversely, projects that do not exceed the project-specific thresholds are generally not considered to be cumulatively significant."

Therefore, this analysis assumes that individual projects that do not generate operational or construction emissions that exceed the SCAQMD's recommended daily thresholds for project-specific impacts would also not cause a cumulatively considerable increase in emissions for those pollutants for which the Basin is in nonattainment, and, therefore, would not be considered to have a significant, adverse air quality impact. Alternatively, individual project-related construction and operational emissions that exceed SCAQMD thresholds for project-specific impacts would be considered cumulatively considerable.

CRITERION 1; REGIONAL ANALYSIS

Construction Impacts

Project construction-source air pollutant emissions would not exceed the SCAQMD regional thresholds for any criteria pollutant. Therefore, the Project would not result in a cumulatively considerable significant impact with respect to construction activity.

Operational Impacts

Project operational-source NOx emissions will exceed applicable SCAQMD regional thresholds. Per SCAQMD significance guidance, these impacts at the Project level are also considered cumulatively significant and would persist over the life of the Project. NO_x emissions are ozone precursors and would therefore contribute considerably to existing ozone non-attainment conditions within the Basin. This is a cumulatively significant impact persisting over the life of the Project.

CRITERION 2; LIST APPROACH

A list approach is used, in accordance with Section 15130(b) of the CEQA Guidelines, which states the following:

> *The following elements are necessary to an adequate discussion of significant cumulative impacts: 1) Either: (A) A list of past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the agency, or (B) A summary of projections contained in an adopted general plan or related planning document, or in a prior environmental document which has been adopted or certified, which described or evaluated regional or area wide conditions contributing to the cumulative impact.*

The SCAQMD has recognized that there is typically insufficient information to quantitatively evaluate the cumulative contributions of multiple projects because each project applicant has no control over nearby projects.

The cumulative project list was developed for the purposes of this analysis through consultation with planning and engineering staff from the City of Moreno Valley. As shown on Table 3-13, the cumulative project list includes known and foreseeable projects that are anticipated to contribute emissions to the air basin in the vicinity of the Project.

Cumulative projects could contribute to an existing or projected air quality exceedance because the Basin is currently nonattainment for ozone, PM10, and PM2.5. As previously noted, the Project would not result in any emissions exceedances over the applicable SCAQMD regional thresholds. As such, the Project would not result in a cumulatively considerable significant impact.

TABLE 3-13: CUMULATIVE DEVELOPMENT LIST

ID	Project Name	Land Use	Quantity	Units
MV1	March Lifecare Campus Specific Plan	Medical Offices	190.000	TSF
		Commercial Retail	210.000	TSF
		Research & Education	200.000	TSF
		Hospital	50	Beds
		Institutional Residential	660	Beds
MV2	O'Reilly Automotive	Automobile Parts Sale	7.500	TSF
	PA15-004	Retail/Restaurant/Fast Food	2.973	TSF
MV3	TM 33417	Condo/Townhomes	60	DU
MV4	TM 33607	Condo/Townhomes	52	DU
MV5	32711 Isaac Genah	SFDR	9	DU
MV6	a Moreno Medical Campus	Medical Offices	80.000	TSF
	b Aqua Bella Specific Plan	SFDR	2,922	DU
	c TR 34329 (Granite Capitol)	SFDR	90	DU
	d Cresta Bella	General Office	30.000	TSF
MV7	P07-0102; and P09-0416, -0418, -0419	General Light Industrial	652.018	TSF
	Alessandro Bl. (APN 263-091-008; 263-100-019; 263-100-005; P14-0841 to 0848)	Commercial and Industrial Complex	101.580	TSF
MV8	Alessandro Metrolink Station	Light Rail Transit Station	300	SP
MV9	Freeway Business Center	High-Cube Warehouse	709.083	TSF
MV10	PA 08-0047-0052 (Komar Cactus Plaza)	Hotel	110	Rooms
		Fast Food w/Drive Thru	8.000	TSF
		Commercial	42.400	TSF
MV11	PA 09-0031	Gas Station	12	VFP
MV12	Prologis	High-Cube Warehouse	1,916.190	TSF
		High-Cube Warehouse	328.448	TSF
	World Logistics Center	High-Cube Warehouse	41,400.000	TSF
		Warehousing	200.000	TSF
		Gas Station w/ Market	12	VFP
		Existing SFDR	7	DU
MV13	Moreno Valley Cactus Center (PEN16-0131)	Warehouse	36.950	TSF
		Fast Food w/Drive Thru	7.900	TSF
		Gas Station w/Car Wash	28	VFP
MJPA 1	Meridian Business Park North	Industrial Park	5,985.000	TSF

4 FINDINGS & CONCLUSIONS

CONSTRUCTION-SOURCE EMISSIONS

REGIONAL IMPACTS

For regional emissions, the Project would not exceed the numerical thresholds of significance established by the South Coast Air Quality Management District (SCAQMD) for emissions of any criteria pollutant after implementation of applicable BACMs and MMs. Therefore, a less than significant impact would occur.

LOCALIZED IMPACTS

For localized emissions, the Project would not exceed the SCAQMD's localized significance threshold for any criteria pollutant. Therefore, a less than significant impact would occur.

Project construction-source emissions would not conflict with the applicable AQMP.

ODORS

Established requirements addressing construction equipment operations, and construction material use, storage, and disposal requirements act to minimize odor impacts that may result from construction activities. Moreover, construction-source odor emissions would be temporary, short-term, and intermittent in nature and would not result in persistent impacts that would affect substantial numbers of people. Potential construction-source odor impacts are therefore considered less-than-significant.

OPERATIONAL-SOURCE EMISSIONS

REGIONAL IMPACTS

For regional emissions, the Project would exceed the numerical thresholds of significance established by the SCAQMD for emissions of NO_x. No feasible mitigation measures or project design features beyond those already identified exist that would reduce these emissions to levels that are less-than-significant. Project operational-source NOx emissions exceedances of applicable SCAQMD regional thresholds are therefore considered significant and unavoidable. Moreover, and as also discussed previously, more than 92 percent of all operational-source emissions (by weight) would be generated by Project mobile sources (traffic). Neither the Project Applicant nor the Lead Agency (City of Moreno Valley) can substantively or materially affect reductions in Project mobile-source emissions beyond what is already required herein. Therefore, Project operational-source NOx emissions exceedances of applicable SCAQMD regional thresholds would be considered significant and unavoidable.

LOCALIZED IMPACTS

For localized emissions, the Project would not exceed the numerical thresholds established by the SCAQMD for any criteria pollutants. The proposed Project would not result in a significant CO "hotspot" as a result of Project related traffic during ongoing operations.

Project operational-source emissions would not conflict with the applicable AQMP.

Odors

Substantial odor-generating sources include land uses such as agricultural activities, feedlots, wastewater treatment facilities, landfills or various heavy industrial uses. The Project does not propose any such uses or activities that would result in potentially significant operational-source odor impacts. Potential sources of operational odors generated by the Project would include disposal of miscellaneous refuse. Moreover, SCAQMD Rule 402 acts to prevent occurrences of odor nuisances (1). Consistent with City requirements, all Project-generated refuse would be stored in covered containers and removed at regular intervals in compliance with solid waste regulations. Potential operational-source odor impacts are therefore considered less-than-significant.

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6 CERTIFICATION

The contents of this air study report represent an accurate depiction of the environmental impacts associated with the proposed Brodiaea Commerce Center Project. The information contained in this air quality impact report is based on the best available data at the time of preparation. If you have any questions, please contact me directly at (949) 336-5987.

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EDUCATION

Master of Science in Environmental Studies
California State University, Fullerton • May, 2010

Bachelor of Arts in Environmental Analysis and Design
University of California, Irvine • June, 2006

PROFESSIONAL AFFILIATIONS

AEP – Association of Environmental Planners
AWMA – Air and Waste Management Association
ASTM – American Society for Testing and Materials

PROFESSIONAL CERTIFICATIONS

Environmental Site Assessment – American Society for Testing and Materials • June, 2013
Planned Communities and Urban Infill – Urban Land Institute • June, 2011
Indoor Air Quality and Industrial Hygiene – EMSL Analytical • April, 2008
Principles of Ambient Air Monitoring – California Air Resources Board • August, 2007
AB2588 Regulatory Standards – Trinity Consultants • November, 2006
Air Dispersion Modeling – Lakes Environmental • June, 2006

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APPENDIX 2.1:

STATE/FEDERAL ATTAINMENT STATUS OF CRITERIA POLLUTANTS

TABLE 2-3

National Ambient Air Quality Standards (NAAQS) Attainment Status - South Coast Air Basin

Criteria Pollutant	Averaging Time	Designation[a]	Attainment Date[b]
Ozone (O_3)	(1979) **1-Hour** (0.12 ppm)[c]	Nonattainment ("extreme")	2/26/2023 (revised deadline)
	(2015) **8-Hour** (0.070 ppm)[d]	Pending – Expect Nonattainment ("extreme")	Pending (beyond 2032)
	(2008) **8-Hour** (0.075 ppm)[d]	Nonattainment ("extreme")	7/20/2032
	(1997) **8-Hour** (0.08 ppm)[d]	Nonattainment ("extreme")	6/15/2024
PM2.5[e]	(2006) **24-Hour** (35 µg/m^3)	Nonattainment ("serious")	12/31/2019
	(2012) **Annual** (12.0 µg/m^3)	Nonattainment ("moderate")	12/31/2021
	(1997) **Annual** (15.0 µg/m^3)	Attainment (final determination pending)	4/5/2015 (attained 2013)
PM10[f]	(1987) **24-hour** (150 µg/m^3)	Attainment (Maintenance)	7/26/2013 (attained)
Lead (Pb)[g]	(2008) **3-Months Rolling** (0.15 µg/m^3)	Nonattainment (Partial) (Attainment determination to be requested)	12/31/2015
CO	(1971) **1-Hour** (35 ppm)	Attainment (Maintenance)	6/11/2007 (attained)
	(1971) **8-Hour** (9 ppm)	Attainment (Maintenance)	6/11/2007 (attained)
NO_2[h]	(2010) **1-Hour** (100 ppb)	Unclassifiable/Attainment	N/A (attained)
	(1971) **Annual** (0.053 ppm)	Attainment (Maintenance)	9/22/1998 (attained)
SO_2[i]	(2010) **1-Hour** (75 ppb)	Designations Pending (expect Unclassifiable/Attainment)	N/A (attained)
	(1971) **24-Hour** (0.14 ppm) (1971) **Annual** (0.03 ppm)	Unclassifiable/Attainment	3/19/1979 (attained)

a) U.S. EPA often only declares Nonattainment areas; everywhere else is listed as Unclassifiable/Attainment or Unclassifiable

b) A design value below the NAAQS for data through the full year or smog season prior to the attainment date is typically required for an attainment demonstration

c) The 1979 1-hour ozone NAAQS (0.12 ppm) was revoked, effective 6/15/05 ; however, the Basin has not attained this standard and therefore has some continuing obligations with respect to the revoked standard; original attainment date was 11/15/2010; the revised attainment date is 2/6/23

d) The 2008 8-hour ozone NAAQS (0.075 ppm) was revised to 0.070 ppm, effective 12/28/15 with classifications and implementation goals to be finalized by 10/1/17; the 1997 8-hour ozone NAAQS (0.08 ppm) was revoked in the 2008 ozone NAAQS implementation rule, effective 4/6/15; there are continuing obligations under the revoked 1997 and revised 2008 ozone NAAQS until they are attained

e) The attainment deadline for the 2006 24-hour PM2.5 NAAQS was 12/31/15 for the former "moderate" classification; U.S.EPA approved reclassification to "serious," effective 2/12/16 with an attainment deadline of 12/31/2019; the 2012 (proposal year) annual PM2.5 NAAQS was revised on 1/15/13, effective 3/18/13, from 15 to 12 µg/m^3; new annual designations were final 1/15/15, effective 4/15/15; on July 25, 2016 U.S. EPA finalized a determination that the Basin attained the 1997 annual (15.0 µg/m^3) and 24-hour PM2.5 (65 µg/m^3) NAAQS, effective August 24, 2016

f) The annual PM10 NAAQS was revoked, effective 12/18/06; the 24-hour PM10 NAAQS deadline was 12/31/2006; the Basin's Attainment Re-designation Request and PM10 Maintenance Plan was approved by U.S. EPA on 6/26/13, effective 7/26/13

g) Partial Nonattainment designation – Los Angeles County portion of the Basin only for near-source monitors; expect to remain in attainment based on current monitoring data; attainment re-designation request pending

h) New 1-hour NO_2 NAAQS became effective 8/2/10, with attainment designations 1/20/12; annual NO_2 NAAQS retained

i) The 1971 annual and 24-hour SO2 NAAQS were revoked, effective 8/23/10; however, these 1971 standards will remain in effect until one year after U.S. EPA promulgates area designations for the 2010 SO2 1-hour NAAQS; final area designations expected by 12/31/20 due to new source-specific monitoring requirements; Basin expected to be in attainment due to ongoing clean data

TABLE 2-4
National Ambient Air Quality Standards (NAAQS) Attainment Status
Coachella Valley Portion of the Salton Sea Air Basin

Criteria Pollutant	Averaging Time	Designation[a]	Attainment Date[b]
Ozone (O_3)	(1979) **1-Hour** (0.12 ppm)[c]	Attainment	11/15/2007 (attained 12/31/2013)
	(2015) **8-Hour** (0.070 ppm)[d]	Pending – Expect Nonattainment (Severe)	Pending
	(2008) **8-Hour** (0.075 ppm)[d]	Nonattainment (Severe-15)	7/20/2027
	(1997) **8-Hour** (0.08 ppm)[d]	Nonattainment (Severe-15)	6/15/2019
PM2.5[e]	(2006) **24-Hour** (35 µg/m^3)	Unclassifiable/Attainment	N/A (attained)
	(2012) **Annual** (12.0 µg/m^3)	Unclassifiable/Attainment	N/A (attained)
	(1997) **Annual** (15.0 µg/m^3)	Unclassifiable/Attainment	N/A (attained)
PM10[f]	(1987) **24-hour** (150 µg/m^3)	Nonattainment ("serious")	12/31/2006
Lead (Pb)	(2008) **3-Months Rolling** (0.15 µg/m^3)	Unclassifiable/Attainment	Unclassifiable/ Attainment
CO	(1971) **1-Hour** (35 ppm)	Unclassifiable/Attainment	N/A (attained)
	(1971) **8-Hour** (9 ppm)	Unclassifiable/Attainment	N/A (attained)
NO_2[g]	(2010) **1-Hour** (100 ppb)	Unclassifiable/Attainment	N/A (attained)
	(1971) **Annual** (0.053 ppm)	Unclassifiable/Attainment	N/A (attained)
SO_2[h]	(2010) **1-Hour** (75 ppb)	Designations Pending	N/A
	(1971) **24-Hour** (0.14 ppm) (1971) **Annual** (0.03 ppm)	Unclassifiable/Attainment	Unclassifiable/ Attainment

a) U.S. EPA often only declares Nonattainment areas; everywhere else is listed as Unclassifiable/Attainment or Unclassifiable
b) A design value below the NAAQS for data through the full year or smog season prior to the attainment date is typically required for an attainment demonstration
c) The 1979 1-hour ozone NAAQS (0.12 ppm) was revoked, effective 6/15/05; the Southeast Desert Modified Air Quality Management Area, including the Coachella Valley, had not timely attained this standard by the 11/15/07 "severe-17" deadline, based on 2005-2007 data; on 8/25/14, U.S. EPA proposed a clean data finding based on 2011–2013 data and a determination of attainment for the former 1-hour ozone NAAQS for the Southeast Desert nonattainment area; this rule was finalized by U.S. EPA on 4/15/15, effective 5/15/15, that included preliminary 2014 data
d) The 2008 8-hour ozone NAAQS (0.075 ppm) was revised to 0.070 ppm, effective 12/28/15 with classifications and implementation goals to be finalized by 10/1/17; the 1997 8-hour ozone NAAQS (0.08 ppm) was revoked in the 2008 ozone NAAQS implementation rule, effective 4/6/15; there are continuing obligations under the 1997 and 2008 ozone NAAQS until they are attained
e) The annual PM2.5 standard was revised on 1/15/13, effective 3/18/13, from 15 to 12 µg/m^3
f) The annual PM10 standard was revoked, effective 12/18/06; the 24-hour PM10 NAAQS attainment deadline was 12/31/2006; the Coachella Valley Attainment Re-designation Request and PM10 Maintenance Plan was postponed by U.S. EPA pending additional monitoring and analysis in the southeastern Coachella Valley
g) New 1-hour NO_2 NAAQS became effective 8/2/10; attainment designations 1/20/12; annual NO_2 NAAQS retained
h) The 1971 Annual and 24-hour SO_2 NAAQS were revoked, effective 8/23/10; however, these 1971 standards will remain in effect until one year after U.S. EPA promulgates area designations for the 2010 SO_2 1-hour standard; final area designations expected by 12/31/2020 with SSAB expected to be designated Unclassifiable/Attainment

The current status of CAAQS attainment for the pollutants with State standards is presented in Table 2-5 for the Basin and the Riverside County portion of the SSAB (Coachella Valley).

TABLE 2-5

California Ambient Air Quality Standards (CAAQS) Attainment Status
South Coast Air Basin and Coachella Valley portion of Salton Sea Air Basin

Pollutant	Averaging Time and Level[b]	Designation[a]	
		South Coast Air Basin	Coachella Valley
Ozone (O_3)	**1-Hour** (0.09 ppm)[c]	Nonattainment	Nonattainment
	8-Hour (0.070 ppm)[d]	Nonattainment	Nonattainment
PM2.5	**Annual** (12.0 µg/m^3)	Nonattainment	Attainment
PM10	**24-Hour** (50 µg/m^3)	Nonattainment	Nonattainment
	Annual (20 µg/m^3)	Nonattainment	Nonattainment
Lead (Pb)	**30-Day Average** (1.5 µg/m^3)	Attainment	Attainment
CO	**1-Hour** (20 ppm)	Attainment	Attainment
	8-Hour (9.0 ppm)	Attainment	Attainment
NO_2	**1-Hour** (0.18 ppm)	Attainment	Attainment
	Annual (0.030 ppm)	Attainment	Attainment
SO_2	**1-Hour** (0.25 ppm)	Attainment	Attainment
	24-Hour (0.04 ppm)	Attainment	Attainment
Sulfates	**24-Hour** (25 µg/m^3)	Attainment	Attainment
H_2S[c]	**1-Hour** (0.03 ppm)	Unclassified	Unclassified [c)]

a) CA State designations shown were updated by CARB in 2016, based on the 2013–2015 3-year period; stated designations are based on a 3-year data period after consideration of outliers and exceptional events; Source: http://www.arb.ca.gov/desig/statedesig.htm#current

b) CA State standards, or CAAQS, for ozone, CO, SO_2, NO_2, PM10 and PM2.5 are values not to be exceeded; lead, sulfates, and H_2S standards are values not to be equaled or exceeded; CAAQS are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations

c) SCAQMD began monitoring H_2S in the southeastern Coachella Valley in November 2013 due to odor events related to the Salton Sea; three full years of data are not yet available for a State designation, but nonattainment is anticipated for the H_2S CAAQS in at least part of the Coachella Valley

The 1979 federal 1-hour ozone standard (0.12 ppm) was revoked by the U.S. EPA and replaced by the 8-hour average ozone standard (0.08 ppm), effective June 15, 2005. However, the Basin and the former Southeast Desert Modified Air Quality Management Area (which included the Coachella Valley) had not attained the 1-hour federal ozone NAAQS by the attainment dates in 2010 and 2007, respectively, and, therefore, had continuing obligations under the former standard. On August 25, 2014, U.S. EPA

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APPENDIX 3.1:

CALEEMOD CONSTRUCTION EMISSIONS MODEL OUTPUTS (UNMITIGATED)

Brodiaea Warehouse (Construction - Unmitigated)

South Coast AQMD Air District, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Unrefrigerated Warehouse-No Rail	262.40	1000sqft	6.02	262,400.00	0
Parking Lot	252.46	1000sqft	5.80	252,460.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	10			**Operational Year**	2019
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Construction schedule adjusted as per Client.

Off-road Equipment - Crawler Tractors used in lieu of Tractors/Loaders/Backhoes.

Off-road Equipment - Crawler Tractors used in lieu of Tractors/Loaders/Backhoes.

Off-road Equipment - Crawler Tractors used in lieu of Tractors/Loaders/Backhoes.

Off-road Equipment -

Off-road Equipment - Hours are based on an 8-hour workday.

Grading -

Vehicle Trips - Construction (Unmitigated) Run Only.

Fleet Mix - Construction (Unmitigated) Run Only.

Energy Use - Construction (Unmitigated) Run Only.

Water And Wastewater - Construction (Unmitigated) Run Only.

Solid Waste - Construction (Unmitigated) Run Only.

Construction Off-road Equipment Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	300.00	230.00
tblConstructionPhase	PhaseEndDate	11/11/2019	7/8/2019
tblConstructionPhase	PhaseEndDate	9/16/2019	5/13/2019
tblConstructionPhase	PhaseEndDate	7/23/2018	6/25/2018
tblConstructionPhase	PhaseEndDate	10/14/2019	6/10/2019
tblConstructionPhase	PhaseEndDate	6/11/2018	5/14/2018
tblConstructionPhase	PhaseStartDate	10/15/2019	6/11/2019
tblConstructionPhase	PhaseStartDate	7/24/2018	6/26/2018
tblConstructionPhase	PhaseStartDate	6/12/2018	5/15/2018
tblConstructionPhase	PhaseStartDate	9/17/2019	5/14/2019

Brodiaea Warehouse (Construction - Unmitigated) - South Coast AQMD Air District, Winter

tblConstructionPhase	PhaseStartDate	5/29/2018	5/1/2018
tblEnergyUse	LightingElect	0.35	0.00
tblEnergyUse	LightingElect	1.17	0.00
tblEnergyUse	NT24E	0.82	0.00
tblEnergyUse	NT24NG	0.03	0.00
tblEnergyUse	T24E	0.37	0.00
tblEnergyUse	T24NG	2.00	0.00
tblFleetMix	HHD	0.03	0.00
tblFleetMix	HHD	0.03	0.00
tblFleetMix	LDA	0.55	1.00
tblFleetMix	LDA	0.55	1.00
tblFleetMix	LDT1	0.04	0.00
tblFleetMix	LDT1	0.04	0.00
tblFleetMix	LDT2	0.20	0.00
tblFleetMix	LDT2	0.20	0.00
tblFleetMix	LHD1	0.02	0.00
tblFleetMix	LHD1	0.02	0.00
tblFleetMix	LHD2	5.8700e-003	0.00
tblFleetMix	LHD2	5.8700e-003	0.00
tblFleetMix	MCY	4.7240e-003	0.00
tblFleetMix	MCY	4.7240e-003	0.00
tblFleetMix	MDV	0.12	0.00
tblFleetMix	MDV	0.12	0.00
tblFleetMix	MH	9.9100e-004	0.00
tblFleetMix	MH	9.9100e-004	0.00
tblFleetMix	MHD	0.02	0.00
tblFleetMix	MHD	0.02	0.00

tblFleetMix	OBUS	1.9990e-003	0.00
tblFleetMix	OBUS	1.9990e-003	0.00
tblFleetMix	SBUS	7.0400e-004	0.00
tblFleetMix	SBUS	7.0400e-004	0.00
tblFleetMix	UBUS	2.0270e-003	0.00
tblFleetMix	UBUS	2.0270e-003	0.00
tblOffRoadEquipment	OffRoadEquipmentType		Crawler Tractors
tblOffRoadEquipment	OffRoadEquipmentType		Crawler Tractors
tblOffRoadEquipment	OffRoadEquipmentType		Crawler Tractors
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblSolidWaste	SolidWasteGenerationRate	246.66	0.00
tblVehicleTrips	CC_TL	8.40	0.00
tblVehicleTrips	CC_TL	8.40	0.00
tblVehicleTrips	CNW_TL	6.90	0.00
tblVehicleTrips	CNW_TL	6.90	0.00
tblVehicleTrips	CNW_TTP	41.00	0.00
tblVehicleTrips	CW_TL	16.60	0.00
tblVehicleTrips	CW_TL	16.60	0.00
tblVehicleTrips	CW_TTP	59.00	0.00
tblVehicleTrips	DV_TP	5.00	0.00
tblVehicleTrips	PB_TP	3.00	0.00
tblVehicleTrips	PR_TP	92.00	0.00

tblVehicleTrips	ST_TR	1.68	0.00
tblVehicleTrips	SU_TR	1.68	0.00
tblVehicleTrips	WD_TR	1.68	0.00
tblWater	IndoorWaterUseRate	60,680,000.00	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	5.9558	71.3560	36.6412	0.0892	18.2675	2.9064	20.1008	9.9840	2.6739	11.6707	0.0000	8,981.8878	8,981.8878	2.2491	0.0000	9,016.9510
2019	125.7175	50.1010	30.4887	0.0882	2.9520	1.8999	4.8519	0.7951	1.7764	2.5714	0.0000	8,827.4460	8,827.4460	1.3758	0.0000	8,861.8409
Maximum	**125.7175**	**71.3560**	**36.6412**	**0.0892**	**18.2675**	**2.9064**	**20.1008**	**9.9840**	**2.6739**	**11.6707**	**0.0000**	**8,981.8878**	**8,981.8878**	**2.2491**	**0.0000**	**9,016.9510**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	5.9558	71.3560	36.6412	0.0892	7.2470	2.9064	9.0804	3.9263	2.6739	5.6130	0.0000	8,981.8878	8,981.8878	2.2491	0.0000	9,016.9510
2019	125.7175	50.1010	30.4887	0.0882	2.9520	1.8999	4.8519	0.7951	1.7764	2.5714	0.0000	8,827.4460	8,827.4460	1.3758	0.0000	8,861.8409
Maximum	**125.7175**	**71.3560**	**36.6412**	**0.0892**	**7.2470**	**2.9064**	**9.0804**	**3.9263**	**2.6739**	**5.6130**	**0.0000**	**8,981.8878**	**8,981.8878**	**2.2491**	**0.0000**	**9,016.9510**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**51.94**	**0.00**	**44.17**	**56.20**	**0.00**	**42.53**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	5.9756	4.9000e-004	0.0531	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1127	0.1127	3.1000e-004		0.1203
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**5.9756**	**4.9000e-004**	**0.0531**	**0.0000**	**0.0000**	**1.9000e-004**	**1.9000e-004**	**0.0000**	**1.9000e-004**	**1.9000e-004**		**0.1127**	**0.1127**	**3.1000e-004**	**0.0000**	**0.1203**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	5.9756	4.9000e-004	0.0531	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1127	0.1127	3.1000e-004		0.1203
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**5.9756**	**4.9000e-004**	**0.0531**	**0.0000**	**0.0000**	**1.9000e-004**	**1.9000e-004**	**0.0000**	**1.9000e-004**	**1.9000e-004**		**0.1127**	**0.1127**	**3.1000e-004**	**0.0000**	**0.1203**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	5/1/2018	5/14/2018	5	10	
2	Grading	Grading	5/15/2018	6/25/2018	5	30	
3	Building Construction	Building Construction	6/26/2018	5/13/2019	5	230	
4	Paving	Paving	5/14/2019	6/10/2019	5	20	
5	Architectural Coating	Architectural Coating	6/11/2019	7/8/2019	5	20	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 105

Acres of Paving: 5.8

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 393,600; Non-Residential Outdoor: 131,200; Striped Parking Area: 15,148 (Architectural Coating – sqft)

OffRoad Equipment

Brodiaea Warehouse (Construction - Unmitigated) - South Coast AQMD Air District, Winter

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	8.00	78	0.48
Site Preparation	Crawler Tractors	4	0.00	212	0.43
Grading	Crawler Tractors	2	8.00	212	0.43
Grading	Excavators	2	8.00	158	0.38
Building Construction	Cranes	1	8.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Paving	Pavers	2	8.00	130	0.42
Paving	Rollers	2	8.00	80	0.38
Building Construction	Crawler Tractors	3	8.00	212	0.43
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Grading	Graders	1	8.00	187	0.41
Grading	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Paving	Paving Equipment	2	8.00	132	0.36
Site Preparation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Building Construction	Welders	1	8.00	46	0.45
Grading	Scrapers	2	8.00	367	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	216.00	84.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	43.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Site Preparation - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	3.4983	37.6799	13.1294	0.0256		1.8317	1.8317		1.6852	1.6852		2,580.5200	2,580.5200	0.8034		2,600.6038
Total	**3.4983**	**37.6799**	**13.1294**	**0.0256**	**18.0663**	**1.8317**	**19.8980**	**9.9307**	**1.6852**	**11.6159**		**2,580.5200**	**2,580.5200**	**0.8034**		**2,600.6038**

3.2 Site Preparation - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1055	0.0762	0.8174	2.0600e-003	0.2012	1.6000e-003	0.2028	0.0534	1.4800e-003	0.0548		205.3223	205.3223	7.0100e-003		205.4974
Total	**0.1055**	**0.0762**	**0.8174**	**2.0600e-003**	**0.2012**	**1.6000e-003**	**0.2028**	**0.0534**	**1.4800e-003**	**0.0548**		**205.3223**	**205.3223**	**7.0100e-003**		**205.4974**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					7.0458	0.0000	7.0458	3.8730	0.0000	3.8730			0.0000			0.0000
Off-Road	3.4983	37.6799	13.1294	0.0256		1.8317	1.8317		1.6852	1.6852	0.0000	2,580.5200	2,580.5200	0.8034		2,600.6038
Total	**3.4983**	**37.6799**	**13.1294**	**0.0256**	**7.0458**	**1.8317**	**8.8776**	**3.8730**	**1.6852**	**5.5581**	**0.0000**	**2,580.5200**	**2,580.5200**	**0.8034**		**2,600.6038**

3.2 Site Preparation - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1055	0.0762	0.8174	2.0600e-003	0.2012	1.6000e-003	0.2028	0.0534	1.4800e-003	0.0548		205.3223	205.3223	7.0100e-003		205.4974
Total	**0.1055**	**0.0762**	**0.8174**	**2.0600e-003**	**0.2012**	**1.6000e-003**	**0.2028**	**0.0534**	**1.4800e-003**	**0.0548**		**205.3223**	**205.3223**	**7.0100e-003**		**205.4974**

3.3 Grading - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.7338	0.0000	9.7338	3.7110	0.0000	3.7110			0.0000			0.0000
Off-Road	5.8386	71.2714	35.7330	0.0715		2.9046	2.9046		2.6723	2.6723		7,199.6723	7,199.6723	2.2414		7,255.7062
Total	**5.8386**	**71.2714**	**35.7330**	**0.0715**	**9.7338**	**2.9046**	**12.6385**	**3.7110**	**2.6723**	**6.3833**		**7,199.6723**	**7,199.6723**	**2.2414**		**7,255.7062**

3.3 Grading - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1172	0.0846	0.9082	2.2900e-003	0.2236	1.7800e-003	0.2253	0.0593	1.6400e-003	0.0609		228.1358	228.1358	7.7800e-003		228.3305
Total	**0.1172**	**0.0846**	**0.9082**	**2.2900e-003**	**0.2236**	**1.7800e-003**	**0.2253**	**0.0593**	**1.6400e-003**	**0.0609**		**228.1358**	**228.1358**	**7.7800e-003**		**228.3305**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.7962	0.0000	3.7962	1.4473	0.0000	1.4473			0.0000			0.0000
Off-Road	5.8386	71.2714	35.7330	0.0715		2.9046	2.9046		2.6723	2.6723	0.0000	7,199.6723	7,199.6723	2.2414		7,255.7062
Total	**5.8386**	**71.2714**	**35.7330**	**0.0715**	**3.7962**	**2.9046**	**6.7008**	**1.4473**	**2.6723**	**4.1196**	**0.0000**	**7,199.6723**	**7,199.6723**	**2.2414**		**7,255.7062**

3.3 Grading - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1172	0.0846	0.9082	2.2900e-003	0.2236	1.7800e-003	0.2253	0.0593	1.6400e-003	0.0609		228.1358	228.1358	7.7800e-003		228.3305
Total	**0.1172**	**0.0846**	**0.9082**	**2.2900e-003**	**0.2236**	**1.7800e-003**	**0.2253**	**0.0593**	**1.6400e-003**	**0.0609**		**228.1358**	**228.1358**	**7.7800e-003**		**228.3305**

3.4 Building Construction - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.9734	42.8532	19.7374	0.0430		2.0130	2.0130		1.8820	1.8820		4,243.6666	4,243.6666	1.1473		4,272.3492
Total	**3.9734**	**42.8532**	**19.7374**	**0.0430**		**2.0130**	**2.0130**		**1.8820**	**1.8820**		**4,243.6666**	**4,243.6666**	**1.1473**		**4,272.3492**

3.4 Building Construction - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.3730	10.1965	2.8141	0.0214	0.5376	0.0755	0.6131	0.1548	0.0722	0.2270		2,274.3541	2,274.3541	0.1712		2,278.6328
Worker	1.2654	0.9141	9.8084	0.0248	2.4144	0.0193	2.4336	0.6403	0.0177	0.6580		2,463.8671	2,463.8671	0.0841		2,465.9690
Total	**1.6385**	**11.1106**	**12.6226**	**0.0461**	**2.9520**	**0.0948**	**3.0468**	**0.7951**	**0.0900**	**0.8851**		**4,738.2212**	**4,738.2212**	**0.2552**		**4,744.6018**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.9734	42.8532	19.7374	0.0430		2.0130	2.0130		1.8820	1.8820	0.0000	4,243.6666	4,243.6666	1.1473		4,272.3492
Total	**3.9734**	**42.8532**	**19.7374**	**0.0430**		**2.0130**	**2.0130**		**1.8820**	**1.8820**	**0.0000**	**4,243.6666**	**4,243.6666**	**1.1473**		**4,272.3492**

3.4 Building Construction - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.3730	10.1965	2.8141	0.0214	0.5376	0.0755	0.6131	0.1548	0.0722	0.2270		2,274.3541	2,274.3541	0.1712		2,278.6328
Worker	1.2654	0.9141	9.8084	0.0248	2.4144	0.0193	2.4336	0.6403	0.0177	0.6580		2,463.8671	2,463.8671	0.0841		2,465.9690
Total	**1.6385**	**11.1106**	**12.6226**	**0.0461**	**2.9520**	**0.0948**	**3.0468**	**0.7951**	**0.0900**	**0.8851**		**4,738.2212**	**4,738.2212**	**0.2552**		**4,744.6018**

3.4 Building Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.6440	39.6763	19.1447	0.0430		1.8165	1.8165		1.6972	1.6972		4,187.5330	4,187.5330	1.1363		4,215.9399
Total	**3.6440**	**39.6763**	**19.1447**	**0.0430**		**1.8165**	**1.8165**		**1.6972**	**1.6972**		**4,187.5330**	**4,187.5330**	**1.1363**		**4,215.9399**

3.4 Building Construction - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.3383	9.6184	2.5877	0.0212	0.5376	0.0647	0.6023	0.1548	0.0619	0.2166		2,253.8567	2,253.8567	0.1650		2,257.9810
Worker	1.1518	0.8063	8.7563	0.0240	2.4144	0.0188	2.4332	0.6403	0.0173	0.6576		2,386.0564	2,386.0564	0.0746		2,387.9201
Total	**1.4901**	**10.4247**	**11.3440**	**0.0451**	**2.9520**	**0.0835**	**3.0355**	**0.7951**	**0.0792**	**0.8743**		**4,639.9131**	**4,639.9131**	**0.2395**		**4,645.9011**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.6440	39.6763	19.1447	0.0430		1.8165	1.8165		1.6972	1.6972	0.0000	4,187.5330	4,187.5330	1.1363		4,215.9399
Total	**3.6440**	**39.6763**	**19.1447**	**0.0430**		**1.8165**	**1.8165**		**1.6972**	**1.6972**	**0.0000**	**4,187.5330**	**4,187.5330**	**1.1363**		**4,215.9399**

3.4 Building Construction - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.3383	9.6184	2.5877	0.0212	0.5376	0.0647	0.6023	0.1548	0.0619	0.2166		2,253.8567	2,253.8567	0.1650		2,257.9810
Worker	1.1518	0.8063	8.7563	0.0240	2.4144	0.0188	2.4332	0.6403	0.0173	0.6576		2,386.0564	2,386.0564	0.0746		2,387.9201
Total	**1.4901**	**10.4247**	**11.3440**	**0.0451**	**2.9520**	**0.0835**	**3.0355**	**0.7951**	**0.0792**	**0.8743**		**4,639.9131**	**4,639.9131**	**0.2395**		**4,645.9011**

3.5 Paving - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4544	15.2441	14.6648	0.0228		0.8246	0.8246		0.7586	0.7586		2,257.0025	2,257.0025	0.7141		2,274.8548
Paving	0.7598					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.2142**	**15.2441**	**14.6648**	**0.0228**		**0.8246**	**0.8246**		**0.7586**	**0.7586**		**2,257.0025**	**2,257.0025**	**0.7141**		**2,274.8548**

3.5 Paving - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0800	0.0560	0.6081	1.6600e-003	0.1677	1.3000e-003	0.1690	0.0445	1.2000e-003	0.0457		165.6984	165.6984	5.1800e-003		165.8278
Total	**0.0800**	**0.0560**	**0.6081**	**1.6600e-003**	**0.1677**	**1.3000e-003**	**0.1690**	**0.0445**	**1.2000e-003**	**0.0457**		**165.6984**	**165.6984**	**5.1800e-003**		**165.8278**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4544	15.2441	14.6648	0.0228		0.8246	0.8246		0.7586	0.7586	0.0000	2,257.0025	2,257.0025	0.7141		2,274.8548
Paving	0.7598					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.2142**	**15.2441**	**14.6648**	**0.0228**		**0.8246**	**0.8246**		**0.7586**	**0.7586**	**0.0000**	**2,257.0025**	**2,257.0025**	**0.7141**		**2,274.8548**

3.5 Paving - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0800	0.0560	0.6081	1.6600e-003	0.1677	1.3000e-003	0.1690	0.0445	1.2000e-003	0.0457		165.6984	165.6984	5.1800e-003		165.8278
Total	**0.0800**	**0.0560**	**0.6081**	**1.6600e-003**	**0.1677**	**1.3000e-003**	**0.1690**	**0.0445**	**1.2000e-003**	**0.0457**		**165.6984**	**165.6984**	**5.1800e-003**		**165.8278**

3.6 Architectural Coating - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	125.1330					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.3553	2.4472	2.4551	3.9600e-003		0.1717	0.1717		0.1717	0.1717		375.2641	375.2641	0.0317		376.0565
Total	**125.4882**	**2.4472**	**2.4551**	**3.9600e-003**		**0.1717**	**0.1717**		**0.1717**	**0.1717**		**375.2641**	**375.2641**	**0.0317**		**376.0565**

3.6 Architectural Coating - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2293	0.1605	1.7432	4.7700e-003	0.4806	3.7400e-003	0.4844	0.1275	3.4500e-003	0.1309		475.0020	475.0020	0.0148		475.3730
Total	**0.2293**	**0.1605**	**1.7432**	**4.7700e-003**	**0.4806**	**3.7400e-003**	**0.4844**	**0.1275**	**3.4500e-003**	**0.1309**		**475.0020**	**475.0020**	**0.0148**		**475.3730**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	125.1330					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.3553	2.4472	2.4551	3.9600e-003		0.1717	0.1717		0.1717	0.1717	0.0000	375.2641	375.2641	0.0317		376.0565
Total	**125.4882**	**2.4472**	**2.4551**	**3.9600e-003**		**0.1717**	**0.1717**		**0.1717**	**0.1717**	**0.0000**	**375.2641**	**375.2641**	**0.0317**		**376.0565**

3.6 Architectural Coating - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2293	0.1605	1.7432	4.7700e-003	0.4806	3.7400e-003	0.4844	0.1275	3.4500e-003	0.1309		475.0020	475.0020	0.0148		475.3730
Total	**0.2293**	**0.1605**	**1.7432**	**4.7700e-003**	**0.4806**	**3.7400e-003**	**0.4844**	**0.1275**	**3.4500e-003**	**0.1309**		**475.0020**	**475.0020**	**0.0148**		**475.3730**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Parking Lot	0.00	0.00	0.00		
Unrefrigerated Warehouse-No Rail	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Parking Lot	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0
Unrefrigerated Warehouse-No Rail	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Parking Lot	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Unrefrigerated Warehouse-No Rail	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	5.9756	4.9000e-004	0.0531	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1127	0.1127	3.1000e-004		0.1203
Unmitigated	5.9756	4.9000e-004	0.0531	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1127	0.1127	3.1000e-004		0.1203

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.6857					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	5.2849					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.0300e-003	4.9000e-004	0.0531	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1127	0.1127	3.1000e-004		0.1203
Total	**5.9756**	**4.9000e-004**	**0.0531**	**0.0000**		**1.9000e-004**	**1.9000e-004**		**1.9000e-004**	**1.9000e-004**		**0.1127**	**0.1127**	**3.1000e-004**		**0.1203**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.6857					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	5.2849					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.0300e-003	4.9000e-004	0.0531	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1127	0.1127	3.1000e-004		0.1203
Total	**5.9756**	**4.9000e-004**	**0.0531**	**0.0000**		**1.9000e-004**	**1.9000e-004**		**1.9000e-004**	**1.9000e-004**		**0.1127**	**0.1127**	**3.1000e-004**		**0.1203**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Brodiaea Warehouse (Construction - Unmitigated)

South Coast AQMD Air District, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Unrefrigerated Warehouse-No Rail	262.40	1000sqft	6.02	262,400.00	0
Parking Lot	252.46	1000sqft	5.80	252,460.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	10			**Operational Year**	2019
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Brodiaea Warehouse (Construction - Unmitigated) - South Coast AQMD Air District, Summer

Project Characteristics -

Land Use -

Construction Phase - Construction schedule adjusted as per Client.

Off-road Equipment - Crawler Tractors used in lieu of Tractors/Loaders/Backhoes.

Off-road Equipment - Crawler Tractors used in lieu of Tractors/Loaders/Backhoes.

Off-road Equipment - Crawler Tractors used in lieu of Tractors/Loaders/Backhoes.

Off-road Equipment -

Off-road Equipment - Hours are based on an 8-hour workday.

Grading -

Vehicle Trips - Construction (Unmitigated) Run Only.

Fleet Mix - Construction (Unmitigated) Run Only.

Energy Use - Construction (Unmitigated) Run Only.

Water And Wastewater - Construction (Unmitigated) Run Only.

Solid Waste - Construction (Unmitigated) Run Only.

Construction Off-road Equipment Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	300.00	230.00
tblConstructionPhase	PhaseEndDate	11/11/2019	7/8/2019
tblConstructionPhase	PhaseEndDate	9/16/2019	5/13/2019
tblConstructionPhase	PhaseEndDate	7/23/2018	6/25/2018
tblConstructionPhase	PhaseEndDate	10/14/2019	6/10/2019
tblConstructionPhase	PhaseEndDate	6/11/2018	5/14/2018
tblConstructionPhase	PhaseStartDate	10/15/2019	6/11/2019
tblConstructionPhase	PhaseStartDate	7/24/2018	6/26/2018
tblConstructionPhase	PhaseStartDate	6/12/2018	5/15/2018
tblConstructionPhase	PhaseStartDate	9/17/2019	5/14/2019

Brodiaea Warehouse (Construction - Unmitigated) - South Coast AQMD Air District, Summer

tblConstructionPhase	PhaseStartDate	5/29/2018	5/1/2018
tblEnergyUse	LightingElect	0.35	0.00
tblEnergyUse	LightingElect	1.17	0.00
tblEnergyUse	NT24E	0.82	0.00
tblEnergyUse	NT24NG	0.03	0.00
tblEnergyUse	T24E	0.37	0.00
tblEnergyUse	T24NG	2.00	0.00
tblFleetMix	HHD	0.03	0.00
tblFleetMix	HHD	0.03	0.00
tblFleetMix	LDA	0.55	1.00
tblFleetMix	LDA	0.55	1.00
tblFleetMix	LDT1	0.04	0.00
tblFleetMix	LDT1	0.04	0.00
tblFleetMix	LDT2	0.20	0.00
tblFleetMix	LDT2	0.20	0.00
tblFleetMix	LHD1	0.02	0.00
tblFleetMix	LHD1	0.02	0.00
tblFleetMix	LHD2	5.8700e-003	0.00
tblFleetMix	LHD2	5.8700e-003	0.00
tblFleetMix	MCY	4.7240e-003	0.00
tblFleetMix	MCY	4.7240e-003	0.00
tblFleetMix	MDV	0.12	0.00
tblFleetMix	MDV	0.12	0.00
tblFleetMix	MH	9.9100e-004	0.00
tblFleetMix	MH	9.9100e-004	0.00
tblFleetMix	MHD	0.02	0.00
tblFleetMix	MHD	0.02	0.00

tblFleetMix	OBUS	1.9990e-003	0.00
tblFleetMix	OBUS	1.9990e-003	0.00
tblFleetMix	SBUS	7.0400e-004	0.00
tblFleetMix	SBUS	7.0400e-004	0.00
tblFleetMix	UBUS	2.0270e-003	0.00
tblFleetMix	UBUS	2.0270e-003	0.00
tblOffRoadEquipment	OffRoadEquipmentType		Crawler Tractors
tblOffRoadEquipment	OffRoadEquipmentType		Crawler Tractors
tblOffRoadEquipment	OffRoadEquipmentType		Crawler Tractors
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblSolidWaste	SolidWasteGenerationRate	246.66	0.00
tblVehicleTrips	CC_TL	8.40	0.00
tblVehicleTrips	CC_TL	8.40	0.00
tblVehicleTrips	CNW_TL	6.90	0.00
tblVehicleTrips	CNW_TL	6.90	0.00
tblVehicleTrips	CNW_TTP	41.00	0.00
tblVehicleTrips	CW_TL	16.60	0.00
tblVehicleTrips	CW_TL	16.60	0.00
tblVehicleTrips	CW_TTP	59.00	0.00
tblVehicleTrips	DV_TP	5.00	0.00
tblVehicleTrips	PB_TP	3.00	0.00
tblVehicleTrips	PR_TP	92.00	0.00

tblVehicleTrips	ST_TR	1.68	0.00
tblVehicleTrips	SU_TR	1.68	0.00
tblVehicleTrips	WD_TR	1.68	0.00
tblWater	IndoorWaterUseRate	60,680,000.00	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	5.9464	71.3487	36.7365	0.0915	18.2675	2.9064	20.1008	9.9840	2.6739	11.6707	0.0000	9,218.1937	9,218.1937	2.2497	0.0000	9,253.1042
2019	125.6988	50.0240	31.1739	0.0904	2.9520	1.8989	4.8509	0.7951	1.7754	2.5705	0.0000	9,058.7148	9,058.7148	1.3696	0.0000	9,092.9543
Maximum	**125.6988**	**71.3487**	**36.7365**	**0.0915**	**18.2675**	**2.9064**	**20.1008**	**9.9840**	**2.6739**	**11.6707**	**0.0000**	**9,218.1937**	**9,218.1937**	**2.2497**	**0.0000**	**9,253.1042**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	5.9464	71.3487	36.7365	0.0915	7.2470	2.9064	9.0804	3.9263	2.6739	5.6130	0.0000	9,218.1937	9,218.1937	2.2497	0.0000	9,253.1042
2019	125.6988	50.0240	31.1739	0.0904	2.9520	1.8989	4.8509	0.7951	1.7754	2.5705	0.0000	9,058.7148	9,058.7148	1.3696	0.0000	9,092.9543
Maximum	**125.6988**	**71.3487**	**36.7365**	**0.0915**	**7.2470**	**2.9064**	**9.0804**	**3.9263**	**2.6739**	**5.6130**	**0.0000**	**9,218.1937**	**9,218.1937**	**2.2497**	**0.0000**	**9,253.1042**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**51.94**	**0.00**	**44.17**	**56.20**	**0.00**	**42.54**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	5.9756	4.9000e-004	0.0531	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1127	0.1127	3.1000e-004		0.1203
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**5.9756**	**4.9000e-004**	**0.0531**	**0.0000**	**0.0000**	**1.9000e-004**	**1.9000e-004**	**0.0000**	**1.9000e-004**	**1.9000e-004**		**0.1127**	**0.1127**	**3.1000e-004**	**0.0000**	**0.1203**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	5.9756	4.9000e-004	0.0531	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1127	0.1127	3.1000e-004		0.1203
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**5.9756**	**4.9000e-004**	**0.0531**	**0.0000**	**0.0000**	**1.9000e-004**	**1.9000e-004**	**0.0000**	**1.9000e-004**	**1.9000e-004**		**0.1127**	**0.1127**	**3.1000e-004**	**0.0000**	**0.1203**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	5/1/2018	5/14/2018	5	10	
2	Grading	Grading	5/15/2018	6/25/2018	5	30	
3	Building Construction	Building Construction	6/26/2018	5/13/2019	5	230	
4	Paving	Paving	5/14/2019	6/10/2019	5	20	
5	Architectural Coating	Architectural Coating	6/11/2019	7/8/2019	5	20	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 105

Acres of Paving: 5.8

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 393,600; Non-Residential Outdoor: 131,200; Striped Parking Area: 15,148 (Architectural Coating – sqft)

OffRoad Equipment

Brodiaea Warehouse (Construction - Unmitigated) - South Coast AQMD Air District, Summer

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	8.00	78	0.48
Site Preparation	Crawler Tractors	4	0.00	212	0.43
Grading	Crawler Tractors	2	8.00	212	0.43
Grading	Excavators	2	8.00	158	0.38
Building Construction	Cranes	1	8.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Paving	Pavers	2	8.00	130	0.42
Paving	Rollers	2	8.00	80	0.38
Building Construction	Crawler Tractors	3	8.00	212	0.43
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Grading	Graders	1	8.00	187	0.41
Grading	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Paving	Paving Equipment	2	8.00	132	0.36
Site Preparation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Building Construction	Welders	1	8.00	46	0.45
Grading	Scrapers	2	8.00	367	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	216.00	84.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	43.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Site Preparation - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	3.4983	37.6799	13.1294	0.0256		1.8317	1.8317		1.6852	1.6852		2,580.5200	2,580.5200	0.8034		2,600.6038
Total	**3.4983**	**37.6799**	**13.1294**	**0.0256**	**18.0663**	**1.8317**	**19.8980**	**9.9307**	**1.6852**	**11.6159**		**2,580.5200**	**2,580.5200**	**0.8034**		**2,600.6038**

3.2 Site Preparation - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0970	0.0695	0.9032	2.2100e-003	0.2012	1.6000e-003	0.2028	0.0534	1.4800e-003	0.0548		219.4833	219.4833	7.4800e-003		219.6704
Total	**0.0970**	**0.0695**	**0.9032**	**2.2100e-003**	**0.2012**	**1.6000e-003**	**0.2028**	**0.0534**	**1.4800e-003**	**0.0548**		**219.4833**	**219.4833**	**7.4800e-003**		**219.6704**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					7.0458	0.0000	7.0458	3.8730	0.0000	3.8730			0.0000			0.0000
Off-Road	3.4983	37.6799	13.1294	0.0256		1.8317	1.8317		1.6852	1.6852	0.0000	2,580.5200	2,580.5200	0.8034		2,600.6038
Total	**3.4983**	**37.6799**	**13.1294**	**0.0256**	**7.0458**	**1.8317**	**8.8776**	**3.8730**	**1.6852**	**5.5581**	**0.0000**	**2,580.5200**	**2,580.5200**	**0.8034**		**2,600.6038**

3.2 Site Preparation - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0970	0.0695	0.9032	2.2100e-003	0.2012	1.6000e-003	0.2028	0.0534	1.4800e-003	0.0548		219.4833	219.4833	7.4800e-003		219.6704
Total	**0.0970**	**0.0695**	**0.9032**	**2.2100e-003**	**0.2012**	**1.6000e-003**	**0.2028**	**0.0534**	**1.4800e-003**	**0.0548**		**219.4833**	**219.4833**	**7.4800e-003**		**219.6704**

3.3 Grading - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.7338	0.0000	9.7338	3.7110	0.0000	3.7110			0.0000			0.0000
Off-Road	5.8386	71.2714	35.7330	0.0715		2.9046	2.9046		2.6723	2.6723		7,199.6723	7,199.6723	2.2414		7,255.7062
Total	**5.8386**	**71.2714**	**35.7330**	**0.0715**	**9.7338**	**2.9046**	**12.6385**	**3.7110**	**2.6723**	**6.3833**		**7,199.6723**	**7,199.6723**	**2.2414**		**7,255.7062**

3.3 Grading - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1078	0.0773	1.0035	2.4500e-003	0.2236	1.7800e-003	0.2253	0.0593	1.6400e-003	0.0609		243.8703	243.8703	8.3200e-003		244.0782
Total	**0.1078**	**0.0773**	**1.0035**	**2.4500e-003**	**0.2236**	**1.7800e-003**	**0.2253**	**0.0593**	**1.6400e-003**	**0.0609**		**243.8703**	**243.8703**	**8.3200e-003**		**244.0782**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.7962	0.0000	3.7962	1.4473	0.0000	1.4473			0.0000			0.0000
Off-Road	5.8386	71.2714	35.7330	0.0715		2.9046	2.9046		2.6723	2.6723	0.0000	7,199.6723	7,199.6723	2.2414		7,255.7062
Total	**5.8386**	**71.2714**	**35.7330**	**0.0715**	**3.7962**	**2.9046**	**6.7008**	**1.4473**	**2.6723**	**4.1196**	**0.0000**	**7,199.6723**	**7,199.6723**	**2.2414**		**7,255.7062**

3.3 Grading - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1078	0.0773	1.0035	2.4500e-003	0.2236	1.7800e-003	0.2253	0.0593	1.6400e-003	0.0609		243.8703	243.8703	8.3200e-003		244.0782
Total	**0.1078**	**0.0773**	**1.0035**	**2.4500e-003**	**0.2236**	**1.7800e-003**	**0.2253**	**0.0593**	**1.6400e-003**	**0.0609**		**243.8703**	**243.8703**	**8.3200e-003**		**244.0782**

3.4 Building Construction - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.9734	42.8532	19.7374	0.0430		2.0130	2.0130		1.8820	1.8820		4,243.6666	4,243.6666	1.1473		4,272.3492
Total	**3.9734**	**42.8532**	**19.7374**	**0.0430**		**2.0130**	**2.0130**		**1.8820**	**1.8820**		**4,243.6666**	**4,243.6666**	**1.1473**		**4,272.3492**

3.4 Building Construction - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.3574	10.1795	2.5351	0.0220	0.5376	0.0744	0.6120	0.1548	0.0712	0.2259		2,340.7275	2,340.7275	0.1593		2,344.7102
Worker	1.1639	0.8344	10.8380	0.0265	2.4144	0.0193	2.4336	0.6403	0.0177	0.6580		2,633.7996	2,633.7996	0.0898		2,636.0448
Total	**1.5213**	**11.0139**	**13.3730**	**0.0485**	**2.9520**	**0.0936**	**3.0456**	**0.7951**	**0.0889**	**0.8840**		**4,974.5271**	**4,974.5271**	**0.2491**		**4,980.7550**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.9734	42.8532	19.7374	0.0430		2.0130	2.0130		1.8820	1.8820	0.0000	4,243.6666	4,243.6666	1.1473		4,272.3492
Total	**3.9734**	**42.8532**	**19.7374**	**0.0430**		**2.0130**	**2.0130**		**1.8820**	**1.8820**	**0.0000**	**4,243.6666**	**4,243.6666**	**1.1473**		**4,272.3492**

3.4 Building Construction - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.3574	10.1795	2.5351	0.0220	0.5376	0.0744	0.6120	0.1548	0.0712	0.2259		2,340.7275	2,340.7275	0.1593		2,344.7102
Worker	1.1639	0.8344	10.8380	0.0265	2.4144	0.0193	2.4336	0.6403	0.0177	0.6580		2,633.7996	2,633.7996	0.0898		2,636.0448
Total	**1.5213**	**11.0139**	**13.3730**	**0.0485**	**2.9520**	**0.0936**	**3.0456**	**0.7951**	**0.0889**	**0.8840**		**4,974.5271**	**4,974.5271**	**0.2491**		**4,980.7550**

3.4 Building Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.6440	39.6763	19.1447	0.0430		1.8165	1.8165		1.6972	1.6972		4,187.5330	4,187.5330	1.1363		4,215.9399
Total	**3.6440**	**39.6763**	**19.1447**	**0.0430**		**1.8165**	**1.8165**		**1.6972**	**1.6972**		**4,187.5330**	**4,187.5330**	**1.1363**		**4,215.9399**

3.4 Building Construction - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.3238	9.6116	2.3235	0.0218	0.5376	0.0637	0.6013	0.1548	0.0609	0.2157		2,320.2455	2,320.2455	0.1535		2,324.0836
Worker	1.0579	0.7361	9.7057	0.0256	2.4144	0.0188	2.4332	0.6403	0.0173	0.6576		2,550.9363	2,550.9363	0.0798		2,552.9308
Total	**1.3817**	**10.3477**	**12.0292**	**0.0474**	**2.9520**	**0.0825**	**3.0344**	**0.7951**	**0.0782**	**0.8733**		**4,871.1818**	**4,871.1818**	**0.2333**		**4,877.0144**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.6440	39.6763	19.1447	0.0430		1.8165	1.8165		1.6972	1.6972	0.0000	4,187.5330	4,187.5330	1.1363		4,215.9399
Total	**3.6440**	**39.6763**	**19.1447**	**0.0430**		**1.8165**	**1.8165**		**1.6972**	**1.6972**	**0.0000**	**4,187.5330**	**4,187.5330**	**1.1363**		**4,215.9399**

3.4 Building Construction - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.3238	9.6116	2.3235	0.0218	0.5376	0.0637	0.6013	0.1548	0.0609	0.2157		2,320.2455	2,320.2455	0.1535		2,324.0836
Worker	1.0579	0.7361	9.7057	0.0256	2.4144	0.0188	2.4332	0.6403	0.0173	0.6576		2,550.9363	2,550.9363	0.0798		2,552.9308
Total	**1.3817**	**10.3477**	**12.0292**	**0.0474**	**2.9520**	**0.0825**	**3.0344**	**0.7951**	**0.0782**	**0.8733**		**4,871.1818**	**4,871.1818**	**0.2333**		**4,877.0144**

3.5 Paving - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4544	15.2441	14.6648	0.0228		0.8246	0.8246		0.7586	0.7586		2,257.0025	2,257.0025	0.7141		2,274.8548
Paving	0.7598					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.2142**	**15.2441**	**14.6648**	**0.0228**		**0.8246**	**0.8246**		**0.7586**	**0.7586**		**2,257.0025**	**2,257.0025**	**0.7141**		**2,274.8548**

3.5 Paving - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0735	0.0511	0.6740	1.7800e-003	0.1677	1.3000e-003	0.1690	0.0445	1.2000e-003	0.0457		177.1484	177.1484	5.5400e-003		177.2869
Total	**0.0735**	**0.0511**	**0.6740**	**1.7800e-003**	**0.1677**	**1.3000e-003**	**0.1690**	**0.0445**	**1.2000e-003**	**0.0457**		**177.1484**	**177.1484**	**5.5400e-003**		**177.2869**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4544	15.2441	14.6648	0.0228		0.8246	0.8246		0.7586	0.7586	0.0000	2,257.0025	2,257.0025	0.7141		2,274.8548
Paving	0.7598					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.2142**	**15.2441**	**14.6648**	**0.0228**		**0.8246**	**0.8246**		**0.7586**	**0.7586**	**0.0000**	**2,257.0025**	**2,257.0025**	**0.7141**		**2,274.8548**

3.5 Paving - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0735	0.0511	0.6740	1.7800e-003	0.1677	1.3000e-003	0.1690	0.0445	1.2000e-003	0.0457		177.1484	177.1484	5.5400e-003		177.2869
Total	**0.0735**	**0.0511**	**0.6740**	**1.7800e-003**	**0.1677**	**1.3000e-003**	**0.1690**	**0.0445**	**1.2000e-003**	**0.0457**		**177.1484**	**177.1484**	**5.5400e-003**		**177.2869**

3.6 Architectural Coating - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	125.1330					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.3553	2.4472	2.4551	3.9600e-003		0.1717	0.1717		0.1717	0.1717		375.2641	375.2641	0.0317		376.0565
Total	**125.4882**	**2.4472**	**2.4551**	**3.9600e-003**		**0.1717**	**0.1717**		**0.1717**	**0.1717**		**375.2641**	**375.2641**	**0.0317**		**376.0565**

3.6 Architectural Coating - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2106	0.1466	1.9322	5.1000e-003	0.4806	3.7400e-003	0.4844	0.1275	3.4500e-003	0.1309		507.8253	507.8253	0.0159		508.2223
Total	**0.2106**	**0.1466**	**1.9322**	**5.1000e-003**	**0.4806**	**3.7400e-003**	**0.4844**	**0.1275**	**3.4500e-003**	**0.1309**		**507.8253**	**507.8253**	**0.0159**		**508.2223**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	125.1330					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.3553	2.4472	2.4551	3.9600e-003		0.1717	0.1717		0.1717	0.1717	0.0000	375.2641	375.2641	0.0317		376.0565
Total	**125.4882**	**2.4472**	**2.4551**	**3.9600e-003**		**0.1717**	**0.1717**		**0.1717**	**0.1717**	**0.0000**	**375.2641**	**375.2641**	**0.0317**		**376.0565**

3.6 Architectural Coating - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2106	0.1466	1.9322	5.1000e-003	0.4806	3.7400e-003	0.4844	0.1275	3.4500e-003	0.1309		507.8253	507.8253	0.0159		508.2223
Total	**0.2106**	**0.1466**	**1.9322**	**5.1000e-003**	**0.4806**	**3.7400e-003**	**0.4844**	**0.1275**	**3.4500e-003**	**0.1309**		**507.8253**	**507.8253**	**0.0159**		**508.2223**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Parking Lot	0.00	0.00	0.00		
Unrefrigerated Warehouse-No Rail	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Parking Lot	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0
Unrefrigerated Warehouse-No Rail	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Parking Lot	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Unrefrigerated Warehouse-No Rail	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	5.9756	4.9000e-004	0.0531	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1127	0.1127	3.1000e-004		0.1203
Unmitigated	5.9756	4.9000e-004	0.0531	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1127	0.1127	3.1000e-004		0.1203

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.6857					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	5.2849					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.0300e-003	4.9000e-004	0.0531	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1127	0.1127	3.1000e-004		0.1203
Total	**5.9756**	**4.9000e-004**	**0.0531**	**0.0000**		**1.9000e-004**	**1.9000e-004**		**1.9000e-004**	**1.9000e-004**		**0.1127**	**0.1127**	**3.1000e-004**		**0.1203**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.6857					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	5.2849					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.0300e-003	4.9000e-004	0.0531	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1127	0.1127	3.1000e-004		0.1203
Total	**5.9756**	**4.9000e-004**	**0.0531**	**0.0000**		**1.9000e-004**	**1.9000e-004**		**1.9000e-004**	**1.9000e-004**		**0.1127**	**0.1127**	**3.1000e-004**		**0.1203**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

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APPENDIX 3.2:

CALEEMOD CONSTRUCTION EMISSIONS MODEL OUTPUTS (MITIGATED)

Brodiaea Warehouse (Construction - Mitigated)

South Coast AQMD Air District, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Unrefrigerated Warehouse-No Rail	262.40	1000sqft	6.02	262,400.00	0
Parking Lot	252.46	1000sqft	5.80	252,460.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	10			**Operational Year**	2019
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Construction schedule adjusted as per Client.

Off-road Equipment - Crawler Tractors used in lieu of Tractors/Loaders/Backhoes.

Off-road Equipment - Crawler Tractors used in lieu of Tractors/Loaders/Backhoes.

Off-road Equipment - Crawler Tractors used in lieu of Tractors/Loaders/Backhoes.

Off-road Equipment -

Off-road Equipment - Hours are based on an 8-hour workday.

Grading -

Vehicle Trips - Construction (Unmitigated) Run Only.

Fleet Mix - Construction (Unmitigated) Run Only.

Energy Use - Construction (Unmitigated) Run Only.

Water And Wastewater - Construction (Unmitigated) Run Only.

Solid Waste - Construction (Unmitigated) Run Only.

Construction Off-road Equipment Mitigation -

Architectural Coating - Use Low VOC Paint (50 g/L)

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	100.00	50.00
tblArchitecturalCoating	EF_Nonresidential_Interior	100.00	50.00
tblArchitecturalCoating	EF_Parking	100.00	50.00
tblConstructionPhase	NumDays	300.00	230.00
tblConstructionPhase	PhaseEndDate	11/11/2019	7/8/2019
tblConstructionPhase	PhaseEndDate	9/16/2019	5/13/2019
tblConstructionPhase	PhaseEndDate	7/23/2018	6/25/2018
tblConstructionPhase	PhaseEndDate	10/14/2019	6/10/2019
tblConstructionPhase	PhaseEndDate	6/11/2018	5/14/2018

tblConstructionPhase	PhaseStartDate	10/15/2019	6/11/2019
tblConstructionPhase	PhaseStartDate	7/24/2018	6/26/2018
tblConstructionPhase	PhaseStartDate	6/12/2018	5/15/2018
tblConstructionPhase	PhaseStartDate	9/17/2019	5/14/2019
tblConstructionPhase	PhaseStartDate	5/29/2018	5/1/2018
tblEnergyUse	LightingElect	0.35	0.00
tblEnergyUse	LightingElect	1.17	0.00
tblEnergyUse	NT24E	0.82	0.00
tblEnergyUse	NT24NG	0.03	0.00
tblEnergyUse	T24E	0.37	0.00
tblEnergyUse	T24NG	2.00	0.00
tblFleetMix	HHD	0.03	0.00
tblFleetMix	HHD	0.03	0.00
tblFleetMix	LDA	0.55	1.00
tblFleetMix	LDA	0.55	1.00
tblFleetMix	LDT1	0.04	0.00
tblFleetMix	LDT1	0.04	0.00
tblFleetMix	LDT2	0.20	0.00
tblFleetMix	LDT2	0.20	0.00
tblFleetMix	LHD1	0.02	0.00
tblFleetMix	LHD1	0.02	0.00
tblFleetMix	LHD2	5.8700e-003	0.00
tblFleetMix	LHD2	5.8700e-003	0.00
tblFleetMix	MCY	4.7240e-003	0.00
tblFleetMix	MCY	4.7240e-003	0.00
tblFleetMix	MDV	0.12	0.00
tblFleetMix	MDV	0.12	0.00

tblFleetMix	MH	9.9100e-004	0.00
tblFleetMix	MH	9.9100e-004	0.00
tblFleetMix	MHD	0.02	0.00
tblFleetMix	MHD	0.02	0.00
tblFleetMix	OBUS	1.9990e-003	0.00
tblFleetMix	OBUS	1.9990e-003	0.00
tblFleetMix	SBUS	7.0400e-004	0.00
tblFleetMix	SBUS	7.0400e-004	0.00
tblFleetMix	UBUS	2.0270e-003	0.00
tblFleetMix	UBUS	2.0270e-003	0.00
tblOffRoadEquipment	OffRoadEquipmentType		Crawler Tractors
tblOffRoadEquipment	OffRoadEquipmentType		Crawler Tractors
tblOffRoadEquipment	OffRoadEquipmentType		Crawler Tractors
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblSolidWaste	SolidWasteGenerationRate	246.66	0.00
tblVehicleTrips	CC_TL	8.40	0.00
tblVehicleTrips	CC_TL	8.40	0.00
tblVehicleTrips	CNW_TL	6.90	0.00
tblVehicleTrips	CNW_TL	6.90	0.00
tblVehicleTrips	CNW_TTP	41.00	0.00
tblVehicleTrips	CW_TL	16.60	0.00
tblVehicleTrips	CW_TL	16.60	0.00

tblVehicleTrips	CW_TTP	59.00	0.00
tblVehicleTrips	DV_TP	5.00	0.00
tblVehicleTrips	PB_TP	3.00	0.00
tblVehicleTrips	PR_TP	92.00	0.00
tblVehicleTrips	ST_TR	1.68	0.00
tblVehicleTrips	SU_TR	1.68	0.00
tblVehicleTrips	WD_TR	1.68	0.00
tblWater	IndoorWaterUseRate	60,680,000.00	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	5.9558	71.3560	36.6412	0.0892	18.2675	2.9064	20.1008	9.9840	2.6739	11.6707	0.0000	8,981.8878	8,981.8878	2.2491	0.0000	9,016.9510
2019	63.1510	50.1010	30.4887	0.0882	2.9520	1.8999	4.8519	0.7951	1.7764	2.5714	0.0000	8,827.4460	8,827.4460	1.3758	0.0000	8,861.8409
Maximum	**63.1510**	**71.3560**	**36.6412**	**0.0892**	**18.2675**	**2.9064**	**20.1008**	**9.9840**	**2.6739**	**11.6707**	**0.0000**	**8,981.8878**	**8,981.8878**	**2.2491**	**0.0000**	**9,016.9510**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	5.9558	71.3560	36.6412	0.0892	7.2470	2.9064	9.0804	3.9263	2.6739	5.6130	0.0000	8,981.8878	8,981.8878	2.2491	0.0000	9,016.9510
2019	63.1510	50.1010	30.4887	0.0882	2.9520	1.8999	4.8519	0.7951	1.7764	2.5714	0.0000	8,827.4460	8,827.4460	1.3758	0.0000	8,861.8409
Maximum	**63.1510**	**71.3560**	**36.6412**	**0.0892**	**7.2470**	**2.9064**	**9.0804**	**3.9263**	**2.6739**	**5.6130**	**0.0000**	**8,981.8878**	**8,981.8878**	**2.2491**	**0.0000**	**9,016.9510**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**51.94**	**0.00**	**44.17**	**56.20**	**0.00**	**42.53**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	5.9756	4.9000e-004	0.0531	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1127	0.1127	3.1000e-004		0.1203
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**5.9756**	**4.9000e-004**	**0.0531**	**0.0000**	**0.0000**	**1.9000e-004**	**1.9000e-004**	**0.0000**	**1.9000e-004**	**1.9000e-004**		**0.1127**	**0.1127**	**3.1000e-004**	**0.0000**	**0.1203**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	5.9756	4.9000e-004	0.0531	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1127	0.1127	3.1000e-004		0.1203
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**5.9756**	**4.9000e-004**	**0.0531**	**0.0000**	**0.0000**	**1.9000e-004**	**1.9000e-004**	**0.0000**	**1.9000e-004**	**1.9000e-004**		**0.1127**	**0.1127**	**3.1000e-004**	**0.0000**	**0.1203**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	5/1/2018	5/14/2018	5	10	
2	Grading	Grading	5/15/2018	6/25/2018	5	30	
3	Building Construction	Building Construction	6/26/2018	5/13/2019	5	230	
4	Paving	Paving	5/14/2019	6/10/2019	5	20	
5	Architectural Coating	Architectural Coating	6/11/2019	7/8/2019	5	20	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 105

Acres of Paving: 5.8

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 393,600; Non-Residential Outdoor: 131,200; Striped Parking Area: 15,148 (Architectural Coating – sqft)

OffRoad Equipment

Brodiaea Warehouse (Construction - Mitigated) - South Coast AQMD Air District, Winter

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	8.00	78	0.48
Site Preparation	Crawler Tractors	4	0.00	212	0.43
Grading	Crawler Tractors	2	8.00	212	0.43
Grading	Excavators	2	8.00	158	0.38
Building Construction	Cranes	1	8.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Paving	Pavers	2	8.00	130	0.42
Paving	Rollers	2	8.00	80	0.38
Building Construction	Crawler Tractors	3	8.00	212	0.43
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Grading	Graders	1	8.00	187	0.41
Grading	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Paving	Paving Equipment	2	8.00	132	0.36
Site Preparation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Building Construction	Welders	1	8.00	46	0.45
Grading	Scrapers	2	8.00	367	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	216.00	84.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	43.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Site Preparation - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	3.4983	37.6799	13.1294	0.0256		1.8317	1.8317		1.6852	1.6852		2,580.5200	2,580.5200	0.8034		2,600.6038
Total	**3.4983**	**37.6799**	**13.1294**	**0.0256**	**18.0663**	**1.8317**	**19.8980**	**9.9307**	**1.6852**	**11.6159**		**2,580.5200**	**2,580.5200**	**0.8034**		**2,600.6038**

3.2 Site Preparation - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1055	0.0762	0.8174	2.0600e-003	0.2012	1.6000e-003	0.2028	0.0534	1.4800e-003	0.0548		205.3223	205.3223	7.0100e-003		205.4974
Total	**0.1055**	**0.0762**	**0.8174**	**2.0600e-003**	**0.2012**	**1.6000e-003**	**0.2028**	**0.0534**	**1.4800e-003**	**0.0548**		**205.3223**	**205.3223**	**7.0100e-003**		**205.4974**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					7.0458	0.0000	7.0458	3.8730	0.0000	3.8730			0.0000			0.0000
Off-Road	3.4983	37.6799	13.1294	0.0256		1.8317	1.8317		1.6852	1.6852	0.0000	2,580.5200	2,580.5200	0.8034		2,600.6038
Total	**3.4983**	**37.6799**	**13.1294**	**0.0256**	**7.0458**	**1.8317**	**8.8776**	**3.8730**	**1.6852**	**5.5581**	**0.0000**	**2,580.5200**	**2,580.5200**	**0.8034**		**2,600.6038**

3.2 Site Preparation - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1055	0.0762	0.8174	2.0600e-003	0.2012	1.6000e-003	0.2028	0.0534	1.4800e-003	0.0548		205.3223	205.3223	7.0100e-003		205.4974
Total	**0.1055**	**0.0762**	**0.8174**	**2.0600e-003**	**0.2012**	**1.6000e-003**	**0.2028**	**0.0534**	**1.4800e-003**	**0.0548**		**205.3223**	**205.3223**	**7.0100e-003**		**205.4974**

3.3 Grading - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.7338	0.0000	9.7338	3.7110	0.0000	3.7110			0.0000			0.0000
Off-Road	5.8386	71.2714	35.7330	0.0715		2.9046	2.9046		2.6723	2.6723		7,199.6723	7,199.6723	2.2414		7,255.7062
Total	**5.8386**	**71.2714**	**35.7330**	**0.0715**	**9.7338**	**2.9046**	**12.6385**	**3.7110**	**2.6723**	**6.3833**		**7,199.6723**	**7,199.6723**	**2.2414**		**7,255.7062**

3.3 Grading - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1172	0.0846	0.9082	2.2900e-003	0.2236	1.7800e-003	0.2253	0.0593	1.6400e-003	0.0609		228.1358	228.1358	7.7800e-003		228.3305
Total	**0.1172**	**0.0846**	**0.9082**	**2.2900e-003**	**0.2236**	**1.7800e-003**	**0.2253**	**0.0593**	**1.6400e-003**	**0.0609**		**228.1358**	**228.1358**	**7.7800e-003**		**228.3305**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.7962	0.0000	3.7962	1.4473	0.0000	1.4473			0.0000			0.0000
Off-Road	5.8386	71.2714	35.7330	0.0715		2.9046	2.9046		2.6723	2.6723	0.0000	7,199.6723	7,199.6723	2.2414		7,255.7062
Total	**5.8386**	**71.2714**	**35.7330**	**0.0715**	**3.7962**	**2.9046**	**6.7008**	**1.4473**	**2.6723**	**4.1196**	**0.0000**	**7,199.6723**	**7,199.6723**	**2.2414**		**7,255.7062**

3.3 Grading - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1172	0.0846	0.9082	2.2900e-003	0.2236	1.7800e-003	0.2253	0.0593	1.6400e-003	0.0609		228.1358	228.1358	7.7800e-003		228.3305
Total	**0.1172**	**0.0846**	**0.9082**	**2.2900e-003**	**0.2236**	**1.7800e-003**	**0.2253**	**0.0593**	**1.6400e-003**	**0.0609**		**228.1358**	**228.1358**	**7.7800e-003**		**228.3305**

3.4 Building Construction - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.9734	42.8532	19.7374	0.0430		2.0130	2.0130		1.8820	1.8820		4,243.6666	4,243.6666	1.1473		4,272.3492
Total	**3.9734**	**42.8532**	**19.7374**	**0.0430**		**2.0130**	**2.0130**		**1.8820**	**1.8820**		**4,243.6666**	**4,243.6666**	**1.1473**		**4,272.3492**

3.4 Building Construction - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.3730	10.1965	2.8141	0.0214	0.5376	0.0755	0.6131	0.1548	0.0722	0.2270		2,274.3541	2,274.3541	0.1712		2,278.6328
Worker	1.2654	0.9141	9.8084	0.0248	2.4144	0.0193	2.4336	0.6403	0.0177	0.6580		2,463.8671	2,463.8671	0.0841		2,465.9690
Total	**1.6385**	**11.1106**	**12.6226**	**0.0461**	**2.9520**	**0.0948**	**3.0468**	**0.7951**	**0.0900**	**0.8851**		**4,738.2212**	**4,738.2212**	**0.2552**		**4,744.6018**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.9734	42.8532	19.7374	0.0430		2.0130	2.0130		1.8820	1.8820	0.0000	4,243.6666	4,243.6666	1.1473		4,272.3492
Total	**3.9734**	**42.8532**	**19.7374**	**0.0430**		**2.0130**	**2.0130**		**1.8820**	**1.8820**	**0.0000**	**4,243.6666**	**4,243.6666**	**1.1473**		**4,272.3492**

3.4 Building Construction - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.3730	10.1965	2.8141	0.0214	0.5376	0.0755	0.6131	0.1548	0.0722	0.2270		2,274.3541	2,274.3541	0.1712		2,278.6328
Worker	1.2654	0.9141	9.8084	0.0248	2.4144	0.0193	2.4336	0.6403	0.0177	0.6580		2,463.8671	2,463.8671	0.0841		2,465.9690
Total	**1.6385**	**11.1106**	**12.6226**	**0.0461**	**2.9520**	**0.0948**	**3.0468**	**0.7951**	**0.0900**	**0.8851**		**4,738.2212**	**4,738.2212**	**0.2552**		**4,744.6018**

3.4 Building Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.6440	39.6763	19.1447	0.0430		1.8165	1.8165		1.6972	1.6972		4,187.5330	4,187.5330	1.1363		4,215.9399
Total	**3.6440**	**39.6763**	**19.1447**	**0.0430**		**1.8165**	**1.8165**		**1.6972**	**1.6972**		**4,187.5330**	**4,187.5330**	**1.1363**		**4,215.9399**

3.4 Building Construction - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.3383	9.6184	2.5877	0.0212	0.5376	0.0647	0.6023	0.1548	0.0619	0.2166		2,253.8567	2,253.8567	0.1650		2,257.9810
Worker	1.1518	0.8063	8.7563	0.0240	2.4144	0.0188	2.4332	0.6403	0.0173	0.6576		2,386.0564	2,386.0564	0.0746		2,387.9201
Total	**1.4901**	**10.4247**	**11.3440**	**0.0451**	**2.9520**	**0.0835**	**3.0355**	**0.7951**	**0.0792**	**0.8743**		**4,639.9131**	**4,639.9131**	**0.2395**		**4,645.9011**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.6440	39.6763	19.1447	0.0430		1.8165	1.8165		1.6972	1.6972	0.0000	4,187.5330	4,187.5330	1.1363		4,215.9399
Total	**3.6440**	**39.6763**	**19.1447**	**0.0430**		**1.8165**	**1.8165**		**1.6972**	**1.6972**	**0.0000**	**4,187.5330**	**4,187.5330**	**1.1363**		**4,215.9399**

3.4 Building Construction - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.3383	9.6184	2.5877	0.0212	0.5376	0.0647	0.6023	0.1548	0.0619	0.2166		2,253.8567	2,253.8567	0.1650		2,257.9810
Worker	1.1518	0.8063	8.7563	0.0240	2.4144	0.0188	2.4332	0.6403	0.0173	0.6576		2,386.0564	2,386.0564	0.0746		2,387.9201
Total	**1.4901**	**10.4247**	**11.3440**	**0.0451**	**2.9520**	**0.0835**	**3.0355**	**0.7951**	**0.0792**	**0.8743**		**4,639.9131**	**4,639.9131**	**0.2395**		**4,645.9011**

3.5 Paving - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4544	15.2441	14.6648	0.0228		0.8246	0.8246		0.7586	0.7586		2,257.0025	2,257.0025	0.7141		2,274.8548
Paving	0.7598					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.2142**	**15.2441**	**14.6648**	**0.0228**		**0.8246**	**0.8246**		**0.7586**	**0.7586**		**2,257.0025**	**2,257.0025**	**0.7141**		**2,274.8548**

3.5 Paving - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0800	0.0560	0.6081	1.6600e-003	0.1677	1.3000e-003	0.1690	0.0445	1.2000e-003	0.0457		165.6984	165.6984	5.1800e-003		165.8278
Total	**0.0800**	**0.0560**	**0.6081**	**1.6600e-003**	**0.1677**	**1.3000e-003**	**0.1690**	**0.0445**	**1.2000e-003**	**0.0457**		**165.6984**	**165.6984**	**5.1800e-003**		**165.8278**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4544	15.2441	14.6648	0.0228		0.8246	0.8246		0.7586	0.7586	0.0000	2,257.0025	2,257.0025	0.7141		2,274.8548
Paving	0.7598					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.2142**	**15.2441**	**14.6648**	**0.0228**		**0.8246**	**0.8246**		**0.7586**	**0.7586**	**0.0000**	**2,257.0025**	**2,257.0025**	**0.7141**		**2,274.8548**

3.5 Paving - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0800	0.0560	0.6081	1.6600e-003	0.1677	1.3000e-003	0.1690	0.0445	1.2000e-003	0.0457		165.6984	165.6984	5.1800e-003		165.8278
Total	**0.0800**	**0.0560**	**0.6081**	**1.6600e-003**	**0.1677**	**1.3000e-003**	**0.1690**	**0.0445**	**1.2000e-003**	**0.0457**		**165.6984**	**165.6984**	**5.1800e-003**		**165.8278**

3.6 Architectural Coating - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	62.5665					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.3553	2.4472	2.4551	3.9600e-003		0.1717	0.1717		0.1717	0.1717		375.2641	375.2641	0.0317		376.0565
Total	**62.9217**	**2.4472**	**2.4551**	**3.9600e-003**		**0.1717**	**0.1717**		**0.1717**	**0.1717**		**375.2641**	**375.2641**	**0.0317**		**376.0565**

3.6 Architectural Coating - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2293	0.1605	1.7432	4.7700e-003	0.4806	3.7400e-003	0.4844	0.1275	3.4500e-003	0.1309		475.0020	475.0020	0.0148		475.3730
Total	**0.2293**	**0.1605**	**1.7432**	**4.7700e-003**	**0.4806**	**3.7400e-003**	**0.4844**	**0.1275**	**3.4500e-003**	**0.1309**		**475.0020**	**475.0020**	**0.0148**		**475.3730**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	62.5665					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.3553	2.4472	2.4551	3.9600e-003		0.1717	0.1717		0.1717	0.1717	0.0000	375.2641	375.2641	0.0317		376.0565
Total	**62.9217**	**2.4472**	**2.4551**	**3.9600e-003**		**0.1717**	**0.1717**		**0.1717**	**0.1717**	**0.0000**	**375.2641**	**375.2641**	**0.0317**		**376.0565**

3.6 Architectural Coating - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2293	0.1605	1.7432	4.7700e-003	0.4806	3.7400e-003	0.4844	0.1275	3.4500e-003	0.1309		475.0020	475.0020	0.0148		475.3730
Total	**0.2293**	**0.1605**	**1.7432**	**4.7700e-003**	**0.4806**	**3.7400e-003**	**0.4844**	**0.1275**	**3.4500e-003**	**0.1309**		**475.0020**	**475.0020**	**0.0148**		**475.3730**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Parking Lot	0.00	0.00	0.00		
Unrefrigerated Warehouse-No Rail	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Parking Lot	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0
Unrefrigerated Warehouse-No Rail	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Parking Lot	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Unrefrigerated Warehouse-No Rail	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	5.9756	4.9000e-004	0.0531	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1127	0.1127	3.1000e-004		0.1203
Unmitigated	5.9756	4.9000e-004	0.0531	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1127	0.1127	3.1000e-004		0.1203

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.6857					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	5.2849					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.0300e-003	4.9000e-004	0.0531	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1127	0.1127	3.1000e-004		0.1203
Total	**5.9756**	**4.9000e-004**	**0.0531**	**0.0000**		**1.9000e-004**	**1.9000e-004**		**1.9000e-004**	**1.9000e-004**		**0.1127**	**0.1127**	**3.1000e-004**		**0.1203**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.6857					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	5.2849					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.0300e-003	4.9000e-004	0.0531	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1127	0.1127	3.1000e-004		0.1203
Total	**5.9756**	**4.9000e-004**	**0.0531**	**0.0000**		**1.9000e-004**	**1.9000e-004**		**1.9000e-004**	**1.9000e-004**		**0.1127**	**0.1127**	**3.1000e-004**		**0.1203**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Brodiaea Warehouse (Construction - Mitigated)

South Coast AQMD Air District, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Unrefrigerated Warehouse-No Rail	262.40	1000sqft	6.02	262,400.00	0
Parking Lot	252.46	1000sqft	5.80	252,460.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	10			**Operational Year**	2019
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Construction schedule adjusted as per Client.

Off-road Equipment - Crawler Tractors used in lieu of Tractors/Loaders/Backhoes.

Off-road Equipment - Crawler Tractors used in lieu of Tractors/Loaders/Backhoes.

Off-road Equipment - Crawler Tractors used in lieu of Tractors/Loaders/Backhoes.

Off-road Equipment -

Off-road Equipment - Hours are based on an 8-hour workday.

Grading -

Vehicle Trips - Construction (Unmitigated) Run Only.

Fleet Mix - Construction (Unmitigated) Run Only.

Energy Use - Construction (Unmitigated) Run Only.

Water And Wastewater - Construction (Unmitigated) Run Only.

Solid Waste - Construction (Unmitigated) Run Only.

Construction Off-road Equipment Mitigation -

Architectural Coating - Use Low VOC Paint (50 g/L)

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	100.00	50.00
tblArchitecturalCoating	EF_Nonresidential_Interior	100.00	50.00
tblArchitecturalCoating	EF_Parking	100.00	50.00
tblConstructionPhase	NumDays	300.00	230.00
tblConstructionPhase	PhaseEndDate	11/11/2019	7/8/2019
tblConstructionPhase	PhaseEndDate	9/16/2019	5/13/2019
tblConstructionPhase	PhaseEndDate	7/23/2018	6/25/2018
tblConstructionPhase	PhaseEndDate	10/14/2019	6/10/2019
tblConstructionPhase	PhaseEndDate	6/11/2018	5/14/2018

tblConstructionPhase	PhaseStartDate	10/15/2019	6/11/2019
tblConstructionPhase	PhaseStartDate	7/24/2018	6/26/2018
tblConstructionPhase	PhaseStartDate	6/12/2018	5/15/2018
tblConstructionPhase	PhaseStartDate	9/17/2019	5/14/2019
tblConstructionPhase	PhaseStartDate	5/29/2018	5/1/2018
tblEnergyUse	LightingElect	0.35	0.00
tblEnergyUse	LightingElect	1.17	0.00
tblEnergyUse	NT24E	0.82	0.00
tblEnergyUse	NT24NG	0.03	0.00
tblEnergyUse	T24E	0.37	0.00
tblEnergyUse	T24NG	2.00	0.00
tblFleetMix	HHD	0.03	0.00
tblFleetMix	HHD	0.03	0.00
tblFleetMix	LDA	0.55	1.00
tblFleetMix	LDA	0.55	1.00
tblFleetMix	LDT1	0.04	0.00
tblFleetMix	LDT1	0.04	0.00
tblFleetMix	LDT2	0.20	0.00
tblFleetMix	LDT2	0.20	0.00
tblFleetMix	LHD1	0.02	0.00
tblFleetMix	LHD1	0.02	0.00
tblFleetMix	LHD2	5.8700e-003	0.00
tblFleetMix	LHD2	5.8700e-003	0.00
tblFleetMix	MCY	4.7240e-003	0.00
tblFleetMix	MCY	4.7240e-003	0.00
tblFleetMix	MDV	0.12	0.00
tblFleetMix	MDV	0.12	0.00

tblFleetMix	MH	9.9100e-004	0.00
tblFleetMix	MH	9.9100e-004	0.00
tblFleetMix	MHD	0.02	0.00
tblFleetMix	MHD	0.02	0.00
tblFleetMix	OBUS	1.9990e-003	0.00
tblFleetMix	OBUS	1.9990e-003	0.00
tblFleetMix	SBUS	7.0400e-004	0.00
tblFleetMix	SBUS	7.0400e-004	0.00
tblFleetMix	UBUS	2.0270e-003	0.00
tblFleetMix	UBUS	2.0270e-003	0.00
tblOffRoadEquipment	OffRoadEquipmentType		Crawler Tractors
tblOffRoadEquipment	OffRoadEquipmentType		Crawler Tractors
tblOffRoadEquipment	OffRoadEquipmentType		Crawler Tractors
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblSolidWaste	SolidWasteGenerationRate	246.66	0.00
tblVehicleTrips	CC_TL	8.40	0.00
tblVehicleTrips	CC_TL	8.40	0.00
tblVehicleTrips	CNW_TL	6.90	0.00
tblVehicleTrips	CNW_TL	6.90	0.00
tblVehicleTrips	CNW_TTP	41.00	0.00
tblVehicleTrips	CW_TL	16.60	0.00
tblVehicleTrips	CW_TL	16.60	0.00

tblVehicleTrips	CW_TTP	59.00	0.00
tblVehicleTrips	DV_TP	5.00	0.00
tblVehicleTrips	PB_TP	3.00	0.00
tblVehicleTrips	PR_TP	92.00	0.00
tblVehicleTrips	ST_TR	1.68	0.00
tblVehicleTrips	SU_TR	1.68	0.00
tblVehicleTrips	WD_TR	1.68	0.00
tblWater	IndoorWaterUseRate	60,680,000.00	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	5.9464	71.3487	36.7365	0.0915	18.2675	2.9064	20.1008	9.9840	2.6739	11.6707	0.0000	9,218.1937	9,218.1937	2.2497	0.0000	9,253.1042
2019	63.1323	50.0240	31.1739	0.0904	2.9520	1.8989	4.8509	0.7951	1.7754	2.5705	0.0000	9,058.7148	9,058.7148	1.3696	0.0000	9,092.9543
Maximum	**63.1323**	**71.3487**	**36.7365**	**0.0915**	**18.2675**	**2.9064**	**20.1008**	**9.9840**	**2.6739**	**11.6707**	**0.0000**	**9,218.1937**	**9,218.1937**	**2.2497**	**0.0000**	**9,253.1042**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	5.9464	71.3487	36.7365	0.0915	7.2470	2.9064	9.0804	3.9263	2.6739	5.6130	0.0000	9,218.1937	9,218.1937	2.2497	0.0000	9,253.1042
2019	63.1323	50.0240	31.1739	0.0904	2.9520	1.8989	4.8509	0.7951	1.7754	2.5705	0.0000	9,058.7148	9,058.7148	1.3696	0.0000	9,092.9543
Maximum	**63.1323**	**71.3487**	**36.7365**	**0.0915**	**7.2470**	**2.9064**	**9.0804**	**3.9263**	**2.6739**	**5.6130**	**0.0000**	**9,218.1937**	**9,218.1937**	**2.2497**	**0.0000**	**9,253.1042**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**51.94**	**0.00**	**44.17**	**56.20**	**0.00**	**42.54**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	5.9756	4.9000e-004	0.0531	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1127	0.1127	3.1000e-004		0.1203
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**5.9756**	**4.9000e-004**	**0.0531**	**0.0000**	**0.0000**	**1.9000e-004**	**1.9000e-004**	**0.0000**	**1.9000e-004**	**1.9000e-004**		**0.1127**	**0.1127**	**3.1000e-004**	**0.0000**	**0.1203**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	5.9756	4.9000e-004	0.0531	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1127	0.1127	3.1000e-004		0.1203
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**5.9756**	**4.9000e-004**	**0.0531**	**0.0000**	**0.0000**	**1.9000e-004**	**1.9000e-004**	**0.0000**	**1.9000e-004**	**1.9000e-004**		**0.1127**	**0.1127**	**3.1000e-004**	**0.0000**	**0.1203**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	5/1/2018	5/14/2018	5	10	
2	Grading	Grading	5/15/2018	6/25/2018	5	30	
3	Building Construction	Building Construction	6/26/2018	5/13/2019	5	230	
4	Paving	Paving	5/14/2019	6/10/2019	5	20	
5	Architectural Coating	Architectural Coating	6/11/2019	7/8/2019	5	20	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 105

Acres of Paving: 5.8

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 393,600; Non-Residential Outdoor: 131,200; Striped Parking Area: 15,148 (Architectural Coating – sqft)

OffRoad Equipment

Brodiaea Warehouse (Construction - Mitigated) - South Coast AQMD Air District, Summer

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	8.00	78	0.48
Site Preparation	Crawler Tractors	4	0.00	212	0.43
Grading	Crawler Tractors	2	8.00	212	0.43
Grading	Excavators	2	8.00	158	0.38
Building Construction	Cranes	1	8.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Paving	Pavers	2	8.00	130	0.42
Paving	Rollers	2	8.00	80	0.38
Building Construction	Crawler Tractors	3	8.00	212	0.43
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Grading	Graders	1	8.00	187	0.41
Grading	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Paving	Paving Equipment	2	8.00	132	0.36
Site Preparation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Building Construction	Welders	1	8.00	46	0.45
Grading	Scrapers	2	8.00	367	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	216.00	84.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	43.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Site Preparation - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	3.4983	37.6799	13.1294	0.0256		1.8317	1.8317		1.6852	1.6852		2,580.5200	2,580.5200	0.8034		2,600.6038
Total	**3.4983**	**37.6799**	**13.1294**	**0.0256**	**18.0663**	**1.8317**	**19.8980**	**9.9307**	**1.6852**	**11.6159**		**2,580.5200**	**2,580.5200**	**0.8034**		**2,600.6038**

3.2 Site Preparation - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0970	0.0695	0.9032	2.2100e-003	0.2012	1.6000e-003	0.2028	0.0534	1.4800e-003	0.0548		219.4833	219.4833	7.4800e-003		219.6704
Total	**0.0970**	**0.0695**	**0.9032**	**2.2100e-003**	**0.2012**	**1.6000e-003**	**0.2028**	**0.0534**	**1.4800e-003**	**0.0548**		**219.4833**	**219.4833**	**7.4800e-003**		**219.6704**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					7.0458	0.0000	7.0458	3.8730	0.0000	3.8730			0.0000			0.0000
Off-Road	3.4983	37.6799	13.1294	0.0256		1.8317	1.8317		1.6852	1.6852	0.0000	2,580.5200	2,580.5200	0.8034		2,600.6038
Total	**3.4983**	**37.6799**	**13.1294**	**0.0256**	**7.0458**	**1.8317**	**8.8776**	**3.8730**	**1.6852**	**5.5581**	**0.0000**	**2,580.5200**	**2,580.5200**	**0.8034**		**2,600.6038**

3.2 Site Preparation - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0970	0.0695	0.9032	2.2100e-003	0.2012	1.6000e-003	0.2028	0.0534	1.4800e-003	0.0548		219.4833	219.4833	7.4800e-003		219.6704
Total	**0.0970**	**0.0695**	**0.9032**	**2.2100e-003**	**0.2012**	**1.6000e-003**	**0.2028**	**0.0534**	**1.4800e-003**	**0.0548**		**219.4833**	**219.4833**	**7.4800e-003**		**219.6704**

3.3 Grading - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.7338	0.0000	9.7338	3.7110	0.0000	3.7110			0.0000			0.0000
Off-Road	5.8386	71.2714	35.7330	0.0715		2.9046	2.9046		2.6723	2.6723		7,199.6723	7,199.6723	2.2414		7,255.7062
Total	**5.8386**	**71.2714**	**35.7330**	**0.0715**	**9.7338**	**2.9046**	**12.6385**	**3.7110**	**2.6723**	**6.3833**		**7,199.6723**	**7,199.6723**	**2.2414**		**7,255.7062**

3.3 Grading - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1078	0.0773	1.0035	2.4500e-003	0.2236	1.7800e-003	0.2253	0.0593	1.6400e-003	0.0609		243.8703	243.8703	8.3200e-003		244.0782
Total	**0.1078**	**0.0773**	**1.0035**	**2.4500e-003**	**0.2236**	**1.7800e-003**	**0.2253**	**0.0593**	**1.6400e-003**	**0.0609**		**243.8703**	**243.8703**	**8.3200e-003**		**244.0782**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.7962	0.0000	3.7962	1.4473	0.0000	1.4473			0.0000			0.0000
Off-Road	5.8386	71.2714	35.7330	0.0715		2.9046	2.9046		2.6723	2.6723	0.0000	7,199.6723	7,199.6723	2.2414		7,255.7062
Total	**5.8386**	**71.2714**	**35.7330**	**0.0715**	**3.7962**	**2.9046**	**6.7008**	**1.4473**	**2.6723**	**4.1196**	**0.0000**	**7,199.6723**	**7,199.6723**	**2.2414**		**7,255.7062**

3.3 Grading - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1078	0.0773	1.0035	2.4500e-003	0.2236	1.7800e-003	0.2253	0.0593	1.6400e-003	0.0609		243.8703	243.8703	8.3200e-003		244.0782
Total	**0.1078**	**0.0773**	**1.0035**	**2.4500e-003**	**0.2236**	**1.7800e-003**	**0.2253**	**0.0593**	**1.6400e-003**	**0.0609**		**243.8703**	**243.8703**	**8.3200e-003**		**244.0782**

3.4 Building Construction - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.9734	42.8532	19.7374	0.0430		2.0130	2.0130		1.8820	1.8820		4,243.6666	4,243.6666	1.1473		4,272.3492
Total	**3.9734**	**42.8532**	**19.7374**	**0.0430**		**2.0130**	**2.0130**		**1.8820**	**1.8820**		**4,243.6666**	**4,243.6666**	**1.1473**		**4,272.3492**

3.4 Building Construction - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.3574	10.1795	2.5351	0.0220	0.5376	0.0744	0.6120	0.1548	0.0712	0.2259		2,340.7275	2,340.7275	0.1593		2,344.7102
Worker	1.1639	0.8344	10.8380	0.0265	2.4144	0.0193	2.4336	0.6403	0.0177	0.6580		2,633.7996	2,633.7996	0.0898		2,636.0448
Total	**1.5213**	**11.0139**	**13.3730**	**0.0485**	**2.9520**	**0.0936**	**3.0456**	**0.7951**	**0.0889**	**0.8840**		**4,974.5271**	**4,974.5271**	**0.2491**		**4,980.7550**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.9734	42.8532	19.7374	0.0430		2.0130	2.0130		1.8820	1.8820	0.0000	4,243.6666	4,243.6666	1.1473		4,272.3492
Total	**3.9734**	**42.8532**	**19.7374**	**0.0430**		**2.0130**	**2.0130**		**1.8820**	**1.8820**	**0.0000**	**4,243.6666**	**4,243.6666**	**1.1473**		**4,272.3492**

3.4 Building Construction - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.3574	10.1795	2.5351	0.0220	0.5376	0.0744	0.6120	0.1548	0.0712	0.2259		2,340.7275	2,340.7275	0.1593		2,344.7102
Worker	1.1639	0.8344	10.8380	0.0265	2.4144	0.0193	2.4336	0.6403	0.0177	0.6580		2,633.7996	2,633.7996	0.0898		2,636.0448
Total	**1.5213**	**11.0139**	**13.3730**	**0.0485**	**2.9520**	**0.0936**	**3.0456**	**0.7951**	**0.0889**	**0.8840**		**4,974.5271**	**4,974.5271**	**0.2491**		**4,980.7550**

3.4 Building Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.6440	39.6763	19.1447	0.0430		1.8165	1.8165		1.6972	1.6972		4,187.5330	4,187.5330	1.1363		4,215.9399
Total	**3.6440**	**39.6763**	**19.1447**	**0.0430**		**1.8165**	**1.8165**		**1.6972**	**1.6972**		**4,187.5330**	**4,187.5330**	**1.1363**		**4,215.9399**

3.4 Building Construction - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.3238	9.6116	2.3235	0.0218	0.5376	0.0637	0.6013	0.1548	0.0609	0.2157		2,320.2455	2,320.2455	0.1535		2,324.0836
Worker	1.0579	0.7361	9.7057	0.0256	2.4144	0.0188	2.4332	0.6403	0.0173	0.6576		2,550.9363	2,550.9363	0.0798		2,552.9308
Total	**1.3817**	**10.3477**	**12.0292**	**0.0474**	**2.9520**	**0.0825**	**3.0344**	**0.7951**	**0.0782**	**0.8733**		**4,871.1818**	**4,871.1818**	**0.2333**		**4,877.0144**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.6440	39.6763	19.1447	0.0430		1.8165	1.8165		1.6972	1.6972	0.0000	4,187.5330	4,187.5330	1.1363		4,215.9399
Total	**3.6440**	**39.6763**	**19.1447**	**0.0430**		**1.8165**	**1.8165**		**1.6972**	**1.6972**	**0.0000**	**4,187.5330**	**4,187.5330**	**1.1363**		**4,215.9399**

3.4 Building Construction - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.3238	9.6116	2.3235	0.0218	0.5376	0.0637	0.6013	0.1548	0.0609	0.2157		2,320.2455	2,320.2455	0.1535		2,324.0836
Worker	1.0579	0.7361	9.7057	0.0256	2.4144	0.0188	2.4332	0.6403	0.0173	0.6576		2,550.9363	2,550.9363	0.0798		2,552.9308
Total	**1.3817**	**10.3477**	**12.0292**	**0.0474**	**2.9520**	**0.0825**	**3.0344**	**0.7951**	**0.0782**	**0.8733**		**4,871.1818**	**4,871.1818**	**0.2333**		**4,877.0144**

3.5 Paving - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4544	15.2441	14.6648	0.0228		0.8246	0.8246		0.7586	0.7586		2,257.0025	2,257.0025	0.7141		2,274.8548
Paving	0.7598					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.2142**	**15.2441**	**14.6648**	**0.0228**		**0.8246**	**0.8246**		**0.7586**	**0.7586**		**2,257.0025**	**2,257.0025**	**0.7141**		**2,274.8548**

3.5 Paving - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0735	0.0511	0.6740	1.7800e-003	0.1677	1.3000e-003	0.1690	0.0445	1.2000e-003	0.0457		177.1484	177.1484	5.5400e-003		177.2869
Total	**0.0735**	**0.0511**	**0.6740**	**1.7800e-003**	**0.1677**	**1.3000e-003**	**0.1690**	**0.0445**	**1.2000e-003**	**0.0457**		**177.1484**	**177.1484**	**5.5400e-003**		**177.2869**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4544	15.2441	14.6648	0.0228		0.8246	0.8246		0.7586	0.7586	0.0000	2,257.0025	2,257.0025	0.7141		2,274.8548
Paving	0.7598					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.2142**	**15.2441**	**14.6648**	**0.0228**		**0.8246**	**0.8246**		**0.7586**	**0.7586**	**0.0000**	**2,257.0025**	**2,257.0025**	**0.7141**		**2,274.8548**

3.5 Paving - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0735	0.0511	0.6740	1.7800e-003	0.1677	1.3000e-003	0.1690	0.0445	1.2000e-003	0.0457		177.1484	177.1484	5.5400e-003		177.2869
Total	**0.0735**	**0.0511**	**0.6740**	**1.7800e-003**	**0.1677**	**1.3000e-003**	**0.1690**	**0.0445**	**1.2000e-003**	**0.0457**		**177.1484**	**177.1484**	**5.5400e-003**		**177.2869**

3.6 Architectural Coating - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	62.5665					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.3553	2.4472	2.4551	3.9600e-003		0.1717	0.1717		0.1717	0.1717		375.2641	375.2641	0.0317		376.0565
Total	**62.9217**	**2.4472**	**2.4551**	**3.9600e-003**		**0.1717**	**0.1717**		**0.1717**	**0.1717**		**375.2641**	**375.2641**	**0.0317**		**376.0565**

3.6 Architectural Coating - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2106	0.1466	1.9322	5.1000e-003	0.4806	3.7400e-003	0.4844	0.1275	3.4500e-003	0.1309		507.8253	507.8253	0.0159		508.2223
Total	**0.2106**	**0.1466**	**1.9322**	**5.1000e-003**	**0.4806**	**3.7400e-003**	**0.4844**	**0.1275**	**3.4500e-003**	**0.1309**		**507.8253**	**507.8253**	**0.0159**		**508.2223**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	62.5665					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.3553	2.4472	2.4551	3.9600e-003		0.1717	0.1717		0.1717	0.1717	0.0000	375.2641	375.2641	0.0317		376.0565
Total	**62.9217**	**2.4472**	**2.4551**	**3.9600e-003**		**0.1717**	**0.1717**		**0.1717**	**0.1717**	**0.0000**	**375.2641**	**375.2641**	**0.0317**		**376.0565**

3.6 Architectural Coating - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2106	0.1466	1.9322	5.1000e-003	0.4806	3.7400e-003	0.4844	0.1275	3.4500e-003	0.1309		507.8253	507.8253	0.0159		508.2223
Total	**0.2106**	**0.1466**	**1.9322**	**5.1000e-003**	**0.4806**	**3.7400e-003**	**0.4844**	**0.1275**	**3.4500e-003**	**0.1309**		**507.8253**	**507.8253**	**0.0159**		**508.2223**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Parking Lot	0.00	0.00	0.00		
Unrefrigerated Warehouse-No Rail	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Parking Lot	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0
Unrefrigerated Warehouse-No Rail	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Parking Lot	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Unrefrigerated Warehouse-No Rail	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	5.9756	4.9000e-004	0.0531	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1127	0.1127	3.1000e-004		0.1203
Unmitigated	5.9756	4.9000e-004	0.0531	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1127	0.1127	3.1000e-004		0.1203

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.6857					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	5.2849					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.0300e-003	4.9000e-004	0.0531	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1127	0.1127	3.1000e-004		0.1203
Total	**5.9756**	**4.9000e-004**	**0.0531**	**0.0000**		**1.9000e-004**	**1.9000e-004**		**1.9000e-004**	**1.9000e-004**		**0.1127**	**0.1127**	**3.1000e-004**		**0.1203**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.6857					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	5.2849					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.0300e-003	4.9000e-004	0.0531	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1127	0.1127	3.1000e-004		0.1203
Total	**5.9756**	**4.9000e-004**	**0.0531**	**0.0000**		**1.9000e-004**	**1.9000e-004**		**1.9000e-004**	**1.9000e-004**		**0.1127**	**0.1127**	**3.1000e-004**		**0.1203**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

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APPENDIX 3.3:

CALEEMOD OPERATIONAL EMISSIONS MODEL OUTPUTS (TRUCKS)

Brodiaea Warehouse (Operations - Trucks)

South Coast AQMD Air District, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Unrefrigerated Warehouse-No Rail	262.40	1000sqft	6.02	262,400.00	0
Parking Lot	252.46	1000sqft	5.80	252,460.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	10			**Operational Year**	2019
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Brodiaea Warehouse (Operations - Trucks) - South Coast AQMD Air District, Summer

Project Characteristics -

Land Use -

Construction Phase - Operations (Truck) Run Only.

Off-road Equipment - Operations (Truck) Run Only.

Trips and VMT - Operations (Truck) Run Only.

Architectural Coating -

Vehicle Trips - Operations (Passenger Car) Run Only. Trip Rates based on ITE 9th Edition.

Fleet Mix - Operations (Truck) Run Only.

Energy Use -

Water And Wastewater -

Solid Waste -

Operational Off-Road Equipment - Operational equipment provided by the Client.

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	10.00	1.00
tblConstructionPhase	PhaseEndDate	5/14/2018	5/1/2018
tblFleetMix	HHD	0.03	0.60
tblFleetMix	LDA	0.55	0.00
tblFleetMix	LDT1	0.04	0.00
tblFleetMix	LDT2	0.20	0.00
tblFleetMix	LHD1	0.02	0.22
tblFleetMix	LHD2	5.8700e-003	0.00
tblFleetMix	MCY	4.7240e-003	0.00
tblFleetMix	MDV	0.12	0.00
tblFleetMix	MH	9.9100e-004	0.00
tblFleetMix	MHD	0.02	0.18
tblFleetMix	OBUS	1.9990e-003	0.00

tblFleetMix	SBUS	7.0400e-004	0.00
tblFleetMix	UBUS	2.0270e-003	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOperationalOffRoadEquipment	OperHoursPerDay	8.00	4.00
tblOperationalOffRoadEquipment	OperHoursPerDay	8.00	4.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00
tblVehicleTrips	CNW_TTP	41.00	0.00
tblVehicleTrips	CW_TL	16.60	61.00
tblVehicleTrips	CW_TTP	59.00	100.00
tblVehicleTrips	DV_TP	5.00	0.00
tblVehicleTrips	PB_TP	3.00	0.00
tblVehicleTrips	PR_TP	92.00	100.00
tblVehicleTrips	ST_TR	1.68	0.64
tblVehicleTrips	SU_TR	1.68	0.64
tblVehicleTrips	WD_TR	1.68	0.64

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	5.9756	4.9000e-004	0.0531	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1127	0.1127	3.1000e-004		0.1203
Energy	0.0157	0.1431	0.1202	8.6000e-004		0.0109	0.0109		0.0109	0.0109		171.6912	171.6912	3.2900e-003	3.1500e-003	172.7115
Mobile	3.1583	86.0575	24.0800	0.2932	9.0800	0.6615	9.7415	2.5486	0.6327	3.1813		31,295.5855	31,295.5855	1.4830		31,332.6615
Offroad	0.1964	1.8828	1.7484	2.3200e-003		0.1333	0.1333		0.1227	0.1227		229.4311	229.4311	0.0726		231.2459
Total	**9.3461**	**88.0839**	**26.0017**	**0.2964**	**9.0800**	**0.8059**	**9.8859**	**2.5486**	**0.7664**	**3.3150**		**31,696.8206**	**31,696.8206**	**1.5592**	**3.1500e-003**	**31,736.7391**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	5.9756	4.9000e-004	0.0531	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1127	0.1127	3.1000e-004		0.1203
Energy	0.0157	0.1431	0.1202	8.6000e-004		0.0109	0.0109		0.0109	0.0109		171.6912	171.6912	3.2900e-003	3.1500e-003	172.7115
Mobile	3.1583	86.0575	24.0800	0.2932	9.0800	0.6615	9.7415	2.5486	0.6327	3.1813		31,295.5855	31,295.5855	1.4830		31,332.6615
Offroad	0.1964	1.8828	1.7484	2.3200e-003		0.1333	0.1333		0.1227	0.1227		229.4311	229.4311	0.0726		231.2459
Total	**9.3461**	**88.0839**	**26.0017**	**0.2964**	**9.0800**	**0.8059**	**9.8859**	**2.5486**	**0.7664**	**3.3150**		**31,696.8206**	**31,696.8206**	**1.5592**	**3.1500e-003**	**31,736.7391**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	5/1/2018	5/1/2018	5	1	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 5.8

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Site Preparation	Rubber Tired Dozers	0	8.00	247	0.40

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	0	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Site Preparation - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.2 Site Preparation - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.2 Site Preparation - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	3.1583	86.0575	24.0800	0.2932	9.0800	0.6615	9.7415	2.5486	0.6327	3.1813		31,295.5855	31,295.5855	1.4830		31,332.6615
Unmitigated	3.1583	86.0575	24.0800	0.2932	9.0800	0.6615	9.7415	2.5486	0.6327	3.1813		31,295.5855	31,295.5855	1.4830		31,332.6615

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Parking Lot	0.00	0.00	0.00		
Unrefrigerated Warehouse-No Rail	167.94	167.94	167.94	3,728,851	3,728,851
Total	167.94	167.94	167.94	3,728,851	3,728,851

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Unrefrigerated Warehouse-No Rail	61.00	8.40	6.90	100.00	0.00	0.00	100	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Parking Lot	0.546418	0.044132	0.199182	0.124467	0.017484	0.005870	0.020172	0.031831	0.001999	0.002027	0.004724	0.000704	0.000991
Unrefrigerated Warehouse-No Rail	0.000000	0.000000	0.000000	0.000000	0.220000	0.000000	0.180000	0.600000	0.000000	0.000000	0.000000	0.000000	0.000000

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0157	0.1431	0.1202	8.6000e-004		0.0109	0.0109		0.0109	0.0109		171.6912	171.6912	3.2900e-003	3.1500e-003	172.7115
NaturalGas Unmitigated	0.0157	0.1431	0.1202	8.6000e-004		0.0109	0.0109		0.0109	0.0109		171.6912	171.6912	3.2900e-003	3.1500e-003	172.7115

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	1459.38	0.0157	0.1431	0.1202	8.6000e-004		0.0109	0.0109		0.0109	0.0109		171.6912	171.6912	3.2900e-003	3.1500e-003	172.7115
Total		**0.0157**	**0.1431**	**0.1202**	**8.6000e-004**		**0.0109**	**0.0109**		**0.0109**	**0.0109**		**171.6912**	**171.6912**	**3.2900e-003**	**3.1500e-003**	**172.7115**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	1.45938	0.0157	0.1431	0.1202	8.6000e-004		0.0109	0.0109		0.0109	0.0109		171.6912	171.6912	3.2900e-003	3.1500e-003	172.7115
Total		**0.0157**	**0.1431**	**0.1202**	**8.6000e-004**		**0.0109**	**0.0109**		**0.0109**	**0.0109**		**171.6912**	**171.6912**	**3.2900e-003**	**3.1500e-003**	**172.7115**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	5.9756	4.9000e-004	0.0531	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1127	0.1127	3.1000e-004		0.1203
Unmitigated	5.9756	4.9000e-004	0.0531	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1127	0.1127	3.1000e-004		0.1203

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.6857					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	5.2849					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.0300e-003	4.9000e-004	0.0531	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1127	0.1127	3.1000e-004		0.1203
Total	**5.9756**	**4.9000e-004**	**0.0531**	**0.0000**		**1.9000e-004**	**1.9000e-004**		**1.9000e-004**	**1.9000e-004**		**0.1127**	**0.1127**	**3.1000e-004**		**0.1203**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.6857					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	5.2849					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.0300e-003	4.9000e-004	0.0531	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1127	0.1127	3.1000e-004		0.1203
Total	**5.9756**	**4.9000e-004**	**0.0531**	**0.0000**		**1.9000e-004**	**1.9000e-004**		**1.9000e-004**	**1.9000e-004**		**0.1127**	**0.1127**	**3.1000e-004**		**0.1203**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
Forklifts	1	4.00	260	89	0.20	Diesel
Tractors/Loaders/Backhoes	1	4.00	260	97	0.37	Diesel

UnMitigated/Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Equipment Type	lb/day										lb/day					
Forklifts	0.0800	0.7142	0.5971	7.6000e-004		0.0553	0.0553		0.0509	0.0509		75.6602	75.6602	0.0239		76.2587
Tractors/Loaders/Backhoes	0.1164	1.1687	1.1513	1.5500e-003		0.0780	0.0780		0.0718	0.0718		153.7709	153.7709	0.0487		154.9872
Total	**0.1964**	**1.8828**	**1.7484**	**2.3100e-003**		**0.1333**	**0.1333**		**0.1227**	**0.1227**		**229.4311**	**229.4311**	**0.0726**		**231.2459**

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Brodiaea Warehouse (Operations - Trucks)

South Coast AQMD Air District, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Unrefrigerated Warehouse-No Rail	262.40	1000sqft	6.02	262,400.00	0
Parking Lot	252.46	1000sqft	5.80	252,460.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	10			**Operational Year**	2019
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Brodiaea Warehouse (Operations - Trucks) - South Coast AQMD Air District, Winter

Project Characteristics -

Land Use -

Construction Phase - Operations (Truck) Run Only.

Off-road Equipment - Operations (Truck) Run Only.

Trips and VMT - Operations (Truck) Run Only.

Architectural Coating -

Vehicle Trips - Operations (Passenger Car) Run Only. Trip Rates based on ITE 9th Edition.

Fleet Mix - Operations (Truck) Run Only.

Energy Use -

Water And Wastewater -

Solid Waste -

Operational Off-Road Equipment - Operational equipment provided by the Client.

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	10.00	1.00
tblConstructionPhase	PhaseEndDate	5/14/2018	5/1/2018
tblFleetMix	HHD	0.03	0.60
tblFleetMix	LDA	0.55	0.00
tblFleetMix	LDT1	0.04	0.00
tblFleetMix	LDT2	0.20	0.00
tblFleetMix	LHD1	0.02	0.22
tblFleetMix	LHD2	5.8700e-003	0.00
tblFleetMix	MCY	4.7240e-003	0.00
tblFleetMix	MDV	0.12	0.00
tblFleetMix	MH	9.9100e-004	0.00
tblFleetMix	MHD	0.02	0.18
tblFleetMix	OBUS	1.9990e-003	0.00

tblFleetMix	SBUS	7.0400e-004	0.00
tblFleetMix	UBUS	2.0270e-003	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOperationalOffRoadEquipment	OperHoursPerDay	8.00	4.00
tblOperationalOffRoadEquipment	OperHoursPerDay	8.00	4.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00
tblVehicleTrips	CNW_TTP	41.00	0.00
tblVehicleTrips	CW_TL	16.60	61.00
tblVehicleTrips	CW_TTP	59.00	100.00
tblVehicleTrips	DV_TP	5.00	0.00
tblVehicleTrips	PB_TP	3.00	0.00
tblVehicleTrips	PR_TP	92.00	100.00
tblVehicleTrips	ST_TR	1.68	0.64
tblVehicleTrips	SU_TR	1.68	0.64
tblVehicleTrips	WD_TR	1.68	0.64

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	5.9756	4.9000e-004	0.0531	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1127	0.1127	3.1000e-004		0.1203
Energy	0.0157	0.1431	0.1202	8.6000e-004		0.0109	0.0109		0.0109	0.0109		171.6912	171.6912	3.2900e-003	3.1500e-003	172.7115
Mobile	3.1820	88.8539	24.4141	0.2917	9.0800	0.6636	9.7437	2.5486	0.6348	3.1833		31,139.4139	31,139.4139	1.5067		31,177.0816
Offroad	0.1964	1.8828	1.7484	2.3200e-003		0.1333	0.1333		0.1227	0.1227		229.4311	229.4311	0.0726		231.2459
Total	**9.3698**	**90.8803**	**26.3358**	**0.2949**	**9.0800**	**0.8080**	**9.8881**	**2.5486**	**0.7685**	**3.3171**		**31,540.6490**	**31,540.6490**	**1.5829**	**3.1500e-003**	**31,581.1592**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	5.9756	4.9000e-004	0.0531	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1127	0.1127	3.1000e-004		0.1203
Energy	0.0157	0.1431	0.1202	8.6000e-004		0.0109	0.0109		0.0109	0.0109		171.6912	171.6912	3.2900e-003	3.1500e-003	172.7115
Mobile	3.1820	88.8539	24.4141	0.2917	9.0800	0.6636	9.7437	2.5486	0.6348	3.1833		31,139.4139	31,139.4139	1.5067		31,177.0816
Offroad	0.1964	1.8828	1.7484	2.3200e-003		0.1333	0.1333		0.1227	0.1227		229.4311	229.4311	0.0726		231.2459
Total	**9.3698**	**90.8803**	**26.3358**	**0.2949**	**9.0800**	**0.8080**	**9.8881**	**2.5486**	**0.7685**	**3.3171**		**31,540.6490**	**31,540.6490**	**1.5829**	**3.1500e-003**	**31,581.1592**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	5/1/2018	5/1/2018	5	1	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 5.8

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Site Preparation	Rubber Tired Dozers	0	8.00	247	0.40

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	0	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Site Preparation - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.2 Site Preparation - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.2 Site Preparation - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	3.1820	88.8539	24.4141	0.2917	9.0800	0.6636	9.7437	2.5486	0.6348	3.1833		31,139.4139	31,139.4139	1.5067		31,177.0816
Unmitigated	3.1820	88.8539	24.4141	0.2917	9.0800	0.6636	9.7437	2.5486	0.6348	3.1833		31,139.4139	31,139.4139	1.5067		31,177.0816

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Parking Lot	0.00	0.00	0.00		
Unrefrigerated Warehouse-No Rail	167.94	167.94	167.94	3,728,851	3,728,851
Total	167.94	167.94	167.94	3,728,851	3,728,851

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Unrefrigerated Warehouse-No Rail	61.00	8.40	6.90	100.00	0.00	0.00	100	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Parking Lot	0.546418	0.044132	0.199182	0.124467	0.017484	0.005870	0.020172	0.031831	0.001999	0.002027	0.004724	0.000704	0.000991
Unrefrigerated Warehouse-No Rail	0.000000	0.000000	0.000000	0.000000	0.220000	0.000000	0.180000	0.600000	0.000000	0.000000	0.000000	0.000000	0.000000

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0157	0.1431	0.1202	8.6000e-004		0.0109	0.0109		0.0109	0.0109		171.6912	171.6912	3.2900e-003	3.1500e-003	172.7115
NaturalGas Unmitigated	0.0157	0.1431	0.1202	8.6000e-004		0.0109	0.0109		0.0109	0.0109		171.6912	171.6912	3.2900e-003	3.1500e-003	172.7115

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	1459.38	0.0157	0.1431	0.1202	8.6000e-004		0.0109	0.0109		0.0109	0.0109		171.6912	171.6912	3.2900e-003	3.1500e-003	172.7115
Total		**0.0157**	**0.1431**	**0.1202**	**8.6000e-004**		**0.0109**	**0.0109**		**0.0109**	**0.0109**		**171.6912**	**171.6912**	**3.2900e-003**	**3.1500e-003**	**172.7115**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	1.45938	0.0157	0.1431	0.1202	8.6000e-004		0.0109	0.0109		0.0109	0.0109		171.6912	171.6912	3.2900e-003	3.1500e-003	172.7115
Total		**0.0157**	**0.1431**	**0.1202**	**8.6000e-004**		**0.0109**	**0.0109**		**0.0109**	**0.0109**		**171.6912**	**171.6912**	**3.2900e-003**	**3.1500e-003**	**172.7115**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	5.9756	4.9000e-004	0.0531	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1127	0.1127	3.1000e-004		0.1203
Unmitigated	5.9756	4.9000e-004	0.0531	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1127	0.1127	3.1000e-004		0.1203

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.6857					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	5.2849					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.0300e-003	4.9000e-004	0.0531	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1127	0.1127	3.1000e-004		0.1203
Total	**5.9756**	**4.9000e-004**	**0.0531**	**0.0000**		**1.9000e-004**	**1.9000e-004**		**1.9000e-004**	**1.9000e-004**		**0.1127**	**0.1127**	**3.1000e-004**		**0.1203**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.6857					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	5.2849					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.0300e-003	4.9000e-004	0.0531	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1127	0.1127	3.1000e-004		0.1203
Total	**5.9756**	**4.9000e-004**	**0.0531**	**0.0000**		**1.9000e-004**	**1.9000e-004**		**1.9000e-004**	**1.9000e-004**		**0.1127**	**0.1127**	**3.1000e-004**		**0.1203**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
Forklifts	1	4.00	260	89	0.20	Diesel
Tractors/Loaders/Backhoes	1	4.00	260	97	0.37	Diesel

UnMitigated/Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Equipment Type	lb/day										lb/day					
Forklifts	0.0800	0.7142	0.5971	7.6000e-004		0.0553	0.0553		0.0509	0.0509		75.6602	75.6602	0.0239		76.2587
Tractors/Loaders/Backhoes	0.1164	1.1687	1.1513	1.5500e-003		0.0780	0.0780		0.0718	0.0718		153.7709	153.7709	0.0487		154.9872
Total	**0.1964**	**1.8828**	**1.7484**	**2.3100e-003**		**0.1333**	**0.1333**		**0.1227**	**0.1227**		**229.4311**	**229.4311**	**0.0726**		**231.2459**

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

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APPENDIX 3.4:

CALEEMOD OPERATIONAL EMISSIONS MODEL OUTPUTS (PASSENGER CARS)

Brodiaea Warehouse (Operations - Passenger Cars)

South Coast AQMD Air District, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Unrefrigerated Warehouse-No Rail	262.40	1000sqft	6.02	262,400.00	0
Parking Lot	252.46	1000sqft	5.80	252,460.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	10			**Operational Year**	2019
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Brodiaea Warehouse (Operations - Passenger Cars) - South Coast AQMD Air District, Summer

Project Characteristics -

Land Use -

Construction Phase - Operations (Passenger Car) Run Only.

Off-road Equipment - Operations (Passenger Car) Run Only.

Trips and VMT - Operations (Passenger Car) Run Only.

Architectural Coating -

Vehicle Trips - Operations (Passenger Car) Run Only. Trip Rates based on ITE 9th Edition.

Fleet Mix - Operations (Passenger Car) Run Only.

Energy Use -

Water And Wastewater -

Solid Waste -

Operational Off-Road Equipment - Operational equipment provided by the Client.

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	10.00	1.00
tblConstructionPhase	PhaseEndDate	6/11/2018	5/1/2018
tblConstructionPhase	PhaseStartDate	5/29/2018	5/1/2018
tblFleetMix	HHD	0.03	0.00
tblFleetMix	HHD	0.03	0.00
tblFleetMix	LDA	0.55	1.00
tblFleetMix	LDA	0.55	1.00
tblFleetMix	LDT1	0.04	0.00
tblFleetMix	LDT1	0.04	0.00
tblFleetMix	LDT2	0.20	0.00
tblFleetMix	LDT2	0.20	0.00
tblFleetMix	LHD1	0.02	0.00
tblFleetMix	LHD1	0.02	0.00

tblFleetMix	LHD2	5.8700e-003	0.00
tblFleetMix	LHD2	5.8700e-003	0.00
tblFleetMix	MCY	4.7240e-003	0.00
tblFleetMix	MCY	4.7240e-003	0.00
tblFleetMix	MDV	0.12	0.00
tblFleetMix	MDV	0.12	0.00
tblFleetMix	MH	9.9100e-004	0.00
tblFleetMix	MH	9.9100e-004	0.00
tblFleetMix	MHD	0.02	0.00
tblFleetMix	MHD	0.02	0.00
tblFleetMix	OBUS	1.9990e-003	0.00
tblFleetMix	OBUS	1.9990e-003	0.00
tblFleetMix	SBUS	7.0400e-004	0.00
tblFleetMix	SBUS	7.0400e-004	0.00
tblFleetMix	UBUS	2.0270e-003	0.00
tblFleetMix	UBUS	2.0270e-003	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOperationalOffRoadEquipment	OperHoursPerDay	8.00	4.00
tblOperationalOffRoadEquipment	OperHoursPerDay	8.00	4.00
tblOperationalOffRoadEquipment	OperLoadFactor	0.20	0.20
tblOperationalOffRoadEquipment	OperLoadFactor	0.37	0.37
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00
tblVehicleTrips	CNW_TTP	41.00	0.00
tblVehicleTrips	CW_TTP	59.00	100.00
tblVehicleTrips	DV_TP	5.00	0.00

tblVehicleTrips	PB_TP	3.00	0.00
tblVehicleTrips	PR_TP	92.00	100.00
tblVehicleTrips	ST_TR	1.68	1.04
tblVehicleTrips	SU_TR	1.68	1.04
tblVehicleTrips	WD_TR	1.68	1.04

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	5.9756	4.9000e-004	0.0531	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1127	0.1127	3.1000e-004		0.1203
Energy	0.0157	0.1431	0.1202	8.6000e-004		0.0109	0.0109		0.0109	0.0109		171.6912	171.6912	3.2900e-003	3.1500e-003	172.7115
Mobile	0.4263	0.6458	9.3164	0.0317	3.4416	0.0227	3.4643	0.9123	0.0209	0.9333		3,161.3973	3,161.3973	0.0733		3,163.2290
Offroad	0.1963	1.8817	1.7468	2.3100e-003		0.1333	0.1333		0.1226	0.1226		229.1860	229.1860	0.0725		230.9988
Total	**6.6140**	**2.6711**	**11.2364**	**0.0349**	**3.4416**	**0.1671**	**3.6086**	**0.9123**	**0.1546**	**1.0670**		**3,562.3873**	**3,562.3873**	**0.1494**	**3.1500e-003**	**3,567.0596**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	5.9756	4.9000e-004	0.0531	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1127	0.1127	3.1000e-004		0.1203
Energy	0.0157	0.1431	0.1202	8.6000e-004		0.0109	0.0109		0.0109	0.0109		171.6912	171.6912	3.2900e-003	3.1500e-003	172.7115
Mobile	0.4263	0.6458	9.3164	0.0317	3.4416	0.0227	3.4643	0.9123	0.0209	0.9333		3,161.3973	3,161.3973	0.0733		3,163.2290
Offroad	0.1963	1.8817	1.7468	2.3100e-003		0.1333	0.1333		0.1226	0.1226		229.1860	229.1860	0.0725		230.9988
Total	**6.6140**	**2.6711**	**11.2364**	**0.0349**	**3.4416**	**0.1671**	**3.6086**	**0.9123**	**0.1546**	**1.0670**		**3,562.3873**	**3,562.3873**	**0.1494**	**3.1500e-003**	**3,567.0596**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	5/1/2018	5/1/2018	5	1	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 5.8

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Site Preparation	Rubber Tired Dozers	0	8.00	247	0.40

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	0	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Site Preparation - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.2 Site Preparation - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.2 Site Preparation - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.4263	0.6458	9.3164	0.0317	3.4416	0.0227	3.4643	0.9123	0.0209	0.9333		3,161.3973	3,161.3973	0.0733		3,163.2290
Unmitigated	0.4263	0.6458	9.3164	0.0317	3.4416	0.0227	3.4643	0.9123	0.0209	0.9333		3,161.3973	3,161.3973	0.0733		3,163.2290

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Parking Lot	0.00	0.00	0.00		
Unrefrigerated Warehouse-No Rail	272.90	272.90	272.90	1,648,947	1,648,947
Total	272.90	272.90	272.90	1,648,947	1,648,947

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Unrefrigerated Warehouse-No Rail	16.60	8.40	6.90	100.00	0.00	0.00	100	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Parking Lot	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Unrefrigerated Warehouse-No Rail	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0157	0.1431	0.1202	8.6000e-004		0.0109	0.0109		0.0109	0.0109		171.6912	171.6912	3.2900e-003	3.1500e-003	172.7115
NaturalGas Unmitigated	0.0157	0.1431	0.1202	8.6000e-004		0.0109	0.0109		0.0109	0.0109		171.6912	171.6912	3.2900e-003	3.1500e-003	172.7115

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	1459.38	0.0157	0.1431	0.1202	8.6000e-004		0.0109	0.0109		0.0109	0.0109		171.6912	171.6912	3.2900e-003	3.1500e-003	172.7115
Total		**0.0157**	**0.1431**	**0.1202**	**8.6000e-004**		**0.0109**	**0.0109**		**0.0109**	**0.0109**		**171.6912**	**171.6912**	**3.2900e-003**	**3.1500e-003**	**172.7115**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	1.45938	0.0157	0.1431	0.1202	8.6000e-004		0.0109	0.0109		0.0109	0.0109		171.6912	171.6912	3.2900e-003	3.1500e-003	172.7115
Total		**0.0157**	**0.1431**	**0.1202**	**8.6000e-004**		**0.0109**	**0.0109**		**0.0109**	**0.0109**		**171.6912**	**171.6912**	**3.2900e-003**	**3.1500e-003**	**172.7115**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	5.9756	4.9000e-004	0.0531	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1127	0.1127	3.1000e-004		0.1203
Unmitigated	5.9756	4.9000e-004	0.0531	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1127	0.1127	3.1000e-004		0.1203

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.6857					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	5.2849					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.0300e-003	4.9000e-004	0.0531	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1127	0.1127	3.1000e-004		0.1203
Total	**5.9756**	**4.9000e-004**	**0.0531**	**0.0000**		**1.9000e-004**	**1.9000e-004**		**1.9000e-004**	**1.9000e-004**		**0.1127**	**0.1127**	**3.1000e-004**		**0.1203**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.6857					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	5.2849					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.0300e-003	4.9000e-004	0.0531	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1127	0.1127	3.1000e-004		0.1203
Total	**5.9756**	**4.9000e-004**	**0.0531**	**0.0000**		**1.9000e-004**	**1.9000e-004**		**1.9000e-004**	**1.9000e-004**		**0.1127**	**0.1127**	**3.1000e-004**		**0.1203**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
Forklifts	1	4.00	260	89	0.20	Diesel
Tractors/Loaders/Backhoes	1	4.00	260	97	0.37	Diesel

UnMitigated/Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Equipment Type	lb/day										lb/day					
Forklifts	0.0804	0.7177	0.6001	7.7000e-004		0.0556	0.0556		0.0512	0.0512		76.0385	76.0385	0.0241		76.6400
Tractors/Loaders/Backhoes	0.1159	1.1640	1.1467	1.5500e-003		0.0777	0.0777		0.0715	0.0715		153.1475	153.1475	0.0485		154.3589
Total	**0.1963**	**1.8817**	**1.7468**	**2.3200e-003**		**0.1333**	**0.1333**		**0.1226**	**0.1226**		**229.1860**	**229.1860**	**0.0725**		**230.9988**

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Brodiaea Warehouse (Operations - Passenger Cars)

South Coast AQMD Air District, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Unrefrigerated Warehouse-No Rail	262.40	1000sqft	6.02	262,400.00	0
Parking Lot	252.46	1000sqft	5.80	252,460.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	10			**Operational Year**	2019
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Brodiaea Warehouse (Operations - Passenger Cars) - South Coast AQMD Air District, Winter

Project Characteristics -

Land Use -

Construction Phase - Operations (Passenger Car) Run Only.

Off-road Equipment - Operations (Passenger Car) Run Only.

Trips and VMT - Operations (Passenger Car) Run Only.

Architectural Coating -

Vehicle Trips - Operations (Passenger Car) Run Only. Trip Rates based on ITE 9th Edition.

Fleet Mix - Operations (Passenger Car) Run Only.

Energy Use -

Water And Wastewater -

Solid Waste -

Operational Off-Road Equipment - Operational equipment provided by the Client.

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	10.00	1.00
tblConstructionPhase	PhaseEndDate	6/11/2018	5/1/2018
tblConstructionPhase	PhaseStartDate	5/29/2018	5/1/2018
tblFleetMix	HHD	0.03	0.00
tblFleetMix	HHD	0.03	0.00
tblFleetMix	LDA	0.55	1.00
tblFleetMix	LDA	0.55	1.00
tblFleetMix	LDT1	0.04	0.00
tblFleetMix	LDT1	0.04	0.00
tblFleetMix	LDT2	0.20	0.00
tblFleetMix	LDT2	0.20	0.00
tblFleetMix	LHD1	0.02	0.00
tblFleetMix	LHD1	0.02	0.00

Brodiaea Warehouse (Operations - Passenger Cars) - South Coast AQMD Air District, Winter

tblFleetMix	LHD2	5.8700e-003	0.00
tblFleetMix	LHD2	5.8700e-003	0.00
tblFleetMix	MCY	4.7240e-003	0.00
tblFleetMix	MCY	4.7240e-003	0.00
tblFleetMix	MDV	0.12	0.00
tblFleetMix	MDV	0.12	0.00
tblFleetMix	MH	9.9100e-004	0.00
tblFleetMix	MH	9.9100e-004	0.00
tblFleetMix	MHD	0.02	0.00
tblFleetMix	MHD	0.02	0.00
tblFleetMix	OBUS	1.9990e-003	0.00
tblFleetMix	OBUS	1.9990e-003	0.00
tblFleetMix	SBUS	7.0400e-004	0.00
tblFleetMix	SBUS	7.0400e-004	0.00
tblFleetMix	UBUS	2.0270e-003	0.00
tblFleetMix	UBUS	2.0270e-003	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOperationalOffRoadEquipment	OperHoursPerDay	8.00	4.00
tblOperationalOffRoadEquipment	OperHoursPerDay	8.00	4.00
tblOperationalOffRoadEquipment	OperLoadFactor	0.20	0.20
tblOperationalOffRoadEquipment	OperLoadFactor	0.37	0.37
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00
tblVehicleTrips	CNW_TTP	41.00	0.00
tblVehicleTrips	CW_TTP	59.00	100.00
tblVehicleTrips	DV_TP	5.00	0.00

tblVehicleTrips	PB_TP	3.00	0.00
tblVehicleTrips	PR_TP	92.00	100.00
tblVehicleTrips	ST_TR	1.68	1.04
tblVehicleTrips	SU_TR	1.68	1.04
tblVehicleTrips	WD_TR	1.68	1.04

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	5.9756	4.9000e-004	0.0531	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1127	0.1127	3.1000e-004		0.1203
Energy	0.0157	0.1431	0.1202	8.6000e-004		0.0109	0.0109		0.0109	0.0109		171.6912	171.6912	3.2900e-003	3.1500e-003	172.7115
Mobile	0.3922	0.7037	8.2880	0.0296	3.4416	0.0227	3.4643	0.9123	0.0209	0.9333		2,951.4498	2,951.4498	0.0680		2,953.1498
Offroad	0.1963	1.8817	1.7468	2.3100e-003		0.1333	0.1333		0.1226	0.1226		229.1860	229.1860	0.0725		230.9988
Total	**6.5799**	**2.7290**	**10.2080**	**0.0328**	**3.4416**	**0.1671**	**3.6086**	**0.9123**	**0.1546**	**1.0670**		**3,352.4397**	**3,352.4397**	**0.1441**	**3.1500e-003**	**3,356.9805**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	5.9756	4.9000e-004	0.0531	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1127	0.1127	3.1000e-004		0.1203
Energy	0.0157	0.1431	0.1202	8.6000e-004		0.0109	0.0109		0.0109	0.0109		171.6912	171.6912	3.2900e-003	3.1500e-003	172.7115
Mobile	0.3922	0.7037	8.2880	0.0296	3.4416	0.0227	3.4643	0.9123	0.0209	0.9333		2,951.4498	2,951.4498	0.0680		2,953.1498
Offroad	0.1963	1.8817	1.7468	2.3100e-003		0.1333	0.1333		0.1226	0.1226		229.1860	229.1860	0.0725		230.9988
Total	**6.5799**	**2.7290**	**10.2080**	**0.0328**	**3.4416**	**0.1671**	**3.6086**	**0.9123**	**0.1546**	**1.0670**		**3,352.4397**	**3,352.4397**	**0.1441**	**3.1500e-003**	**3,356.9805**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	5/1/2018	5/1/2018	5	1	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 5.8

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Site Preparation	Rubber Tired Dozers	0	8.00	247	0.40

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	0	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Site Preparation - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.2 Site Preparation - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.2 Site Preparation - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.3922	0.7037	8.2880	0.0296	3.4416	0.0227	3.4643	0.9123	0.0209	0.9333		2,951.4498	2,951.4498	0.0680		2,953.1498
Unmitigated	0.3922	0.7037	8.2880	0.0296	3.4416	0.0227	3.4643	0.9123	0.0209	0.9333		2,951.4498	2,951.4498	0.0680		2,953.1498

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Parking Lot	0.00	0.00	0.00		
Unrefrigerated Warehouse-No Rail	272.90	272.90	272.90	1,648,947	1,648,947
Total	272.90	272.90	272.90	1,648,947	1,648,947

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Unrefrigerated Warehouse-No Rail	16.60	8.40	6.90	100.00	0.00	0.00	100	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Parking Lot	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Unrefrigerated Warehouse-No Rail	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0157	0.1431	0.1202	8.6000e-004		0.0109	0.0109		0.0109	0.0109		171.6912	171.6912	3.2900e-003	3.1500e-003	172.7115
NaturalGas Unmitigated	0.0157	0.1431	0.1202	8.6000e-004		0.0109	0.0109		0.0109	0.0109		171.6912	171.6912	3.2900e-003	3.1500e-003	172.7115

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	1459.38	0.0157	0.1431	0.1202	8.6000e-004		0.0109	0.0109		0.0109	0.0109		171.6912	171.6912	3.2900e-003	3.1500e-003	172.7115
Total		**0.0157**	**0.1431**	**0.1202**	**8.6000e-004**		**0.0109**	**0.0109**		**0.0109**	**0.0109**		**171.6912**	**171.6912**	**3.2900e-003**	**3.1500e-003**	**172.7115**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	1.45938	0.0157	0.1431	0.1202	8.6000e-004		0.0109	0.0109		0.0109	0.0109		171.6912	171.6912	3.2900e-003	3.1500e-003	172.7115
Total		**0.0157**	**0.1431**	**0.1202**	**8.6000e-004**		**0.0109**	**0.0109**		**0.0109**	**0.0109**		**171.6912**	**171.6912**	**3.2900e-003**	**3.1500e-003**	**172.7115**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	5.9756	4.9000e-004	0.0531	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1127	0.1127	3.1000e-004		0.1203
Unmitigated	5.9756	4.9000e-004	0.0531	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1127	0.1127	3.1000e-004		0.1203

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.6857					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	5.2849					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.0300e-003	4.9000e-004	0.0531	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1127	0.1127	3.1000e-004		0.1203
Total	**5.9756**	**4.9000e-004**	**0.0531**	**0.0000**		**1.9000e-004**	**1.9000e-004**		**1.9000e-004**	**1.9000e-004**		**0.1127**	**0.1127**	**3.1000e-004**		**0.1203**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.6857					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	5.2849					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.0300e-003	4.9000e-004	0.0531	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1127	0.1127	3.1000e-004		0.1203
Total	**5.9756**	**4.9000e-004**	**0.0531**	**0.0000**		**1.9000e-004**	**1.9000e-004**		**1.9000e-004**	**1.9000e-004**		**0.1127**	**0.1127**	**3.1000e-004**		**0.1203**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
Forklifts	1	4.00	260	89	0.20	Diesel
Tractors/Loaders/Backhoes	1	4.00	260	97	0.37	Diesel

UnMitigated/Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Equipment Type	lb/day										lb/day					
Forklifts	0.0804	0.7177	0.6001	7.7000e-004		0.0556	0.0556		0.0512	0.0512		76.0385	76.0385	0.0241		76.6400
Tractors/Loaders/Backhoes	0.1159	1.1640	1.1467	1.5500e-003		0.0777	0.0777		0.0715	0.0715		153.1475	153.1475	0.0485		154.3589
Total	**0.1963**	**1.8817**	**1.7468**	**2.3200e-003**		**0.1333**	**0.1333**		**0.1226**	**0.1226**		**229.1860**	**229.1860**	**0.0725**		**230.9988**

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

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Brodiaea Commerce Center

MOBILE SOURCE HEALTH RISK ASSESSMENT

CITY OF MORENO VALLEY

PREPARED BY:

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(949) 336-5987

FEBRUARY 12, 2018

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LIST OF ABBREVIATED TERMS

(1)	Reference
µg	Microgram
AERMOD	Atmospheric Dispersion Modeling System
APS	Auxiliary Power System
AQMD	Air Quality Management District
ARB	Air Resources Board
CEQA	California Environmental Quality Act
CPF	Cancer Potency Factor
DPM	Diesel Particulate Matter
EMFAC	Emission Factor Model
EPA	Environmental Protection Agency
HHD	Heavy Heavy-Duty
HI	Hazard Index
HRA	Health Risk Assessment
LHD	Light Heavy-Duty
MATES	Multiple Air Toxics Exposure Study
MEIR	Maximally Exposed Individual Receptor
MEISC	Maximally Exposed Individual School Child
MEIW	Maximally Exposed Individual Worker
MHD	Medium Heavy-Duty
NAD	North American Datum
OEHHA	Office of Environmental Health Hazard
PCE	Passenger Car Equivalent
PM10	Particulate Matter 10 microns in diameter or less
Project	Brodiaea Commerce Center
REL	Reference Exposure Level
RM	Recommended Measures
SCAQMD	South Coast Air Quality Management District
SRA	Source Receptor Area
TAC	Toxic Air Contaminant
TIA	Traffic Impact Analysis
URF	Unit Risk Factor
UTM	Universal Transverse Mercator
VMT	Vehicle Miles Traveled

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EXECUTIVE SUMMARY

This report evaluated the potential mobile source health risk impacts to sensitive receptors (residents and schools) and adjacent workers associated with the development of the proposed Project, more specifically, health risk impacts as a result of exposure to diesel particulate matter (DPM) as a result of heavy-duty diesel trucks accessing the site. This section summarizes the significance criteria and Project mobile source health risks.

The results of the health risk assessment of lifetime cancer risk from Project-generated DPM emissions are provided in Table ES-1 below for the Project.

Residential Exposure Scenario:

The residential land use with the greatest potential exposure to Project DPM source emissions is located approximately 186 feet adjacent to the east of the Project site across Heacock Street. At the maximally exposed individual receptor (MEIR), the maximum incremental cancer risk attributable to Project DPM source emissions is estimated at 1.77 in one million, which is less than the threshold of 10 in one million. At this same location, non-cancer risks were estimated to be 0.0007, which would not exceed the applicable threshold of 1.0. As such, the Project will not cause a significant human health or cancer risk to adjacent residences.

Worker Exposure Scenario:

The worker receptor land use with the greatest potential exposure to Project DPM source emissions is located immediately adjacent to the west of the Project site. At the maximally exposed individual worker (MEIW), the maximum incremental cancer risk impact at this location is 0.78 in one million which is less than the threshold of 10 in one million. Maximum non-cancer risks at this same location were estimated to be 0.002, which would not exceed the applicable threshold of 1.0. As such, the Project will not cause a significant human health or cancer risk to adjacent workers.

School Child Exposure Scenario:

The school site land use with the greatest potential exposure to Project DPM source emissions is located at Creekside Elementary School at 23800 March Memorial Drive in the City of Moreno Valley located approximately 2,177 feet north of the Project site. At the maximally exposed individual school child (MEISC), the maximum incremental cancer risk impact at this location is 0.07 in one million which is less than the threshold of 10 in one million. Maximum non-cancer risks at this same location were estimated to be 0.0001 which would not exceed the applicable threshold of 1.0. Any other schools in the vicinity of the Project would be exposed to less emissions and consequently less impacts than what is disclosed for the MEISC. As such, the Project will not cause a significant human health or cancer risk to adjacent school children.

The results of the analysis also indicate that the project will not result in a significant cumulative health risk. Section 2.7 contains a detailed cumulative analysis for the Project.

TABLE ES-1: SUMMARY OF CANCER AND NON-CANCER RISKS

Time Period	Location	Maximum Lifetime Cancer Risk (Risk per Million)	Significance Threshold (Risk per Million)	Exceeds Significance Threshold
30 Year Exposure	Maximum Exposed Sensitive Receptor	1.77	10	NO
25 Year Exposure	Maximum Exposed Worker Receptor	0.78	10	NO
9 Year Exposure	Maximum Exposed School Child	0.07	10	NO
Time Period	Location	Maximum Hazard Index	Significance Threshold	Exceeds Significance Threshold
30 Year Exposure	Maximum Exposed Sensitive Receptor	0.0007	1.0	NO
25 Year Exposure	Maximum Exposed Worker Receptor	0.002	1.0	NO
9 Year Exposure	Maximum Exposed School Child	0.0001	1.0	NO

1 INTRODUCTION

The purpose of this Health Risk Assessment (HRA) is to evaluate Project-related impacts to sensitive receptors (residential, schools) and adjacent workers as a result of heavy-duty diesel trucks accessing the site.

The South Coast Air Quality Management District (SCAQMD) typically issues a comment letter on the Notice of Preparation of a CEQA Document. Per the SCAQMD's typical comment letter, if a proposed Project is expected to generate/attract diesel trucks, which emit diesel particulate matter (DPM), preparation of a HRA is necessary. This document serves to meet the SCAQMD's request for preparation of a HRA. The mobile source HRA has been prepared in accordance with the document Health Risk Assessment Guidance for Analyzing Cancer Risk from Mobile Source Diesel Idling Emissions for CEQA Air Quality Analysis (1) and is comprised of all relevant and appropriate procedures presented by the U.S. EPA, California Environmental Protection Agency and SCAQMD. Cancer risk is expressed in terms of expected incremental incidence per million population. The SCAQMD has established an incidence rate of ten (10) persons per million as the maximum acceptable incremental cancer risk due to DPM exposure. This threshold serves to determine whether or not a given project has a potentially significant development-specific and cumulative impact.

The AQMD has published a report on how to address cumulative impacts from air pollution: *White Paper on Potential Control Strategies to Address Cumulative Impacts from Air Pollution* (2). In this report the AQMD clearly states (Page D-3):

"…the AQMD uses the same significance thresholds for project specific and cumulative impacts for all environmental topics analyzed in an Environmental Assessment or EIR. The only case where the significance thresholds for project specific and cumulative impacts differ is the Hazard Index (HI) significance threshold for toxic air contaminant (TAC) emissions. The project specific (project increment) significance threshold is HI > 1.0 while the cumulative (facility-wide) is HI > 3.0. It should be noted that the HI is only one of three TAC emission significance thresholds considered (when applicable) in a CEQA analysis. The other two are the maximum individual cancer risk (MICR) and the cancer burden, both of which use the same significance thresholds (MICR of 10 in 1 million and cancer burden of 0.5) for project specific and cumulative impacts.

Projects that exceed the project-specific significance thresholds are considered by the SCAQMD to be cumulatively considerable. This is the reason project-specific and cumulative significance thresholds are the same. Conversely, projects that do not exceed the project-specific thresholds are generally not considered to be cumulatively significant."

The SCAQMD has also established non-carcinogenic risk parameters for use in HRAs. Non-carcinogenic risks are quantified by calculating a "hazard index," expressed as the ratio between the ambient pollutant concentration and its toxicity or Reference Exposure Level (REL). An REL is a concentration at or below which health effects are not likely to occur. A hazard index less of than one (1.0) means that adverse health effects are not expected. Within this analysis, non-carcinogenic exposures of less than 1.0 are considered less-than-significant.

1.1 SITE LOCATION

The proposed Brodiaea Commerce Center site is located on the northwest corner of Heacock St. and Brodiaea Ave. in the City of Moreno Valley. The Project site is bounded by business park-designated land use. The March Air Reserve Base/Inland Port Airport (MARB/IPA) is located approximately one mile west of the Project site, and the Interstate 215 (I-215) Freeway is located roughly two miles to the west of the Project site.

1.2 STUDY AREA

The Project site is currently vacant. The City of Moreno Valley's General Plan Land Use designation for the Project site is Business Park/Light Industrial (BP/LI). The land uses and development proposed by the Project are permitted/conditionally permitted under the Project site's current BP/LI Land Use designations. The Project is proposed to consist of a 262,398 square-foot (sf) high-cube warehouse/distribution center use within a single building. As such, the Project's land uses and development are permitted/conditionally permitted under the City General Plan Land Use designations. The Project site is zoned Business Park-Mixed Use (MPX) with the "Mixed-Use Neighborhood" (MUN) overlay. The Project would change the zoning for this area to Light Industrial (LI).

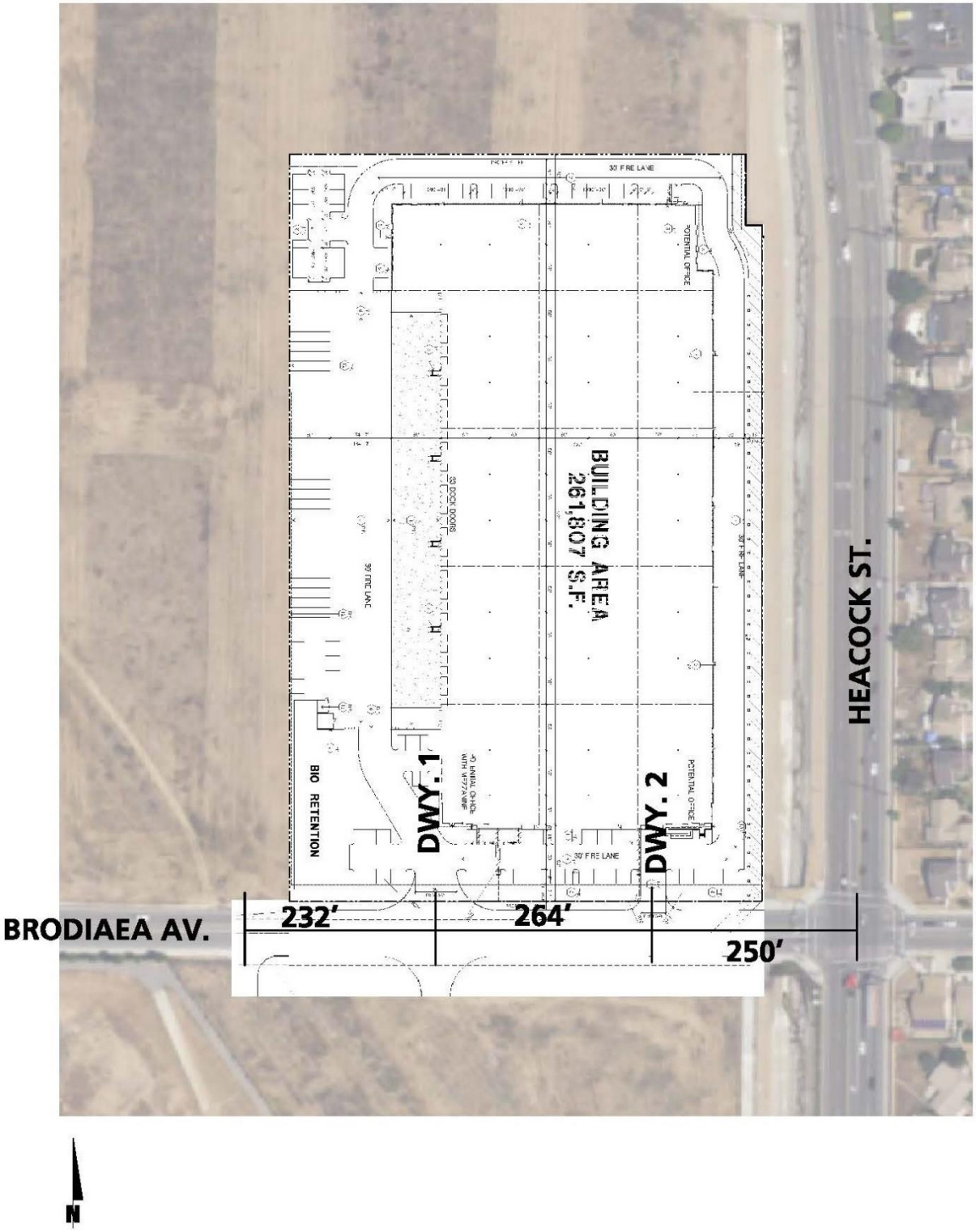
1.3 PROJECT DESCRIPTION

The Project is proposed to consist of a 262,398 square-foot (sf) high-cube warehouse/distribution center use within a single building, as shown on Exhibit 1-A. The current site plan shows a total square footage of 261,807 sf, however, the higher square footage was evaluated for the purposes of this analysis in an effort to conduct a conservative analysis. The Project is anticipated to have an Opening Year of 2019[1.]

As part of the Project's design, all on-site indoor and outdoor cargo handling equipment (CHE) (including yard trucks, hostlers, yard goats, pallet jacks, forklifts, and other on-site equipment) will be powered by non-combustion engines (e.g. electric). Since there are no exhaust emissions associated with the equipment, for purposes of the Project, emissions associated with yard trucks and forklifts are not included in the emissions totals.

[1] The Traffic Impact Analysis (TIA) prepared for the Project evaluates an Opening Year of 2022 since the City of Moreno Valley traffic study guidelines require the Opening Year to be a minimum of 5 years from baseline (2017) conditions. Utilizing a 2019 Opening Year for purposes of this AQIA would generate more emissions than if the Project utilized a 2022 Opening Year consistent with the traffic study because as the analysis year increases, vehicle emission factors would decrease as a result of emissions regulations becoming more stringent. Utilizing a 2019 Opening Year for purposes of the HRA herein represents a conservative estimate of emissions compared to if a 2022 Opening Year, consistent with the traffic study, were utilized.

EXHIBIT 1-A: SITE PLAN



2 BACKGROUND

2.1 REGULATORY SETTING

ARB estimates that the average Californian is exposed to 1.2-1.8 µg/m^3 of DPM annually, this exposure results in an average cancer risk of 360-540 in one million for the average Californian exposed to DPM (3).

As noted above, this HRA is based on SCAQMD guidelines to produce conservative estimates of risk posed by exposure to DPM. The conservative nature of this analysis is due primarily to the following factors:

- The ARB-adopted diesel exhaust Unit Risk Factor (URF) of 300 in one million per µg/m3 is based upon the upper 95 percentile of estimated risk for each of the epidemiological studies utilized to develop the URF. Using the 95th percentile URF represents a very conservative (health-protective) risk posed by DPM.
- The risk estimates assume sensitive receptors will be subject to DPM for 24 hours a day, 350 days a year.
- The emissions derived assume that every truck accessing the project site will idle for 15 minutes under the unmitigated scenario, this is an overestimation of actual idling times and thus conservative.[2] It should be noted that ARB's anti-idling requirements impose a 5-minute maximum idling time and therefore the analysis conservatively overestimates DPM emissions from idling by a factor of 3.

2.2 EMISSIONS ESTIMATION

2.2.1 ON-SITE AND OFF-SITE TRUCK ACTIVITY

Vehicle DPM emissions were estimated using emission factors for particulate matter less than 10µm in diameter (PM_{10}) generated with the 2014 version of the Emission FACtor model (EMFAC) developed by the ARB. EMFAC 2014 is a mathematical model that was developed to calculate emission rates from motor vehicles that operate on highways, freeways, and local roads in California and is commonly used by the ARB to project changes in future emissions from on-road mobile sources (4). The most recent version of this model, EMFAC 2014, incorporates regional motor vehicle data, information and estimates regarding the distribution of vehicle miles traveled (VMT) by speed, and number of starts per day.

Several distinct emission processes are included in EMFAC 2014. Emission factors calculated using EMFAC 2014 are expressed in units of grams per vehicle miles traveled (g/VMT) or grams per idle-hour (g/idle-hr), depending on the emission process. The emission processes and

[2] Although the Project is required to comply with ARB's idling limit of 5 minutes, staff at SCAQMD recommends that the on-site idling emissions should be estimated for 15 minutes of truck idling (personal communication, in person, with Jillian Wong, December 22, 2016), which would take into account on-site idling which occurs while the trucks are waiting to pull up to the truck bays, idling at the bays, idling at check-in and check-out, etc.

corresponding emission factor units associated with diesel particulate exhaust for this Project are presented below.

For this Project, annual average PM_{10} emission factors were generated by running EMFAC 2014 in EMFAC Mode for vehicles in the SCAQMD jurisdiction. The EMFAC Mode generates emission factors in terms of grams of pollutant emitted per vehicle activity and can calculate a matrix of emission factors at specific values of temperature, relative humidity, and vehicle speed. The model was run for speeds traveled in the vicinity of the Project. The vehicle travel speeds for each segment modeled are summarized below.

- Idling – on-site loading/unloading and truck gate
- 5 miles per hour – on-site vehicle movement including driving and maneuvering
- 25 miles per hour – off-site vehicle movement including driving and maneuvering.

Calculated emission factors are shown at Table 2-1. As a conservative measure, a 2019 EMFAC 2014 run was conducted and a static 2019 emissions factor data set was used for the entire duration of analysis herein (e.g., 30 years). Use of 2019 emission factors would overstate potential impacts since this approach assumes that emission factors remain "static" and do not change over time due to fleet turnover or cleaner technology with lower emissions that would incorporated after 2019.

The vehicle DPM exhaust emissions were calculated for running exhaust emissions. The running exhaust emissions were calculated by applying the running exhaust PM10 emission factor (g/VMT) from EMFAC over the total distance traveled. The following equation was used to estimate off-site emissions for each of the different vehicle classes comprising the mobile sources (4):

$Emissions_{speedA}$ (g/s) = $EF_{RunExhaust}$ (g/VMT) * Distance (VMT/trip) * Number of Trips (trips/day) / seconds per day

Where:

$Emissions_{speedA}$ (g/s): Vehicle emissions at a given speed A;

$EF_{RunExhaust}$ (g/VMT): EMFAC running exhaust PM_{10} emission factor at speed A;

Distance (VMT/trip): Total distance traveled per trip.

Similar to off-site traffic, on-site vehicle running emissions were calculated by applying the running exhaust PM_{10} emission factor (g/VMT) from EMFAC and the total vehicle trip number over the length of the driving path using the same formula presented above for on-site emissions. In addition, on-site vehicle idling exhaust emissions were calculated by applying the idle exhaust PM_{10} emission factor (g/idle-hr) from EMFAC and the total truck trip over the total idle time (15 minutes). The following equation was used to estimate the on-site vehicle idling emissions for each of the different vehicle classes (4):

$Emissions_{idle}$ (g/s) = EF_{idle} (g/hr) * Number of Trips (trips/day) * Idling Time (min/trip) *

60 minutes per hour / seconds per day

Where:

$Emissions_{idle}$ (g/s): Vehicle emissions during idling;

EF_{idle}(g/s): EMFAC idle exhaust PM_{10} emission factor.

TABLE 2-1: 2019 WEIGHTED AVERAGE DPM EMISSIONS FACTORS

Speed	Weighted Average
0 (idling)	0.17223 (g/idle-hr)
5	0.01661 (g/s)
25	0.01029 (g/s)

Each roadway was modeled as a line source (made up of multiple adjacent volume sources). Due to the large number of volume sources modeled for this analysis, the corresponding coordinates of each volume source have not been included in this report, but are included in Appendix "2.1". The DPM emission rate for each volume source was calculated by multiplying the emission factor (based on the average travel speed along the roadway) by the number of trips and the distance traveled along each roadway segment and dividing the result by the number of volume sources along that roadway, as illustrated on Table 2-2. The modeled emission sources are illustrated on Exhibit 2-A. The modeled truck travel routes included in the HRA are based on the truck trip distributions (inbound and outbound) available from the Project's Traffic Impact Analysis (TIA) (5). The modeled truck route is consistent with the trip distribution patterns identified in the Project's traffic study is supported by substantial evidence and was modeled to determine the potential impacts to sensitive receptors along the primary truck routes. The modeling domain is limited to the Project's primary truck route and includes off-site sources in the study area for approximately 0.1 mile to 0.8 miles. This modeling domain is consistent with and more conservative than using only a ¼ mile modeling domain which is supported by substantial evidence since several studies have shown that the greatest potential risks occur within a ¼ mile of the primary source of emissions (in the case of the Project this is the on-site idling, travel, and on-site equipment), additional detail on the justification for the modeling domain can be found in Section 2.7 of this report.

On-site truck idling was estimated to occur as trucks enter and travel through the facility. Although the Project is required to comply with CARB's idling limit of 5 minutes, staff at SCAQMD recommends that the on-site idling emissions should be estimated for 15 minutes of truck idling (6), which would take into account on-site idling which occurs while the trucks are waiting to pull up to the truck bays, idling at the bays, idling at check-in and check-out, etc. As such, this analysis estimated truck idling at 15 minutes, consistent with SCAQMD's recommendation.

EXHIBIT 2-A: MODELED EMISSION SOURCES

Per the *Brodiaea Commerce Center Traffic Impact Analysis* prepared by Urban Crossroads, Inc. the Project is expected to generate a net total of approximately 441 trip-ends per day (actual vehicles) with 29 AM peak hour trips and 31 PM peak hour trips. (5) The net Project trip generation includes 168 truck trip-ends per day from the Project site. This HRA study relies on the net Project trips (as opposed to the passenger car equivalents) to accurately account for the effect of individual truck emissions associated with the Project.

The vehicle fleet mix, in terms of actual trucks, as derived from the traffic study for the Project is comprised of the following: 16.9% Light-Heavy-Duty (LHD), 22.7% Medium-Heavy-Duty (MHD), 60.4% Heavy-Heavy-Duty (HHD).

2.3 EXPOSURE QUANTIFICATION

The analysis herein has been conducted in accordance with the guidelines in the Health Risk Assessment Guidance for Analyzing Cancer Risks from Mobile Source Diesel Idling Emissions for CEQA Air Quality Analysis (1). SCAQMD recommends using the Environmental Protection Agency's (U.S. EPA's) AERMOD model. For purposes of this analysis, the model was used to calculate annual average particulate concentrations associated with site operations.

The model offers additional flexibility by allowing the user to assign an initial release height and vertical dispersion parameters for mobile sources representative of a roadway. For this HRA, the roadways were modeled as adjacent volume sources. Roadways were modeled using the U.S. EPA's haul route methodology for modeling of on-site and off-site truck movement. More specifically, the Haul Road Volume Source Calculator in AERMOD View has been utilized to determine the release height parameters. Based on the US EPA methodology, the Project's modeled sources would result in a release height of 3.49 meters, and an initial lateral dimension of 4.0 meters, and an initial vertical dimension of 3.25 meters.

TABLE 2-2: DPM EMISSIONS FROM PROJECT TRUCKS (2019 ANALYSIS YEAR)

Source	Trucks Per Day	VMT [a] (miles/day)	Truck Emission Rate [b] (grams/mile)	Truck Emission Rate [b] (grams/idle-hour)	Daily Truck Emissions [c] (grams/day)	Modeled Emission Rates (g/second)
On-Site Idling	84			0.2151	4.52	5.229E-05
On-Site Travel	168	60.32	23.74		2.32	2.686E-05
Off-Site Travel 80%	134	93.09	58.00		2.49	2.876E-05
Off-Site Travel 10% North on Heacock St.	17	62.06	14.01		0.60	6.949E-06
Off-Site Travel 10% West on Alessandro	17	28.02	13.97		0.60	6.928E-06

[a] Vehicle miles traveled are for modeled truck route only.

[b] Emission rates determined using EMFAC 2014. Idle emission rates are expressed in grams per idle hour rather than grams per mile.

[c] This column includes the total truck travel and truck idle emissions. For idle emissions this column includes emissions based on the assumption that each truck idles for 15 minutes.

SCAQMD required model parameters are presented in Table 2-3 (7). The model requires additional input parameters including emission data and local meteorology. Meteorological data from the SCAQMD's Perris monitoring station (SRA 24) was used to represent local weather conditions and prevailing winds (8).

TABLE 2-3: AERMOD MODEL PARAMETERS

Dispersion Coefficient (Urban/Rural)	Urban
Terrain (Flat/Elevated)	Elevated (Regulatory Default)
Averaging Time	1 year (5-year Meteorological Data Set)
Receptor Height	0 meters (Regulatory Default)

Universal Transverse Mercator (UTM) coordinates for World Geodetic System (WGS) 84 were used to locate the project boundaries, each volume source location, and receptor locations in the project vicinity. The AERMOD dispersion model summary output files for the proposed facility are presented in Appendix "2.1".

Modeled sensitive receptors were placed at residential and non-residential locations. Based on recommendations from SCAMD staff, a receptor grids with a maximum of 100 meters spacing were placed at residential, worker, and school locations to ensure that the maximum impacts are properly analyzed.

Receptors may be placed at applicable structure locations for residential and worker property and not the necessarily the boundaries of these uses. It should be noted that the primary purpose of receptor placement is focused on long-term exposure. For example, the HRA evaluates the potential health risks to residential and worker over a period of 30 or 25 years of exposure respectively. As such, even though it is unlikely to occur in practical terms (because the amount of time spent indoors), this study assumes that a resident or worker would be exposed over a long-period of time for 12 or 24-hours per day at the structure they reside or work.

Furthermore, worker receptors immediately adjacent to the Project site have been evaluated in the HRA. Any impacts to workers located at schools, or non-school workers located further away from the Project site than the modeled worker receptors would have a lesser impact than what has already been disclosed in the HRA at the MEIW.

Discrete variants for daily breathing rates, exposure frequency, and exposure duration were obtained from relevant distribution profiles presented in the 2015 OEHHA Guidelines. Tables 2-4, 2-5, and 2-6 summarize the Exposure Parameters for Residents, School, and Offsite Worker scenarios based on 2015 OEHHA Guidelines. Appendix 2.2 includes the detailed risk calculation.

TABLE 2-4: EXPOSURE ASSUMPTIONS FOR INDIVIDUAL CANCER RISK (30 YEAR RESIDENTIAL)

Age	Daily Breathing Rate (L/kg-day)	Age Specific Factor	Exposure Duration (years)	Fraction of Time at Home	Exposure Frequency (days/year)	Exposure Time (hours/day)
-0.25 to 0	361	10	0.25	1	350	24
0 to 2	1090	10	2	1	350	24
2 to 16	572	3	14	1	365	24
16 to 30	261	1	14	0.73	365	24

TABLE 2-5: EXPOSURE ASSUMPTIONS FOR INDIVIDUAL CANCER RISK (25 YEAR WORKER)

Age	Daily Breathing Rate (L/kg-day)	Age Specific Factor	Exposure Duration (years)	Exposure Frequency (days/year)	Exposure Time (hours/day)
16 to 41	230	1	25	250	12

TABLE 2-6: EXPOSURE ASSUMPTIONS FOR INDIVIDUAL CANCER RISK (9 YEAR SCHOOL CHILD)

Age	Daily Breathing Rate (L/kg-day)	Age Specific Factor	Exposure Duration (years)	Exposure Frequency (days/year) [a]	Exposure Time (hours/day)
4 to 13	572	3	9	180	12

[a] To represent the unique characteristics of the school-based population, the assessment employed the U.S. Environmental Protection Agency's guidance to develop viable dose estimates based on reasonable maximum exposures (RME). RME's are defined as the "highest exposure that is reasonably expected to occur" for a given receptor population. As a result, lifetime risk values for the student population were adjusted to account for an exposure duration of 180 days per year for nine (9) years. The 9 year exposure duration is also consistent with OEHHA Recommendations and consistent with the exposure duration utilized in school-based risk assessments for various schools within the Los Angeles County Unified School District (LAUSD) that have been accepted by the SCAQMD.

2.4 CARCINOGENIC CHEMICAL RISK

The SCAQMD CEQA Air Quality Handbook (1993) states that emissions of toxic air contaminants (TACs) are considered significant if a HRA shows an increased risk of greater than 10 in one million. Based on guidance from the SCAQMD in the document Health Risk Assessment Guidance for Analyzing Cancer Risks from Mobile Source Diesel Idling Emissions for CEQA Air Quality Analysis (1), for purposes of this analysis, 10 in one million is used as the cancer risk threshold for the proposed Project.

Excess cancer risks are estimated as the upper-bound incremental probability that an individual will develop cancer over a lifetime as a direct result of exposure to potential carcinogens over a specified exposure duration. The estimated risk is expressed as a unitless probability. The cancer

risk attributed to a chemical is calculated by multiplying the chemical intake or dose at the human exchange boundaries (e.g., lungs) by the chemical-specific cancer potency factor (CPF). A risk level of 10 in one million implies a likelihood that up to 10 people, out of one million equally exposed people would contract cancer if exposed continuously (24 hours per day) to the levels of toxic air contaminants over a specified duration of time. As an example, the risk of dying from accidental drowning is 1,000 in a million which is 100 times more than the SCAQMD's threshold of 10 in one million, the nearest comparison to 10 in one million is the 7 in one million lifetime chance that an individual would be struck by lightning.

Guidance from CARB and the California Environmental Protection Agency, Office of Environmental Health Hazard Assessment (OEHHA) recommends a refinement to the standard point estimate approach when alternate human body weights and breathing rates are utilized to assess risk for susceptible subpopulations such as children. For the inhalation pathway, the procedure requires the incorporation of several discrete variates to effectively quantify dose. Once determined, contaminant dose is multiplied by the cancer potency factor (CPF) in units of inverse dose expressed in milligrams per kilogram per day (mg/kg/day)-1 to derive the cancer risk estimate. Therefore, to assess exposures, the following dose algorithm was utilized.

$$DOSEair = (Cair \times [BR/BW] \times A \times EF) \times (1 \times 10^{-6})$$

Where:

DOSEair = chronic daily intake (mg/kg/day)

Cair = concentration of contaminant in air (ug/m3)

[BR/BW] = daily breathing rate normalized to body weight (L/kg BW-day)

A = inhalation absorption factor

EF = exposure frequency (days/365 days)

BW = body weight (kg)

1×10^{-6} = conversion factors (ug to mg, L to m3)

$$RISKair = DOSEair \times CPF \times ED/AT$$

Where:

DOSEair = chronic daily intake (mg/kg/day)

CPF = cancer potency factor

ED = number of years within particular age group

AT = averaging time

2.5 NON-CARCINOGENIC EXPOSURES

An evaluation of the potential noncarcinogenic effects of chronic exposures was also conducted. Adverse health effects are evaluated by comparing a compound's annual concentration with its toxicity factor or Reference Exposure Level (REL). The REL for diesel particulates was obtained from OEHHA for this analysis. The chronic reference exposure level (REL) for DPM was established by OEHHA as 5 µg/m^3 (OEHHA Toxicity Criteria Database, http://www.oehha.org/risk/chemicaldb/index.asp).

The non-cancer hazard index was calculated (consistent with SCAQMD methodology) as follows:

The relationship for the non-cancer health effects of DPM is given by the following equation:

$$HI_{DPM} = C_{DPM}/REL_{DPM}$$

Where:

HI_{DPM} = Hazard Index; an expression of the potential for non-cancer health effects.

C_{DPM} = Annual average DPM concentration (µg/m^3).

REL_{DPM} = Reference exposure level (REL) for DPM; the DPM concentration at which no adverse health effects are anticipated.

For purposes of this analysis the hazard index for the respiratory endpoint totaled less than one for all receptors in the project vicinity, and thus is less than significant.

2.6 POTENTIAL PROJECT-RELATED DPM SOURCE CANCER AND NON-CANCER RISKS[3]

Residential Exposure Scenario:

The residential land use with the greatest potential exposure to Project DPM source emissions is located approximately 186 feet adjacent to the east the Project site across Heacock Street. At the maximally exposed individual receptor (MEIR), the maximum incremental cancer risk attributable to Project DPM source emissions is estimated at 1.77 in one million, which is less than the threshold of 10 in one million. At this same location, non-cancer risks were estimated to be 0.0007, which would not exceed the applicable threshold of 1.0. As such, the Project will not cause a significant human health or cancer risk to adjacent residences. The nearest modeled receptors are illustrated on Exhibit 2-B.

Worker Exposure Scenario:

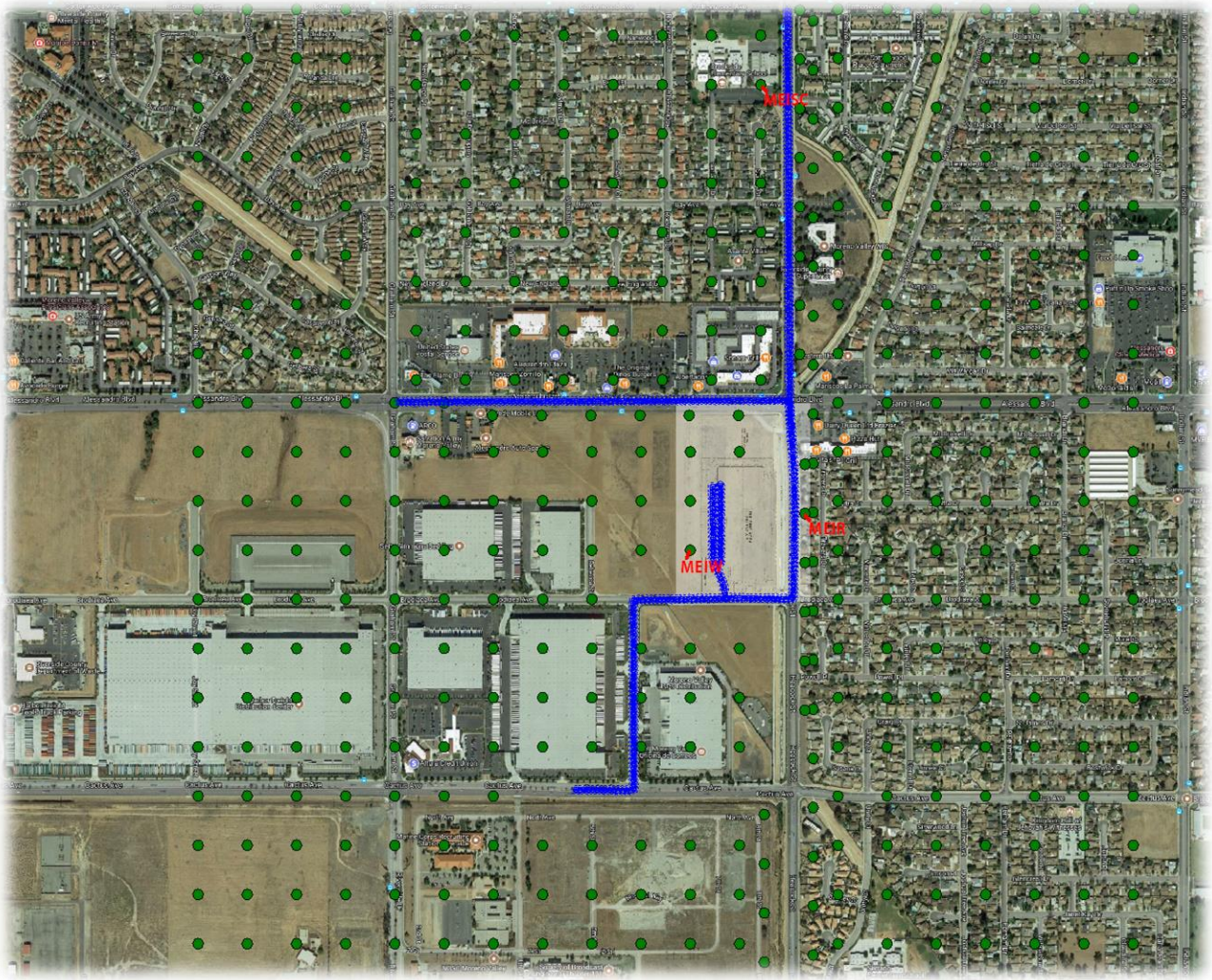
The worker receptor land use with the greatest potential exposure to Project DPM source emissions is located immediately adjacent to the west of the Project site. At the maximally exposed individual worker (MEIW), the maximum incremental cancer risk impact at this location is 0.78 in one million which is less than the threshold of 10 in one million. Maximum non-cancer risks at this same location were estimated to be 0.002, which would not exceed the applicable threshold of 1.0. As such, the Project will not cause a significant human health or cancer risk to adjacent workers. The nearest modeled receptors are illustrated on Exhibit 2-B.

School Child Exposure Scenario:

The school site land use with the greatest potential exposure to Project DPM source emissions is located at Creekside Elementary School at 23800 March Memorial Drive in the City of Moreno Valley located approximately 2,177 feet north of the Project site. At the maximally exposed individual school child (MEISC), the maximum incremental cancer risk impact at this location is 0.07 in one million which is less than the threshold of 10 in one million. Maximum non-cancer risks at this same location were estimated to be 0.0001 which would not exceed the applicable threshold of 1.0. Any other schools in the vicinity of the Project would be exposed to less emissions and consequently less impacts than what is disclosed for the MEISC. As such, the Project will not cause a significant human health or cancer risk to adjacent school children. The nearest modeled receptors are illustrated on Exhibit 2-B.

3 SCAQMD guidance does not require assessment of the potential health risk to on-site workers. Excerpts from the document OEHHA Air Toxics Hot Spots Program Risk Assessment Guidelines—The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments (OEHHA 2003), also indicate that it is not necessary to examine the health effects to on-site workers unless required by RCRA (Resource Conservation and Recovery Act) / CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act) or the worker resides on-site.

EXHIBIT 2-B: MODELED RECEPTORS



2.7 CEQA REQUIREMENTS FOR ADDRESSING CUMULATIVE IMPACTS

As a first step in determining a cumulative threshold for cumulative toxic air contaminant impacts, the applicable provisions of CEQA were reviewed. Excerpts from CEQA and the CEQA Guidelines regarding cumulative impacts are provided below.

In defining what may constitute a significant effect on the environment, CEQA 21083(b)(2) lists the following conditions for cumulative impacts:

> *The possible effects of a project are individually limited but cumulatively considerable. As used in this paragraph, "cumulatively considerable" means that the incremental effects of an individual project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.*

CEQA Guidelines 15064(h) provides guidance for determining the significance of environmental effects caused by the project. The following subsections provide guidance specifically addressed at cumulative impacts.

(1) When assessing whether a cumulative effect requires an EIR, the lead agency shall consider whether the cumulative impact is significant and whether the effects of the project are cumulatively considerable. An EIR must be prepared if the cumulative impact may be significant and the project's incremental effect, though individually limited, is cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.

(2) A lead agency may determine in an initial study that a project's contribution to a significant cumulative impact will be rendered less than cumulatively considerable and thus is not significant. When a project might contribute to a significant cumulative impact, but the contribution will be rendered less than cumulatively considerable through mitigation measures set forth in a mitigated negative declaration, the initial study shall briefly indicate and explain how the contribution has been rendered less than cumulatively considerable.

(3) A lead agency may determine that a project's incremental contribution to a cumulative effect is not cumulatively considerable if the project will comply with the requirements in a previously approved plan or mitigation program (including, but not limited to, water quality control plan, air quality attainment or maintenance plan, integrated waste management plan, habitat conservation plan, natural community conservation plan, plans or regulations for the reduction of greenhouse gas emissions) that provides specific requirements that will avoid or substantially lessen the cumulative problem within the geographic area in which the project is located. Such plans or programs must be specified in law or adopted by the public agency with jurisdiction over the affected resources through a public review process to implement, interpret, or make specific the law enforced or administered by the public agency. When relying on a plan, regulation or program, the lead agency should explain how implementing the particular requirements in the plan,

regulation or program ensure that the project's incremental contribution to the cumulative effect is not cumulatively considerable. If there is substantial evidence that the possible effects of a particular project are still cumulatively considerable notwithstanding that the project complies with the specified plan or mitigation program addressing the cumulative problem, an EIR must be prepared for the project.

(4) The mere existence of significant cumulative impacts caused by other projects alone shall not constitute substantial evidence that the proposed project's incremental effects are cumulatively considerable.

CEQA Guidelines 15130 provides guidance for discussing cumulative impact in an EIR. The following excerpts apply:

(a) An EIR shall discuss cumulative impacts of a project when the project's incremental effect is cumulatively considerable, as defined in section 15065 (a)(3). Where a lead agency is examining a project with an incremental effect that is not "cumulatively considerable," a lead agency need not consider that effect significant, but shall briefly describe its basis for concluding that the incremental effect is not cumulatively considerable.

(1) As defined in Section 15355, a cumulative impact consists of an impact which is created as a result of the combination of the project evaluated in the EIR together with other projects causing related impacts. An EIR should not discuss impacts which do not result in part from the project evaluated in the EIR.

(2) When the combined cumulative impact associated with the project's incremental effect and the effects of other projects is not significant, the EIR shall briefly indicate why the cumulative impact is not significant and is not discussed in further detail in the EIR. A lead agency shall identify facts and analysis supporting the lead agency's conclusion that the cumulative impact is less than significant.

(b) The discussion of cumulative impacts shall reflect the severity of the impacts and their likelihood of occurrence, but the discussion need not provide as great detail as is provided for the effects attributable to the project alone. The discussion should be guided by standards of practicality and reasonableness, and should focus on the cumulative impact to which the identified other projects contribute rather than the attributes of other projects which do not contribute to the cumulative impact. The following elements are necessary to an adequate discussion of significant cumulative impacts:

(1) Either:

(A) A list of past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the agency, or

(B) A summary of projections contained in an adopted local, regional or statewide plan, or related planning document, that describes or evaluates conditions contributing to the cumulative effect….

(2) When utilizing a list, as suggested in paragraph (1) of subdivision (b), factors to consider when determining whether to include a related project should include the nature of each environmental resource being examined, the location of the project and its type. Location may be important, for example, when water quality impacts are at issue since projects outside the watershed would probably not contribute to a cumulative effect. Project type may be important, for example, when the impact is specialized, such as a particular air pollutant or mode of traffic.

(3) Lead agencies should define the geographic scope of the area affected by the cumulative effect and provide a reasonable explanation for the geographic limitation used.

(4) A summary of the expected environmental effects to be produced by those projects with specific reference to additional information stating where that information is available; and

(5) A reasonable analysis of the cumulative impacts of the relevant projects. An EIR shall examine reasonable, feasible options for mitigating or avoiding the project's contribution to any significant cumulative effects.

(c) With some projects, the only feasible mitigation for cumulative impacts may involve the adoption of ordinances or regulations rather than the imposition of conditions on a project-by-project basis.

For cumulative toxic air contaminant (or "TAC") assessment, a list approach should be used to identify past and probable future projects producing related impacts. This allows for discrete sources of TAC emissions contributing to the cumulative impact to be identified. The location and geographic scope of the analysis is important for TACs due to effects of distance from the source on exposure of sensitive receptors to these pollutants.

2.8 EXISTING CONDITIONS FOR TOXIC EMISSIONS

There are no state or federal ambient air quality standards applicable to TAC emissions. Preparing a cumulative assessment for TACs is complicated by the fact that site-specific impacts can be far different from average impacts over a larger geographic area. Impacts from TAC emissions are highest closest to sources of TACs, but the sources are often spread over a large area. For example, emissions from diesel engines, the largest source of risk from TACs, are operated on roads, businesses, and construction sites throughout the air basin. Locations where large numbers of TAC sources are concentrated such as freeways, railyards, and ports may pose a higher level of risk to sensitive receptors near these facilities. Examination of the risk from TACs at national, state, regional, and local levels is useful for providing context, but site-specific evaluation is ultimately necessary to determine existing conditions for development projects.

AMBIENT TAC IMPACTS PRESUMED CUMULATIVELY SIGNIFICANT

The SCAQMD has conducted an in-depth analysis of the toxic air contaminants and their resulting health risks for all of Southern California. This study, the *Multiple Air Toxics Exposure Study in the South Coast Air Basin, MATES IV,"* shows that cancer risk has decreased more than 50% between MATES III (2005) and MATES IV (2012) (9). This is a result of uniform CEQA review, low-sulfur diesel fuel regulations, new fleets coming on line, and the imposition of clean truck access rules at the Ports of Long Beach and Los Angeles.

MATES-IV is the most comprehensive dataset documenting the ambient air toxic levels and health risks associated with the South Coast Air Basin emissions. Therefore, MATES-IV study represents the baseline health risk for a cumulative analysis. MATES-IV estimates the average excess cancer risk level from exposure to TACs is less than 400 in one million basin-wide. These model estimates were based on monitoring data collected at ten fixed sites within the South Coast Air Basin. None of the fixed monitoring sites are within the local area of the Project site. However, MATES-IV has extrapolated the excess cancer risk levels throughout the basin by modeling the specific grids. MATES-IV modeling predicted an excess cancer risk of 568.32 in one million for the Project area. DPM is included in this cancer risk along with all other TAC sources. DPM accounts for 68% of the total risk shown in MATES-IV. Cumulative Project generated TACs are limited to DPM.

The SCAQMD has established a significance threshold for incremental project-level TAC impacts. Specifically, if a given project would generate TACs resulting in or causing an increase in cancer risks of 10 or more incidents per million population, that project's incremental cancer risk would be considered significant. This same significance threshold (10 in one million) is applied by SCAQMD in determining whether a given project's incremental contribution to ambient TAC-source cancer risks is cumulatively considerable. The SCAQMD has not however established a significance threshold for ambient cumulative TAC impacts affecting the Basin. Likewise, the City of Moreno Valley (the Lead Agency) has no adopted cumulative TAC impacts significance threshold.

Absent an established threshold for cumulative TAC impacts, the following discussion assesses whether, in the light of other available existing information, the ambient cumulative TAC-source impacts affecting the Basin and the area encompassing the Project site could be characterized as significant.

As noted previously, *MATES-IV* estimates the average ambient cumulative TAC-source cancer risk for the Basin at 400 incidents per million population; in the localized area encompassing the Project site, the risk is estimated at 568.32 incidents per million population. Either of these existing cumulative TAC-source cancer risk levels (400 per million, or 568.32 per million) far exceeds the 10 in one million cancer risk at which project-level TAC-source cancer risks would be determined significant as measured against the SCAQMD thresholds. As noted previously, data from the SCAQMD shows that cancer risk has decreased more than 50% between MATES III (2005) and MATES IV (2012).

Comparing the ambient cumulative TAC-source cancer risk (568.32 per million locally, or 400 per million Basin-wide) to the SCAQMD's established threshold for project-level TAC-source cancer risks (10 in one million), the ambient cumulative TAC-source cancer risk is approximately 40 to 57 times greater than the incremental risk at which project-level TAC-source cancer risks would be considered significant.

Although there is not yet an established significance threshold for ambient cumulative TAC impacts, given the magnitude by which the ambient cumulative condition exceeds SCAQMD's established project-level significance threshold (ambient cumulative TAC conditions are 40 to 57 times greater than the project-level threshold), the ambient cumulative condition would likely exceed whatever significance threshold may be established for cumulative impacts affecting the Basin. On this basis, and absent a prevailing threshold adopted by the Lead or Responsible Agency, ambient cumulative TAC impacts are presumed to be significant.

JUSTIFICATION OF THE GEOGRAPHIC SCOPE OF THE ANALYSIS

Proximity to sources of toxics is critical to determining the impact. In traffic-related studies, the additional non-cancer health risk attributable to proximity was seen within 1,000 feet and was strongest within 300 feet. California freeway studies show about a 70-percent drop-off in particulate pollution levels at 500 feet. Based on ARB and South Coast District emissions and modeling analyses, an 80-percent drop-off in pollutant concentrations is estimated at approximately 1,000 feet from a distribution center (10).

The 1,000-foot evaluation distance is supported by research-based findings concerning TAC emission dispersion rates from roadways and large sources showing that emissions diminish substantially between 500 and 1,000 feet from emission sources.

For assessing the cumulative impacts of a new source of TAC emissions associated with a project in combination with existing sources and probable future sources, a project radius is necessary. Assessment of impacts from existing sources within 1,000 feet of the new source in combination with risks and hazards from the new source is recommended. Then, once the location of the maximally impacted receptor is identified for the project, cumulative impacts from other sources within the radius of the project (i.e., not the receptor) are assessed at that location. Assessments should sum individual hazards or risks to find the cumulative impact at the location of the maximally impacted receptor from the new source.

Lastly, the Waters Bill (AB 3205) (H&SC Section, 42301.6 through 42301.9) (11) addresses sources of hazardous air pollutants near schools. It requires new or modified sources of hazardous air emissions located within 1,000 feet from the outer boundary of a school to give public notice to the parents or guardians of children enrolled in any school located within one-quarter mile of the source and to each address within a 1,000 foot radius.

For purposes of this assessment, a one-quarter mile radius or 1,320 feet geographic scope is utilized for determining potential cumulative impacts. This radius is more robust than, and provides a more health protective scenario for evaluation than the 1,000 feet buffer identified above.

RELATED PROJECTS CONTRIBUTION TO CUMULATIVE TAC IMPACTS

Consistent with Section 15130(b) of the CEQA Guidelines a list of past, present, and probable future projects producing related or cumulative impacts have been identified. In addition to the MATES-IV cumulative TAC-source cancer risk noted above, other new or proposed potential TAC-generating projects (related projects) in the Study Area could contribute to cumulative TAC impacts. These related projects, due to their recent and/or tentative nature, may not be reflected in the background TAC impacts identified in the MATES-IV study.

In consultation with the Lead Agency, related TAC-generating projects located within a one-quarter mile radius of the Project were identified and are reflected in this cumulative TAC analysis. The related projects listed below were selected based on their propensity to generate TACs that would contribute to, or interact with, TACs generated by the Project.

Of the cumulative projects identified in the Project's traffic study, the following cumulative projects have the potential to emit TACs and are located within the quarter-mile buffer:

- P 09-0031 (12 VFP Gasoline Station) [4]

The primary TAC-source emission associated with the cumulative projects would be DPM associated with any truck trips accessing the cumulative projects and traveling on roadways in the study area. As such, the estimated health risks from these cumulative projects has been totaled. The total maximum estimated cancer risk associated with the cumulative projects identified above is estimated to be less than or equal to 10 in one million.

PROJECT MAXIMUM CONTRIBUTION TO CUMULATIVE TAC IMPACTS

Project-source TACs would incrementally increase the background cancer risk by a maximum of 1.77 incidents per million population under all the scenarios considered in this analysis. The applicable SCAQMD significance threshold for Project-level TAC-source cancer risk impacts is 10 incidents per million population. Similarly, SCAQMD significance thresholds state that Project contributions to cumulative TAC-source cancer risks would be cumulatively considerable if greater than 10 incidents per million population would occur. The 1.77 incidents per million population increment resulting from the Project is therefore not significant, nor cumulatively considerable.

2.8.6 CUMULATIVE IMPACTS

The cumulative health risk is significant because the existing conditions plus cumulative projects would generate greater than a 10 in one million cancer risk. Notwithstanding, the Project's contribution is less than cumulatively considerable because it is less than the 10 in one million incremental cancer risk threshold established by the SCAQMD. Lastly, it should be noted that although there will be ambient growth in the Project vicinity, any increase in emissions and consequently cancer risk from ambient growth would be offset by the expected decrease in

[4] It is presumed that the potential risk from the gas station would be less than 10 in one million since the gas station would be required to obtain permits to operate from the SCAQMD and could only obtain those permits with a less than 10 in one million risk estimate.

future risk estimates due to the natural turnover of older fleets and equipment being replaced by more efficient, less polluting engines and regulatory actions being phased in.

As noted, the Project's maximum contribution to cumulative TAC Impacts would not be cumulatively considerable and are summarized below and on Table 2-7. As previously noted that the risk value of less than or equal to 10 in one million from related projects is likely a very conservative overstatement of the actual risk that is likely to occur at any given location. As an extremely conservative measure to overstate rather than understate the potential risk impacts this analysis assumes that the maximum impact from each related project overlaps and would occur at the same location in the Project vicinity for the receptor, worker, and school child exposure scenarios.

Residential Exposure Scenario:

The greatest cumulative with Project cancer risk is ≤580.09 in one million. The Project's maximum incremental contribution to the cumulative health risk in the Project area is 0.30 in one million which is less than the 10 in one million incremental threshold set by SCAQMD, and is therefore considered to have a less than cumulatively considerable impact. Accordingly, pursuant to SCAQMD cumulative impact criteria, the Project's Residential Exposure impacts would not be cumulatively considerable.

Worker Exposure Scenario:

The greatest cumulative with Project cancer risk is ≤579.10 in one million. The Project's maximum incremental contribution to the cumulative health risk in the Project area is 1.77 in one million which is less than the 10 in one million incremental threshold set by SCAQMD, and is therefore considered to have a less than cumulatively considerable impact. Accordingly, pursuant to SCAQMD cumulative impact criteria, the Project's Worker Exposure impacts would not be cumulatively considerable.

School Child Exposure Scenario:

The greatest cumulative with Project cancer risk is ≤578.39 in one million. The Project's maximum incremental contribution to the cumulative health risk in the Project area is 0.07 in one million which is less than the 10 in one million incremental threshold set by SCAQMD, and is therefore less than cumulatively considerable. Accordingly, pursuant to SCAQMD cumulative impact criteria, the Project's School Child Exposure impacts would not be cumulatively considerable.

TABLE 2-7: CUMULATIVE CANCER RISK[5]

	Cancer Risk as Maximum Sensitive Receptor (risk in one million)			
	Existing	Project Site	Cumulative Projects	Total Cumulative Risk
Maximum Impact to All Receptors Without Project	568.32		≤10	≤578.32
Maximum Impact to Nearest Residential With Project	568.32	1.77	≤10	≤580.09
Maximum Impact to Nearest Worker With Project	568.32	0.78	≤10	≤579.10
Maximum Impact to Nearest School With Project	568.32	0.07	≤10	≤578.39
	Source: **MATES IV Carcinogenic Risk Interactive Map** (SCAQMD 2018).			

SUMMARY AND CONCLUSIONS

To provide context for, and quantify cumulative TAC effects within the Study Area, the Project TAC-source cancer risk, and the TAC-source cancer risks from the related projects identified herein, were added to the total background risk derived by the MATES IV study, yielding a maximum potential cumulative TAC-source risk affecting the Study Area. As indicated at Table 2-7, the maximum potential cumulative cancer risk within the Study Area is estimated at 580.09 in one million.

The MATES-IV ambient background plus related cumulative project TAC impact represents approximately 98 percent of the total cumulative impact identified at Table 2-7; and due to its magnitude when compared to project-level TAC impact significance thresholds, is presumed to be cumulatively significant. The Project would incrementally contribute to this presumably significant cumulative impact. However, the Project's maximum incremental contribution of 1.77 incidents per million population does not exceed the established SCAQMD threshold (10 incidents per million population) at which project-level TAC contributions would be determined cumulatively considerable. On this basis, the Project TAC emissions impacts are not considered cumulatively considerable.

5 Although cumulative impacts typically represent a General Plan Buildout Scenario, there is no such data available for what General Plan Buildout DPM emissions impacts would be. The background risk, however, would likely overstate, rather than understate future DPM impacts and is assumed to be inclusive of future growth. It should be noted that due to improved DPM emissions control technologies and increasingly stringent DPM emissions regulations, the cancer risk incidence in the seven (7) years between the Mates III and Mates IV studies declined by approximately 50% even as population and business growth occurred throughout the region. Similar future declines in area-wide DPM source emissions are anticipated pursuant to enactment of further emissions regulations, including but not limited to anticipated greenhouse gas (GHG) reduction and control measures to be implemented by the state (see also: emissions regulatory measures discussed within Brodiaea Commerce Center Air Quality Impact Analysis (Urban Crossroads) 2017; and Brodiaea Commerce Center Greenhouse Gas Impact Analysis (Urban Crossroads) 2018.

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3 REFERENCES

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6. **Koizumi, James.** *Planning, Rule Development & Area Sources.* May 6, 2009.
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10. **Air Resources Board.** *Air Quality and Land Use Handbook: A Community Health Perspective.* 2005.
11. **CAL HSC Code 42301.6 California Code - Section 42301.6. *Find Law.* [Online] http://codes.lp.findlaw.com/cacode/HSC/1/d26/4/4/1/s42301.6.**

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4 CERTIFICATION

The contents of this health risk assessment represent an accurate depiction of the impacts to sensitive receptors associated with the proposed Brodiaea Commerce Center Project. The information contained in this health risk assessment report is based on the best available data at the time of preparation. If you have any questions, please contact me directly at (949) 336-5987.

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EDUCATION

Master of Science in Environmental Studies
California State University, Fullerton • May, 2010

Bachelor of Arts in Environmental Analysis and Design
University of California, Irvine • June, 2006

PROFESSIONAL AFFILIATIONS

AEP – Association of Environmental Planners
AWMA – Air and Waste Management Association
ASTM – American Society for Testing and Materials

PROFESSIONAL CERTIFICATIONS

Environmental Site Assessment – American Society for Testing and Materials • June, 2013
Planned Communities and Urban Infill – Urban Land Institute • June, 2011
Indoor Air Quality and Industrial Hygiene – EMSL Analytical • April, 2008
Principles of Ambient Air Monitoring – California Air Resources Board • August, 2007
AB2588 Regulatory Standards – Trinity Consultants • November, 2006
Air Dispersion Modeling – Lakes Environmental • June, 2006

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APPENDIX 2.1:

AERMOD MODEL INPUT/OUTPUT

AVERAGE EMISSION FACTOR
RIVERSIDE 2019

Speed	LHD1	MHD	HHD
0	0.785893	0.265333	0.03607
5	0.113867	0.200402	0.05461
25	0.03779	0.085494	0.02822

Speed	**Weighted Average Emissions**
0	**0.21513**
5	**0.09776**
25	**0.04285**

Emission Rates - 2019 Emission Factors

Truck Emission Rates						
Source	**Trucks Per Day**	**VMT [a] (miles/day)**	**Truck Emission Rate [b] (grams/mile)**	**Truck Emission Rate [b] (grams/idle-hour)**	**Daily Truck Emissions [c] (grams/day)**	**Modeled Emission Rates (g/second)**
On-Site Idling	84			0.2151	4.52	5.229E-05
On-Site Travel	168	23.74	0.0978		2.32	2.686E-05
Off-Site Travel 80%	134	58.00	0.0428		2.49	2.876E-05
Off-Site Travel 10% North on Heacock St.	17	14.01	0.0428		0.60	6.949E-06
Off-Site Travel 10% West on Alessandro	17	13.97	0.0428		0.60	6.928E-06

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** Lakes Environmental AERMOD MPI
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** LAKES ENVIRONMENTAL SOFTWARE INC.
** DATE: 1/24/2018
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CO FINISHED
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** AERMOD SOURCE PATHWAY
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LOCATION	L0001405	VOLUME	477291.647	3752611.817	474.20
LOCATION	L0001406	VOLUME	477283.058	3752611.677	474.05
LOCATION	L0001407	VOLUME	477274.469	3752611.536	474.00
LOCATION	L0001408	VOLUME	477265.880	3752611.396	474.00
LOCATION	L0001409	VOLUME	477257.291	3752611.256	474.00
LOCATION	L0001410	VOLUME	477248.702	3752611.115	474.00
LOCATION	L0001411	VOLUME	477240.114	3752610.975	474.00
LOCATION	L0001412	VOLUME	477231.525	3752610.835	474.00
LOCATION	L0001413	VOLUME	477222.936	3752610.694	474.00
LOCATION	L0001414	VOLUME	477214.347	3752610.554	474.00
LOCATION	L0001415	VOLUME	477205.758	3752610.414	474.00
LOCATION	L0001416	VOLUME	477197.169	3752610.273	474.00
LOCATION	L0001417	VOLUME	477188.580	3752610.133	473.98
LOCATION	L0001418	VOLUME	477179.992	3752609.993	473.82
LOCATION	L0001419	VOLUME	477171.403	3752609.852	473.66
LOCATION	L0001420	VOLUME	477162.814	3752609.712	473.50
LOCATION	L0001421	VOLUME	477154.225	3752609.572	473.43
LOCATION	L0001422	VOLUME	477152.186	3752602.999	473.22
LOCATION	L0001423	VOLUME	477152.202	3752594.409	473.00
LOCATION	L0001424	VOLUME	477152.218	3752585.819	473.00
LOCATION	L0001425	VOLUME	477152.234	3752577.229	473.00
LOCATION	L0001426	VOLUME	477152.250	3752568.639	473.00
LOCATION	L0001427	VOLUME	477152.266	3752560.049	472.95
LOCATION	L0001428	VOLUME	477152.282	3752551.459	472.87
LOCATION	L0001429	VOLUME	477152.298	3752542.870	472.80
LOCATION	L0001430	VOLUME	477152.314	3752534.280	472.75
LOCATION	L0001431	VOLUME	477152.330	3752525.690	472.75
LOCATION	L0001432	VOLUME	477152.346	3752517.100	472.75
LOCATION	L0001433	VOLUME	477152.362	3752508.510	472.75
LOCATION	L0001434	VOLUME	477152.378	3752499.920	472.75
LOCATION	L0001435	VOLUME	477152.394	3752491.330	472.75
LOCATION	L0001436	VOLUME	477152.410	3752482.740	472.75
LOCATION	L0001437	VOLUME	477152.426	3752474.150	472.75
LOCATION	L0001438	VOLUME	477152.442	3752465.560	472.76
LOCATION	L0001439	VOLUME	477152.458	3752456.970	472.76
LOCATION	L0001440	VOLUME	477152.474	3752448.380	472.76
LOCATION	L0001441	VOLUME	477152.490	3752439.790	472.76
LOCATION	L0001442	VOLUME	477152.506	3752431.200	472.76
LOCATION	L0001443	VOLUME	477152.522	3752422.610	472.76
LOCATION	L0001444	VOLUME	477152.538	3752414.020	472.69
LOCATION	L0001445	VOLUME	477152.554	3752405.430	472.48
LOCATION	L0001446	VOLUME	477152.570	3752396.840	472.26
LOCATION	L0001447	VOLUME	477152.586	3752388.250	472.04
LOCATION	L0001448	VOLUME	477152.601	3752379.660	472.00
LOCATION	L0001449	VOLUME	477152.617	3752371.070	472.00
LOCATION	L0001450	VOLUME	477152.633	3752362.480	472.00
LOCATION	L0001451	VOLUME	477152.649	3752353.890	472.00
LOCATION	L0001452	VOLUME	477152.665	3752345.300	472.00
LOCATION	L0001453	VOLUME	477152.681	3752336.710	472.00
LOCATION	L0001454	VOLUME	477152.697	3752328.120	472.00
LOCATION	L0001455	VOLUME	477152.713	3752319.530	472.00
LOCATION	L0001456	VOLUME	477152.729	3752310.940	472.00
LOCATION	L0001457	VOLUME	477152.745	3752302.350	472.00
LOCATION	L0001458	VOLUME	477152.761	3752293.760	471.91
LOCATION	L0001459	VOLUME	477152.777	3752285.170	471.62
LOCATION	L0001460	VOLUME	477152.793	3752276.580	471.33
LOCATION	L0001461	VOLUME	477152.809	3752267.990	471.05
LOCATION	L0001462	VOLUME	477152.825	3752259.400	471.00
LOCATION	L0001463	VOLUME	477152.841	3752250.810	471.00
LOCATION	L0001464	VOLUME	477152.857	3752242.220	471.00
LOCATION	L0001465	VOLUME	477152.873	3752233.630	471.00
LOCATION	L0001466	VOLUME	477152.889	3752225.040	471.00
LOCATION	L0001467	VOLUME	477147.207	3752222.188	471.00
LOCATION	L0001468	VOLUME	477138.617	3752222.263	471.00
LOCATION	L0001469	VOLUME	477130.028	3752222.338	471.00
LOCATION	L0001470	VOLUME	477121.438	3752222.414	471.00
LOCATION	L0001471	VOLUME	477112.848	3752222.489	471.00

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   LOCATION L0001472     VOLUME   477104.259 3752222.564 471.00
   LOCATION L0001473     VOLUME   477095.669 3752222.640 471.00
   LOCATION L0001474     VOLUME   477087.079 3752222.715 471.00
   LOCATION L0001475     VOLUME   477078.490 3752222.790 471.00
   LOCATION L0001476     VOLUME   477069.900 3752222.866 471.00
   LOCATION L0001477     VOLUME   477061.310 3752222.941 471.00
   LOCATION L0001478     VOLUME   477052.721 3752223.016 471.00
   LOCATION L0001479     VOLUME   477044.131 3752223.092 471.00
   LOCATION L0001480     VOLUME   477035.541 3752223.167 471.00
** END OF LINE VOLUME SOURCE ID = SLINE3
** ----------------------------------------------------------------------
** LINE SOURCE REPRESENTED BY ADJACENT VOLUME SOURCES
** LINE VOLUME SOURCE ID = SLINE4
** DESCRSRC 10% INBOUND/OUTBOUND NORTH ON HEACOCK ST.
** PREFIX
** LENGTH OF SIDE = 8.59
** CONFIGURATION = ADJACENT
** EMISSION RATE = 6.949E-06
** VERTICAL DIMENSION = 6.99
** SZINIT = 3.25
** NODES = 6
** 477337.712, 3752613.839, 474.64, 3.49, 4.00
** 477476.763, 3752611.311, 474.67, 3.49, 4.00
** 477479.923, 3752788.917, 475.66, 3.49, 4.00
** 477477.801, 3752885.573, 477.00, 3.49, 4.00
** 477469.944, 3753006.689, 478.00, 3.49, 4.00
** 477465.190, 3753814.254, 484.55, 3.49, 4.00
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   LOCATION L0001483     VOLUME   477359.183 3752613.449 474.56
   LOCATION L0001484     VOLUME   477367.772 3752613.292 474.56
   LOCATION L0001485     VOLUME   477376.360 3752613.136 474.55
   LOCATION L0001486     VOLUME   477384.949 3752612.980 474.55
   LOCATION L0001487     VOLUME   477393.538 3752612.824 474.54
   LOCATION L0001488     VOLUME   477402.126 3752612.668 474.54
   LOCATION L0001489     VOLUME   477410.715 3752612.512 474.53
   LOCATION L0001490     VOLUME   477419.303 3752612.355 474.53
   LOCATION L0001491     VOLUME   477427.892 3752612.199 474.52
   LOCATION L0001492     VOLUME   477436.480 3752612.043 474.52
   LOCATION L0001493     VOLUME   477445.069 3752611.887 474.51
   LOCATION L0001494     VOLUME   477453.658 3752611.731 474.51
   LOCATION L0001495     VOLUME   477462.246 3752611.575 474.54
   LOCATION L0001496     VOLUME   477470.835 3752611.419 474.68
   LOCATION L0001497     VOLUME   477476.810 3752613.971 474.82
   LOCATION L0001498     VOLUME   477476.963 3752622.560 474.94
   LOCATION L0001499     VOLUME   477477.116 3752631.149 475.00
   LOCATION L0001500     VOLUME   477477.268 3752639.737 475.00
   LOCATION L0001501     VOLUME   477477.421 3752648.326 475.00
   LOCATION L0001502     VOLUME   477477.574 3752656.915 475.00
   LOCATION L0001503     VOLUME   477477.727 3752665.503 475.00
   LOCATION L0001504     VOLUME   477477.880 3752674.092 475.00
   LOCATION L0001505     VOLUME   477478.033 3752682.681 475.00
   LOCATION L0001506     VOLUME   477478.185 3752691.269 475.00
   LOCATION L0001507     VOLUME   477478.338 3752699.858 475.00
   LOCATION L0001508     VOLUME   477478.491 3752708.446 475.00
   LOCATION L0001509     VOLUME   477478.644 3752717.035 475.01
   LOCATION L0001510     VOLUME   477478.797 3752725.624 475.19
   LOCATION L0001511     VOLUME   477478.950 3752734.212 475.38
   LOCATION L0001512     VOLUME   477479.102 3752742.801 475.56
   LOCATION L0001513     VOLUME   477479.255 3752751.390 475.65
   LOCATION L0001514     VOLUME   477479.408 3752759.978 475.65
   LOCATION L0001515     VOLUME   477479.561 3752768.567 475.66
   LOCATION L0001516     VOLUME   477479.714 3752777.156 475.67
   LOCATION L0001517     VOLUME   477479.866 3752785.744 475.77
   LOCATION L0001518     VOLUME   477479.804 3752794.332 475.86
   LOCATION L0001519     VOLUME   477479.615 3752802.920 475.96
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LOCATION	L0001520	VOLUME	477479.427	3752811.508	476.00
LOCATION	L0001521	VOLUME	477479.238	3752820.096	476.00
LOCATION	L0001522	VOLUME	477479.050	3752828.684	476.00
LOCATION	L0001523	VOLUME	477478.861	3752837.272	476.02
LOCATION	L0001524	VOLUME	477478.673	3752845.860	476.31
LOCATION	L0001525	VOLUME	477478.484	3752854.448	476.60
LOCATION	L0001526	VOLUME	477478.295	3752863.036	476.88
LOCATION	L0001527	VOLUME	477478.107	3752871.624	477.00
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LOCATION	L0001529	VOLUME	477477.592	3752888.794	477.00
LOCATION	L0001530	VOLUME	477477.036	3752897.366	477.00
LOCATION	L0001531	VOLUME	477476.480	3752905.938	477.00
LOCATION	L0001532	VOLUME	477475.924	3752914.510	477.00
LOCATION	L0001533	VOLUME	477475.368	3752923.082	477.00
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LOCATION	L0001538	VOLUME	477472.587	3752965.942	477.31
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LOCATION	L0001542	VOLUME	477470.363	3753000.229	478.00
LOCATION	L0001543	VOLUME	477469.932	3753008.806	478.00
LOCATION	L0001544	VOLUME	477469.881	3753017.396	478.00
LOCATION	L0001545	VOLUME	477469.831	3753025.986	478.00
LOCATION	L0001546	VOLUME	477469.780	3753034.575	478.00
LOCATION	L0001547	VOLUME	477469.730	3753043.165	478.00
LOCATION	L0001548	VOLUME	477469.679	3753051.755	478.00
LOCATION	L0001549	VOLUME	477469.628	3753060.345	478.00
LOCATION	L0001550	VOLUME	477469.578	3753068.935	478.00
LOCATION	L0001551	VOLUME	477469.527	3753077.525	478.03
LOCATION	L0001552	VOLUME	477469.477	3753086.115	478.32
LOCATION	L0001553	VOLUME	477469.426	3753094.704	478.61
LOCATION	L0001554	VOLUME	477469.376	3753103.294	478.89
LOCATION	L0001555	VOLUME	477469.325	3753111.884	479.00
LOCATION	L0001556	VOLUME	477469.274	3753120.474	479.00
LOCATION	L0001557	VOLUME	477469.224	3753129.064	479.00
LOCATION	L0001558	VOLUME	477469.173	3753137.654	479.00
LOCATION	L0001559	VOLUME	477469.123	3753146.243	479.00
LOCATION	L0001560	VOLUME	477469.072	3753154.833	479.00
LOCATION	L0001561	VOLUME	477469.022	3753163.423	479.00
LOCATION	L0001562	VOLUME	477468.971	3753172.013	479.00
LOCATION	L0001563	VOLUME	477468.920	3753180.603	479.00
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LOCATION	L0001569	VOLUME	477468.617	3753232.142	480.00
LOCATION	L0001570	VOLUME	477468.566	3753240.732	480.00
LOCATION	L0001571	VOLUME	477468.516	3753249.322	480.00
LOCATION	L0001572	VOLUME	477468.465	3753257.912	480.00
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LOCATION	L0001579	VOLUME	477468.111	3753318.041	481.00
LOCATION	L0001580	VOLUME	477468.061	3753326.630	481.00
LOCATION	L0001581	VOLUME	477468.010	3753335.220	481.00
LOCATION	L0001582	VOLUME	477467.959	3753343.810	481.00
LOCATION	L0001583	VOLUME	477467.909	3753352.400	481.14
LOCATION	L0001584	VOLUME	477467.858	3753360.990	481.35
LOCATION	L0001585	VOLUME	477467.808	3753369.580	481.56
LOCATION	L0001586	VOLUME	477467.757	3753378.169	481.75

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   LOCATION L0001587     VOLUME   477467.707 3753386.759 481.83
   LOCATION L0001588     VOLUME   477467.656 3753395.349 481.90
   LOCATION L0001589     VOLUME   477467.605 3753403.939 481.98
   LOCATION L0001590     VOLUME   477467.555 3753412.529 482.00
   LOCATION L0001591     VOLUME   477467.504 3753421.119 482.00
   LOCATION L0001592     VOLUME   477467.454 3753429.709 482.00
   LOCATION L0001593     VOLUME   477467.403 3753438.298 482.00
   LOCATION L0001594     VOLUME   477467.353 3753446.888 482.00
   LOCATION L0001595     VOLUME   477467.302 3753455.478 482.00
   LOCATION L0001596     VOLUME   477467.251 3753464.068 482.00
   LOCATION L0001597     VOLUME   477467.201 3753472.658 482.00
   LOCATION L0001598     VOLUME   477467.150 3753481.248 482.00
   LOCATION L0001599     VOLUME   477467.100 3753489.838 482.00
   LOCATION L0001600     VOLUME   477467.049 3753498.427 482.00
   LOCATION L0001601     VOLUME   477466.999 3753507.017 482.00
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   LOCATION L0001603     VOLUME   477466.897 3753524.197 482.00
   LOCATION L0001604     VOLUME   477466.847 3753532.787 482.00
   LOCATION L0001605     VOLUME   477466.796 3753541.377 482.00
   LOCATION L0001606     VOLUME   477466.746 3753549.966 482.00
   LOCATION L0001607     VOLUME   477466.695 3753558.556 482.00
   LOCATION L0001608     VOLUME   477466.645 3753567.146 482.00
   LOCATION L0001609     VOLUME   477466.594 3753575.736 482.00
   LOCATION L0001610     VOLUME   477466.543 3753584.326 482.00
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   LOCATION L0001612     VOLUME   477466.442 3753601.506 482.00
   LOCATION L0001613     VOLUME   477466.392 3753610.095 482.00
   LOCATION L0001614     VOLUME   477466.341 3753618.685 482.00
   LOCATION L0001615     VOLUME   477466.291 3753627.275 482.00
   LOCATION L0001616     VOLUME   477466.240 3753635.865 482.00
   LOCATION L0001617     VOLUME   477466.189 3753644.455 482.00
   LOCATION L0001618     VOLUME   477466.139 3753653.045 482.00
   LOCATION L0001619     VOLUME   477466.088 3753661.635 482.00
   LOCATION L0001620     VOLUME   477466.038 3753670.224 482.00
   LOCATION L0001621     VOLUME   477465.987 3753678.814 482.02
   LOCATION L0001622     VOLUME   477465.937 3753687.404 482.07
   LOCATION L0001623     VOLUME   477465.886 3753695.994 482.13
   LOCATION L0001624     VOLUME   477465.835 3753704.584 482.19
   LOCATION L0001625     VOLUME   477465.785 3753713.174 482.38
   LOCATION L0001626     VOLUME   477465.734 3753721.764 482.61
   LOCATION L0001627     VOLUME   477465.684 3753730.353 482.83
   LOCATION L0001628     VOLUME   477465.633 3753738.943 483.08
   LOCATION L0001629     VOLUME   477465.582 3753747.533 483.37
   LOCATION L0001630     VOLUME   477465.532 3753756.123 483.65
   LOCATION L0001631     VOLUME   477465.481 3753764.713 483.94
   LOCATION L0001632     VOLUME   477465.431 3753773.303 484.00
   LOCATION L0001633     VOLUME   477465.380 3753781.892 484.00
   LOCATION L0001634     VOLUME   477465.330 3753790.482 484.00
   LOCATION L0001635     VOLUME   477465.279 3753799.072 484.07
   LOCATION L0001636     VOLUME   477465.228 3753807.662 484.30
** END OF LINE VOLUME SOURCE ID = SLINE4
** ----------------------------------------------------------------------
** LINE SOURCE REPRESENTED BY ADJACENT VOLUME SOURCES
** LINE VOLUME SOURCE ID = SLINE5
** DESCRSRC 10% INBOUND/OUTBOUND WEST ON ALESSANDRO
** PREFIX
** LENGTH OF SIDE = 8.59
** CONFIGURATION = ADJACENT
** EMISSION RATE = 6.928E-06
** VERTICAL DIMENSION = 6.99
** SZINIT = 3.25
** NODES = 6
** 477337.712, 3752613.839, 474.64, 3.49, 4.00
** 477476.763, 3752611.311, 474.67, 3.49, 4.00
** 477479.923, 3752788.917, 475.66, 3.49, 4.00
** 477477.801, 3752885.573, 477.00, 3.49, 4.00
** 477468.449, 3753015.664, 478.00, 3.49, 4.00
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** 476674.068, 3753012.344, 479.00, 3.49, 4.00
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   LOCATION L0001638     VOLUME   477350.595 3752613.605 474.57
   LOCATION L0001639     VOLUME   477359.183 3752613.449 474.56
   LOCATION L0001640     VOLUME   477367.772 3752613.292 474.56
   LOCATION L0001641     VOLUME   477376.360 3752613.136 474.55
   LOCATION L0001642     VOLUME   477384.949 3752612.980 474.55
   LOCATION L0001643     VOLUME   477393.538 3752612.824 474.54
   LOCATION L0001644     VOLUME   477402.126 3752612.668 474.54
   LOCATION L0001645     VOLUME   477410.715 3752612.512 474.53
   LOCATION L0001646     VOLUME   477419.303 3752612.355 474.53
   LOCATION L0001647     VOLUME   477427.892 3752612.199 474.52
   LOCATION L0001648     VOLUME   477436.480 3752612.043 474.52
   LOCATION L0001649     VOLUME   477445.069 3752611.887 474.51
   LOCATION L0001650     VOLUME   477453.658 3752611.731 474.51
   LOCATION L0001651     VOLUME   477462.246 3752611.575 474.54
   LOCATION L0001652     VOLUME   477470.835 3752611.419 474.68
   LOCATION L0001653     VOLUME   477476.810 3752613.971 474.82
   LOCATION L0001654     VOLUME   477476.963 3752622.560 474.94
   LOCATION L0001655     VOLUME   477477.116 3752631.149 475.00
   LOCATION L0001656     VOLUME   477477.268 3752639.737 475.00
   LOCATION L0001657     VOLUME   477477.421 3752648.326 475.00
   LOCATION L0001658     VOLUME   477477.574 3752656.915 475.00
   LOCATION L0001659     VOLUME   477477.727 3752665.503 475.00
   LOCATION L0001660     VOLUME   477477.880 3752674.092 475.00
   LOCATION L0001661     VOLUME   477478.033 3752682.681 475.00
   LOCATION L0001662     VOLUME   477478.185 3752691.269 475.00
   LOCATION L0001663     VOLUME   477478.338 3752699.858 475.00
   LOCATION L0001664     VOLUME   477478.491 3752708.446 475.00
   LOCATION L0001665     VOLUME   477478.644 3752717.035 475.01
   LOCATION L0001666     VOLUME   477478.797 3752725.624 475.19
   LOCATION L0001667     VOLUME   477478.950 3752734.212 475.38
   LOCATION L0001668     VOLUME   477479.102 3752742.801 475.56
   LOCATION L0001669     VOLUME   477479.255 3752751.390 475.65
   LOCATION L0001670     VOLUME   477479.408 3752759.978 475.65
   LOCATION L0001671     VOLUME   477479.561 3752768.567 475.66
   LOCATION L0001672     VOLUME   477479.714 3752777.156 475.67
   LOCATION L0001673     VOLUME   477479.866 3752785.744 475.77
   LOCATION L0001674     VOLUME   477479.804 3752794.332 475.86
   LOCATION L0001675     VOLUME   477479.615 3752802.920 475.96
   LOCATION L0001676     VOLUME   477479.427 3752811.508 476.00
   LOCATION L0001677     VOLUME   477479.238 3752820.096 476.00
   LOCATION L0001678     VOLUME   477479.050 3752828.684 476.00
   LOCATION L0001679     VOLUME   477478.861 3752837.272 476.02
   LOCATION L0001680     VOLUME   477478.673 3752845.860 476.31
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   LOCATION L0001682     VOLUME   477478.295 3752863.036 476.88
   LOCATION L0001683     VOLUME   477478.107 3752871.624 477.00
   LOCATION L0001684     VOLUME   477477.918 3752880.212 477.00
   LOCATION L0001685     VOLUME   477477.569 3752888.792 477.00
   LOCATION L0001686     VOLUME   477476.953 3752897.360 477.00
   LOCATION L0001687     VOLUME   477476.337 3752905.928 477.00
   LOCATION L0001688     VOLUME   477475.721 3752914.496 477.00
   LOCATION L0001689     VOLUME   477475.105 3752923.064 477.00
   LOCATION L0001690     VOLUME   477474.489 3752931.632 477.00
   LOCATION L0001691     VOLUME   477473.874 3752940.199 477.00
   LOCATION L0001692     VOLUME   477473.258 3752948.767 477.00
   LOCATION L0001693     VOLUME   477472.642 3752957.335 477.03
   LOCATION L0001694     VOLUME   477472.026 3752965.903 477.31
   LOCATION L0001695     VOLUME   477471.410 3752974.471 477.60
   LOCATION L0001696     VOLUME   477470.794 3752983.039 477.88
   LOCATION L0001697     VOLUME   477470.178 3752991.607 478.00
   LOCATION L0001698     VOLUME   477469.562 3753000.175 478.00
   LOCATION L0001699     VOLUME   477468.946 3753008.743 478.00
   LOCATION L0001700     VOLUME   477466.798 3753015.657 478.00
   LOCATION L0001701     VOLUME   477458.208 3753015.621 478.00
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LOCATION	L0001703	VOLUME	477441.028	3753015.550	478.00
LOCATION	L0001704	VOLUME	477432.438	3753015.514	478.00
LOCATION	L0001705	VOLUME	477423.848	3753015.478	478.00
LOCATION	L0001706	VOLUME	477415.258	3753015.442	478.00
LOCATION	L0001707	VOLUME	477406.668	3753015.406	478.00
LOCATION	L0001708	VOLUME	477398.079	3753015.370	478.00
LOCATION	L0001709	VOLUME	477389.489	3753015.334	478.00
LOCATION	L0001710	VOLUME	477380.899	3753015.298	478.00
LOCATION	L0001711	VOLUME	477372.309	3753015.262	478.00
LOCATION	L0001712	VOLUME	477363.719	3753015.226	478.00
LOCATION	L0001713	VOLUME	477355.129	3753015.191	478.00
LOCATION	L0001714	VOLUME	477346.539	3753015.155	478.00
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LOCATION	L0001716	VOLUME	477329.359	3753015.083	478.00
LOCATION	L0001717	VOLUME	477320.769	3753015.047	478.00
LOCATION	L0001718	VOLUME	477312.179	3753015.011	478.00
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LOCATION	L0001720	VOLUME	477294.999	3753014.939	478.00
LOCATION	L0001721	VOLUME	477286.410	3753014.903	478.00
LOCATION	L0001722	VOLUME	477277.820	3753014.867	478.00
LOCATION	L0001723	VOLUME	477269.230	3753014.832	478.00
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LOCATION	L0001725	VOLUME	477252.050	3753014.760	478.00
LOCATION	L0001726	VOLUME	477243.460	3753014.724	478.00
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LOCATION	L0001732	VOLUME	477191.920	3753014.509	478.00
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LOCATION	L0001734	VOLUME	477174.741	3753014.437	478.00
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LOCATION	L0001736	VOLUME	477157.561	3753014.365	477.99
LOCATION	L0001737	VOLUME	477148.971	3753014.329	477.97
LOCATION	L0001738	VOLUME	477140.381	3753014.293	477.95
LOCATION	L0001739	VOLUME	477131.791	3753014.257	477.93
LOCATION	L0001740	VOLUME	477123.201	3753014.221	477.92
LOCATION	L0001741	VOLUME	477114.611	3753014.185	477.92
LOCATION	L0001742	VOLUME	477106.021	3753014.150	477.92
LOCATION	L0001743	VOLUME	477097.431	3753014.114	477.93
LOCATION	L0001744	VOLUME	477088.841	3753014.078	477.95
LOCATION	L0001745	VOLUME	477080.251	3753014.042	477.97
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LOCATION	L0001750	VOLUME	477037.302	3753013.862	478.00
LOCATION	L0001751	VOLUME	477028.712	3753013.826	478.00
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LOCATION	L0001753	VOLUME	477011.532	3753013.755	478.00
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LOCATION	L0001759	VOLUME	476959.992	3753013.539	478.00
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LOCATION	L0001761	VOLUME	476942.813	3753013.467	478.00
LOCATION	L0001762	VOLUME	476934.223	3753013.432	478.00
LOCATION	L0001763	VOLUME	476925.633	3753013.396	478.00
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LOCATION	L0001766	VOLUME	476899.863	3753013.288	478.00
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LOCATION	L0001768	VOLUME	476882.683	3753013.216	478.00

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   LOCATION L0001778     VOLUME   476796.784 3753012.857 478.09
   LOCATION L0001779     VOLUME   476788.194 3753012.821 478.34
   LOCATION L0001780     VOLUME   476779.604 3753012.785 478.59
   LOCATION L0001781     VOLUME   476771.014 3753012.750 478.84
   LOCATION L0001782     VOLUME   476762.424 3753012.714 478.90
   LOCATION L0001783     VOLUME   476753.834 3753012.678 478.94
   LOCATION L0001784     VOLUME   476745.244 3753012.642 478.98
   LOCATION L0001785     VOLUME   476736.654 3753012.606 479.00
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   LOCATION L0001787     VOLUME   476719.474 3753012.534 479.00
   LOCATION L0001788     VOLUME   476710.885 3753012.498 479.00
   LOCATION L0001789     VOLUME   476702.295 3753012.462 479.00
   LOCATION L0001790     VOLUME   476693.705 3753012.426 479.00
   LOCATION L0001791     VOLUME   476685.115 3753012.391 479.00
   LOCATION L0001792     VOLUME   476676.525 3753012.355 479.00
** END OF LINE VOLUME SOURCE ID = SLINE5
** SOURCE PARAMETERS **
** LINE VOLUME SOURCE ID = SLINE1
   SRCPARAM L0001336     0.000002752      3.49      4.00      3.25
   SRCPARAM L0001337     0.000002752      3.49      4.00      3.25
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   SRCPARAM L0001353     0.000002752      3.49      4.00      3.25
   SRCPARAM L0001354     0.000002752      3.49      4.00      3.25
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** LINE VOLUME SOURCE ID = SLINE2
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   SRCPARAM L0001375     0.000001033      3.49      4.00      3.25
   SRCPARAM L0001376     0.000001033      3.49      4.00      3.25
   SRCPARAM L0001377     0.000001033      3.49      4.00      3.25
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   SRCPARAM L0001379     0.000001033      3.49      4.00      3.25
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   SRCPARAM L0001384     0.000001033      3.49      4.00      3.25
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   SRCPARAM L0001387     0.000001033      3.49      4.00      3.25
   SRCPARAM L0001388     0.000001033      3.49      4.00      3.25
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   SRCPARAM L0001392     0.000001033      3.49      4.00      3.25
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   SRCPARAM L0001393     0.000001033      3.49      4.00      3.25
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   SRCPARAM L0001398     0.000001033      3.49      4.00      3.25
   SRCPARAM L0001399     0.000001033      3.49      4.00      3.25
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   SRCPARAM L0001401     0.0000003551      3.49      4.00      3.25
   SRCPARAM L0001402     0.0000003551      3.49      4.00      3.25
   SRCPARAM L0001403     0.0000003551      3.49      4.00      3.25
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   SRCPARAM L0001406     0.0000003551      3.49      4.00      3.25
   SRCPARAM L0001407     0.0000003551      3.49      4.00      3.25
   SRCPARAM L0001408     0.0000003551      3.49      4.00      3.25
   SRCPARAM L0001409     0.0000003551      3.49      4.00      3.25
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                                                        11141 HRA
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   SRCPARAM L0001792     0.00000004441      3.49      4.00      3.25
** ---------------------------------------------------------------------
   URBANSRC ALL
   SRCGROUP ALL
SO FINISHED
**
****************************************
** AERMOD RECEPTOR PATHWAY
****************************************
**
**
RE STARTING
   INCLUDED "11141 HRA.ROU"
RE FINISHED
**
****************************************
** AERMOD METEOROLOGY PATHWAY
****************************************
**
**
ME STARTING
   SURFFILE PERRISADJU\PERI_V9_ADJU\PERI_V9.SFC
   PROFFILE PERRISADJU\PERI_V9_ADJU\PERI_V9.PFL
   SURFDATA 3171 2010
   UAIRDATA 3190 2010
   SITEDATA 99999 2010
   PROFBASE 442.0 FEET
ME FINISHED
**
****************************************
** AERMOD OUTPUT PATHWAY
****************************************
**
**
OU STARTING
** AUTO-GENERATED PLOTFILES
   PLOTFILE   ANNUAL ALL "11141 HRA.AD\AN00GALL.PLT" 31
   SUMMFILE "11141 HRA.SUM"
OU FINISHED


  *** Message Summary For AERMOD Model Setup ***

  --------- Summary of Total Messages --------

 A Total of            0 Fatal Error Message(s)
 A Total of            2 Warning Message(s)
 A Total of            0 Informational Message(s)


    ******** FATAL ERROR MESSAGES ********
               ***  NONE  ***


    ********   WARNING MESSAGES   ********
 ME W186    1035       MEOPEN: THRESH_1MIN 1-min ASOS wind speed threshold used           0.50
 ME W187    1035       MEOPEN: ADJ_U* Option for Low Winds used in AERMET

 ************************************
 *** SETUP Finishes Successfully ***
 ************************************

♀ *** AERMOD - VERSION 16216r ***   *** C:\LAKES\AERMOD VIEW\11141 HRA\11141 HRA.ISC                          ***
    01/24/18
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 *** AERMET - VERSION  16216 ***   ***                                                                   ***
   12:49:32

   PAGE   1
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  URBAN  ADJ_U*

                                            ***     MODEL SETUP OPTIONS SUMMARY       ***
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - -

 **Model Is Setup For Calculation of Average CONCentration Values.

   --  DEPOSITION LOGIC  --
 **NO GAS DEPOSITION Data Provided.
 **NO PARTICLE DEPOSITION Data Provided.
 **Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
 **Model Uses NO WET DEPLETION.  WETDPLT  =  F

 **Model Uses URBAN Dispersion Algorithm for the SBL for   438 Source(s),
   for Total of    1 Urban Area(s):
   Urban Population =   2189641.0 ;  Urban Roughness Length =  1.000 m

 **Model Uses Regulatory DEFAULT Options:
         1. Stack-tip Downwash.
         2. Model Accounts for ELEVated Terrain Effects.
         3. Use Calms Processing Routine.
         4. Use Missing Data Processing Routine.
         5. No Exponential Decay.
         6. Urban Roughness Length of 1.0 Meter Assumed.

 **Other Options Specified:
         ADJ_U*   - Use ADJ_U* BETA option for SBL in AERMET
         CCVR_Sub - Meteorological data includes CCVR substitutions
         TEMP_Sub - Meteorological data includes TEMP substitutions

 **Model Assumes No FLAGPOLE Receptor Heights.

 **The User Specified a Pollutant Type of:  DPM

 **Model Calculates ANNUAL Averages Only

 **This Run Includes:    438 Source(s);       1 Source Group(s); and     429 Receptor(s)

                with:      0 POINT(s), including
                           0 POINTCAP(s) and      0 POINTHOR(s)
                 and:    438 VOLUME source(s)
                 and:      0 AREA type source(s)
                 and:      0 LINE source(s)
                 and:      0 OPENPIT source(s)
                 and:      0 BUOYANT LINE source(s) with      0 line(s)


 **Model Set To Continue RUNning After the Setup Testing.

 **The AERMET Input Meteorological Data Version Date:  16216

 **Output Options Selected:
          Model Outputs Tables of ANNUAL Averages by Receptor
          Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
          Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

 **NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                 m for Missing Hours
                                                                 b for Both Calm and Missing Hours

 **Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =   134.72 ;  Decay Coef. =    0.000     ;  Rot. Angle
=     0.0
```

Emission Units = GRAMS/SEC ; Emission Rate Unit Factor = 0.10000E+07

Output Units = MICROGRAMS/M**3

**Approximate Storage Requirements of Model = 3.7 MB of RAM.

**File for Summary of Results: 11141 HRA.SUM

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*** MODELOPTs: RegDFAULT CONC ELEV URBAN ADJ_U*

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0001336	0	0.27520E-05	477329.1	3752841.0	476.0	3.49	4.00	3.25	YES	
L0001337	0	0.27520E-05	477329.1	3752832.4	476.0	3.49	4.00	3.25	YES	
L0001338	0	0.27520E-05	477329.1	3752823.9	476.0	3.49	4.00	3.25	YES	
L0001339	0	0.27520E-05	477329.1	3752815.3	476.0	3.49	4.00	3.25	YES	
L0001340	0	0.27520E-05	477329.1	3752806.7	476.0	3.49	4.00	3.25	YES	
L0001341	0	0.27520E-05	477329.1	3752798.1	476.0	3.49	4.00	3.25	YES	
L0001342	0	0.27520E-05	477329.1	3752789.5	476.0	3.49	4.00	3.25	YES	
L0001343	0	0.27520E-05	477329.1	3752780.9	476.0	3.49	4.00	3.25	YES	
L0001344	0	0.27520E-05	477329.1	3752772.3	476.0	3.49	4.00	3.25	YES	
L0001345	0	0.27520E-05	477329.1	3752763.7	476.0	3.49	4.00	3.25	YES	
L0001346	0	0.27520E-05	477329.1	3752755.1	476.0	3.49	4.00	3.25	YES	
L0001347	0	0.27520E-05	477329.1	3752746.5	476.0	3.49	4.00	3.25	YES	
L0001348	0	0.27520E-05	477329.1	3752738.0	475.7	3.49	4.00	3.25	YES	
L0001349	0	0.27520E-05	477329.1	3752729.4	475.4	3.49	4.00	3.25	YES	
L0001350	0	0.27520E-05	477329.1	3752720.8	475.1	3.49	4.00	3.25	YES	
L0001351	0	0.27520E-05	477329.1	3752712.2	475.0	3.49	4.00	3.25	YES	
L0001352	0	0.27520E-05	477329.1	3752703.6	475.0	3.49	4.00	3.25	YES	
L0001353	0	0.27520E-05	477329.1	3752695.0	475.0	3.49	4.00	3.25	YES	
L0001354	0	0.27520E-05	477329.1	3752686.4	475.0	3.49	4.00	3.25	YES	
L0001374	0	0.10330E-05	477337.1	3752628.5	475.0	3.49	4.00	3.25	YES	
L0001375	0	0.10330E-05	477336.4	3752637.1	475.0	3.49	4.00	3.25	YES	
L0001376	0	0.10330E-05	477333.6	3752645.1	475.0	3.49	4.00	3.25	YES	
L0001377	0	0.10330E-05	477330.4	3752653.1	475.0	3.49	4.00	3.25	YES	
L0001378	0	0.10330E-05	477327.1	3752661.0	475.0	3.49	4.00	3.25	YES	
L0001379	0	0.10330E-05	477323.9	3752669.0	475.0	3.49	4.00	3.25	YES	
L0001380	0	0.10330E-05	477320.7	3752677.0	475.0	3.49	4.00	3.25	YES	
L0001381	0	0.10330E-05	477317.4	3752684.9	475.0	3.49	4.00	3.25	YES	
L0001382	0	0.10330E-05	477314.2	3752692.9	475.0	3.49	4.00	3.25	YES	
L0001383	0	0.10330E-05	477314.1	3752701.5	475.0	3.49	4.00	3.25	YES	
L0001384	0	0.10330E-05	477314.0	3752710.0	475.0	3.49	4.00	3.25	YES	
L0001385	0	0.10330E-05	477314.0	3752718.6	475.1	3.49	4.00	3.25	YES	
L0001386	0	0.10330E-05	477314.0	3752727.2	475.4	3.49	4.00	3.25	YES	
L0001387	0	0.10330E-05	477313.9	3752735.8	475.6	3.49	4.00	3.25	YES	
L0001388	0	0.10330E-05	477313.9	3752744.4	475.9	3.49	4.00	3.25	YES	
L0001389	0	0.10330E-05	477313.9	3752753.0	476.0	3.49	4.00	3.25	YES	
L0001390	0	0.10330E-05	477313.8	3752761.6	476.0	3.49	4.00	3.25	YES	
L0001391	0	0.10330E-05	477313.8	3752770.2	476.0	3.49	4.00	3.25	YES	
L0001392	0	0.10330E-05	477313.8	3752778.8	476.0	3.49	4.00	3.25	YES	
L0001393	0	0.10330E-05	477313.7	3752787.4	476.0	3.49	4.00	3.25	YES	
L0001394	0	0.10330E-05	477313.7	3752795.9	476.0	3.49	4.00	3.25	YES	

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*** MODELOPTs: RegDFAULT CONC ELEV URBAN ADJ_U*

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0001395	0	0.10330E-05	477313.7	3752804.5	476.0	3.49	4.00	3.25	YES	
L0001396	0	0.10330E-05	477313.6	3752813.1	476.0	3.49	4.00	3.25	YES	
L0001397	0	0.10330E-05	477313.6	3752821.7	476.0	3.49	4.00	3.25	YES	
L0001398	0	0.10330E-05	477313.6	3752830.3	476.0	3.49	4.00	3.25	YES	
L0001399	0	0.10330E-05	477313.5	3752838.9	476.0	3.49	4.00	3.25	YES	
L0001400	0	0.35510E-06	477334.6	3752612.5	474.5	3.49	4.00	3.25	YES	
L0001401	0	0.35510E-06	477326.0	3752612.4	474.5	3.49	4.00	3.25	YES	
L0001402	0	0.35510E-06	477317.4	3752612.2	474.5	3.49	4.00	3.25	YES	
L0001403	0	0.35510E-06	477308.8	3752612.1	474.5	3.49	4.00	3.25	YES	
L0001404	0	0.35510E-06	477300.2	3752612.0	474.4	3.49	4.00	3.25	YES	
L0001405	0	0.35510E-06	477291.6	3752611.8	474.2	3.49	4.00	3.25	YES	
L0001406	0	0.35510E-06	477283.1	3752611.7	474.1	3.49	4.00	3.25	YES	
L0001407	0	0.35510E-06	477274.5	3752611.5	474.0	3.49	4.00	3.25	YES	
L0001408	0	0.35510E-06	477265.9	3752611.4	474.0	3.49	4.00	3.25	YES	
L0001409	0	0.35510E-06	477257.3	3752611.3	474.0	3.49	4.00	3.25	YES	
L0001410	0	0.35510E-06	477248.7	3752611.1	474.0	3.49	4.00	3.25	YES	
L0001411	0	0.35510E-06	477240.1	3752611.0	474.0	3.49	4.00	3.25	YES	
L0001412	0	0.35510E-06	477231.5	3752610.8	474.0	3.49	4.00	3.25	YES	
L0001413	0	0.35510E-06	477222.9	3752610.7	474.0	3.49	4.00	3.25	YES	
L0001414	0	0.35510E-06	477214.3	3752610.6	474.0	3.49	4.00	3.25	YES	
L0001415	0	0.35510E-06	477205.8	3752610.4	474.0	3.49	4.00	3.25	YES	
L0001416	0	0.35510E-06	477197.2	3752610.3	474.0	3.49	4.00	3.25	YES	
L0001417	0	0.35510E-06	477188.6	3752610.1	474.0	3.49	4.00	3.25	YES	
L0001418	0	0.35510E-06	477180.0	3752610.0	473.8	3.49	4.00	3.25	YES	
L0001419	0	0.35510E-06	477171.4	3752609.9	473.7	3.49	4.00	3.25	YES	
L0001420	0	0.35510E-06	477162.8	3752609.7	473.5	3.49	4.00	3.25	YES	
L0001421	0	0.35510E-06	477154.2	3752609.6	473.4	3.49	4.00	3.25	YES	
L0001422	0	0.35510E-06	477152.2	3752603.0	473.2	3.49	4.00	3.25	YES	
L0001423	0	0.35510E-06	477152.2	3752594.4	473.0	3.49	4.00	3.25	YES	
L0001424	0	0.35510E-06	477152.2	3752585.8	473.0	3.49	4.00	3.25	YES	
L0001425	0	0.35510E-06	477152.2	3752577.2	473.0	3.49	4.00	3.25	YES	
L0001426	0	0.35510E-06	477152.2	3752568.6	473.0	3.49	4.00	3.25	YES	
L0001427	0	0.35510E-06	477152.3	3752560.0	472.9	3.49	4.00	3.25	YES	
L0001428	0	0.35510E-06	477152.3	3752551.5	472.9	3.49	4.00	3.25	YES	
L0001429	0	0.35510E-06	477152.3	3752542.9	472.8	3.49	4.00	3.25	YES	
L0001430	0	0.35510E-06	477152.3	3752534.3	472.8	3.49	4.00	3.25	YES	
L0001431	0	0.35510E-06	477152.3	3752525.7	472.8	3.49	4.00	3.25	YES	
L0001432	0	0.35510E-06	477152.3	3752517.1	472.8	3.49	4.00	3.25	YES	
L0001433	0	0.35510E-06	477152.4	3752508.5	472.8	3.49	4.00	3.25	YES	
L0001434	0	0.35510E-06	477152.4	3752499.9	472.8	3.49	4.00	3.25	YES	

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*** MODELOPTs: RegDFAULT CONC ELEV URBAN ADJ_U*

*** VOLUME SOURCE DATA ***

NUMBER EMISSION RATE BASE RELEASE INIT. INIT. URBAN EMISSION RATE

SOURCE ID	PART. CATS.	(GRAMS/SEC)	X (METERS)	Y (METERS)	ELEV. (METERS)	HEIGHT (METERS)	SY (METERS)	SZ (METERS)	SOURCE	SCALAR VARY BY
L0001435	0	0.35510E-06	477152.4	3752491.3	472.8	3.49	4.00	3.25	YES	
L0001436	0	0.35510E-06	477152.4	3752482.7	472.8	3.49	4.00	3.25	YES	
L0001437	0	0.35510E-06	477152.4	3752474.1	472.8	3.49	4.00	3.25	YES	
L0001438	0	0.35510E-06	477152.4	3752465.6	472.8	3.49	4.00	3.25	YES	
L0001439	0	0.35510E-06	477152.5	3752457.0	472.8	3.49	4.00	3.25	YES	
L0001440	0	0.35510E-06	477152.5	3752448.4	472.8	3.49	4.00	3.25	YES	
L0001441	0	0.35510E-06	477152.5	3752439.8	472.8	3.49	4.00	3.25	YES	
L0001442	0	0.35510E-06	477152.5	3752431.2	472.8	3.49	4.00	3.25	YES	
L0001443	0	0.35510E-06	477152.5	3752422.6	472.8	3.49	4.00	3.25	YES	
L0001444	0	0.35510E-06	477152.5	3752414.0	472.7	3.49	4.00	3.25	YES	
L0001445	0	0.35510E-06	477152.6	3752405.4	472.5	3.49	4.00	3.25	YES	
L0001446	0	0.35510E-06	477152.6	3752396.8	472.3	3.49	4.00	3.25	YES	
L0001447	0	0.35510E-06	477152.6	3752388.2	472.0	3.49	4.00	3.25	YES	
L0001448	0	0.35510E-06	477152.6	3752379.7	472.0	3.49	4.00	3.25	YES	
L0001449	0	0.35510E-06	477152.6	3752371.1	472.0	3.49	4.00	3.25	YES	
L0001450	0	0.35510E-06	477152.6	3752362.5	472.0	3.49	4.00	3.25	YES	
L0001451	0	0.35510E-06	477152.6	3752353.9	472.0	3.49	4.00	3.25	YES	
L0001452	0	0.35510E-06	477152.7	3752345.3	472.0	3.49	4.00	3.25	YES	
L0001453	0	0.35510E-06	477152.7	3752336.7	472.0	3.49	4.00	3.25	YES	
L0001454	0	0.35510E-06	477152.7	3752328.1	472.0	3.49	4.00	3.25	YES	
L0001455	0	0.35510E-06	477152.7	3752319.5	472.0	3.49	4.00	3.25	YES	
L0001456	0	0.35510E-06	477152.7	3752310.9	472.0	3.49	4.00	3.25	YES	
L0001457	0	0.35510E-06	477152.7	3752302.3	472.0	3.49	4.00	3.25	YES	
L0001458	0	0.35510E-06	477152.8	3752293.8	471.9	3.49	4.00	3.25	YES	
L0001459	0	0.35510E-06	477152.8	3752285.2	471.6	3.49	4.00	3.25	YES	
L0001460	0	0.35510E-06	477152.8	3752276.6	471.3	3.49	4.00	3.25	YES	
L0001461	0	0.35510E-06	477152.8	3752268.0	471.1	3.49	4.00	3.25	YES	
L0001462	0	0.35510E-06	477152.8	3752259.4	471.0	3.49	4.00	3.25	YES	
L0001463	0	0.35510E-06	477152.8	3752250.8	471.0	3.49	4.00	3.25	YES	
L0001464	0	0.35510E-06	477152.9	3752242.2	471.0	3.49	4.00	3.25	YES	
L0001465	0	0.35510E-06	477152.9	3752233.6	471.0	3.49	4.00	3.25	YES	
L0001466	0	0.35510E-06	477152.9	3752225.0	471.0	3.49	4.00	3.25	YES	
L0001467	0	0.35510E-06	477147.2	3752222.2	471.0	3.49	4.00	3.25	YES	
L0001468	0	0.35510E-06	477138.6	3752222.3	471.0	3.49	4.00	3.25	YES	
L0001469	0	0.35510E-06	477130.0	3752222.3	471.0	3.49	4.00	3.25	YES	
L0001470	0	0.35510E-06	477121.4	3752222.4	471.0	3.49	4.00	3.25	YES	
L0001471	0	0.35510E-06	477112.8	3752222.5	471.0	3.49	4.00	3.25	YES	
L0001472	0	0.35510E-06	477104.3	3752222.6	471.0	3.49	4.00	3.25	YES	
L0001473	0	0.35510E-06	477095.7	3752222.6	471.0	3.49	4.00	3.25	YES	
L0001474	0	0.35510E-06	477087.1	3752222.7	471.0	3.49	4.00	3.25	YES	

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0001475	0	0.35510E-06	477078.5	3752222.8	471.0	3.49	4.00	3.25	YES	
L0001476	0	0.35510E-06	477069.9	3752222.9	471.0	3.49	4.00	3.25	YES	
L0001477	0	0.35510E-06	477061.3	3752222.9	471.0	3.49	4.00	3.25	YES	
L0001478	0	0.35510E-06	477052.7	3752223.0	471.0	3.49	4.00	3.25	YES	
L0001479	0	0.35510E-06	477044.1	3752223.1	471.0	3.49	4.00	3.25	YES	

L0001480	0	0.35510E-06	477035.5	3752223.2	471.0	3.49	4.00	3.25	YES	
L0001481	0	0.44540E-07	477342.0	3752613.8	474.6	3.49	4.00	3.25	YES	
L0001482	0	0.44540E-07	477350.6	3752613.6	474.6	3.49	4.00	3.25	YES	
L0001483	0	0.44540E-07	477359.2	3752613.4	474.6	3.49	4.00	3.25	YES	
L0001484	0	0.44540E-07	477367.8	3752613.3	474.6	3.49	4.00	3.25	YES	
L0001485	0	0.44540E-07	477376.4	3752613.1	474.6	3.49	4.00	3.25	YES	
L0001486	0	0.44540E-07	477384.9	3752613.0	474.6	3.49	4.00	3.25	YES	
L0001487	0	0.44540E-07	477393.5	3752612.8	474.5	3.49	4.00	3.25	YES	
L0001488	0	0.44540E-07	477402.1	3752612.7	474.5	3.49	4.00	3.25	YES	
L0001489	0	0.44540E-07	477410.7	3752612.5	474.5	3.49	4.00	3.25	YES	
L0001490	0	0.44540E-07	477419.3	3752612.4	474.5	3.49	4.00	3.25	YES	
L0001491	0	0.44540E-07	477427.9	3752612.2	474.5	3.49	4.00	3.25	YES	
L0001492	0	0.44540E-07	477436.5	3752612.0	474.5	3.49	4.00	3.25	YES	
L0001493	0	0.44540E-07	477445.1	3752611.9	474.5	3.49	4.00	3.25	YES	
L0001494	0	0.44540E-07	477453.7	3752611.7	474.5	3.49	4.00	3.25	YES	
L0001495	0	0.44540E-07	477462.2	3752611.6	474.5	3.49	4.00	3.25	YES	
L0001496	0	0.44540E-07	477470.8	3752611.4	474.7	3.49	4.00	3.25	YES	
L0001497	0	0.44540E-07	477476.8	3752614.0	474.8	3.49	4.00	3.25	YES	
L0001498	0	0.44540E-07	477477.0	3752622.6	474.9	3.49	4.00	3.25	YES	
L0001499	0	0.44540E-07	477477.1	3752631.1	475.0	3.49	4.00	3.25	YES	
L0001500	0	0.44540E-07	477477.3	3752639.7	475.0	3.49	4.00	3.25	YES	
L0001501	0	0.44540E-07	477477.4	3752648.3	475.0	3.49	4.00	3.25	YES	
L0001502	0	0.44540E-07	477477.6	3752656.9	475.0	3.49	4.00	3.25	YES	
L0001503	0	0.44540E-07	477477.7	3752665.5	475.0	3.49	4.00	3.25	YES	
L0001504	0	0.44540E-07	477477.9	3752674.1	475.0	3.49	4.00	3.25	YES	
L0001505	0	0.44540E-07	477478.0	3752682.7	475.0	3.49	4.00	3.25	YES	
L0001506	0	0.44540E-07	477478.2	3752691.3	475.0	3.49	4.00	3.25	YES	
L0001507	0	0.44540E-07	477478.3	3752699.9	475.0	3.49	4.00	3.25	YES	
L0001508	0	0.44540E-07	477478.5	3752708.4	475.0	3.49	4.00	3.25	YES	
L0001509	0	0.44540E-07	477478.6	3752717.0	475.0	3.49	4.00	3.25	YES	
L0001510	0	0.44540E-07	477478.8	3752725.6	475.2	3.49	4.00	3.25	YES	
L0001511	0	0.44540E-07	477479.0	3752734.2	475.4	3.49	4.00	3.25	YES	
L0001512	0	0.44540E-07	477479.1	3752742.8	475.6	3.49	4.00	3.25	YES	
L0001513	0	0.44540E-07	477479.3	3752751.4	475.7	3.49	4.00	3.25	YES	
L0001514	0	0.44540E-07	477479.4	3752760.0	475.7	3.49	4.00	3.25	YES	

♀ *** AERMOD - VERSION 16216r *** *** C:\LAKES\AERMOD VIEW\11141 HRA\11141 HRA.ISC *** 01/24/18
*** AERMET - VERSION 16216 *** *** *** 12:49:32

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*** MODELOPTs: RegDFAULT CONC ELEV URBAN ADJ_U*

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0001515	0	0.44540E-07	477479.6	3752768.6	475.7	3.49	4.00	3.25	YES	
L0001516	0	0.44540E-07	477479.7	3752777.2	475.7	3.49	4.00	3.25	YES	
L0001517	0	0.44540E-07	477479.9	3752785.7	475.8	3.49	4.00	3.25	YES	
L0001518	0	0.44540E-07	477479.8	3752794.3	475.9	3.49	4.00	3.25	YES	
L0001519	0	0.44540E-07	477479.6	3752802.9	476.0	3.49	4.00	3.25	YES	
L0001520	0	0.44540E-07	477479.4	3752811.5	476.0	3.49	4.00	3.25	YES	
L0001521	0	0.44540E-07	477479.2	3752820.1	476.0	3.49	4.00	3.25	YES	
L0001522	0	0.44540E-07	477479.0	3752828.7	476.0	3.49	4.00	3.25	YES	
L0001523	0	0.44540E-07	477478.9	3752837.3	476.0	3.49	4.00	3.25	YES	
L0001524	0	0.44540E-07	477478.7	3752845.9	476.3	3.49	4.00	3.25	YES	
L0001525	0	0.44540E-07	477478.5	3752854.4	476.6	3.49	4.00	3.25	YES	
L0001526	0	0.44540E-07	477478.3	3752863.0	476.9	3.49	4.00	3.25	YES	
L0001527	0	0.44540E-07	477478.1	3752871.6	477.0	3.49	4.00	3.25	YES	
L0001528	0	0.44540E-07	477477.9	3752880.2	477.0	3.49	4.00	3.25	YES	
L0001529	0	0.44540E-07	477477.6	3752888.8	477.0	3.49	4.00	3.25	YES	

L0001530	0	0.44540E-07	477477.0	3752897.4	477.0	3.49	4.00	3.25	YES
L0001531	0	0.44540E-07	477476.5	3752905.9	477.0	3.49	4.00	3.25	YES
L0001532	0	0.44540E-07	477475.9	3752914.5	477.0	3.49	4.00	3.25	YES
L0001533	0	0.44540E-07	477475.4	3752923.1	477.0	3.49	4.00	3.25	YES
L0001534	0	0.44540E-07	477474.8	3752931.7	477.0	3.49	4.00	3.25	YES
L0001535	0	0.44540E-07	477474.3	3752940.2	477.0	3.49	4.00	3.25	YES
L0001536	0	0.44540E-07	477473.7	3752948.8	477.0	3.49	4.00	3.25	YES
L0001537	0	0.44540E-07	477473.1	3752957.4	477.0	3.49	4.00	3.25	YES
L0001538	0	0.44540E-07	477472.6	3752965.9	477.3	3.49	4.00	3.25	YES
L0001539	0	0.44540E-07	477472.0	3752974.5	477.6	3.49	4.00	3.25	YES
L0001540	0	0.44540E-07	477471.5	3752983.1	477.9	3.49	4.00	3.25	YES
L0001541	0	0.44540E-07	477470.9	3752991.7	478.0	3.49	4.00	3.25	YES
L0001542	0	0.44540E-07	477470.4	3753000.2	478.0	3.49	4.00	3.25	YES
L0001543	0	0.44540E-07	477469.9	3753008.8	478.0	3.49	4.00	3.25	YES
L0001544	0	0.44540E-07	477469.9	3753017.4	478.0	3.49	4.00	3.25	YES
L0001545	0	0.44540E-07	477469.8	3753026.0	478.0	3.49	4.00	3.25	YES
L0001546	0	0.44540E-07	477469.8	3753034.6	478.0	3.49	4.00	3.25	YES
L0001547	0	0.44540E-07	477469.7	3753043.2	478.0	3.49	4.00	3.25	YES
L0001548	0	0.44540E-07	477469.7	3753051.8	478.0	3.49	4.00	3.25	YES
L0001549	0	0.44540E-07	477469.6	3753060.3	478.0	3.49	4.00	3.25	YES
L0001550	0	0.44540E-07	477469.6	3753068.9	478.0	3.49	4.00	3.25	YES
L0001551	0	0.44540E-07	477469.5	3753077.5	478.0	3.49	4.00	3.25	YES
L0001552	0	0.44540E-07	477469.5	3753086.1	478.3	3.49	4.00	3.25	YES
L0001553	0	0.44540E-07	477469.4	3753094.7	478.6	3.49	4.00	3.25	YES
L0001554	0	0.44540E-07	477469.4	3753103.3	478.9	3.49	4.00	3.25	YES

*** MODELOPTs: RegDFAULT CONC ELEV URBAN ADJ_U*

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0001555	0	0.44540E-07	477469.3	3753111.9	479.0	3.49	4.00	3.25	YES	
L0001556	0	0.44540E-07	477469.3	3753120.5	479.0	3.49	4.00	3.25	YES	
L0001557	0	0.44540E-07	477469.2	3753129.1	479.0	3.49	4.00	3.25	YES	
L0001558	0	0.44540E-07	477469.2	3753137.7	479.0	3.49	4.00	3.25	YES	
L0001559	0	0.44540E-07	477469.1	3753146.2	479.0	3.49	4.00	3.25	YES	
L0001560	0	0.44540E-07	477469.1	3753154.8	479.0	3.49	4.00	3.25	YES	
L0001561	0	0.44540E-07	477469.0	3753163.4	479.0	3.49	4.00	3.25	YES	
L0001562	0	0.44540E-07	477469.0	3753172.0	479.0	3.49	4.00	3.25	YES	
L0001563	0	0.44540E-07	477468.9	3753180.6	479.0	3.49	4.00	3.25	YES	
L0001564	0	0.44540E-07	477468.9	3753189.2	479.0	3.49	4.00	3.25	YES	
L0001565	0	0.44540E-07	477468.8	3753197.8	479.0	3.49	4.00	3.25	YES	
L0001566	0	0.44540E-07	477468.8	3753206.4	479.3	3.49	4.00	3.25	YES	
L0001567	0	0.44540E-07	477468.7	3753215.0	479.6	3.49	4.00	3.25	YES	
L0001568	0	0.44540E-07	477468.7	3753223.6	479.9	3.49	4.00	3.25	YES	
L0001569	0	0.44540E-07	477468.6	3753232.1	480.0	3.49	4.00	3.25	YES	
L0001570	0	0.44540E-07	477468.6	3753240.7	480.0	3.49	4.00	3.25	YES	
L0001571	0	0.44540E-07	477468.5	3753249.3	480.0	3.49	4.00	3.25	YES	
L0001572	0	0.44540E-07	477468.5	3753257.9	480.0	3.49	4.00	3.25	YES	
L0001573	0	0.44540E-07	477468.4	3753266.5	480.0	3.49	4.00	3.25	YES	
L0001574	0	0.44540E-07	477468.4	3753275.1	480.0	3.49	4.00	3.25	YES	
L0001575	0	0.44540E-07	477468.3	3753283.7	480.0	3.49	4.00	3.25	YES	
L0001576	0	0.44540E-07	477468.3	3753292.3	480.2	3.49	4.00	3.25	YES	
L0001577	0	0.44540E-07	477468.2	3753300.9	480.5	3.49	4.00	3.25	YES	
L0001578	0	0.44540E-07	477468.2	3753309.5	480.8	3.49	4.00	3.25	YES	
L0001579	0	0.44540E-07	477468.1	3753318.0	481.0	3.49	4.00	3.25	YES	

L0001580	0	0.44540E-07	477468.1	3753326.6	481.0	3.49	4.00	3.25	YES	
L0001581	0	0.44540E-07	477468.0	3753335.2	481.0	3.49	4.00	3.25	YES	
L0001582	0	0.44540E-07	477468.0	3753343.8	481.0	3.49	4.00	3.25	YES	
L0001583	0	0.44540E-07	477467.9	3753352.4	481.1	3.49	4.00	3.25	YES	
L0001584	0	0.44540E-07	477467.9	3753361.0	481.4	3.49	4.00	3.25	YES	
L0001585	0	0.44540E-07	477467.8	3753369.6	481.6	3.49	4.00	3.25	YES	
L0001586	0	0.44540E-07	477467.8	3753378.2	481.8	3.49	4.00	3.25	YES	
L0001587	0	0.44540E-07	477467.7	3753386.8	481.8	3.49	4.00	3.25	YES	
L0001588	0	0.44540E-07	477467.7	3753395.3	481.9	3.49	4.00	3.25	YES	
L0001589	0	0.44540E-07	477467.6	3753403.9	482.0	3.49	4.00	3.25	YES	
L0001590	0	0.44540E-07	477467.6	3753412.5	482.0	3.49	4.00	3.25	YES	
L0001591	0	0.44540E-07	477467.5	3753421.1	482.0	3.49	4.00	3.25	YES	
L0001592	0	0.44540E-07	477467.5	3753429.7	482.0	3.49	4.00	3.25	YES	
L0001593	0	0.44540E-07	477467.4	3753438.3	482.0	3.49	4.00	3.25	YES	
L0001594	0	0.44540E-07	477467.4	3753446.9	482.0	3.49	4.00	3.25	YES	

♀ *** AERMOD - VERSION 16216r ***   *** C:\LAKES\AERMOD VIEW\11141 HRA\11141 HRA.ISC   ***
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*** AERMET - VERSION 16216 ***   ***   ***
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*** MODELOPTs: RegDFAULT CONC ELEV URBAN ADJ_U*

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0001595	0	0.44540E-07	477467.3	3753455.5	482.0	3.49	4.00	3.25	YES	
L0001596	0	0.44540E-07	477467.3	3753464.1	482.0	3.49	4.00	3.25	YES	
L0001597	0	0.44540E-07	477467.2	3753472.7	482.0	3.49	4.00	3.25	YES	
L0001598	0	0.44540E-07	477467.1	3753481.2	482.0	3.49	4.00	3.25	YES	
L0001599	0	0.44540E-07	477467.1	3753489.8	482.0	3.49	4.00	3.25	YES	
L0001600	0	0.44540E-07	477467.0	3753498.4	482.0	3.49	4.00	3.25	YES	
L0001601	0	0.44540E-07	477467.0	3753507.0	482.0	3.49	4.00	3.25	YES	
L0001602	0	0.44540E-07	477466.9	3753515.6	482.0	3.49	4.00	3.25	YES	
L0001603	0	0.44540E-07	477466.9	3753524.2	482.0	3.49	4.00	3.25	YES	
L0001604	0	0.44540E-07	477466.8	3753532.8	482.0	3.49	4.00	3.25	YES	
L0001605	0	0.44540E-07	477466.8	3753541.4	482.0	3.49	4.00	3.25	YES	
L0001606	0	0.44540E-07	477466.7	3753550.0	482.0	3.49	4.00	3.25	YES	
L0001607	0	0.44540E-07	477466.7	3753558.6	482.0	3.49	4.00	3.25	YES	
L0001608	0	0.44540E-07	477466.6	3753567.1	482.0	3.49	4.00	3.25	YES	
L0001609	0	0.44540E-07	477466.6	3753575.7	482.0	3.49	4.00	3.25	YES	
L0001610	0	0.44540E-07	477466.5	3753584.3	482.0	3.49	4.00	3.25	YES	
L0001611	0	0.44540E-07	477466.5	3753592.9	482.0	3.49	4.00	3.25	YES	
L0001612	0	0.44540E-07	477466.4	3753601.5	482.0	3.49	4.00	3.25	YES	
L0001613	0	0.44540E-07	477466.4	3753610.1	482.0	3.49	4.00	3.25	YES	
L0001614	0	0.44540E-07	477466.3	3753618.7	482.0	3.49	4.00	3.25	YES	
L0001615	0	0.44540E-07	477466.3	3753627.3	482.0	3.49	4.00	3.25	YES	
L0001616	0	0.44540E-07	477466.2	3753635.9	482.0	3.49	4.00	3.25	YES	
L0001617	0	0.44540E-07	477466.2	3753644.5	482.0	3.49	4.00	3.25	YES	
L0001618	0	0.44540E-07	477466.1	3753653.0	482.0	3.49	4.00	3.25	YES	
L0001619	0	0.44540E-07	477466.1	3753661.6	482.0	3.49	4.00	3.25	YES	
L0001620	0	0.44540E-07	477466.0	3753670.2	482.0	3.49	4.00	3.25	YES	
L0001621	0	0.44540E-07	477466.0	3753678.8	482.0	3.49	4.00	3.25	YES	
L0001622	0	0.44540E-07	477465.9	3753687.4	482.1	3.49	4.00	3.25	YES	
L0001623	0	0.44540E-07	477465.9	3753696.0	482.1	3.49	4.00	3.25	YES	
L0001624	0	0.44540E-07	477465.8	3753704.6	482.2	3.49	4.00	3.25	YES	
L0001625	0	0.44540E-07	477465.8	3753713.2	482.4	3.49	4.00	3.25	YES	
L0001626	0	0.44540E-07	477465.7	3753721.8	482.6	3.49	4.00	3.25	YES	
L0001627	0	0.44540E-07	477465.7	3753730.4	482.8	3.49	4.00	3.25	YES	
L0001628	0	0.44540E-07	477465.6	3753738.9	483.1	3.49	4.00	3.25	YES	
L0001629	0	0.44540E-07	477465.6	3753747.5	483.4	3.49	4.00	3.25	YES	

L0001630	0	0.44540E-07	477465.5	3753756.1	483.7	3.49	4.00	3.25	YES
L0001631	0	0.44540E-07	477465.5	3753764.7	483.9	3.49	4.00	3.25	YES
L0001632	0	0.44540E-07	477465.4	3753773.3	484.0	3.49	4.00	3.25	YES
L0001633	0	0.44540E-07	477465.4	3753781.9	484.0	3.49	4.00	3.25	YES
L0001634	0	0.44540E-07	477465.3	3753790.5	484.0	3.49	4.00	3.25	YES

*** MODELOPTs: RegDFAULT CONC ELEV URBAN ADJ_U*

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0001635	0	0.44540E-07	477465.3	3753799.1	484.1	3.49	4.00	3.25	YES	
L0001636	0	0.44540E-07	477465.2	3753807.7	484.3	3.49	4.00	3.25	YES	
L0001637	0	0.44410E-07	477342.0	3752613.8	474.6	3.49	4.00	3.25	YES	
L0001638	0	0.44410E-07	477350.6	3752613.6	474.6	3.49	4.00	3.25	YES	
L0001639	0	0.44410E-07	477359.2	3752613.4	474.6	3.49	4.00	3.25	YES	
L0001640	0	0.44410E-07	477367.8	3752613.3	474.6	3.49	4.00	3.25	YES	
L0001641	0	0.44410E-07	477376.4	3752613.1	474.6	3.49	4.00	3.25	YES	
L0001642	0	0.44410E-07	477384.9	3752613.0	474.6	3.49	4.00	3.25	YES	
L0001643	0	0.44410E-07	477393.5	3752612.8	474.5	3.49	4.00	3.25	YES	
L0001644	0	0.44410E-07	477402.1	3752612.7	474.5	3.49	4.00	3.25	YES	
L0001645	0	0.44410E-07	477410.7	3752612.5	474.5	3.49	4.00	3.25	YES	
L0001646	0	0.44410E-07	477419.3	3752612.4	474.5	3.49	4.00	3.25	YES	
L0001647	0	0.44410E-07	477427.9	3752612.2	474.5	3.49	4.00	3.25	YES	
L0001648	0	0.44410E-07	477436.5	3752612.0	474.5	3.49	4.00	3.25	YES	
L0001649	0	0.44410E-07	477445.1	3752611.9	474.5	3.49	4.00	3.25	YES	
L0001650	0	0.44410E-07	477453.7	3752611.7	474.5	3.49	4.00	3.25	YES	
L0001651	0	0.44410E-07	477462.2	3752611.6	474.5	3.49	4.00	3.25	YES	
L0001652	0	0.44410E-07	477470.8	3752611.4	474.7	3.49	4.00	3.25	YES	
L0001653	0	0.44410E-07	477476.8	3752614.0	474.8	3.49	4.00	3.25	YES	
L0001654	0	0.44410E-07	477477.0	3752622.6	474.9	3.49	4.00	3.25	YES	
L0001655	0	0.44410E-07	477477.1	3752631.1	475.0	3.49	4.00	3.25	YES	
L0001656	0	0.44410E-07	477477.3	3752639.7	475.0	3.49	4.00	3.25	YES	
L0001657	0	0.44410E-07	477477.4	3752648.3	475.0	3.49	4.00	3.25	YES	
L0001658	0	0.44410E-07	477477.6	3752656.9	475.0	3.49	4.00	3.25	YES	
L0001659	0	0.44410E-07	477477.7	3752665.5	475.0	3.49	4.00	3.25	YES	
L0001660	0	0.44410E-07	477477.9	3752674.1	475.0	3.49	4.00	3.25	YES	
L0001661	0	0.44410E-07	477478.0	3752682.7	475.0	3.49	4.00	3.25	YES	
L0001662	0	0.44410E-07	477478.2	3752691.3	475.0	3.49	4.00	3.25	YES	
L0001663	0	0.44410E-07	477478.3	3752699.9	475.0	3.49	4.00	3.25	YES	
L0001664	0	0.44410E-07	477478.5	3752708.4	475.0	3.49	4.00	3.25	YES	
L0001665	0	0.44410E-07	477478.6	3752717.0	475.0	3.49	4.00	3.25	YES	
L0001666	0	0.44410E-07	477478.8	3752725.6	475.2	3.49	4.00	3.25	YES	
L0001667	0	0.44410E-07	477479.0	3752734.2	475.4	3.49	4.00	3.25	YES	
L0001668	0	0.44410E-07	477479.1	3752742.8	475.6	3.49	4.00	3.25	YES	
L0001669	0	0.44410E-07	477479.3	3752751.4	475.7	3.49	4.00	3.25	YES	
L0001670	0	0.44410E-07	477479.4	3752760.0	475.7	3.49	4.00	3.25	YES	
L0001671	0	0.44410E-07	477479.6	3752768.6	475.7	3.49	4.00	3.25	YES	
L0001672	0	0.44410E-07	477479.7	3752777.2	475.7	3.49	4.00	3.25	YES	
L0001673	0	0.44410E-07	477479.9	3752785.7	475.8	3.49	4.00	3.25	YES	
L0001674	0	0.44410E-07	477479.8	3752794.3	475.9	3.49	4.00	3.25	YES	

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*** MODELOPTs: RegDFAULT CONC ELEV URBAN ADJ_U*

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0001675	0	0.44410E-07	477479.6	3752802.9	476.0	3.49	4.00	3.25	YES	
L0001676	0	0.44410E-07	477479.4	3752811.5	476.0	3.49	4.00	3.25	YES	
L0001677	0	0.44410E-07	477479.2	3752820.1	476.0	3.49	4.00	3.25	YES	
L0001678	0	0.44410E-07	477479.0	3752828.7	476.0	3.49	4.00	3.25	YES	
L0001679	0	0.44410E-07	477478.9	3752837.3	476.0	3.49	4.00	3.25	YES	
L0001680	0	0.44410E-07	477478.7	3752845.9	476.3	3.49	4.00	3.25	YES	
L0001681	0	0.44410E-07	477478.5	3752854.4	476.6	3.49	4.00	3.25	YES	
L0001682	0	0.44410E-07	477478.3	3752863.0	476.9	3.49	4.00	3.25	YES	
L0001683	0	0.44410E-07	477478.1	3752871.6	477.0	3.49	4.00	3.25	YES	
L0001684	0	0.44410E-07	477477.9	3752880.2	477.0	3.49	4.00	3.25	YES	
L0001685	0	0.44410E-07	477477.6	3752888.8	477.0	3.49	4.00	3.25	YES	
L0001686	0	0.44410E-07	477477.0	3752897.4	477.0	3.49	4.00	3.25	YES	
L0001687	0	0.44410E-07	477476.3	3752905.9	477.0	3.49	4.00	3.25	YES	
L0001688	0	0.44410E-07	477475.7	3752914.5	477.0	3.49	4.00	3.25	YES	
L0001689	0	0.44410E-07	477475.1	3752923.1	477.0	3.49	4.00	3.25	YES	
L0001690	0	0.44410E-07	477474.5	3752931.6	477.0	3.49	4.00	3.25	YES	
L0001691	0	0.44410E-07	477473.9	3752940.2	477.0	3.49	4.00	3.25	YES	
L0001692	0	0.44410E-07	477473.3	3752948.8	477.0	3.49	4.00	3.25	YES	
L0001693	0	0.44410E-07	477472.6	3752957.3	477.0	3.49	4.00	3.25	YES	
L0001694	0	0.44410E-07	477472.0	3752965.9	477.3	3.49	4.00	3.25	YES	
L0001695	0	0.44410E-07	477471.4	3752974.5	477.6	3.49	4.00	3.25	YES	
L0001696	0	0.44410E-07	477470.8	3752983.0	477.9	3.49	4.00	3.25	YES	
L0001697	0	0.44410E-07	477470.2	3752991.6	478.0	3.49	4.00	3.25	YES	
L0001698	0	0.44410E-07	477469.6	3753000.2	478.0	3.49	4.00	3.25	YES	
L0001699	0	0.44410E-07	477468.9	3753008.7	478.0	3.49	4.00	3.25	YES	
L0001700	0	0.44410E-07	477466.8	3753015.7	478.0	3.49	4.00	3.25	YES	
L0001701	0	0.44410E-07	477458.2	3753015.6	478.0	3.49	4.00	3.25	YES	
L0001702	0	0.44410E-07	477449.6	3753015.6	478.0	3.49	4.00	3.25	YES	
L0001703	0	0.44410E-07	477441.0	3753015.5	478.0	3.49	4.00	3.25	YES	
L0001704	0	0.44410E-07	477432.4	3753015.5	478.0	3.49	4.00	3.25	YES	
L0001705	0	0.44410E-07	477423.8	3753015.5	478.0	3.49	4.00	3.25	YES	
L0001706	0	0.44410E-07	477415.3	3753015.4	478.0	3.49	4.00	3.25	YES	
L0001707	0	0.44410E-07	477406.7	3753015.4	478.0	3.49	4.00	3.25	YES	
L0001708	0	0.44410E-07	477398.1	3753015.4	478.0	3.49	4.00	3.25	YES	
L0001709	0	0.44410E-07	477389.5	3753015.3	478.0	3.49	4.00	3.25	YES	
L0001710	0	0.44410E-07	477380.9	3753015.3	478.0	3.49	4.00	3.25	YES	
L0001711	0	0.44410E-07	477372.3	3753015.3	478.0	3.49	4.00	3.25	YES	
L0001712	0	0.44410E-07	477363.7	3753015.2	478.0	3.49	4.00	3.25	YES	
L0001713	0	0.44410E-07	477355.1	3753015.2	478.0	3.49	4.00	3.25	YES	
L0001714	0	0.44410E-07	477346.5	3753015.2	478.0	3.49	4.00	3.25	YES	

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*** MODELOPTs: RegDFAULT CONC ELEV URBAN ADJ_U*

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY

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L0001715	0	0.44410E-07	477337.9	3753015.1	478.0	3.49	4.00	3.25	YES	
L0001716	0	0.44410E-07	477329.4	3753015.1	478.0	3.49	4.00	3.25	YES	
L0001717	0	0.44410E-07	477320.8	3753015.0	478.0	3.49	4.00	3.25	YES	
L0001718	0	0.44410E-07	477312.2	3753015.0	478.0	3.49	4.00	3.25	YES	
L0001719	0	0.44410E-07	477303.6	3753015.0	478.0	3.49	4.00	3.25	YES	
L0001720	0	0.44410E-07	477295.0	3753014.9	478.0	3.49	4.00	3.25	YES	
L0001721	0	0.44410E-07	477286.4	3753014.9	478.0	3.49	4.00	3.25	YES	
L0001722	0	0.44410E-07	477277.8	3753014.9	478.0	3.49	4.00	3.25	YES	
L0001723	0	0.44410E-07	477269.2	3753014.8	478.0	3.49	4.00	3.25	YES	
L0001724	0	0.44410E-07	477260.6	3753014.8	478.0	3.49	4.00	3.25	YES	
L0001725	0	0.44410E-07	477252.0	3753014.8	478.0	3.49	4.00	3.25	YES	
L0001726	0	0.44410E-07	477243.5	3753014.7	478.0	3.49	4.00	3.25	YES	
L0001727	0	0.44410E-07	477234.9	3753014.7	478.0	3.49	4.00	3.25	YES	
L0001728	0	0.44410E-07	477226.3	3753014.7	478.0	3.49	4.00	3.25	YES	
L0001729	0	0.44410E-07	477217.7	3753014.6	478.0	3.49	4.00	3.25	YES	
L0001730	0	0.44410E-07	477209.1	3753014.6	478.0	3.49	4.00	3.25	YES	
L0001731	0	0.44410E-07	477200.5	3753014.5	478.0	3.49	4.00	3.25	YES	
L0001732	0	0.44410E-07	477191.9	3753014.5	478.0	3.49	4.00	3.25	YES	
L0001733	0	0.44410E-07	477183.3	3753014.5	478.0	3.49	4.00	3.25	YES	
L0001734	0	0.44410E-07	477174.7	3753014.4	478.0	3.49	4.00	3.25	YES	
L0001735	0	0.44410E-07	477166.2	3753014.4	478.0	3.49	4.00	3.25	YES	
L0001736	0	0.44410E-07	477157.6	3753014.4	478.0	3.49	4.00	3.25	YES	
L0001737	0	0.44410E-07	477149.0	3753014.3	478.0	3.49	4.00	3.25	YES	
L0001738	0	0.44410E-07	477140.4	3753014.3	477.9	3.49	4.00	3.25	YES	
L0001739	0	0.44410E-07	477131.8	3753014.3	477.9	3.49	4.00	3.25	YES	
L0001740	0	0.44410E-07	477123.2	3753014.2	477.9	3.49	4.00	3.25	YES	
L0001741	0	0.44410E-07	477114.6	3753014.2	477.9	3.49	4.00	3.25	YES	
L0001742	0	0.44410E-07	477106.0	3753014.1	477.9	3.49	4.00	3.25	YES	
L0001743	0	0.44410E-07	477097.4	3753014.1	477.9	3.49	4.00	3.25	YES	
L0001744	0	0.44410E-07	477088.8	3753014.1	477.9	3.49	4.00	3.25	YES	
L0001745	0	0.44410E-07	477080.3	3753014.0	478.0	3.49	4.00	3.25	YES	
L0001746	0	0.44410E-07	477071.7	3753014.0	478.0	3.49	4.00	3.25	YES	
L0001747	0	0.44410E-07	477063.1	3753014.0	478.0	3.49	4.00	3.25	YES	
L0001748	0	0.44410E-07	477054.5	3753013.9	478.0	3.49	4.00	3.25	YES	
L0001749	0	0.44410E-07	477045.9	3753013.9	478.0	3.49	4.00	3.25	YES	
L0001750	0	0.44410E-07	477037.3	3753013.9	478.0	3.49	4.00	3.25	YES	
L0001751	0	0.44410E-07	477028.7	3753013.8	478.0	3.49	4.00	3.25	YES	
L0001752	0	0.44410E-07	477020.1	3753013.8	478.0	3.49	4.00	3.25	YES	
L0001753	0	0.44410E-07	477011.5	3753013.8	478.0	3.49	4.00	3.25	YES	
L0001754	0	0.44410E-07	477002.9	3753013.7	478.0	3.49	4.00	3.25	YES	

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*** MODELOPTs: RegDFAULT CONC ELEV URBAN ADJ_U*

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0001755	0	0.44410E-07	476994.4	3753013.7	478.0	3.49	4.00	3.25	YES	
L0001756	0	0.44410E-07	476985.8	3753013.6	478.0	3.49	4.00	3.25	YES	
L0001757	0	0.44410E-07	476977.2	3753013.6	478.0	3.49	4.00	3.25	YES	
L0001758	0	0.44410E-07	476968.6	3753013.6	478.0	3.49	4.00	3.25	YES	
L0001759	0	0.44410E-07	476960.0	3753013.5	478.0	3.49	4.00	3.25	YES	
L0001760	0	0.44410E-07	476951.4	3753013.5	478.0	3.49	4.00	3.25	YES	
L0001761	0	0.44410E-07	476942.8	3753013.5	478.0	3.49	4.00	3.25	YES	
L0001762	0	0.44410E-07	476934.2	3753013.4	478.0	3.49	4.00	3.25	YES	

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 L0001763         0   0.44410E-07  476925.6 3753013.4   478.0     3.49     4.00     3.25     YES
 L0001764         0   0.44410E-07  476917.0 3753013.4   478.0     3.49     4.00     3.25     YES
 L0001765         0   0.44410E-07  476908.5 3753013.3   478.0     3.49     4.00     3.25     YES
 L0001766         0   0.44410E-07  476899.9 3753013.3   478.0     3.49     4.00     3.25     YES
 L0001767         0   0.44410E-07  476891.3 3753013.3   478.0     3.49     4.00     3.25     YES
 L0001768         0   0.44410E-07  476882.7 3753013.2   478.0     3.49     4.00     3.25     YES
 L0001769         0   0.44410E-07  476874.1 3753013.2   478.0     3.49     4.00     3.25     YES
 L0001770         0   0.44410E-07  476865.5 3753013.1   478.0     3.49     4.00     3.25     YES
 L0001771         0   0.44410E-07  476856.9 3753013.1   478.0     3.49     4.00     3.25     YES
 L0001772         0   0.44410E-07  476848.3 3753013.1   478.0     3.49     4.00     3.25     YES
 L0001773         0   0.44410E-07  476839.7 3753013.0   478.0     3.49     4.00     3.25     YES
 L0001774         0   0.44410E-07  476831.1 3753013.0   478.0     3.49     4.00     3.25     YES
 L0001775         0   0.44410E-07  476822.6 3753013.0   478.0     3.49     4.00     3.25     YES
 L0001776         0   0.44410E-07  476814.0 3753012.9   478.0     3.49     4.00     3.25     YES
 L0001777         0   0.44410E-07  476805.4 3753012.9   478.0     3.49     4.00     3.25     YES
 L0001778         0   0.44410E-07  476796.8 3753012.9   478.1     3.49     4.00     3.25     YES
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 L0001781         0   0.44410E-07  476771.0 3753012.8   478.8     3.49     4.00     3.25     YES
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 L0001783         0   0.44410E-07  476753.8 3753012.7   478.9     3.49     4.00     3.25     YES
 L0001784         0   0.44410E-07  476745.2 3753012.6   479.0     3.49     4.00     3.25     YES
 L0001785         0   0.44410E-07  476736.7 3753012.6   479.0     3.49     4.00     3.25     YES
 L0001786         0   0.44410E-07  476728.1 3753012.6   479.0     3.49     4.00     3.25     YES
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 L0001789         0   0.44410E-07  476702.3 3753012.5   479.0     3.49     4.00     3.25     YES
 L0001790         0   0.44410E-07  476693.7 3753012.4   479.0     3.49     4.00     3.25     YES
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♀ *** AERMOD - VERSION 16216r ***   *** C:\LAKES\AERMOD VIEW\11141 HRA\11141 HRA.ISC                         ***
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 *** MODELOPTs:    RegDFAULT  CONC  ELEV  URBAN  ADJ_U*


                                        *** SOURCE IDs DEFINING SOURCE GROUPS ***

 SRCGROUP ID                                          SOURCE IDs
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♀ *** AERMOD - VERSION 16216r ***   *** C:\LAKES\AERMOD VIEW\11141 HRA\11141 HRA.ISC                        ***
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 *** MODELOPTs:    RegDFAULT  CONC  ELEV  URBAN  ADJ_U*


                                        *** SOURCE IDs DEFINING SOURCE GROUPS ***

 SRCGROUP ID                                            SOURCE IDs
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L0001674    ,
♀ *** AERMOD - VERSION 16216r ***   *** C:\LAKES\AERMOD VIEW\11141 HRA\11141 HRA.ISC                        ***
    01/24/18
 *** AERMET - VERSION  16216 ***   ***                                                                      ***
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   PAGE  15
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  URBAN  ADJ_U*


                                        *** SOURCE IDs DEFINING SOURCE GROUPS ***

 SRCGROUP ID                                            SOURCE IDs
 -----------                                            ----------


            L0001675    , L0001676    , L0001677    , L0001678    , L0001679    , L0001680    , L0001681    ,
L0001682    ,

            L0001683    , L0001684    , L0001685    , L0001686    , L0001687    , L0001688    , L0001689    ,
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            L0001691    , L0001692    , L0001693    , L0001694    , L0001695    , L0001696    , L0001697    ,
L0001698    ,
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L0001706    ,

            L0001707    , L0001708    , L0001709    , L0001710    , L0001711    , L0001712    , L0001713    ,
L0001714    ,

            L0001715    , L0001716    , L0001717    , L0001718    , L0001719    , L0001720    , L0001721    ,
L0001722    ,

            L0001723    , L0001724    , L0001725    , L0001726    , L0001727    , L0001728    , L0001729    ,
L0001730    ,

            L0001731    , L0001732    , L0001733    , L0001734    , L0001735    , L0001736    , L0001737    ,
L0001738    ,

            L0001739    , L0001740    , L0001741    , L0001742    , L0001743    , L0001744    , L0001745    ,
L0001746    ,

            L0001747    , L0001748    , L0001749    , L0001750    , L0001751    , L0001752    , L0001753    ,
L0001754    ,

            L0001755    , L0001756    , L0001757    , L0001758    , L0001759    , L0001760    , L0001761    ,
L0001762    ,

            L0001763    , L0001764    , L0001765    , L0001766    , L0001767    , L0001768    , L0001769    ,
L0001770    ,

            L0001771    , L0001772    , L0001773    , L0001774    , L0001775    , L0001776    , L0001777    ,
L0001778    ,

            L0001779    , L0001780    , L0001781    , L0001782    , L0001783    , L0001784    , L0001785    ,
L0001786    ,

            L0001787    , L0001788    , L0001789    , L0001790    , L0001791    , L0001792    ,
♀ *** AERMOD - VERSION 16216r ***   *** C:\LAKES\AERMOD VIEW\11141 HRA\11141 HRA.ISC                         ***
    01/24/18
 *** AERMET - VERSION  16216 ***   ***                                                                       ***
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 *** MODELOPTs:    RegDFAULT  CONC  ELEV  URBAN  ADJ_U*


                                        *** SOURCE IDs DEFINED AS URBAN SOURCES ***

  URBAN ID   URBAN POP                                  SOURCE IDs
  --------   ---------                                  ----------


              2189641.   L0001336    , L0001337    , L0001338    , L0001339    , L0001340    , L0001341    ,
L0001342    ,
 L0001343    ,

            L0001344    , L0001345    , L0001346    , L0001347    , L0001348    , L0001349    , L0001350    ,
L0001351    ,

            L0001352    , L0001353    , L0001354    , L0001374    , L0001375    , L0001376    , L0001377    ,
L0001378    ,

            L0001379    , L0001380    , L0001381    , L0001382    , L0001383    , L0001384    , L0001385    ,
L0001386    ,

            L0001387    , L0001388    , L0001389    , L0001390    , L0001391    , L0001392    , L0001393    ,
L0001394    ,

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            L0001419    , L0001420    , L0001421    , L0001422    , L0001423    , L0001424    , L0001425    ,
L0001426    ,

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L0001434    ,

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L0001442    ,

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L0001506    ,

            L0001507    , L0001508    , L0001509    , L0001510    , L0001511    , L0001512    , L0001513    ,
L0001514    ,
♀ *** AERMOD - VERSION 16216r ***   *** C:\LAKES\AERMOD VIEW\11141 HRA\11141 HRA.ISC                        ***
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 *** AERMET - VERSION  16216 ***   ***                                                                      ***
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 *** MODELOPTs:    RegDFAULT  CONC  ELEV  URBAN  ADJ_U*


                                        *** SOURCE IDs DEFINED AS URBAN SOURCES ***

  URBAN ID   URBAN POP                                  SOURCE IDs
  --------   ---------                                  ----------


            L0001515    , L0001516    , L0001517    , L0001518    , L0001519    , L0001520    , L0001521    ,
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L0001554    ,

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             L0001579    , L0001580    , L0001581    , L0001582    , L0001583    , L0001584    , L0001585    ,
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L0001618    ,

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L0001626    ,

             L0001627    , L0001628    , L0001629    , L0001630    , L0001631    , L0001632    , L0001633    ,
L0001634    ,

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L0001666    ,

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L0001674    ,
♀ *** AERMOD - VERSION 16216r ***   *** C:\LAKES\AERMOD VIEW\11141 HRA\11141 HRA.ISC                        ***
    01/24/18
 *** AERMET - VERSION  16216 ***   ***                                                                      ***
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 *** MODELOPTs:    RegDFAULT  CONC  ELEV  URBAN  ADJ_U*


                                        *** SOURCE IDs DEFINED AS URBAN SOURCES ***

  URBAN ID   URBAN POP                                  SOURCE IDs
  --------   ---------                                  ----------


             L0001675    , L0001676    , L0001677    , L0001678    , L0001679    , L0001680    , L0001681    ,
L0001682    ,
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L0001714    ,

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L0001722    ,

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L0001730    ,

            L0001731    , L0001732    , L0001733    , L0001734    , L0001735    , L0001736    , L0001737    ,
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♀ *** AERMOD - VERSION 16216r ***   *** C:\LAKES\AERMOD VIEW\11141 HRA\11141 HRA.ISC                          ***
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 *** AERMET - VERSION  16216 ***   ***                                                                        ***
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   PAGE  19
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  URBAN  ADJ_U*

                                        *** DISCRETE CARTESIAN RECEPTORS ***
                                      (X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)
                                                (METERS)

     ( 477517.6, 3751787.5,     468.0,     468.0,       0.0);         ( 476267.8, 3751810.8,     469.9,     469.9,
     0.0);
     ( 476367.8, 3751810.8,     469.8,     469.8,       0.0);         ( 476467.8, 3751810.8,     469.8,     469.8,
     0.0);
     ( 476567.8, 3751810.8,     469.8,     469.8,       0.0);         ( 476667.8, 3751810.8,     469.8,     469.8,
     0.0);
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     0.0);
     ( 476967.8, 3751810.8,     468.8,     468.8,       0.0);         ( 477067.8, 3751810.8,     468.8,     468.8,
     0.0);
     ( 477167.8, 3751810.8,     468.0,     468.0,       0.0);         ( 477267.8, 3751810.8,     468.0,     468.0,
     0.0);
     ( 477367.8, 3751810.8,     468.0,     468.0,       0.0);         ( 477567.8, 3751810.8,     468.0,     468.0,
     0.0);
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(478067.8, 3751810.8, 469.9, 469.9, 0.0); (478167.8, 3751810.8, 470.0, 470.0, 0.0);
(477517.6, 3751887.5, 468.4, 468.4, 0.0); (476267.8, 3751910.8, 470.0, 470.0, 0.0);
(476367.8, 3751910.8, 470.0, 470.0, 0.0); (476467.8, 3751910.8, 470.0, 470.0, 0.0);
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(476967.8, 3751910.8, 469.0, 469.0, 0.0); (477067.8, 3751910.8, 469.0, 469.0, 0.0);
(477167.8, 3751910.8, 469.0, 469.0, 0.0); (477267.8, 3751910.8, 469.0, 469.0, 0.0);
(477367.8, 3751910.8, 469.0, 469.0, 0.0); (477567.8, 3751910.8, 469.0, 469.0, 0.0);
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(478067.8, 3751910.8, 470.0, 470.0, 0.0); (478167.8, 3751910.8, 470.7, 470.7, 0.0);
(477517.6, 3751987.5, 469.0, 469.0, 0.0); (476267.8, 3752010.8, 471.0, 471.0, 0.0);
(476367.8, 3752010.8, 471.0, 471.0, 0.0); (476467.8, 3752010.8, 471.0, 471.0, 0.0);
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(477067.8, 3752110.8, 470.0, 470.0, 0.0); (477167.8, 3752110.8, 470.0, 470.0, 0.0);
(477267.8, 3752110.8, 470.0, 470.0, 0.0); (477367.8, 3752110.8, 470.0, 470.0, 0.0);
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(478067.8, 3752110.8, 471.9, 471.9, 0.0); (478167.8, 3752110.8, 472.0, 472.0,

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     0.0);
     ( 476367.8, 3752210.8,     472.0,     472.0,       0.0);         ( 476467.8, 3752210.8,     472.0,     472.0,
     0.0);
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     0.0);
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     0.0);
♀ *** AERMOD - VERSION 16216r ***   *** C:\LAKES\AERMOD VIEW\11141 HRA\11141 HRA.ISC                        ***
    01/24/18
 *** AERMET - VERSION  16216 ***   ***                                                                      ***
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   PAGE  20
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  URBAN  ADJ_U*

                                          *** DISCRETE CARTESIAN RECEPTORS ***
                                        (X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)
                                                        (METERS)

     ( 477418.4, 3751973.0,     469.0,     469.0,       0.0);         ( 477567.8, 3752210.8,     471.1,     471.1,
     0.0);
     ( 477667.8, 3752210.8,     471.1,     471.1,       0.0);         ( 477767.8, 3752210.8,     472.0,     472.0,
     0.0);
     ( 477867.8, 3752210.8,     472.0,     472.0,       0.0);         ( 477967.8, 3752210.8,     472.0,     472.0,
     0.0);
     ( 478067.8, 3752210.8,     472.0,     472.0,       0.0);         ( 478167.8, 3752210.8,     473.0,     473.0,
     0.0);
     ( 477517.6, 3752287.5,     472.0,     472.0,       0.0);         ( 476267.8, 3752310.8,     473.0,     473.0,
     0.0);
     ( 476367.8, 3752310.8,     473.0,     473.0,       0.0);         ( 476467.8, 3752310.8,     473.0,     473.0,
     0.0);
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     0.0);
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     0.0);
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     0.0);
     ( 477167.8, 3752310.8,     472.0,     472.0,       0.0);         ( 477267.8, 3752310.8,     472.0,     472.0,
     0.0);
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     0.0);
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     0.0);
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     0.0);
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     0.0);
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     0.0);
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     0.0);
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     0.0);
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     0.0);
     ( 476867.8, 3752410.8,     473.0,     473.0,       0.0);         ( 476967.8, 3752410.8,     472.0,     472.0,
     0.0);
     ( 477067.8, 3752410.8,     472.0,     472.0,       0.0);         ( 477167.8, 3752410.8,     472.8,     472.8,
     0.0);
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     0.0);
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     0.0);
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     0.0);
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    0.0);
    ( 478067.8, 3752410.8,     474.8,     474.8,       0.0);         ( 478167.8, 3752410.8,     475.0,     475.0,
    0.0);
    ( 477517.6, 3752487.5,     474.0,     474.0,       0.0);         ( 476267.8, 3752510.8,     475.0,     475.0,
    0.0);
    ( 476367.8, 3752510.8,     475.0,     475.0,       0.0);         ( 476467.8, 3752510.8,     474.1,     474.1,
    0.0);
    ( 476567.8, 3752510.8,     474.1,     474.1,       0.0);         ( 476667.8, 3752510.8,     474.0,     474.0,
    0.0);
    ( 476767.8, 3752510.8,     474.0,     474.0,       0.0);         ( 476867.8, 3752510.8,     474.0,     474.0,
    0.0);
    ( 476967.8, 3752510.8,     473.1,     473.1,       0.0);         ( 477067.8, 3752510.8,     473.0,     473.0,
    0.0);
    ( 477167.8, 3752510.8,     473.0,     473.0,       0.0);         ( 477267.8, 3752510.8,     473.1,     473.1,
    0.0);
    ( 477367.8, 3752510.8,     474.0,     474.0,       0.0);         ( 477500.7, 3752385.2,     472.4,     472.4,
    0.0);
    ( 477567.8, 3752510.8,     474.0,     474.0,       0.0);         ( 477667.8, 3752510.8,     474.0,     474.0,
    0.0);
    ( 477767.8, 3752510.8,     474.1,     474.1,       0.0);         ( 477867.8, 3752510.8,     475.0,     475.0,
    0.0);
    ( 477967.8, 3752510.8,     475.0,     475.0,       0.0);         ( 478067.8, 3752510.8,     475.1,     475.1,
    0.0);
    ( 478167.8, 3752510.8,     476.0,     476.0,       0.0);         ( 477517.6, 3752587.5,     474.7,     474.7,
    0.0);
    ( 476267.8, 3752610.8,     475.0,     475.0,       0.0);         ( 476367.8, 3752610.8,     476.0,     476.0,
    0.0);
    ( 476467.8, 3752610.8,     475.0,     475.0,       0.0);         ( 476567.8, 3752610.8,     476.0,     476.0,
    0.0);
    ( 476667.8, 3752610.8,     475.0,     475.0,       0.0);         ( 476767.8, 3752610.8,     475.0,     475.0,
    0.0);
    ( 476867.8, 3752610.8,     475.0,     475.0,       0.0);         ( 476967.8, 3752610.8,     474.5,     474.5,
    0.0);
    ( 477067.8, 3752610.8,     474.0,     474.0,       0.0);         ( 477500.7, 3752485.2,     474.0,     474.0,
    0.0);
    ( 477567.8, 3752610.8,     475.0,     475.0,       0.0);         ( 477667.8, 3752610.8,     475.0,     475.0,
    0.0);
    ( 477767.8, 3752610.8,     475.0,     475.0,       0.0);         ( 477867.8, 3752610.8,     475.5,     475.5,
    0.0);
    ( 477967.8, 3752610.8,     476.0,     476.0,       0.0);         ( 478067.8, 3752610.8,     476.0,     476.0,
    0.0);
    ( 478167.8, 3752610.8,     476.5,     476.5,       0.0);         ( 477517.6, 3752687.5,     475.0,     475.0,
    0.0);
♀ *** AERMOD - VERSION 16216r ***   *** C:\LAKES\AERMOD VIEW\11141 HRA\11141 HRA.ISC                          ***
   01/24/18
 *** AERMET - VERSION  16216 ***   ***                                                                        ***
  12:49:32

  PAGE  21
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  URBAN  ADJ_U*

                                        *** DISCRETE CARTESIAN RECEPTORS ***
                                      (X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)
                                                   (METERS)

    ( 476267.8, 3752710.8,     476.0,     476.0,       0.0);         ( 476367.8, 3752710.8,     476.0,     476.0,
    0.0);
    ( 476467.8, 3752710.8,     475.8,     475.8,       0.0);         ( 476567.8, 3752710.8,     476.0,     476.0,
    0.0);
    ( 476667.8, 3752710.8,     476.0,     476.0,       0.0);         ( 476767.8, 3752710.8,     476.0,     476.0,
    0.0);
    ( 476867.8, 3752710.8,     476.0,     476.0,       0.0);         ( 476967.8, 3752710.8,     475.8,     475.8,
    0.0);
    ( 477067.8, 3752710.8,     475.1,     475.1,       0.0);         ( 477167.8, 3752710.8,     475.0,     475.0,
    0.0);
    ( 477267.8, 3752710.8,     475.0,     475.0,       0.0);         ( 477500.7, 3752585.2,     474.6,     474.6,
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0.0);
(477567.8, 3752710.8, 475.8, 475.8, 0.0); (477667.8, 3752710.8, 475.8, 475.8, 0.0);
(477767.8, 3752710.8, 476.0, 476.0, 0.0); (477867.8, 3752710.8, 476.0, 476.0, 0.0);
(477967.8, 3752710.8, 477.0, 477.0, 0.0); (478067.8, 3752710.8, 477.0, 477.0, 0.0);
(478167.8, 3752710.8, 477.5, 477.5, 0.0); (477517.6, 3752787.5, 476.0, 476.0, 0.0);
(476267.8, 3752810.8, 477.0, 477.0, 0.0); (476367.8, 3752810.8, 476.1, 476.1, 0.0);
(476467.8, 3752810.8, 476.1, 476.1, 0.0); (476567.8, 3752810.8, 477.0, 477.0, 0.0);
(476667.8, 3752810.8, 477.0, 477.0, 0.0); (476767.8, 3752810.8, 477.0, 477.0, 0.0);
(476867.8, 3752810.8, 477.0, 477.0, 0.0); (476967.8, 3752810.8, 476.1, 476.1, 0.0);
(477067.8, 3752810.8, 476.0, 476.0, 0.0); (477167.8, 3752810.8, 475.0, 475.0, 0.0);
(477267.8, 3752810.8, 476.0, 476.0, 0.0); (477500.7, 3752685.2, 475.0, 475.0, 0.0);
(477567.8, 3752810.8, 476.0, 476.0, 0.0); (477667.8, 3752810.8, 476.1, 476.1, 0.0);
(477767.8, 3752810.8, 477.0, 477.0, 0.0); (477867.8, 3752810.8, 477.0, 477.0, 0.0);
(477967.8, 3752810.8, 477.9, 477.9, 0.0); (478067.8, 3752810.8, 478.0, 478.0, 0.0);
(478167.8, 3752810.8, 478.0, 478.0, 0.0); (477517.6, 3752887.5, 476.7, 476.7, 0.0);
(476267.8, 3752910.8, 477.9, 477.9, 0.0); (476367.8, 3752910.8, 478.0, 478.0, 0.0);
(476467.8, 3752910.8, 478.0, 478.0, 0.0); (476567.8, 3752910.8, 478.0, 478.0, 0.0);
(476667.8, 3752910.8, 478.0, 478.0, 0.0); (476767.8, 3752910.8, 478.0, 478.0, 0.0);
(476867.8, 3752910.8, 477.5, 477.5, 0.0); (476967.8, 3752910.8, 477.0, 477.0, 0.0);
(477067.8, 3752910.8, 476.1, 476.1, 0.0); (477167.8, 3752910.8, 476.0, 476.0, 0.0);
(477267.8, 3752910.8, 476.5, 476.5, 0.0); (477367.8, 3752910.8, 477.0, 477.0, 0.0);
(477500.7, 3752785.2, 476.0, 476.0, 0.0); (477567.8, 3752910.8, 477.0, 477.0, 0.0);
(477667.8, 3752910.8, 477.0, 477.0, 0.0); (477767.8, 3752910.8, 477.6, 477.6, 0.0);
(477867.8, 3752910.8, 478.0, 478.0, 0.0); (477967.8, 3752910.8, 478.4, 478.4, 0.0);
(478067.8, 3752910.8, 478.5, 478.5, 0.0); (478167.8, 3752910.8, 479.0, 479.0, 0.0);
(477517.6, 3752987.5, 478.0, 478.0, 0.0); (476267.8, 3753010.8, 478.9, 478.9, 0.0);
(476367.8, 3753010.8, 478.0, 478.0, 0.0); (476467.8, 3753010.8, 478.8, 478.8, 0.0);
(476567.8, 3753010.8, 479.0, 479.0, 0.0); (476667.8, 3753010.8, 479.0, 479.0, 0.0);
(476767.8, 3753010.8, 478.8, 478.8, 0.0); (476865.8, 3752984.8, 478.0, 478.0, 0.0);
(476965.8, 3752984.8, 478.0, 478.0, 0.0); (477065.8, 3752984.8, 477.9, 477.9, 0.0);
(477165.8, 3752984.8, 477.9, 477.9, 0.0); (477265.8, 3752984.8, 477.9, 477.9, 0.0);
(477365.8, 3752984.8, 477.9, 477.9, 0.0); (477500.7, 3752885.2, 476.9, 476.9, 0.0);
(477567.8, 3753010.8, 477.9, 477.9, 0.0); (477667.8, 3753010.8, 478.0, 478.0, 0.0);
(477767.8, 3753010.8, 478.0, 478.0, 0.0); (477867.8, 3753010.8, 479.0, 479.0, 0.0);

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     ( 477967.8, 3753010.8,     479.0,     479.0,       0.0);         ( 478067.8, 3753010.8,     479.0,     479.0,
     0.0);
     ( 478167.8, 3753010.8,     479.5,     479.5,       0.0);         ( 477517.6, 3753087.5,     478.0,     478.0,
     0.0);
     ( 476267.8, 3753110.8,     479.0,     479.0,       0.0);         ( 476367.8, 3753110.8,     479.1,     479.1,
     0.0);
     ( 476467.8, 3753110.8,     479.1,     479.1,       0.0);         ( 476567.8, 3753110.8,     480.0,     480.0,
     0.0);
     ( 476711.1, 3753057.1,     479.0,     479.0,       0.0);         ( 476811.1, 3753057.1,     479.0,     479.0,
     0.0);
     ( 476911.1, 3753057.1,     479.0,     479.0,       0.0);         ( 477011.1, 3753057.1,     478.3,     478.3,
     0.0);
♀ *** AERMOD - VERSION 16216r ***   *** C:\LAKES\AERMOD VIEW\11141 HRA\11141 HRA.ISC                          ***
    01/24/18
 *** AERMET - VERSION  16216 ***   ***                                                                        ***
   12:49:32

   PAGE  22
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  URBAN  ADJ_U*

                                        *** DISCRETE CARTESIAN RECEPTORS ***
                                      (X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)
                                                (METERS)

     ( 477111.1, 3753057.1,     478.0,     478.0,       0.0);         ( 477211.1, 3753057.1,     478.2,     478.2,
     0.0);
     ( 477311.1, 3753057.1,     479.0,     479.0,       0.0);         ( 477411.1, 3753057.1,     478.2,     478.2,
     0.0);
     ( 477490.5, 3753108.8,     479.0,     479.0,       0.0);         ( 477567.8, 3753110.8,     478.1,     478.1,
     0.0);
     ( 477667.8, 3753110.8,     478.1,     478.1,       0.0);         ( 477767.8, 3753110.8,     479.0,     479.0,
     0.0);
     ( 477867.8, 3753110.8,     479.1,     479.1,       0.0);         ( 477967.8, 3753110.8,     480.0,     480.0,
     0.0);
     ( 478067.8, 3753110.8,     480.0,     480.0,       0.0);         ( 478167.8, 3753110.8,     480.0,     480.0,
     0.0);
     ( 477517.6, 3753187.5,     479.0,     479.0,       0.0);         ( 476267.8, 3753210.8,     480.5,     480.5,
     0.0);
     ( 476367.8, 3753210.8,     480.0,     480.0,       0.0);         ( 476467.8, 3753210.8,     480.0,     480.0,
     0.0);
     ( 476567.8, 3753210.8,     480.0,     480.0,       0.0);         ( 476711.1, 3753157.1,     480.0,     480.0,
     0.0);
     ( 476811.1, 3753157.1,     480.0,     480.0,       0.0);         ( 476911.1, 3753157.1,     479.7,     479.7,
     0.0);
     ( 477011.1, 3753157.1,     479.7,     479.7,       0.0);         ( 477111.1, 3753157.1,     479.0,     479.0,
     0.0);
     ( 477211.1, 3753157.1,     479.5,     479.5,       0.0);         ( 477311.1, 3753157.1,     479.7,     479.7,
     0.0);
     ( 477411.1, 3753157.1,     479.0,     479.0,       0.0);         ( 477490.5, 3753208.8,     479.4,     479.4,
     0.0);
     ( 477567.8, 3753210.8,     479.0,     479.0,       0.0);         ( 477667.8, 3753210.8,     479.0,     479.0,
     0.0);
     ( 477767.8, 3753210.8,     479.6,     479.6,       0.0);         ( 477867.8, 3753210.8,     480.0,     480.0,
     0.0);
     ( 477967.8, 3753210.8,     480.4,     480.4,       0.0);         ( 478067.8, 3753210.8,     481.0,     481.0,
     0.0);
     ( 478167.8, 3753210.8,     481.0,     481.0,       0.0);         ( 477517.6, 3753287.5,     480.0,     480.0,
     0.0);
     ( 476267.8, 3753310.8,     481.0,     481.0,       0.0);         ( 476367.8, 3753310.8,     481.0,     481.0,
     0.0);
     ( 476467.8, 3753310.8,     481.0,     481.0,       0.0);         ( 476567.8, 3753310.8,     481.0,     481.0,
     0.0);
     ( 476711.1, 3753257.1,     481.0,     481.0,       0.0);         ( 476811.1, 3753257.1,     481.0,     481.0,
     0.0);
     ( 476911.1, 3753257.1,     481.0,     481.0,       0.0);         ( 477011.1, 3753257.1,     480.0,     480.0,
     0.0);
     ( 477111.1, 3753257.1,     481.0,     481.0,       0.0);         ( 477211.1, 3753257.1,     481.0,     481.0,
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     0.0);
     ( 477311.1, 3753257.1,     481.0,     481.0,       0.0);         ( 477411.1, 3753257.1,     480.0,     480.0,
     0.0);
     ( 477490.5, 3753308.8,     480.7,     480.7,       0.0);         ( 477567.8, 3753310.8,     479.9,     479.9,
     0.0);
     ( 477667.8, 3753310.8,     478.1,     478.1,       0.0);         ( 477767.8, 3753310.8,     479.3,     479.3,
     0.0);
     ( 477867.8, 3753310.8,     480.5,     480.5,       0.0);         ( 477967.8, 3753310.8,     481.0,     481.0,
     0.0);
     ( 478067.8, 3753310.8,     481.8,     481.8,       0.0);         ( 478167.8, 3753310.8,     481.8,     481.8,
     0.0);
     ( 477517.6, 3753387.5,     481.4,     481.4,       0.0);         ( 476267.8, 3753410.8,     482.0,     482.0,
     0.0);
     ( 476367.8, 3753410.8,     482.0,     482.0,       0.0);         ( 476467.8, 3753410.8,     482.0,     482.0,
     0.0);
     ( 476567.8, 3753410.8,     482.0,     482.0,       0.0);         ( 476711.1, 3753357.1,     482.0,     482.0,
     0.0);
     ( 476811.1, 3753357.1,     481.4,     481.4,       0.0);         ( 476911.1, 3753357.1,     481.4,     481.4,
     0.0);
     ( 477011.1, 3753357.1,     481.4,     481.4,       0.0);         ( 477111.1, 3753357.1,     481.4,     481.4,
     0.0);
     ( 477211.1, 3753357.1,     481.4,     481.4,       0.0);         ( 477311.1, 3753357.1,     481.4,     481.4,
     0.0);
     ( 477411.1, 3753357.1,     481.4,     481.4,       0.0);         ( 477490.5, 3753408.8,     482.0,     482.0,
     0.0);
     ( 477567.8, 3753410.8,     481.0,     481.0,       0.0);         ( 477667.8, 3753410.8,     479.1,     479.1,
     0.0);
     ( 477767.8, 3753410.8,     480.1,     480.1,       0.0);         ( 477867.8, 3753410.8,     481.0,     481.0,
     0.0);
     ( 477967.8, 3753410.8,     481.9,     481.9,       0.0);         ( 478067.8, 3753410.8,     482.0,     482.0,
     0.0);
     ( 478167.8, 3753410.8,     482.1,     482.1,       0.0);         ( 477517.6, 3753487.5,     482.0,     482.0,
     0.0);
     ( 476267.8, 3753510.8,     483.0,     483.0,       0.0);         ( 476367.8, 3753510.8,     483.0,     483.0,
     0.0);
     ( 476467.8, 3753510.8,     483.0,     483.0,       0.0);         ( 476567.8, 3753510.8,     483.0,     483.0,
     0.0);
     ( 476711.1, 3753457.1,     482.7,     482.7,       0.0);         ( 476811.1, 3753457.1,     482.7,     482.7,
     0.0);
     ( 476911.1, 3753457.1,     482.7,     482.7,       0.0);         ( 477011.1, 3753457.1,     482.7,     482.7,
     0.0);
     ( 477111.1, 3753457.1,     482.7,     482.7,       0.0);         ( 477211.1, 3753457.1,     482.7,     482.7,
     0.0);
     ( 477311.1, 3753457.1,     482.0,     482.0,       0.0);         ( 477411.1, 3753457.1,     482.0,     482.0,
     0.0);
     ( 477490.5, 3753508.8,     482.0,     482.0,       0.0);         ( 477567.8, 3753510.8,     481.0,     481.0,
     0.0);
♀ *** AERMOD - VERSION 16216r ***   *** C:\LAKES\AERMOD VIEW\11141 HRA\11141 HRA.ISC                          ***
    01/24/18
 *** AERMET - VERSION  16216 ***   ***                                                                        ***
   12:49:32

   PAGE  23
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  URBAN  ADJ_U*

                                        *** DISCRETE CARTESIAN RECEPTORS ***
                                      (X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)
                                                (METERS)

     ( 477667.8, 3753510.8,     481.0,     481.0,       0.0);         ( 477767.8, 3753510.8,     481.0,     481.0,
     0.0);
     ( 477867.8, 3753510.8,     482.0,     482.0,       0.0);         ( 477967.8, 3753510.8,     482.0,     482.0,
     0.0);
     ( 478067.8, 3753510.8,     483.0,     483.0,       0.0);         ( 478167.8, 3753510.8,     483.0,     483.0,
     0.0);
     ( 477517.6, 3753587.5,     482.0,     482.0,       0.0);         ( 476267.8, 3753610.8,     484.0,     484.0,
     0.0);
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0.0);
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0.0);
( 476811.1, 3753557.1,     484.0,     484.0,       0.0);         ( 476911.1, 3753557.1,     484.0,     484.0,
0.0);
( 477011.1, 3753557.1,     483.0,     483.0,       0.0);         ( 477111.1, 3753557.1,     483.0,     483.0,
0.0);
( 477211.1, 3753557.1,     483.0,     483.0,       0.0);         ( 477311.1, 3753557.1,     483.0,     483.0,
0.0);
( 477411.1, 3753557.1,     482.0,     482.0,       0.0);         ( 477490.5, 3753608.8,     482.0,     482.0,
0.0);
( 477567.8, 3753610.8,     481.6,     481.6,       0.0);         ( 477667.8, 3753610.8,     482.0,     482.0,
0.0);
( 477767.8, 3753610.8,     481.9,     481.9,       0.0);         ( 477867.8, 3753610.8,     482.0,     482.0,
0.0);
( 477967.8, 3753610.8,     483.0,     483.0,       0.0);         ( 478067.8, 3753610.8,     483.0,     483.0,
0.0);
( 478167.8, 3753610.8,     483.9,     483.9,       0.0);         ( 477517.6, 3753687.5,     482.4,     482.4,
0.0);
( 476267.8, 3753710.8,     485.0,     485.0,       0.0);         ( 476367.8, 3753710.8,     485.0,     485.0,
0.0);
( 476467.8, 3753710.8,     485.0,     485.0,       0.0);         ( 476567.8, 3753710.8,     485.0,     485.0,
0.0);
( 476711.1, 3753657.1,     484.4,     484.4,       0.0);         ( 476811.1, 3753657.1,     484.4,     484.4,
0.0);
( 476911.1, 3753657.1,     484.4,     484.4,       0.0);         ( 477011.1, 3753657.1,     484.3,     484.3,
0.0);
( 477111.1, 3753657.1,     484.0,     484.0,       0.0);         ( 477211.1, 3753657.1,     484.0,     484.0,
0.0);
( 477311.1, 3753657.1,     484.0,     484.0,       0.0);         ( 477411.1, 3753657.1,     482.0,     482.0,
0.0);
( 477490.5, 3753708.8,     483.0,     483.0,       0.0);         ( 477567.8, 3753710.8,     483.0,     483.0,
0.0);
( 477667.8, 3753710.8,     482.2,     482.2,       0.0);         ( 477767.8, 3753710.8,     482.0,     482.0,
0.0);
( 477867.8, 3753710.8,     482.6,     482.6,       0.0);         ( 477967.8, 3753710.8,     483.1,     483.1,
0.0);
( 478067.8, 3753710.8,     484.0,     484.0,       0.0);         ( 478167.8, 3753710.8,     484.0,     484.0,
0.0);
( 477517.6, 3753787.5,     484.0,     484.0,       0.0);         ( 476267.8, 3753810.8,     485.0,     485.0,
0.0);
( 476367.8, 3753810.8,     485.0,     485.0,       0.0);         ( 476467.8, 3753810.8,     485.5,     485.5,
0.0);
( 476567.8, 3753810.8,     485.5,     485.5,       0.0);         ( 476711.1, 3753757.1,     485.0,     485.0,
0.0);
( 476811.1, 3753757.1,     485.0,     485.0,       0.0);         ( 476911.1, 3753757.1,     485.0,     485.0,
0.0);
( 477011.1, 3753757.1,     485.0,     485.0,       0.0);         ( 477111.1, 3753757.1,     485.0,     485.0,
0.0);
( 477211.1, 3753757.1,     485.0,     485.0,       0.0);         ( 477311.1, 3753757.1,     484.0,     484.0,
0.0);
( 477411.1, 3753757.1,     483.9,     483.9,       0.0);         ( 477490.5, 3753808.8,     484.0,     484.0,
0.0);
( 477567.8, 3753810.8,     484.0,     484.0,       0.0);         ( 477667.8, 3753810.8,     484.0,     484.0,
0.0);
( 477767.8, 3753810.8,     483.2,     483.2,       0.0);         ( 477867.8, 3753810.8,     482.6,     482.6,
0.0);
( 477967.8, 3753810.8,     484.0,     484.0,       0.0);         ( 478067.8, 3753810.8,     484.1,     484.1,
0.0);
( 478167.8, 3753810.8,     485.0,     485.0,       0.0);

♀ *** AERMOD - VERSION 16216r ***   *** C:\LAKES\AERMOD VIEW\11141 HRA\11141 HRA.ISC                          ***
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 *** AERMET - VERSION  16216 ***   ***                                                                        ***
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*** MODELOPTs: RegDFAULT CONC ELEV URBAN ADJ_U*

* SOURCE-RECEPTOR COMBINATIONS FOR WHICH CALCULATIONS MAY NOT BE PERFORMED *
LESS THAN 1.0 METER; WITHIN OPENPIT; OR BEYOND 80KM FOR FASTAREA/FASTALL

SOURCE ID	- - RECEPTOR LOCATION - - XR (METERS)	YR (METERS)	DISTANCE (METERS)
L0001781	476767.8	3753010.8	-4.84
L0001782	476767.8	3753010.8	-2.86
L0001792	476667.8	3753010.8	0.25

♀ *** AERMOD - VERSION 16216r *** *** C:\LAKES\AERMOD VIEW\11141 HRA\11141 HRA.ISC ***
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*** AERMET - VERSION 16216 *** *** ***
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*** MODELOPTs: RegDFAULT CONC ELEV URBAN ADJ_U*

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
(1=YES; 0=NO)

```
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1
1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1
1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1
1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1
1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1
1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1
1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1
1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1
```

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54, 3.09, 5.14, 8.23, 10.80,

♀ *** AERMOD - VERSION 16216r *** *** C:\LAKES\AERMOD VIEW\11141 HRA\11141 HRA.ISC ***
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*** AERMET - VERSION 16216 *** *** ***
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*** MODELOPTs: RegDFAULT CONC ELEV URBAN ADJ_U*

*** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

Surface file: PERRISADJU\PERI_V9_ADJU\PERI_V9.SFC Met Version: 16216
Profile file: PERRISADJU\PERI_V9_ADJU\PERI_V9.PFL
Surface format: FREE

Profile format: FREE

Surface station no.: 3171 Upper air station no.: 3190
Name: UNKNOWN Name: UNKNOWN
Year: 2010 Year: 2010

First 24 hours of scalar data

YR	MO	DY	JDY	HR	H0	U*	W*	DT/DZ	ZICNV	ZIMCH	M-O LEN	Z0	BOWEN	ALBEDO	REF WS	WD	HT	REF TA	HT
10	01	01	1	01	-7.9	0.125	-9.000	-9.000	-999.	106.	21.2	0.19	0.61	1.00	1.30	335.	9.1	282.5	5.5
10	01	01	1	02	-3.9	0.088	-9.000	-9.000	-999.	62.	15.1	0.19	0.61	1.00	0.90	142.	9.1	280.9	5.5
10	01	01	1	03	-3.9	0.088	-9.000	-9.000	-999.	62.	15.1	0.19	0.61	1.00	0.90	324.	9.1	280.4	5.5
10	01	01	1	04	-1.3	0.064	-9.000	-9.000	-999.	39.	18.3	0.19	0.61	1.00	0.40	294.	9.1	278.8	5.5
10	01	01	1	05	-3.9	0.088	-9.000	-9.000	-999.	62.	15.0	0.19	0.61	1.00	0.90	205.	9.1	278.1	5.5
10	01	01	1	06	-1.3	0.065	-9.000	-9.000	-999.	39.	18.3	0.19	0.61	1.00	0.40	3.	9.1	277.0	5.5
10	01	01	1	07	-8.0	0.125	-9.000	-9.000	-999.	106.	21.0	0.19	0.61	1.00	1.30	99.	9.1	277.0	5.5
10	01	01	1	08	-3.3	0.086	-9.000	-9.000	-999.	61.	16.8	0.19	0.61	0.54	0.90	319.	9.1	278.8	5.5
10	01	01	1	09	20.1	0.128	0.307	0.010	49.	110.	-9.0	0.19	0.61	0.33	0.90	239.	9.1	284.2	5.5
10	01	01	1	10	56.7	0.087	0.560	0.010	107.	62.	-1.0	0.19	0.61	0.26	0.40	188.	9.1	289.2	5.5
10	01	01	1	11	81.5	0.323	0.867	0.008	277.	441.	-35.9	0.19	0.61	0.23	2.70	310.	9.1	290.9	5.5
10	01	01	1	12	97.1	0.281	1.058	0.008	421.	357.	-19.7	0.19	0.61	0.22	2.20	357.	9.1	293.1	5.5
10	01	01	1	13	92.2	0.279	1.117	0.008	523.	354.	-20.4	0.19	0.61	0.22	2.20	356.	9.1	293.8	5.5
10	01	01	1	14	77.6	0.275	1.102	0.008	595.	347.	-23.2	0.19	0.61	0.23	2.20	50.	9.1	294.2	5.5
10	01	01	1	15	54.9	0.230	1.006	0.008	640.	266.	-19.2	0.19	0.61	0.27	1.80	53.	9.1	293.8	5.5
10	01	01	1	16	12.3	0.206	0.613	0.008	648.	225.	-61.5	0.19	0.61	0.36	1.80	11.	9.1	292.5	5.5
10	01	01	1	17	-3.6	0.087	-9.000	-9.000	-999.	71.	15.6	0.19	0.61	0.64	0.90	351.	9.1	290.4	5.5
10	01	01	1	18	-3.8	0.087	-9.000	-9.000	-999.	62.	15.2	0.19	0.61	1.00	0.90	186.	9.1	287.5	5.5
10	01	01	1	19	-3.8	0.087	-9.000	-9.000	-999.	62.	15.2	0.19	0.61	1.00	0.90	275.	9.1	285.9	5.5
10	01	01	1	20	-1.2	0.064	-9.000	-9.000	-999.	39.	18.1	0.19	0.61	1.00	0.40	181.	9.1	285.4	5.5
10	01	01	1	21	-7.8	0.125	-9.000	-9.000	-999.	106.	21.3	0.19	0.61	1.00	1.30	318.	9.1	284.9	5.5
10	01	01	1	22	-3.8	0.088	-9.000	-9.000	-999.	62.	15.1	0.19	0.61	1.00	0.90	196.	9.1	283.1	5.5
10	01	01	1	23	-3.8	0.088	-9.000	-9.000	-999.	62.	15.1	0.19	0.61	1.00	0.90	330.	9.1	281.4	5.5
10	01	01	1	24	-7.9	0.125	-9.000	-9.000	-999.	106.	21.2	0.19	0.61	1.00	1.30	332.	9.1	280.9	5.5

First hour of profile data

YR	MO	DY	HR	HEIGHT	F	WDIR	WSPD	AMB_TMP	sigmaA	sigmaW	sigmaV
10	01	01	01	5.5	0	-999.	-99.00	282.6	99.0	-99.00	-99.00
10	01	01	01	9.1	1	335.	1.30	-999.0	99.0	-99.00	-99.00

F indicates top of profile (=1) or below (=0)

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*** MODELOPTs: RegDFAULT CONC ELEV URBAN ADJ_U*

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 5 YEARS FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): L0001336 , L0001337 , L0001338 , L0001339 , L0001340 ,
L0001341 , L0001342 , L0001343 , L0001344 , L0001345 , L0001346 , L0001347 , L0001348 ,
L0001349 , L0001350 , L0001351 , L0001352 , L0001353 , L0001354 , L0001374 , L0001375 ,
L0001376 , L0001377 , L0001378 , L0001379 , L0001380 , L0001381 , L0001382 , . . . ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF DPM IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
477517.57	3751787.50	0.00028	476267.82	3751810.77	0.00012
476367.82	3751810.77	0.00014	476467.82	3751810.77	0.00015
476567.82	3751810.77	0.00017	476667.82	3751810.77	0.00019
476767.82	3751810.77	0.00021	476867.82	3751810.77	0.00024
476967.82	3751810.77	0.00026	477067.82	3751810.77	0.00028
477167.82	3751810.77	0.00030	477267.82	3751810.77	0.00031
477367.82	3751810.77	0.00031	477567.82	3751810.77	0.00028
477667.82	3751810.77	0.00026	477767.82	3751810.77	0.00024
477867.82	3751810.77	0.00022	477967.82	3751810.77	0.00019
478067.82	3751810.77	0.00017	478167.82	3751810.77	0.00015
477517.57	3751887.50	0.00033	476267.82	3751910.77	0.00013
476367.82	3751910.77	0.00015	476467.82	3751910.77	0.00017
476567.82	3751910.77	0.00019	476667.82	3751910.77	0.00022
476767.82	3751910.77	0.00025	476867.82	3751910.77	0.00029
476967.82	3751910.77	0.00033	477067.82	3751910.77	0.00037
477167.82	3751910.77	0.00039	477267.82	3751910.77	0.00040
477367.82	3751910.77	0.00038	477567.82	3751910.77	0.00033
477667.82	3751910.77	0.00030	477767.82	3751910.77	0.00027
477867.82	3751910.77	0.00024	477967.82	3751910.77	0.00021
478067.82	3751910.77	0.00019	478167.82	3751910.77	0.00016
477517.57	3751987.50	0.00040	476267.82	3752010.77	0.00014
476367.82	3752010.77	0.00016	476467.82	3752010.77	0.00018

476567.82	3752010.77	0.00021	476667.82	3752010.77	0.00025
476767.82	3752010.77	0.00030	476867.82	3752010.77	0.00036
476967.82	3752010.77	0.00043	477067.82	3752010.77	0.00052
477167.82	3752010.77	0.00056	477267.82	3752010.77	0.00054
477367.82	3752010.77	0.00049	477418.36	3751772.97	0.00028
477567.82	3752010.77	0.00040	477667.82	3752010.77	0.00036
477767.82	3752010.77	0.00032	477867.82	3752010.77	0.00027
477967.82	3752010.77	0.00023	478067.82	3752010.77	0.00020
478167.82	3752010.77	0.00018	477517.57	3752087.50	0.00050
476267.82	3752110.77	0.00015	476367.82	3752110.77	0.00017
476467.82	3752110.77	0.00020	476567.82	3752110.77	0.00024
476667.82	3752110.77	0.00028	476767.82	3752110.77	0.00035
476867.82	3752110.77	0.00045	476967.82	3752110.77	0.00062
477067.82	3752110.77	0.00091	477167.82	3752110.77	0.00098
477267.82	3752110.77	0.00078	477367.82	3752110.77	0.00064
477418.36	3751872.97	0.00034	477567.82	3752110.77	0.00049
477667.82	3752110.77	0.00043	477767.82	3752110.77	0.00036
477867.82	3752110.77	0.00031	477967.82	3752110.77	0.00026

♀ *** AERMOD - VERSION 16216r *** *** C:\LAKES\AERMOD VIEW\11141 HRA\11141 HRA.ISC ***
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PAGE 28
*** MODELOPTs: RegDFAULT CONC ELEV URBAN ADJ_U*

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 5 YEARS FOR SOURCE GROUP: ALL
***
INCLUDING SOURCE(S): L0001336 , L0001337 , L0001338 , L0001339 ,
L0001340 ,
L0001341 , L0001342 , L0001343 , L0001344 , L0001345 , L0001346 , L0001347 ,
L0001348 ,
L0001349 , L0001350 , L0001351 , L0001352 , L0001353 , L0001354 , L0001374 ,
L0001375 ,
L0001376 , L0001377 , L0001378 , L0001379 , L0001380 , L0001381 , L0001382 ,
. . . ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF DPM IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
478067.82	3752110.77	0.00022	478167.82	3752110.77	0.00019
477517.57	3752187.50	0.00063	476267.82	3752210.77	0.00016

476367.82	3752210.77	0.00019	476467.82	3752210.77	0.00022
476567.82	3752210.77	0.00026	476667.82	3752210.77	0.00032
476767.82	3752210.77	0.00040	476867.82	3752210.77	0.00055
477418.36	3751972.97	0.00043	477567.82	3752210.77	0.00061
477667.82	3752210.77	0.00051	477767.82	3752210.77	0.00042
477867.82	3752210.77	0.00034	477967.82	3752210.77	0.00028
478067.82	3752210.77	0.00023	478167.82	3752210.77	0.00020
477517.57	3752287.50	0.00081	476267.82	3752310.77	0.00017
476367.82	3752310.77	0.00020	476467.82	3752310.77	0.00023
476567.82	3752310.77	0.00028	476667.82	3752310.77	0.00035
476767.82	3752310.77	0.00045	476867.82	3752310.77	0.00062
476967.82	3752310.77	0.00096	477067.82	3752310.77	0.00185
477167.82	3752310.77	0.00565	477267.82	3752310.77	0.00151
477367.82	3752310.77	0.00112	477418.36	3752072.97	0.00054
477567.82	3752310.77	0.00077	477667.82	3752310.77	0.00061
477767.82	3752310.77	0.00047	477867.82	3752310.77	0.00037
477967.82	3752310.77	0.00030	478067.82	3752310.77	0.00025
478167.82	3752310.77	0.00021	477517.57	3752387.50	0.00108
476267.82	3752410.77	0.00017	476367.82	3752410.77	0.00020
476467.82	3752410.77	0.00024	476567.82	3752410.77	0.00030
476667.82	3752410.77	0.00037	476767.82	3752410.77	0.00049
476867.82	3752410.77	0.00067	476967.82	3752410.77	0.00100
477067.82	3752410.77	0.00181	477167.82	3752410.77	0.00585
477267.82	3752410.77	0.00194	477367.82	3752410.77	0.00160
477418.36	3752172.97	0.00070	477567.82	3752410.77	0.00099
477667.82	3752410.77	0.00072	477767.82	3752410.77	0.00053
477867.82	3752410.77	0.00041	477967.82	3752410.77	0.00032
478067.82	3752410.77	0.00026	478167.82	3752410.77	0.00022
477517.57	3752487.50	0.00149	476267.82	3752510.77	0.00018
476367.82	3752510.77	0.00021	476467.82	3752510.77	0.00025
476567.82	3752510.77	0.00031	476667.82	3752510.77	0.00039
476767.82	3752510.77	0.00051	476867.82	3752510.77	0.00071
476967.82	3752510.77	0.00107	477067.82	3752510.77	0.00197
477167.82	3752510.77	0.00632	477267.82	3752510.77	0.00300

477367.82	3752510.77	0.00280	477500.67	3752385.25	0.00111
477567.82	3752510.77	0.00128	477667.82	3752510.77	0.00084
477767.82	3752510.77	0.00059	477867.82	3752510.77	0.00044
477967.82	3752510.77	0.00034	478067.82	3752510.77	0.00028

♀ *** AERMOD - VERSION 16216r *** *** C:\LAKES\AERMOD VIEW\11141 HRA\11141 HRA.ISC ***
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PAGE 29
*** MODELOPTs: RegDFAULT CONC ELEV URBAN ADJ_U*

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 5 YEARS FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): L0001336 , L0001337 , L0001338 , L0001339 , L0001340 ,
L0001341 , L0001342 , L0001343 , L0001344 , L0001345 , L0001346 , L0001347 , L0001348 ,
L0001349 , L0001350 , L0001351 , L0001352 , L0001353 , L0001354 , L0001374 , L0001375 ,
L0001376 , L0001377 , L0001378 , L0001379 , L0001380 , L0001381 , L0001382 , . . . ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF DPM IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
478167.82	3752510.77	0.00023	477517.57	3752587.50	0.00217
476267.82	3752610.77	0.00018	476367.82	3752610.77	0.00021
476467.82	3752610.77	0.00026	476567.82	3752610.77	0.00032
476667.82	3752610.77	0.00040	476767.82	3752610.77	0.00053
476867.82	3752610.77	0.00073	476967.82	3752610.77	0.00109
477067.82	3752610.77	0.00198	477500.67	3752485.25	0.00158
477567.82	3752610.77	0.00161	477667.82	3752610.77	0.00095
477767.82	3752610.77	0.00064	477867.82	3752610.77	0.00046
477967.82	3752610.77	0.00036	478067.82	3752610.77	0.00028
478167.82	3752610.77	0.00023	477517.57	3752687.50	0.00275
476267.82	3752710.77	0.00018	476367.82	3752710.77	0.00021
476467.82	3752710.77	0.00026	476567.82	3752710.77	0.00032
476667.82	3752710.77	0.00040	476767.82	3752710.77	0.00053
476867.82	3752710.77	0.00072	476967.82	3752710.77	0.00106
477067.82	3752710.77	0.00176	477167.82	3752710.77	0.00346
477267.82	3752710.77	0.01152	477500.67	3752585.25	0.00247

477567.82	3752710.77	0.00180	477667.82	3752710.77	0.00101
477767.82	3752710.77	0.00066	477867.82	3752710.77	0.00048
477967.82	3752710.77	0.00036	478067.82	3752710.77	0.00029
478167.82	3752710.77	0.00023	477517.57	3752787.50	0.00274
476267.82	3752810.77	0.00018	476367.82	3752810.77	0.00021
476467.82	3752810.77	0.00026	476567.82	3752810.77	0.00032
476667.82	3752810.77	0.00040	476767.82	3752810.77	0.00052
476867.82	3752810.77	0.00070	476967.82	3752810.77	0.00099
477067.82	3752810.77	0.00155	477167.82	3752810.77	0.00296
477267.82	3752810.77	0.01074	477500.67	3752685.25	0.00341
477567.82	3752810.77	0.00173	477667.82	3752810.77	0.00098
477767.82	3752810.77	0.00065	477867.82	3752810.77	0.00047
477967.82	3752810.77	0.00036	478067.82	3752810.77	0.00028
478167.82	3752810.77	0.00023	477517.57	3752887.50	0.00225
476267.82	3752910.77	0.00017	476367.82	3752910.77	0.00021
476467.82	3752910.77	0.00025	476567.82	3752910.77	0.00031
476667.82	3752910.77	0.00041	476767.82	3752910.77	0.00054
476867.82	3752910.77	0.00070	476967.82	3752910.77	0.00093
477067.82	3752910.77	0.00131	477167.82	3752910.77	0.00208
477267.82	3752910.77	0.00384	477367.82	3752910.77	0.00421
477500.67	3752785.25	0.00344	477567.82	3752910.77	0.00144
477667.82	3752910.77	0.00088	477767.82	3752910.77	0.00060
477867.82	3752910.77	0.00044	477967.82	3752910.77	0.00034
478067.82	3752910.77	0.00028	478167.82	3752910.77	0.00023

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*** MODELOPTs: RegDFAULT CONC ELEV URBAN ADJ_U*

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 5 YEARS FOR SOURCE GROUP: ALL
***
INCLUDING SOURCE(S): L0001336 , L0001337 , L0001338 , L0001339 ,
L0001340 ,
L0001341 , L0001342 , L0001343 , L0001344 , L0001345 , L0001346 , L0001347 ,
L0001348 ,
L0001349 , L0001350 , L0001351 , L0001352 , L0001353 , L0001354 , L0001374 ,
L0001375 ,
L0001376 , L0001377 , L0001378 , L0001379 , L0001380 , L0001381 , L0001382 ,
. . . ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF DPM IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
477517.57	3752987.50	0.00163	476267.82	3753010.77	0.00017
476367.82	3753010.77	0.00020	476467.82	3753010.77	0.00024
476567.82	3753010.77	0.00030	476667.82	3753010.77	0.00054
476767.82	3753010.77	0.00093	476865.82	3752984.84	0.00091
476965.82	3752984.84	0.00108	477065.82	3752984.84	0.00134
477165.82	3752984.84	0.00176	477265.82	3752984.84	0.00231
477365.82	3752984.84	0.00243	477500.67	3752885.25	0.00279
477567.82	3753010.77	0.00111	477667.82	3753010.77	0.00074
477767.82	3753010.77	0.00054	477867.82	3753010.77	0.00041
477967.82	3753010.77	0.00032	478067.82	3753010.77	0.00026
478167.82	3753010.77	0.00022	477517.57	3753087.50	0.00114
476267.82	3753110.77	0.00016	476367.82	3753110.77	0.00019
476467.82	3753110.77	0.00022	476567.82	3753110.77	0.00027
476711.07	3753057.15	0.00052	476811.07	3753057.15	0.00065
476911.07	3753057.15	0.00078	477011.07	3753057.15	0.00093
477111.07	3753057.15	0.00114	477211.07	3753057.15	0.00140
477311.07	3753057.15	0.00157	477411.07	3753057.15	0.00159
477490.45	3753108.78	0.00136	477567.82	3753110.77	0.00084
477667.82	3753110.77	0.00061	477767.82	3753110.77	0.00046
477867.82	3753110.77	0.00036	477967.82	3753110.77	0.00029
478067.82	3753110.77	0.00024	478167.82	3753110.77	0.00020
477517.57	3753187.50	0.00087	476267.82	3753210.77	0.00015
476367.82	3753210.77	0.00017	476467.82	3753210.77	0.00020
476567.82	3753210.77	0.00024	476711.07	3753157.15	0.00035
476811.07	3753157.15	0.00043	476911.07	3753157.15	0.00052
477011.07	3753157.15	0.00062	477111.07	3753157.15	0.00073
477211.07	3753157.15	0.00084	477311.07	3753157.15	0.00092
477411.07	3753157.15	0.00100	477490.45	3753208.78	0.00108
477567.82	3753210.77	0.00065	477667.82	3753210.77	0.00050
477767.82	3753210.77	0.00040	477867.82	3753210.77	0.00032

477967.82	3753210.77	0.00026	478067.82	3753210.77	0.00022
478167.82	3753210.77	0.00019	477517.57	3753287.50	0.00071
476267.82	3753310.77	0.00014	476367.82	3753310.77	0.00016
476467.82	3753310.77	0.00019	476567.82	3753310.77	0.00022
476711.07	3753257.15	0.00029	476811.07	3753257.15	0.00035
476911.07	3753257.15	0.00041	477011.07	3753257.15	0.00048
477111.07	3753257.15	0.00055	477211.07	3753257.15	0.00062
477311.07	3753257.15	0.00066	477411.07	3753257.15	0.00076
477490.45	3753308.78	0.00092	477567.82	3753310.77	0.00053
477667.82	3753310.77	0.00041	477767.82	3753310.77	0.00034

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*** MODELOPTs: RegDFAULT CONC ELEV URBAN ADJ_U*

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 5 YEARS FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): L0001336 , L0001337 , L0001338 , L0001339 , L0001340 ,
L0001341 , L0001342 , L0001343 , L0001344 , L0001345 , L0001346 , L0001347 , L0001348 ,
L0001349 , L0001350 , L0001351 , L0001352 , L0001353 , L0001354 , L0001374 , L0001375 ,
L0001376 , L0001377 , L0001378 , L0001379 , L0001380 , L0001381 , L0001382 , . . . ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF DPM IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
477867.82	3753310.77	0.00028	477967.82	3753310.77	0.00024
478067.82	3753310.77	0.00020	478167.82	3753310.77	0.00017
477517.57	3753387.50	0.00060	476267.82	3753410.77	0.00013
476367.82	3753410.77	0.00015	476467.82	3753410.77	0.00017
476567.82	3753410.77	0.00019	476711.07	3753357.15	0.00025
476811.07	3753357.15	0.00029	476911.07	3753357.15	0.00034
477011.07	3753357.15	0.00039	477111.07	3753357.15	0.00045
477211.07	3753357.15	0.00049	477311.07	3753357.15	0.00052
477411.07	3753357.15	0.00063	477490.45	3753408.78	0.00082
477567.82	3753410.77	0.00045	477667.82	3753410.77	0.00035
477767.82	3753410.77	0.00029	477867.82	3753410.77	0.00025

477967.82	3753410.77	0.00021	478067.82	3753410.77	0.00018
478167.82	3753410.77	0.00016	477517.57	3753487.50	0.00053
476267.82	3753510.77	0.00012	476367.82	3753510.77	0.00014
476467.82	3753510.77	0.00015	476567.82	3753510.77	0.00017
476711.07	3753457.15	0.00022	476811.07	3753457.15	0.00026
476911.07	3753457.15	0.00029	477011.07	3753457.15	0.00033
477111.07	3753457.15	0.00037	477211.07	3753457.15	0.00040
477311.07	3753457.15	0.00042	477411.07	3753457.15	0.00054
477490.45	3753508.78	0.00074	477567.82	3753510.77	0.00039
477667.82	3753510.77	0.00030	477767.82	3753510.77	0.00025
477867.82	3753510.77	0.00021	477967.82	3753510.77	0.00019
478067.82	3753510.77	0.00016	478167.82	3753510.77	0.00014
477517.57	3753587.50	0.00047	476267.82	3753610.77	0.00011
476367.82	3753610.77	0.00013	476467.82	3753610.77	0.00014
476567.82	3753610.77	0.00016	476711.07	3753557.15	0.00020
476811.07	3753557.15	0.00023	476911.07	3753557.15	0.00026
477011.07	3753557.15	0.00029	477111.07	3753557.15	0.00031
477211.07	3753557.15	0.00033	477311.07	3753557.15	0.00036
477411.07	3753557.15	0.00048	477490.45	3753608.78	0.00068
477567.82	3753610.77	0.00034	477667.82	3753610.77	0.00025
477767.82	3753610.77	0.00022	477867.82	3753610.77	0.00019
477967.82	3753610.77	0.00017	478067.82	3753610.77	0.00015
478167.82	3753610.77	0.00013	477517.57	3753687.50	0.00042
476267.82	3753710.77	0.00011	476367.82	3753710.77	0.00012
476467.82	3753710.77	0.00013	476567.82	3753710.77	0.00015
476711.07	3753657.15	0.00018	476811.07	3753657.15	0.00021
476911.07	3753657.15	0.00023	477011.07	3753657.15	0.00025
477111.07	3753657.15	0.00027	477211.07	3753657.15	0.00028
477311.07	3753657.15	0.00030	477411.07	3753657.15	0.00042

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*** MODELOPTs: RegDFAULT CONC ELEV URBAN ADJ_U*

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 5 YEARS FOR SOURCE GROUP: ALL ***

INCLUDING SOURCE(S): L0001336 , L0001337 , L0001338 , L0001339 , L0001340 ,
L0001341 , L0001342 , L0001343 , L0001344 , L0001345 , L0001346 , L0001347 , L0001348 ,
L0001349 , L0001350 , L0001351 , L0001352 , L0001353 , L0001354 , L0001374 , L0001375 ,
L0001376 , L0001377 , L0001378 , L0001379 , L0001380 , L0001381 , L0001382 , . . . ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF DPM IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
477490.45	3753708.78	0.00061	477567.82	3753710.77	0.00029
477667.82	3753710.77	0.00022	477767.82	3753710.77	0.00019
477867.82	3753710.77	0.00017	477967.82	3753710.77	0.00015
478067.82	3753710.77	0.00013	478167.82	3753710.77	0.00012
477517.57	3753787.50	0.00032	476267.82	3753810.77	0.00010
476367.82	3753810.77	0.00011	476467.82	3753810.77	0.00012
476567.82	3753810.77	0.00014	476711.07	3753757.15	0.00017
476811.07	3753757.15	0.00019	476911.07	3753757.15	0.00021
477011.07	3753757.15	0.00022	477111.07	3753757.15	0.00024
477211.07	3753757.15	0.00024	477311.07	3753757.15	0.00026
477411.07	3753757.15	0.00036	477490.45	3753808.78	0.00040
477567.82	3753810.77	0.00023	477667.82	3753810.77	0.00019
477767.82	3753810.77	0.00016	477867.82	3753810.77	0.00015
477967.82	3753810.77	0.00013	478067.82	3753810.77	0.00012
478167.82	3753810.77	0.00011			

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*** MODELOPTs: RegDFAULT CONC ELEV URBAN ADJ_U*

*** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS ***

** CONC OF DPM IN MICROGRAMS/M**3 **

NETWORK GROUP ID	AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID

```
ALL       1ST HIGHEST VALUE IS       0.01152 AT (  477267.82,  3752710.77,   475.00,   475.00,    0.00)  DC

          2ND HIGHEST VALUE IS       0.01074 AT (  477267.82,  3752810.77,   476.00,   476.00,    0.00)  DC

          3RD HIGHEST VALUE IS       0.00632 AT (  477167.82,  3752510.77,   473.00,   473.00,    0.00)  DC

          4TH HIGHEST VALUE IS       0.00585 AT (  477167.82,  3752410.77,   472.81,   472.81,    0.00)  DC

          5TH HIGHEST VALUE IS       0.00565 AT (  477167.82,  3752310.77,   472.00,   472.00,    0.00)  DC

          6TH HIGHEST VALUE IS       0.00421 AT (  477367.82,  3752910.77,   477.00,   477.00,    0.00)  DC

          7TH HIGHEST VALUE IS       0.00384 AT (  477267.82,  3752910.77,   476.47,   476.47,    0.00)  DC

          8TH HIGHEST VALUE IS       0.00346 AT (  477167.82,  3752710.77,   475.00,   475.00,    0.00)  DC

          9TH HIGHEST VALUE IS       0.00344 AT (  477500.67,  3752785.25,   476.00,   476.00,    0.00)  DC

         10TH HIGHEST VALUE IS       0.00341 AT (  477500.67,  3752685.25,   475.00,   475.00,    0.00)  DC


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
♀ *** AERMOD - VERSION 16216r ***   *** C:\LAKES\AERMOD VIEW\11141 HRA\11141 HRA.ISC                          ***
    01/24/18
 *** AERMET - VERSION  16216 ***   ***                                                                       ***
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   PAGE  34
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  URBAN  ADJ_U*

 *** Message Summary : AERMOD Model Execution ***

  --------- Summary of Total Messages --------

 A Total of            0 Fatal Error Message(s)
 A Total of            4 Warning Message(s)
 A Total of         2028 Informational Message(s)

 A Total of        43824 Hours Were Processed

 A Total of          978 Calm Hours Identified

 A Total of         1050 Missing Hours Identified (  2.40 Percent)


    ******** FATAL ERROR MESSAGES ********
               ***  NONE  ***


    ********   WARNING MESSAGES   ********
 ME W186    1035       MEOPEN: THRESH_1MIN 1-min ASOS wind speed threshold used           0.50
 ME W187    1035       MEOPEN: ADJ_U* Option for Low Winds used in AERMET
 MX W450   17521       CHKDAT: Record Out of Sequence in Meteorological File at:      14010101
 MX W450   17521       CHKDAT: Record Out of Sequence in Meteorological File at:    2 year gap

    ************************************
    *** AERMOD Finishes Successfully ***
    ************************************
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APPENDIX 2.2:

RISK CALCULATIONS

Table 1
Quantification of Carcinogenic Risks and Noncarcinogenic Risks
Resident 30-Year Exposure Scenario

Source Number*	Source	Mass GLC		Weight Fraction	Contaminant	Carcinogenic Risk				Noncarcinogenic Hazards/ Toxicological Endpoints**									
						URF	CPF	DOSE	RISK	REL	RfD	RESP	CNS/PNS	CV/BL	IMMUN	KIDN	GI/LV	REPRO	EYES
		(ug/m^3)	(mg/m^3)			$(ug/m^3)^{-1}$	$(mg/kg/day)^{-1}$	(mg/kg-day)		(ug/m^3)	(mg/kg/day)								
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)	(s)
1	Diesel	3.40E-03	3.40E-06	1.00E+00	Diesel Particulate	3.0E-04	1.1E+00	1.5E-06	1.8E-06	5.0E+00	1.4E-03	6.8E-04							
	TOTAL								1.77E-06 1.77			6.8E-04	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

** Key to Toxicological Endpoints

RESP	Respiratory System
CNS/PNS	Central/Peripheral Nervous System
CV/BL	Cardiovascular/Blood System
IMMUN	Immune System
KIDN	Kidney
GI/LV	Gastrointestinal System/Liver
REPRO	Reproductive System (e.g. teratogenic and developmental effects)
EYES	Eye irritation and/or other effects

Note: Exposure factors used to calculate contaminant intake

exposure frequency (days/year)	350
exposure duration (years)	30
inhalation rate (L/kg-day))	461
inhalation absorption factor	1
averaging time (years)	70
fraction of time at home	1
age sensitivity factor (age third trimester to 2 ye	10
age sensitivity factor (ages 2 to 16 years old)	3
weighted age sensitivity factor	2.6

Table 2
Quantification of Carcinogenic Risks and Noncarcinogenic Risks
25-Year Worker Exposure Scenario

	Source	Mass GLC		Weight Fraction	Contaminant	Carcinogenic Risk				Noncarcinogenic Hazards/ Toxicological Endpoints**									
						URF	CPF	DOSE	RISK	REL	RfD	RESP	CNS/PNS	CV/BL	IMMUN	KIDN	GI/LV	REPRO	EYES
		(ug/m^3)	(mg/m^3)			$(ug/m^3)^{-1}$	$(mg/kg/day)^{-1}$	(mg/kg-day)		(ug/m^3)	(mg/kg/day)								
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)	(s)
1	Diesel Particulates	1.15E-02	1.15E-05	1.00E+00	Diesel Particulate	3.0E-04	1.1E+00	2.1E-06	7.7E-07	5.0E+00	1.4E-03	2.3E-03							
	TOTAL								7.8E-07 0.78			2.3E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

** Key to Toxicological Endpoints

RESP	Respiratory System
CNS/PNS	Central/Peripheral Nervous System
CV/BL	Cardiovascular/Blood System
IMMUN	Immune System
KIDN	Kidney
GI/LV	Gastrointestinal System/Liver
REPRO	Reproductive System (e.g. teratogenic and developmental effects)
EYES	Eye irritation and/or other effects

Note: Exposure factors used to calculate contaminant intake

exposure frequency (days/year)	240
exposure duration (years)	25
inhalation rate (L/kg-day))	271
inhalation absorption factor	1
averaging time (years)	70

Table 3
Quantification of Carcinogenic Risks and Noncarcinogenic Risks
9-Year School Child Exposure Scenario

	Source	Mass GLC		Weight Fraction	Contaminant	Carcinogenic Risk				Noncarcinogenic Hazards/ Toxicological Endpoints**									
						URF	CPF	DOSE	RISK	REL	RfD	RESP	CNS/PNS	CV/BL	IMMUN	KIDN	GI/LV	REPRO	EYES
		(ug/m^3)	(mg/m^3)			$(ug/m^3)^{-1}$	$(mg/kg/day)^{-1}$	(mg/kg-day)		(ug/m^3)	(mg/kg/day)								
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)	(s)
1	Diesel Particulates	4.00E-04	4.00E-07	1.00E+00	Diesel Particulate	3.0E-04	1.1E+00	1.1E-07	4.6E-08	5.0E+00	1.4E-03	8.0E-05							
	TOTAL								6.6E-08			1.2E-04	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
									0.07										

** Key to Toxicological Endpoints

RESP	Respiratory System
CNS/PNS	Central/Peripheral Nervous System
CV/BL	Cardiovascular/Blood System
IMMUN	Immune System
KIDN	Kidney
GI/LV	Gastrointestinal System/Liver
REPRO	Reproductive System (e.g. teratogenic and developmental effects)
EYES	Eye irritation and/or other effects

Note: Exposure factors used to calculate contaminant intake

exposure frequency (days/year)	180
exposure duration (years)	9
inhalation rate (L/kg-day))	572
inhalation absorption factor	1
averaging time (years)	70
age sensitivity factor (ages 4-13)	3

General Biological Resources Assessment for the Brodiaea Commerce Center Project

November 6, 2017

Prepared for:

T&B Planning
17542 East 17th Street, Suite 100
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Prepared by:

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ALDEN
ENVIRONMENTAL, INC

Brodiaea Commerce Center Project
General Biological Resources Assessment

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Brodiaea Commerce Center Project
General Biological Resources Assessment

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B	Plant Species Observed
C	Animal Species Observed or Detected
D	Riverside County Integrated Project Conservation Summary Report

1.0 INTRODUCTION

This report describes the existing biological resources on the proposed Brodiaea Commerce Center project site and evaluates the potential impacts to those resources that may occur as a result of project implementation. This report is intended to provide the City of Moreno Valley (City) with information necessary to assess significant impacts to biological resources under the Western Riverside Multiple Species Habitat Conservation Plan (MSHCP).

2.0 PROJECT LOCATION AND DESCRIPTION

2.1 PROJECT LOCATION

The approximately 12.8-acre project study area is located in the City of Moreno Valley, Riverside County, California within the USGS Sunnymeade Quadrangle, Township 3S, Range 4W, Section 3 (Figures 1 and 2). The site is within the MSHCP plan area but is not within a criteria cell area.

The site is bordered to the north by a fallow field and Alessandro Boulevard. To the east is the Heacock channel, Heacock Street, and developed areas. Brodiaea Avenue, fallow fields and developed land borders the site to the south. Fallow fields border the site to the west.

2.2 PROJECT DESCRIPTION

The proposed project involves the construction of a commercial facility. The facility will incorporate structures with supporting installations to include surface parking and loading areas, utility infrastructure, landscaping, and water detention basins. Driveways connecting the facility to Brodiaea Street also are planned. The project also would incorporate a catch basin along the northern border. This basin would collect off site stormwater flow from the fallow field to the north and direct it to the existing Heacock channel on the project's eastern boundary.

3.0 METHODS

3.1 LITERATURE REVIEW

Prior to conducting the biological fieldwork, background research was conducted to obtain information on the existing biological conditions within the project vicinity. Background research included a review of current local, state, and federal regulations, historical and current aerial photographs, USGS topographic maps, U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) soil survey maps, and the MSHCP.

A review of the California Natural Diversity Data Base (CNDDB) was performed to identify sensitive biological resources known from the proposed project vicinity. The CNDDB, which is administered by the California Department of Fish and Wildlife (CDFW), provides an inventory of vegetation communities, plant species, and wildlife species that are considered sensitive by state and federal resource agencies, academic institutions, and other conservation groups.

Historical occurrences of sensitive species from the proposed project vicinity were used to determine species with a potential to occur within and adjacent to the proposed project area.

3.2 BIOLOGICAL SURVEYS

3.2.1 Burrowing Owl

A focused burrowing owl (*Athene cunicularia*) survey was conducted according to the Burrowing Owl Survey Instructions for the Western Riverside MSHCP Area (County 2006). The survey covered the entire site and consisted of 4 separate visits (Table 1).

Table 1
BURROWING OWL SURVEY INFORMATION

Survey	Date	Biologists	Time (start/stop)	Weather Conditions (start/stop)
1*	8/2/17	Brian Leatherman	0530/0900	90%, 73°F, wind 0 mph/ 100%, 86°F, wind 0-2 mph
2	8/7/17	Brian Leatherman	0530/0845	Clear, 65°F, wind 0 mph / Clear, 78°F, wind 0-2 mph
3	8/9/17	Brian Leatherman	0545/0900	Clear, 66°F, wind 0-2 mph / Clear, 85°F, wind 0 mph
4	8/14/17	Brian Leatherman	0515/0900	100%, 64°F, wind 0-2 mph / Clear, 70°F, wind 0 mph

*Includes the burrow survey, which was conducted concurrently

All surveys were conducted by walking transects no more than 100 feet apart, through suitable habitat over the entire survey area, using binoculars and/or a spotting scope where necessary. The area was surveyed for burrowing owls and potential burrows or perches that could be used by the owl. Burrowing owls are known to occupy California ground squirrel (*Spermophilus beecheyi*) burrows; therefore, particular attention was paid to areas along fence lines, or other locations where squirrel activity has been observed in the past, was presently observed, or was likely to occur. Dirt piles, drainages, and culverts also were carefully examined as these sites often provide cavities that can support the species. The determination of owl presence is made by direct owl observation or by owl sign such as, but not limited to, excavated soil, whitewash (excrement), castings (pellets), and/or feathers. A burrowing owl survey letter report was prepared and is included as Appendix A.

Figure 1

Regional Location

BRODIAEA COMMERCE CENTER

N
W E
S

0 2 4 Miles

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Figure 2

Project Location

BRODIAEA COMMERCE CENTER

N
W E
S

0 1,000 2,000 Feet

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3.2.2 Vegetation Mapping

Vegetation communities were mapped according to Holland (1986) or Oberbauer (2008) classifications. Plant and animal species detected on site were recorded during fieldwork conducted on site. The site also was assessed for potential riparian/riverine and jurisdictional (wetland) features.

3.2.3 Rare Plants

The site is not within or adjacent to the MSHCP Criteria Area Species Survey Area (CASSA) or the Narrow Endemic Plant Species Survey Area (NEPSSA) and focused rare plant surveys are not required. Additionally, The CNDDB database search did not identify any sensitive plant species that have been known to occur on site or within the project vicinity.

3.2.4 Riparian/Riverine and Vernal Pool Resources

During the site visits (Table 1), the project site was inspected for Riparian/Riverine and Vernal Pool Resources, as well as any features that have potential to be considered Waters of the U.S. (WUS) or Waters of the State (WS) under the jurisdiction of the U.S. Army Corps of Engineers (Corps) and/or CDFW, respectively. WUS and WS encompass wetlands but also may include ephemeral and intermittent streams that may or may not be vegetated. The entire site was surveyed on foot for these resources.

Aerial photographs (current and historic), topographic maps, and soils maps were also reviewed for any sign of potential for flowing or ponded water, topographic depressions, and drainage features. The National Wetlands Inventory database also was queried for the site to determine if wetland/streambed features had been mapped on site in the past. The on-site evaluation consisted of a directed search for field characteristics indicative of riparian/riverine or vernal pool habitats. Field indicators may include wetland/riparian plant species, drainage courses, drainage patterns, ponded water, changes in soil character, changes in vegetation character, or water-borne debris deposits.

3.3 SURVEY LIMITATIONS

Few survey limitations exist for the study area. Since the site visits were conducted during daylight hours, the presence of nocturnal animals such as coyotes (*Canis latrans*), raccoons (*Procyon lotor*), and rodents could be determined only by indirect sign (tracks, scat, or burrows). A complete list of these species would require night surveys and trapping, but is not warranted because potential to occur and the relative sensitivity of animals that might be detected are both low.

3.4 NOMENCLATURE

Nomenclature used in this report follows Holland (1986) and Oberbauer (2008) for vegetation community classifications. Latin plant names follow Baldwin, ed. (2012) while common names follow Baldwin or CNPS (2012). Sensitive plant status follows CNPS (2012) and CDFG (2012). Animal nomenclature is taken from Crother (2001) for amphibians and reptiles, American Ornithologists' Union (2009) for birds, and Baker, et al. (2003) for mammals. Sensitive animal status follows CDFG (2011).

4.0 RESULTS

4.1 PHYSICAL DESCRIPTION AND LAND USE

The site is relatively flat with on-site elevations ranging from approximately 1,560 feet above mean sea level (AMSL) on the southern boundary to approximately 1,565 feet at the northern boundary. Soil on site (Figure 3) is mapped as Greenfield sandy loam, 2-8% slopes (GyC2) and Monserate sandy loam, 0-5% slopes (MmB).

There are no natural drainage features on site, but the concrete-lined Heacock channel does occur to the east of the site limit. This is a constructed channel that has a concrete bottom and sides.

4.2 VEGETATION COMMUNITIES AND LAND COVER TYPES

Virtually the entire site is a fallow agricultural field and does not support sensitive vegetation communities (Figure 4). Sparse vegetation in the fallow field is dominated by tilled, non-native grasses and exotic forb species.

4.2.1 Upland Habitats

Disturbed/Developed

The entire site is either developed or disturbed. Disturbed area consists of the fallow agricultural field. The developed areas include the Heacock Channel to the east and the portion of Brodiaea Avenue to the south where roadway improvements (driveway) would occur.

4.2.2 Wetland/Riparian Vegetation Communities

There are no riparian/riverine communities or potential jurisdictional areas located on the site. The property is flat and does not support any aquatic features necessary for the development of these habitats. The Heacock channel to the east is concrete lined and does not support vegetation communities.

Figure 3

Soils

BRODIAEA COMMERCE CENTER

N
W E
S

0 100 200 Feet

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Boundary
Impacts

Vegetation
Disturbed Habitat
Developed

N
W E
S

0 75 150 Feet

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Figure 4

Biological Resources/Impacts

BRODIAEA COMMERCE CENTER

4.3 PLANT SPECIES OBSERVED

A single sensitive plant species, smooth tarplant (*Centromadia pungens* ssp. *laevis*), was observed on the site. This species is not listed as threatened or endangered; however, is is considered a CNPS List 1B.1 and an MSHCP Group 3 species. The MSHCP (Table 9-2) identifies conservation objectives for this species where it occurs within the CASSA. Given that the site is not located within the CASSA and has not been identified as an area requiring specific conservation measures for this species, no surveys or mitigation measures are required. No other sensitive plant species were observed or anticipated to occur on the site.

A list of plant species observed is included as Appendix B.

4.4 ANIMAL SPECIES OBSERVED OR DETECTED

A single sensitive animal species, the California horned lark (*Eremophila alpestris actia*) was observed on site. This species is classified as a Special Animal in the State of California and is considered to be adequately conserved under the MSHCP. This species is not listed as threatened or endangered either by the State or Federal government. Impacts to the California horned lark would not be considered significant and no mitigation would be required. No other sensitive species were observed on site.

Although the site is disturbed, it does provide suitable habitat for burrowing owls. No burrowing owl or sign of burrowing owl presence were observed during focused surveys on site. While burrowing owls are not anticipated to occur, the site does have the potential to support burrowing owls. In compliance with the conditions of the MSHCP, it is anticipated that the City of Moreno Valley will require that a pre-construction burrowing owl survey be conducted no more than 30 days prior to grading on the site.

The site is disturbed and does not support significant tree or shrub species that would provide potential nesting location for tree nesting bird species. Also, the maintained nature of the site reduces the potential to support ground nesting bird species. As such, the potential for there to be active bird nests during the bird breeding season is considered to be low.

A list of animal species observed or detected is included as Appendix C.

4.5 JURISDICTIONAL AREAS

The site is flat and does not support any natural drainages, swales, creeks, ponds, streambeds, or other riparian or wetland habitat features. The concrete-lined Heacock channel that does occur to the east of the site site is man-made and supports no riparian or wetland plant species. The project proposes to outlet existing stormwater flows from the north of the site into the Heacock channel through a pipe that would outfall in the upper edge of the existing concrete side wall of the channel. No construction activity is proposed within the existing concrete channel bottom. Based on this, the project would not require Corps or CDFW permits. See Section 5.4 of this report, *Riparian/Riverine and Vernal Pool Requirements*, for more information.

5.0 MSHCP COMPLIANCE

5.1 MSHCP SURVEY REQUIREMENTS

The project site is located within the MSHCP Reche Canyon/ Badlands Area Plan but is not within an MSHCP Criteria Cell (Figure 5). Required species survey areas for the project site were identified by conducting a search on the Riverside County Integrated Project (RCIP) Conservation Summary Report (Appendix D).

5.1.1 Burrowing Owl Analysis

The site is within the MSHCP burrowing owl survey area. No burrowing owls were observed during the focused breeding season surveys conducted on the site. The area surrounding the site also is mostly developed and the potential for owls to occur is considered to be minimal. While owls are not expected to occur on site, a pre-construction survey would be required to help ensure that no owls are present at the time of site development.

5.1.2 Sensitive Plant Species

The site is not located within the MSHCP NEPSSA or CASSA species survey areas; as such, no focused rare plant surveys were required.

5.2 URBAN/WILDLANDS INTERFACE GUIDELINES

According to the Section 6.1.4 of the MSHCP, the Urban/Wildlands Interface Guidelines are intended to address indirect effects associated with locating development in proximity to MSHCP conservation areas (County 2003). The project site is not adjacent to any MSHCP conservation areas. Consequently, the Urban/Wildlife Interface Guidelines do not apply to the project.

5.3 MSHCP AND RESERVE ASSEMBLY CRITERIA

The study area is not located within any Criteria Cells or identified for potential use for the MSHCP Reserve Assembly. Therefore, the proposed project will not conflict with MSHCP conservation objectives for the area.

5.4 RIPARIAN/RIVERINE AND VERNAL POOL REQUIREMENTS

Section 6.1.2 of the MSHCP describes the process to protect species associated with Riparian/Riverine and Vernal Pool Resources. As defined in the MSHCP, riparian/riverine areas are lands that contain habitat dominated by trees, shrubs, persistent emergents, or emergent mosses and lichens that occur close to or depend on a nearby freshwater source or areas that contain a freshwater flow during all or a portion of the year. As defined in the MSHCP, vernal pools are seasonal wetlands that occur in depression areas that have wetlands indicators of all three parameters (soils, vegetation and hydrology) during the wetter portion of the growing season but normally lack wetlands indicators of hydrology and/or vegetation during the drier

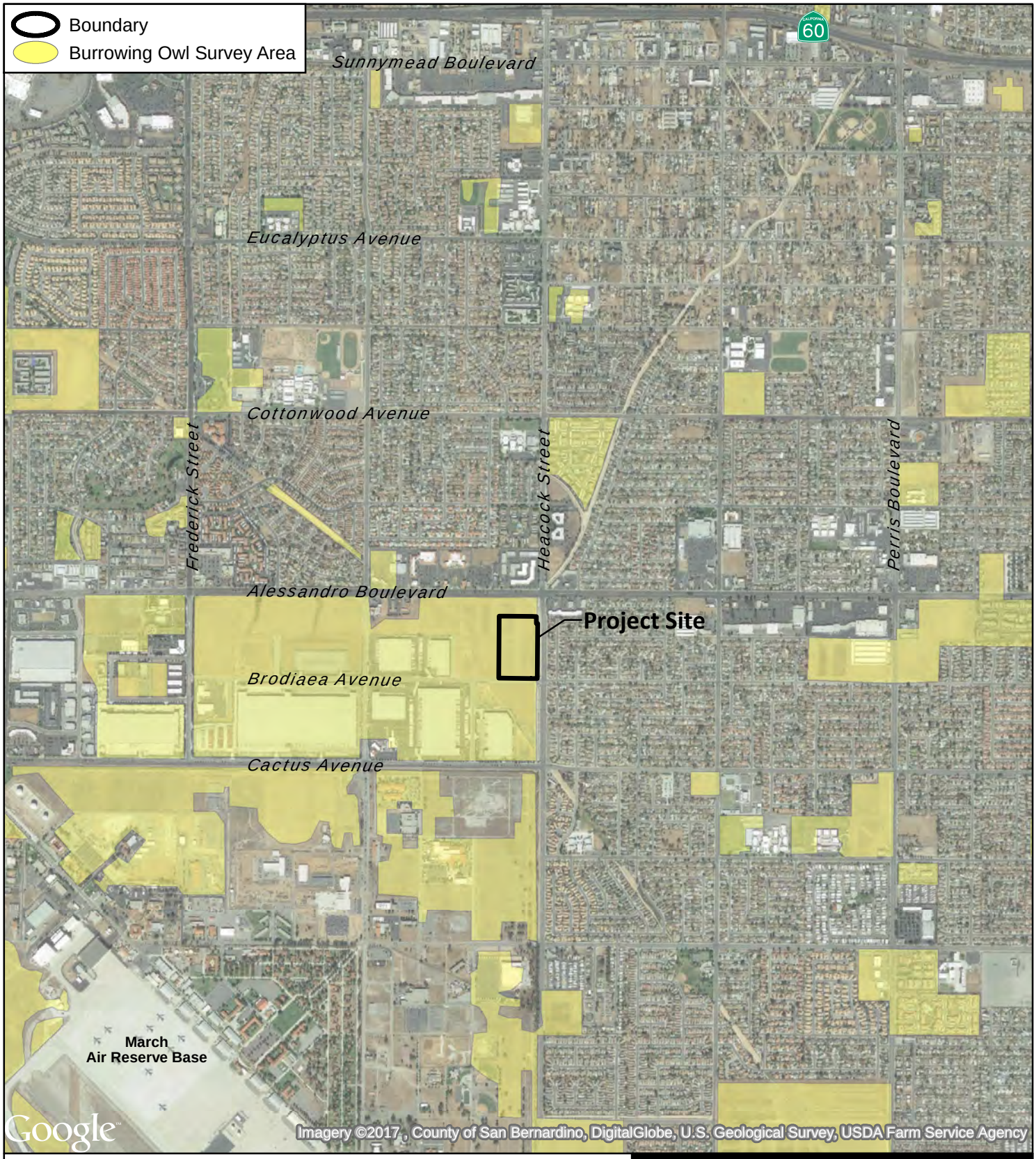

Figure 5

MSHCP Survey Areas

BRODIAEA COMMERCE CENTER

N
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0 1,000 2,000 Feet

ALDEN ENVIRONMENTAL, INC

portion of the growing season. Riparian/Riverine and Vernal Pool Resources may support one or more of the species listed in Section 6.1.2 of the MSHCP.

While the project site does have an adjacent concrete-lined channel within which water flows, it does not support water-dependent vegetation. The Heacock channel is an underground pipe to the north of the site. The pipe becomes an above-ground concrete-lined channel approximately 130 feet south of the intersection of Alessandro Boulevard and Heacock Street. The channel remains above ground for approximately 1,000 feet along the eastern boundary of the site. The channel is piped under Brodiaea Avenue and emerges again as an above ground channel on the south side of Brodiaea Avenue. No riparian/riverine habitat occurs along the channel, and none is observable using Google Earth in an upstream or downstream direction. The MSHCP requires focused surveys for sensitive riparian bird species when suitable riparian habitat would be affected. Given that there are no riparian/riverine features on or adjacent to the site, sensitive riparian bird surveys are not required.

6.0 MITIGATION MEASURES

6.1 MITIGATION MEASURES

Compliance with the requirements of Section 6.0 of the MSHCP is intended to provide full mitigation under CEQA, the National Environmental Policy Act, the California Endangered Species Act (CESA), and the federal Endangered Species Act (FESA) for impacts on species and habitats covered by the MSHCP, pursuant to agreements with the U.S. Fish and Wildlife Service (USFWS) and the CDFW, as set forth in the implementing agreement for the MSHCP.

The following standard mitigation conditions would reduce project-related impacts to MSHCP covered species and other biological resources to less than significant:

1. The Project shall comply with City of Moreno Valley Municipal Code Title 3, Chapter 3.48, Western Riverside County Multiple Species Habitat Conservation Plan Fee Program, which requires a per-acre local development impact and mitigation fee. The Project Applicant shall pay Western Riverside County MSHCP development impact and mitigation fees to the City prior to the issuance of a building permit.

2. Within 30 days prior to grading, a qualified biologist shall conduct a survey of the undeveloped portions of the property and make a determination regarding the presence or absence of the burrowing owl. The determination shall be documented in a report and shall be submitted, reviewed, and accepted by the City of Moreno Valley Planning Division prior to the issuance of a grading permit and subject to the following provisions:
    a. In the event that the pre-construction survey identifies no burrowing owls on the property, a grading permit may be issued without restriction.

b. In the event that the pre-construction survey identifies the presence of at least one individual but less than three (3) mating pairs of burrowing owl, then prior to the issuance of a grading permit and prior to the commencement of ground-disturbing activities on the property, the qualified biologist shall passively or actively relocate any burrowing owls. Passive relocation, including the required use of one-way doors to exclude owls from the site and the collapsing of burrows, will occur if the biologist determines that the proximity and availability of alternate habitat is suitable for successful passive relocation. Passive relocation shall follow CDFW relocation protocol and shall only occur between September 15 and February 1. If proximate alternate habitat is not present as determined by the biologist, active relocation shall follow CDFW relocation protocol. The biologist shall confirm in writing that the species has fledged the site or been relocated prior to the issuance of a grading permit.

c. In the event that the pre-construction survey identifies the presence of three (3) or more mating pairs of burrowing owl, the requirements of MSCHP Species-Specific Conservation Objectives 5 for the burrowing owl shall be followed. Objective 5 states that if the site (including adjacent areas) supports three (3) or more pairs of burrowing owls and supports greater than 35 acres of suitable Habitat, at least 90 percent of the area with long-term conservation value and burrowing owl pairs will be conserved onsite until it is demonstrated that Objectives 1-4 have been met. A grading permit shall only be issued, either:
    i. upon approval and implementation of a property-specific Determination of Biologically Superior Preservation (DBESP) report for the western burrowing owl by the CDFW; or
    ii. a determination by the biologist that the site is part of an area supporting less than 35 acres of suitable Habitat, and upon passive or active relocation of the species following accepted CDFW protocols. Passive relocation, including the required use of one-way doors to exclude owls from the site and the collapsing of burrows, will occur if the biologist determines that the proximity and availability of alternate habitat is suitable for successful passive relocation. Passive relocation shall follow CDFW relocation protocol and shall only occur between September 15 and February 1. If proximate alternate habitat is not present as determined by the biologist, active relocation shall follow CDFW relocation protocol. The biologist shall confirm in writing that the species has fledged the site or been relocated prior to the issuance of a grading permit.

3. As a condition of approval for all grading permits, vegetation clearing and ground disturbance shall be prohibited during the migratory bird nesting season (February 1 through September 15), unless a migratory bird nesting survey is completed in accordance with the following requirements:
    a. A migratory nesting bird survey of the Project's impact footprint shall be conducted by a qualified biologist within three (3) days prior to initiating vegetation clearing or ground disturbance.
    b. A copy of the migratory nesting bird survey results report shall be provided to the City of Moreno Valley Planning Division. If the survey identifies the presence of active nests, then the qualified biologist shall provide the City of Moreno Valley Planning Division with a copy of maps showing the location of all nests and an appropriate buffer zone around each nest sufficient to protect the nest from direct and indirect impact. The size and location of all buffer zones, if required, shall be subject to review and approval by the City of Moreno Valley Planning Division and shall be no less than a 300-foot radius around the nest for non-raptors and a 500-foot radius around the nest for raptors. The nests and buffer zones shall be field checked weekly by a qualified biological monitor. The approved buffer zone shall be marked in the field with construction fencing, within which no vegetation clearing or ground disturbance shall commence until the qualified biologist and City Planning Division verify that the nests are no longer occupied and the juvenile birds can survive independently from the nests.

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Appendix A

BURROWING OWL SURVEY REPORT

ALDEN ENVIRONMENTAL, INC
3245 University Ave, #1188 | San Diego, CA 92104 | **Phone/Fax:** 619.284.3815

August 16, 2017

Ms. Tracy Zinn
T&B Planning, Inc.
17542 East 17th Street, Suite 100
Tustin, CA 92780

Re: Burrowing Owl Survey Report for the Brodiaea Ave. & Heacock Street Warehouse Project

Dear Ms. Zinn:

This letter presents the results of the 2017 nesting season survey for the burrowing owl (*Athene cunicularia*) conducted by Alden Environmental, Inc. for the Brodiaea Ave. & Heacock Ave. Warehouse Project (project) in the city of Moreno Valley, CA (City).

LOCATION AND SITE DESCRIPTION

The approximately 13-acre project site is located on the northwest corner of Brodiaea Avenue and Heacock Street (Figures 1 and 2) and within the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP) Burrowing Owl Survey Area.

The project site occurs on an empty lot that is at least two times bigger than the project site itself. The empty lot continues approximately 300 feet north of the site to Alessandro Boulevard and to Rebecca Street and industrial buildings approximately 600 feet to the west. The project site and a buffer area of suitable habitat were surveyed out to approximately 500 feet. A fenced off triangular field and detention basin occur to the south across Brodiaea Avenue. This area could not be surveyed due to perimeter fencing, but was scanned before and during each survey for burrowing owls according to the survey protocol. The lot is connected to adjacent lots with similar habitat to the west (at the north half of the site) but otherwise is relatively isolated with residential development to the east, a retail center to the north, and industrial buildings to the south and west.

The entire project site and surrounding habitat consists of fallow agricultural lands. The perimeter of the site and a cross-section through the middle is periodically plowed so that approximately half of the site is regularly disturbed. The remainder of the site supports non-native grassland dominated by brome grasses (primarily *Bromus rubens* sp.) and many other weedy species including Russian thistle (*Salsola tragus*), vinegar weed (*Trichostema lanceolatum*), doveweed (*Croton setiger*), stinknet (*Oncosiphon piluliferum*) and tumbleweed (*Amaranthus albus*). Native plants occurring on the lot include Rancher's fiddleneck (*Amsinckia intermedia*), smooth tarplant (*Centromadia pungens* spp. *laevis*), Jimson weed (*Datura wrightii*), and sand aster (*Corethrogyne filaginifolia*).

Burrowing owls generally occur in drier, open areas that can include prairies, grasslands, and savannas. The burrowing owl can also be found in deserts, farmlands, pastures, cemeteries, airports, vacant lots, university campuses, golf courses, and other urban areas. Burrowing owls are

dependent on the presence of fossorial mammals (primarily prairie dogs and ground squirrels), whose burrows are used for nesting and roosting.

Based on the habitat conditions on site, the entire site is considered to have potential to support the burrowing owl. Additionally, undeveloped, disturbed land west of the project site is also considered to have potential to support the species (Figure 3).

METHODS

The burrowing owl survey consisted of a focused burrow survey and focused burrowing owl survey (Table 1) according to the *Burrowing Owl Survey Instructions for the Western Riverside MSHCP Area*.[1] The surveys were conducted on four different days between August 2 and August 14 by Brian Leatherman with assistance from Greg Stratton or Nicole Leatherman.

Ground visibility was excellent in the plowed areas but ground visibility was limited in the non-native grasslands; therefore, transects were walked at 10 meter intervals across entire project site. Transects were walked in both north-south and east-west directions. Prior to starting each survey, the project site and the empty lot across the street to the south and the west of the project site were scanned with binoculars in search of potentially active burrowing owls that might be visible on exposed perches. These areas were also scanned periodically throughout the time transects were being conducted (Figure 3).

The survey area was searched for burrows, artificial refugia, or perches that could be used by the owl, as well as for burrowing owls and owl sign. Burrowing owls are known to occupy California ground squirrel burrows; therefore, particular attention was paid to those on site, as well as any other locations where squirrel activity was observed or was likely to occur.

The determination of owl presence is made by direct owl observation or by owl sign such as, but not necessarily limited to, excavated soil, whitewash (excrement), castings (pellets), and/or feathers. Representative site photographs are presented as Attachment A.

[1] County of Riverside. 2006. Burrowing Owl Survey Instructions for the Western Riverside Multiple Species Habitat Conservation Plan Area. March 29.

ALDEN ENVIRONMENTAL, INC
3245 University Ave, #1188 | San Diego, CA 92104 | Phone/Fax: 619.284.3815

Table 1 BURROWING OWL SURVEY INFORMATION				
Visit Number	**Date**	**Biologist**	**Time** (start/stop)	**Weather Conditions**[1] (start/stop)
1	8/2/17	Brian Leatherman	0530/0900	90%, 73°F, wind 0 mph/ 100%, 86°F, wind 0-2 mph
2	8/7/17	Brian Leatherman	0530/0845	Clear, 65°F, wind 0 mph / Clear, 78°F, wind 0-2 mph
3	8/9/17	Brian Leatherman	0545/0900	Clear, 66°F, wind 0-2 mph / Clear, 85°F, wind 0 mph
4	8/14/17	Brian Leatherman	0515/0900	100%, 64°F, wind 0-2 mph / Clear, 70°F, wind 0 mph

[1] Estimated cloud cover, temperature, and wind speed

SURVEY RESULTS

No BUOW or sign of BUOW were observed during the four focused surveys on the project site. One pellet that was likely that of a BUOW was observed approximately 350 feet west of the project site at the base of a survey stake during the survey of the buffer area (Figure 3). No BUOW or any other sign of BUOW was observed at or near a burrow or burrow entrance or elsewhere on the site. This pellet was heavily bleached out and clearly not recent.

California ground squirrel burrows were observed across the survey area. Ten burrows that appeared suitable for burrowing owl occurred within the project site, and an additional 13 burrows were documented in the buffer area. Additional ground squirrel burrows and pocket gopher burrows that did not appear to be large enough for burrowing owls use were also observed.

Please contact me if you have any questions.

Sincerely,

Greg Mason
Principal/Senior Biologist

Enclosures:

Figure 1	Regional Location Map
Figure 2	Project Location Map
Figure 3	Burrowing Owl Survey Results
Attachment A	Representative Photographs

Figure 1

Regional Location

BRODIAEA AVENUE & HEACOCK STREET WAREHOUSE PROJECT

N W E S

0 2 4 Miles

ALDEN ENVIRONMENTAL, INC

Figure 2

Project Location

BRODIAEA AVENUE & HEACOCK STREET
WAREHOUSE PROJECT

N
W E
S

0 1,000 2,000 Feet

ALDEN
ENVIRONMENTAL, INC

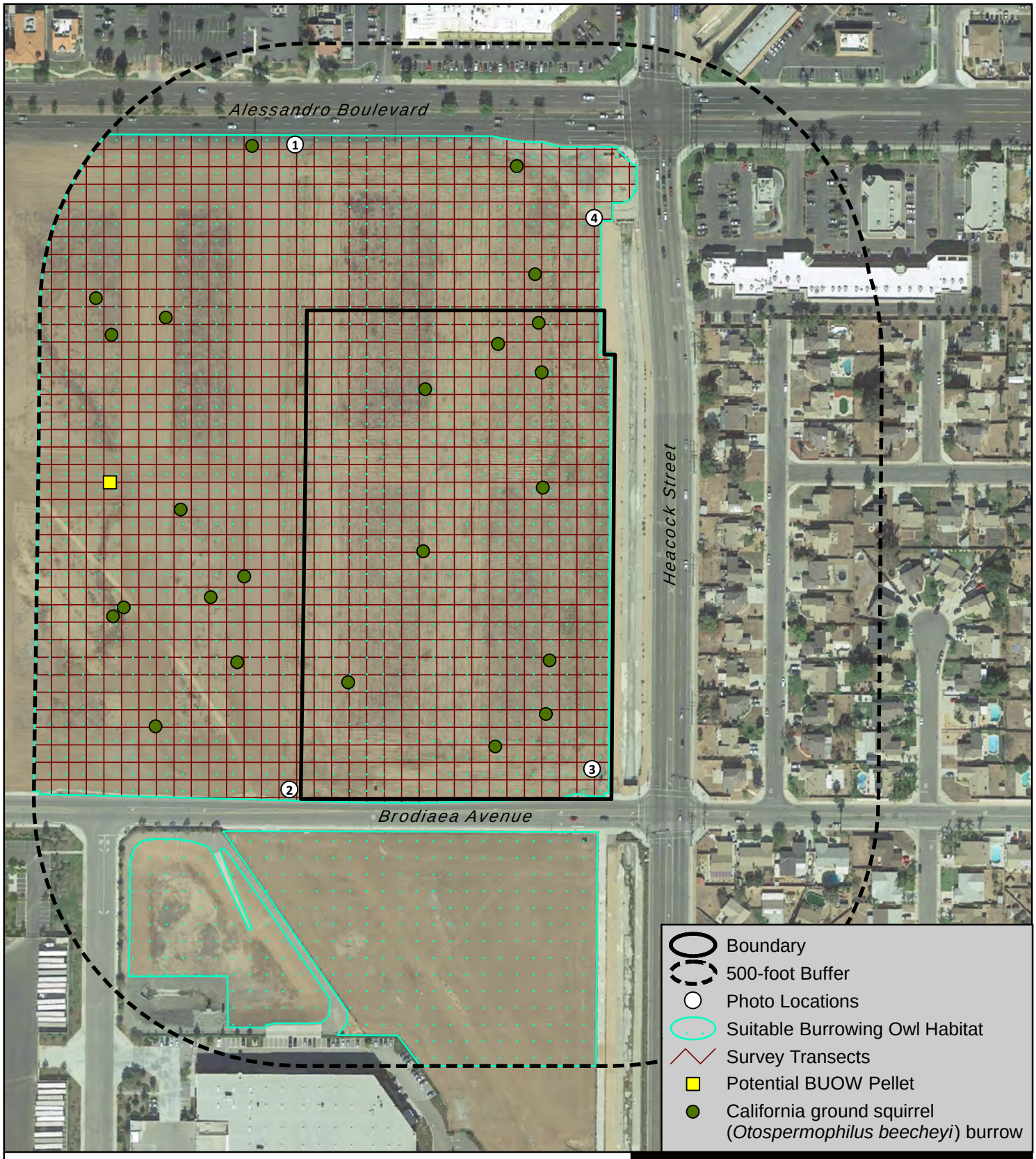

Figure 3

Burrowing Owl Survey Results

BRODIAEA AVENUE & HEACOCK STREET WAREHOUSE PROJECT

N
W E
S

0 125 250 Feet

ALDEN ENVIRONMENTAL, INC

Attachment A

REPRESENTATIVE PHOTOGRAPHS

Photo 1

Photo 2

Photo 3

Photo 4

Photo 5

Appendix B

PLANT SPECIES OBERVED

Appendix B
PLANT SPECIES OBSERVED

SCIENTIFIC NAME	COMMON NAME
ANGIOSPERMAE – MONOCOTYLEDONEAE	
Poaceae (Gramineae) – Grass Family	
Bromus madritensis sp. *rubens*[2]	red brome, foxtail chess
ANGIOSPERMAE – DICOTYLEDONEAE	
Asteraceae (Compositae) – Sunflower Family	
Oncosiphon piluliferum	stinknet
Centromadia pungens spp. *laevis*	smooth tarplant
Corethrogyne filaginifolia	sand aster
Boraginaceae – Borage Family	
Amsinckia americana	Rancher's fiddleneck
Chenopodiaceae – Goosefoot Family	
Salsola tragus[2]	Russian-thistle
Amaranthus albus	tumbleweed
Euphorbiaceae – Spurge Family	
Croton setiger	doveweed
Lamiaceae – Mint Family	
Trichostema lanceolatum	vinegar weed
Solanaceae –Potato Family	
Datura wrightii	Jimson weed

[1] Vegetation community acronyms: NNG = non-native grassland; DL = disturbed land
[2] Non-native species

Appendix C

ANIMAL SPECIES OBSERVED OR DETECTED

Appendix C
ANIMAL SPECIES OBSERVED/DETECTED

SCIENTIFIC NAME	COMMON NAME
Reptiles	
Phrynosomatidae	Phrynosomatids
Birds	
Columba livia	rock dove
Zenaida macroura	mourning dove
Corvus brachyrhynchos	American crow
Corvus corax	common raven
*Eremophila alpestris**	horned lark
Stelgidopteryx serripennis	northern rough-winged swallow
Hinundo rustica	barn swallow
Mimus polyglottis	northern mockingbird
Sturnus vulgaris	European starling
Haemorhous mexicanus	house finch
Spinus psaltria	lesser goldfinch
Charadrius vociferus	killdeer
Falco sparverius	American kestrel
Buteo jamaicensis	red-tailed hawk
Mammals	
Sylvilagus audubonii	desert cottontail
Spermophilus beecheyi	California ground squirrel
Thomomys bottae	botta's pocket gopher (burrows)
Canis latrans	coyote
Calis domesticus	dog
Felis familiarus	house cat
Uta stansburiana	side-blotched lizard

*sensitive species

Appendix D

RIVERSIDE COUNTY INTEGRATED PROJECT CONSERVATION SUMMARY REPORT

Riverside County Transporation and Land Management Agency - TLMA

Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP)

APN	Cell	Cell Group	Acres	Area Plan	Sub Unit
297170036	Not A Part	Independent	7.67	Reche Canyon / Badlands	Not a Part
297170038	Not A Part	Independent	8.84	Reche Canyon / Badlands	Not a Part

---

HABITAT ASSESSMENTS

Habitat assessment shall be required and should address at a minimum potential habitat for the following species:

APN	Amphibia Species	Burrowing Owl	Criteria Area Species	Mammalian Species	Narrow Endemic Plant Species	Special Linkage Area
297170036	NO	YES	NO	NO	NO	NO
297170038	NO	YES	NO	NO	NO	NO

Burrowing Owl

Burrowing owl.

If potential habitat for these species is determined to be located on the property, focused surveys may be required during the appropriate season.

Background

The final MSHCP was approved by the County Board of Supervisors on June 17, 2003. The federal and state permits were issued on June 22, 2004 and implementation of the MSHCP began on June 23, 2004.

For more information concerning the MSHCP, contact your local city or the County of Riverside for the unincorporated areas. Additionally, the Western Riverside County Regional Conservation Authority (RCA), which oversees all the cities and County implementation of the MSHCP, can be reached at:

Western Riverside County Regional Conservation Authority
3403 10th Street, Suite 320
Riverside, CA 92501

Phone: 951-955-9700
Fax: 951-955-8873

www.wrc-rca.org

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GIS Home Page

TLMA Home Page

PHASE I CULTURAL RESOURCES SURVEY FOR THE BRODIAEA COMMERCE CENTER PROJECT

CITY OF MORENO VALLEY, COUNTY OF RIVERSIDE

APN 297-170-038 and a Portion of APN 297-170-036

Prepared for:

T&B Planning, Inc.
17542 East 17th Street, Suite 100
Tustin, California 92780

Prepared by:

Brian F. Smith and Associates, Inc.
14010 Poway Road, Suite A
Poway, California 92064

September 26, 2017

Archaeological Database Information

Author(s):	Andrew J. Garrison and Brian F. Smith
Prepared by:	Brian F. Smith and Associates, Inc. 14010 Poway Road, Suite A Poway, California 92064 (858) 484-0915
Report Date:	September 26, 2017
Report Title:	Phase I Cultural Resources Survey for the Brodiaea Commerce Center Project, City of Moreno Valley, County of Riverside
Prepared for:	T&B Planning, Inc. 17542 East 17th Street, Suite 100 Tustin, California 92780
Assessor's Parcel Numbers:	297-170-038 and a Portion of 297-170-036
USGS Quadrangle:	*Sunnymead, California* (7.5 minute)
Study Area:	Approximately 11.8 acres
Key Words:	Cultural resources survey; city of Moreno Valley; negative survey; no mitigation measures recommended.

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**Deleted for public review and bound separately in the Confidential Appendix*

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1.0 MANAGEMENT SUMMARY/ABSTRACT

The following report describes the results of a Phase I cultural resources assessment conducted by Brian F. Smith and Associates, Inc. (BFSA) for the Brodiaea Commerce Center Project. The survey covered approximately 11.8 acres northwest of the intersection of Brodiaea Avenue and Heacock Street within the city of Moreno Valley in Riverside County, California. Specifically, this project is located within Section 13 of the USGS 7.5-minute *Sunnymead, California* topographic quadrangle (Township 3 South, Range 4 West, San Bernardino Base and Meridian). The property encompasses all of Assessor's Parcel Number (APN) 297-170-038 and the southern portion of APN 297-170-036, and lies northeast of March Air Reserve Base. The project proposes to develop an approximately 262,100-square-foot industrial warehouse/logistics building with approximately 10,000 square feet of office space and 35 dock doors positioned on the western side. Additional project improvements include approximately 37 truck trailer parking stalls, approximately 128 passenger vehicle parking stalls, water detention basins, drive aisles, a bicycle path, and associated landscaping. In compliance with the California Environmental Quality Act (CEQA) and City of Moreno Valley environmental policies, BFSA conducted the assessment to locate and record any cultural resources present within the project area.

The cultural resources investigation of the subject property also included a review of a records search performed by the Eastern Information Center (EIC) at the University of California at Riverside (UCR) on September 20, 2017 in order to assess previous archaeological studies and identify any previously recorded cultural resources within the project boundaries or in the immediate vicinity. Results of the records search from the EIC indicate that 39 cultural resource properties have been recorded within a one-mile radius of the project area. None of these properties involved the project area. Additionally, the records search indicated that 33 cultural resource studies were conducted within a one-mile radius of the project area, one of which (Foster et al. 1991) covered portions of the project area. No cultural resources were discovered within the project area as a result of this study.

BFSA requested a review of the Sacred Lands File (SLF) from the Native American Heritage Commission (NAHC) on August 31, 2017 to determine if any recorded Native American sacred sites or locations of religious or ceremonial importance are present within one mile of the project. The search results received from the NAHC on September 1, 2017 did not indicate that any Native American religious, ritual, or other special activities occurred at this location. In accordance with the recommendations of the NAHC, BFSA contacted all Native American consultants listed in the NAHC response letter on September 6, 2017. As of the date of this report, the BFSA has received six responses. The Viejas Band of Kumeyaay Indians, San Manuel Band of Mission Indians, Twenty-Nine Palms Band of Mission Indians, San Pasqual Band of Mission Indians, and Augustine Band of Cahuilla Indians all stated that the project is out of their respective territories. The Pauma Band of Luiseño Indians also indicated that they were unaware of any cultural resources within the APE.

The cultural resources survey of the property was conducted on September 7, 2017. Survey conditions were generally good and ground visibility was good to excellent in most areas. Much of the property has been disturbed by historic agricultural use, vegetation clearing, disking, and development of the surrounding area. No prehistoric or historic cultural resources were identified during the survey. Because no cultural resources were identified, monitoring of grading is not recommended as a condition of approval for the project.

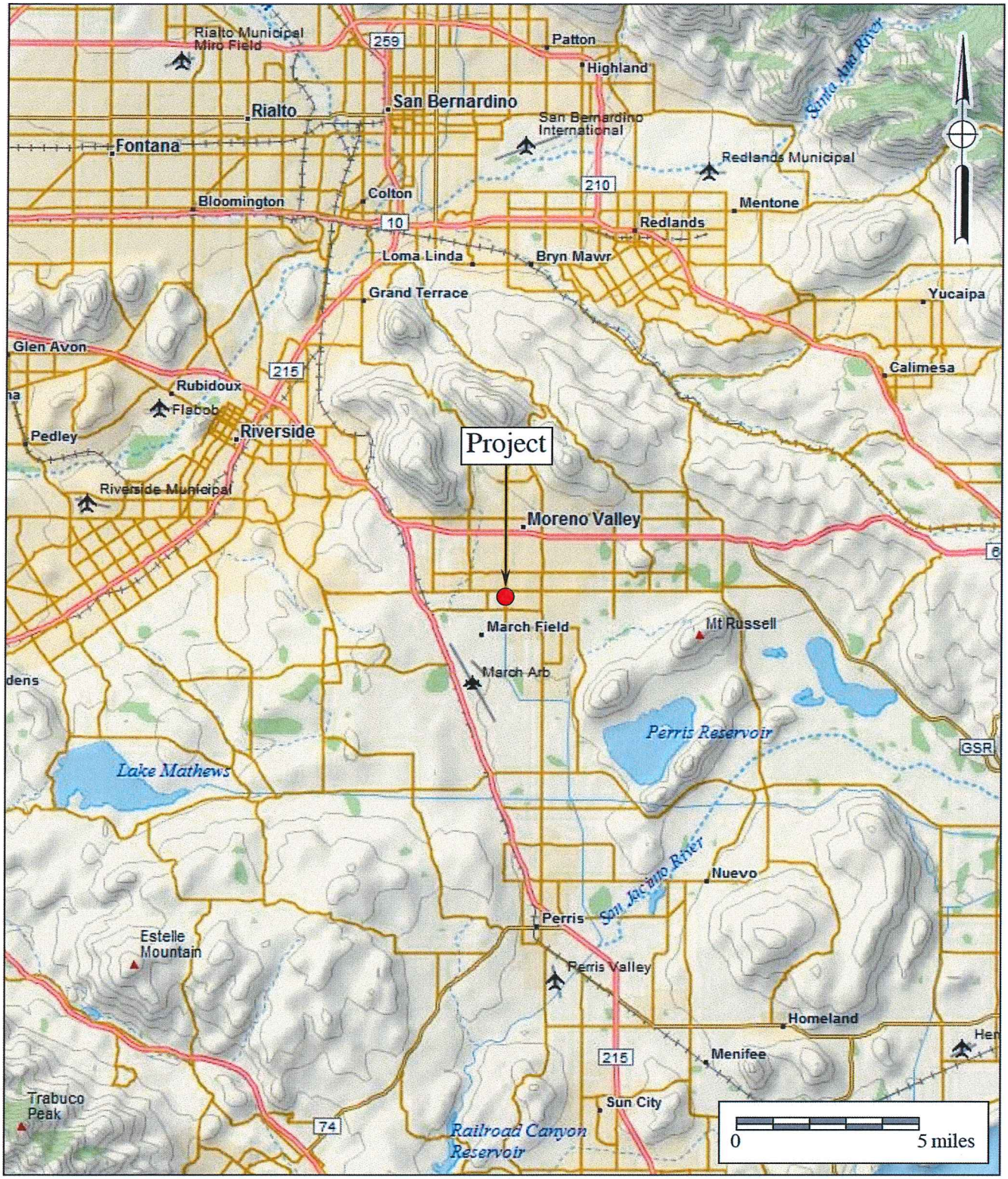
A copy of this report will be permanently filed with the EIC at UCR. All notes, photographs, and other materials related to this project will be curated at the archaeological laboratory of BFSA in Poway, California.

2.0 INTRODUCTION

In response to a request by T&B Planning, Inc., BFSA conducted a cultural resources assessment of the Brodiaea Commerce Center Project. The cultural resources survey and evaluation program for the project were conducted in order to comply with CEQA and City of Moreno Valley environmental policies. The project is located in an area of low archaeological sensitivity, as suggested by known site density and predictive modeling.

The project is an approximately 11.8-acre property located in Moreno Valley, Riverside County, California (Figure 2.0–1). The project encompasses all of APN 297-170-038 and the southern portion of APN 297-170-036. The project is located northeast of March Field Air Force Base, at the northwest corner of Brodiaea Avenue and Heacock Street, within Section 13 of the USGS 7.5-minute *Sunnymead, California* topographic quadrangle (Township 3 South, Range 4 West, San Bernardino Base and Meridian) (Figure 2.0–2). The project proposes to develop an approximately 262,100-square-foot industrial warehouse/logistics building with approximately 10,000 square feet of office space and 35 dock doors positioned on the western side. Additional project improvements include approximately 37 truck trailer parking stalls, approximately 128 passenger vehicle parking stalls, water detention basins, drive aisles, a bicycle path, and associated landscaping (Figure 2.0–3).

Principal Investigator Brian F. Smith and Project Archaeologist Andrew J. Garrison directed the Phase I archaeological survey program. The technical report was prepared by Andrew Garrison and Brian Smith. Courtney Accardy conducted technical editing and report production and Kris Reinicke created the report graphics. Qualifications of key personnel are provided in Appendix A.

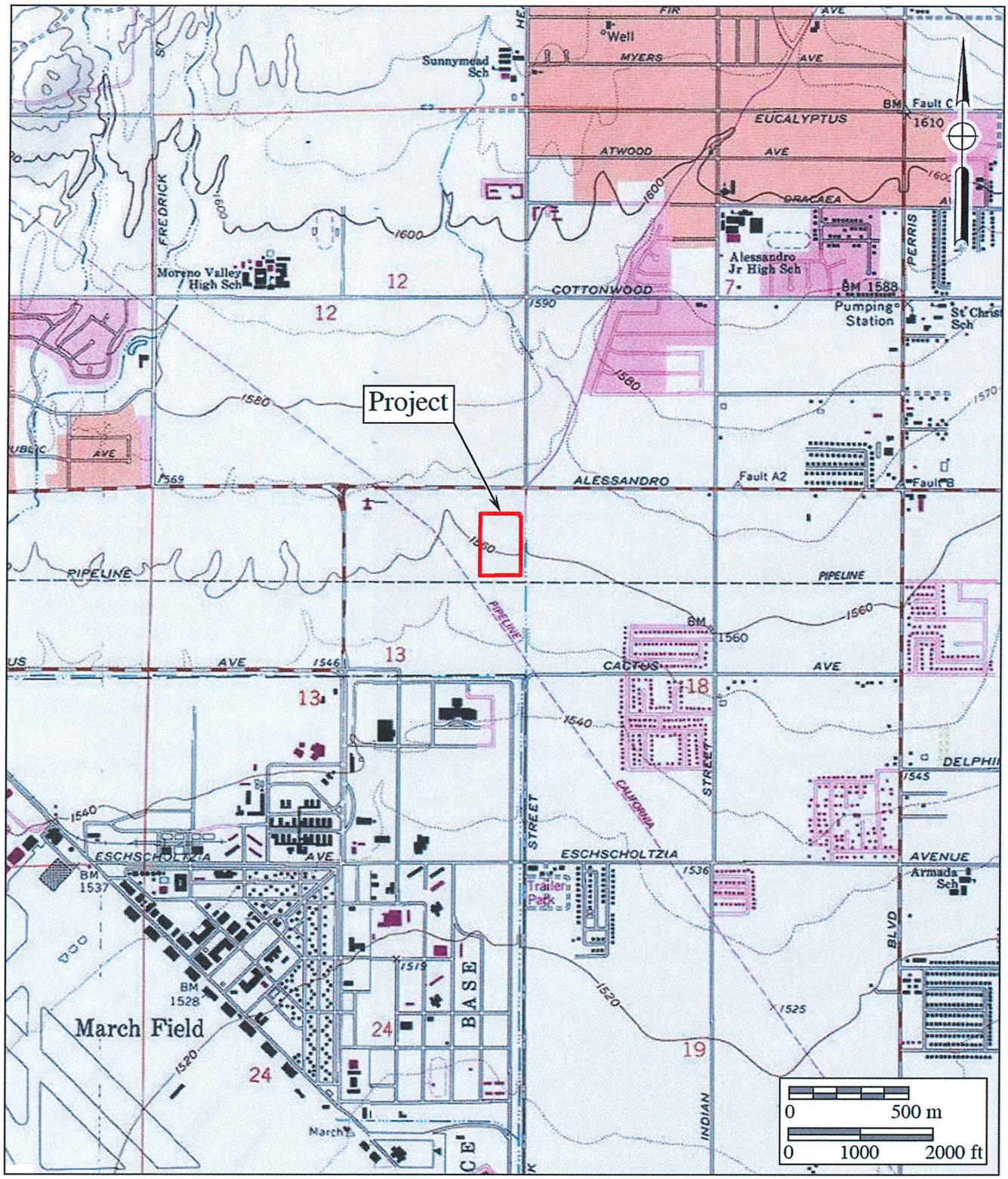


Feature 2.0–1

General Location Map

The Brodiaea Commerce Center Project

DeLorme (1:250,000)



Feature 2.0–2

Project Location Map

The Brodiaea Commerce Center Project

USGS *Riverside East* and *Sunnymead* Quadrangles (7.5-minute series)

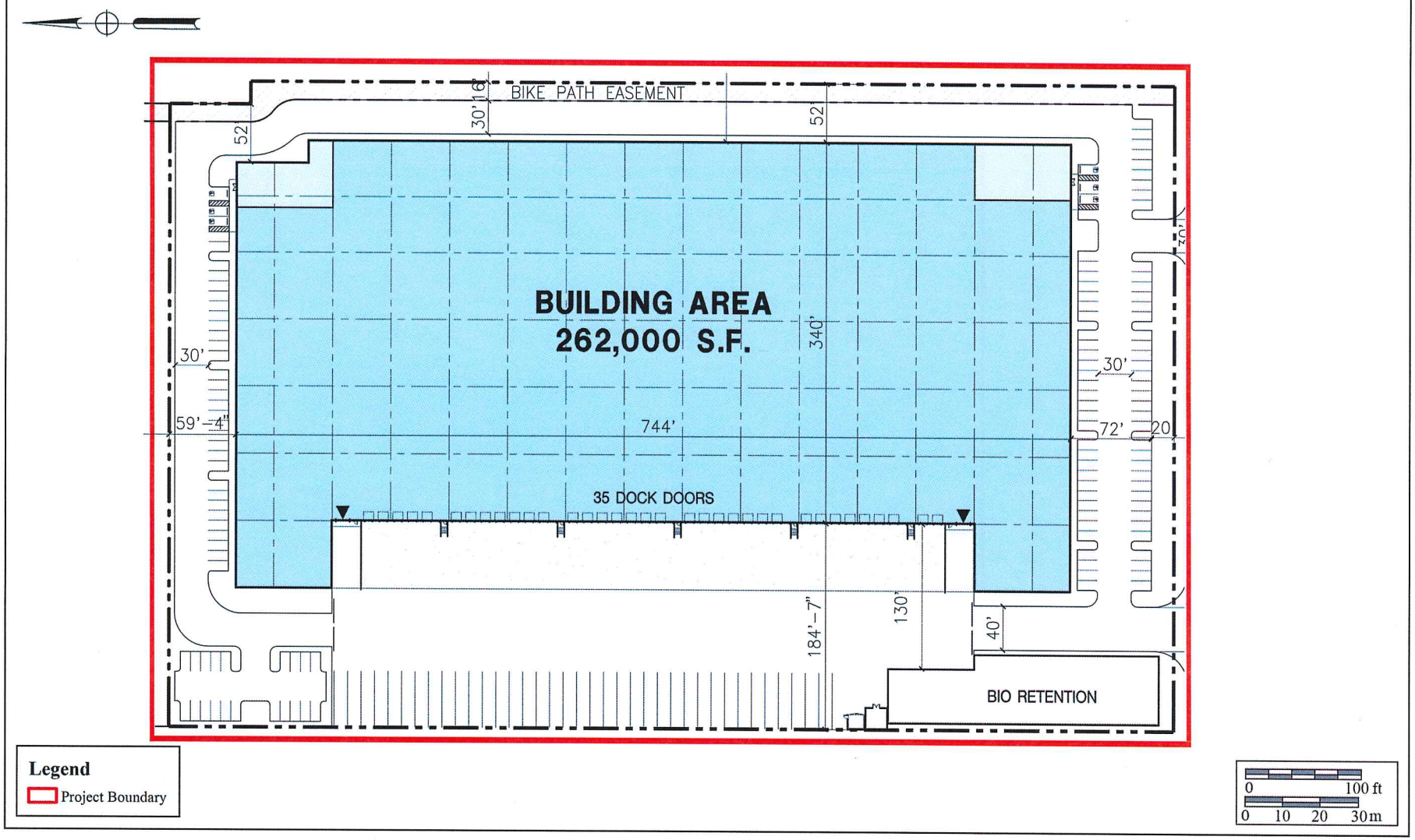


Figure 2.0–3

Site Plan

The Brodiaea Commerce Center Project

3.0 PROJECT SETTING

The project setting includes the natural physical, geological, and biological contexts of the proposed project, as well as the cultural setting of prehistoric and historic human activities in the general area. The following sections discuss both the environmental and cultural settings at the subject property, the relationship between the two, and the relevance of that relationship to the project.

3.1 Environmental Setting

Riverside County lies in the Peninsular Range Geologic Province of southern California. The range, which lies in a northwest to southeast trend through the county, extends some 1,000 miles from the Raymond-Malibu Fault Zone in western Los Angeles County to the southern tip of Baja California. The subject property is northwest of the Perris Reservoir in the Moreno Valley, southeast of the Box Springs Mountains. The Heacock Channel, a channelized drainage, is located outside of the APE between the eastern boundary and Heacock Street. The project area is relatively flat, with the property's lowest point located at its southeast corner and its highest point located at its northwest corner. Elevations within the project area range from approximately 1,575 to 1,564 feet above mean sea level (AMSL). The entire project area has been disked and disturbed by past agricultural activities. Non-native vegetation varying in height from six inches to two feet is located throughout the property.

3.2 Cultural Setting

3.2.1 Prehistoric Period

Paleo Indian, Archaic Period Milling Stone Horizon, and the Late Prehistoric Shoshonean groups are the three general cultural periods represented in Riverside County. The following discussion of the cultural history of Riverside County references the San Dieguito Complex, Encinitas Tradition, Milling Stone Horizon, La Jolla Complex, Pauma Complex, and San Luis Rey Complex, since these culture sequences have been used to describe archaeological manifestations in the region. The Late Prehistoric component in the area of Riverside County was represented by the Cahuilla, Gabrielino, and Luiseño Indians.

Absolute chronological information, where possible, will be incorporated into this discussion to examine the effectiveness of continuing to use these terms interchangeably. Reference will be made to the geological framework that divides the culture chronology of the area into four segments: late Pleistocene (20,000 to 10,000 years before the present [YBP]), early Holocene (10,000 to 6,650 YBP), middle Holocene (6,650 to 3,350 YBP), and late Holocene (3,350 to 200 YBP).

Paleo Indian Period (Late Pleistocene: 11,500 to circa 9,000 YBP)

The Paleo Indian Period is associated with the terminus of the late Pleistocene (12,000 to 10,000 YBP). The environment during the late Pleistocene was cool and moist, which allowed for glaciation in the mountains and the formation of deep, pluvial lakes in the deserts and basin lands (Moratto 1984). However, by the terminus of the late Pleistocene, the climate became warmer, which caused the glaciers to melt, sea levels to rise, greater coastal erosion, large lakes to recede and evaporate, extinction of Pleistocene megafauna, and major vegetation changes (Moratto 1984; Martin 1967, 1973; Fagan 1991). The coastal shoreline at 10,000 YBP, depending on the particular area of the coast, was near the 30-meter isobath, or two to six kilometers further west than its present location (Masters 1983).

Paleo Indians were likely attracted to multiple habitat types, including mountains, marshlands, estuaries, and lakeshores. These people likely subsisted using a more generalized hunting, gathering, and collecting adaptation, utilizing a variety of resources including birds, mollusks, and both large and small mammals (Erlandson and Colten 1991; Moratto 1984; Moss and Erlandson 1995).

Archaic Period (Early and Middle Holocene: circa 9,000 to 1,300 YBP)

Between 9,000 and 8,000 YBP, a widespread complex was established in the southern California region, primarily along the coast (Warren and True 1961). This complex is locally known as the La Jolla Complex (Rogers 1939; Moriarty 1966), which is regionally associated with the Encinitas Tradition (Warren 1968) and shared cultural components with the widespread Milling Stone Horizon (Wallace 1955). The coastal expression of this complex, with a focus on coastal resources and development of deeply stratified shell middens located primarily around bays and lagoons, appeared in the southern California coastal areas, where the older sites associated with this expression are located at Topanga Canyon, Newport Bay, Agua Hedionda Lagoon, and some of the Channel Islands. Radiocarbon dates from sites attributed to this complex span a period of over 7,000 years in this region, beginning over 9,000 YBP.

The Encinitas Tradition is best recognized for its pattern of large coastal sites characterized by shell middens, grinding tools closely associated with the marine resources of the area, cobble-based tools, and flexed human burials (Shumway et al. 1961; Smith and Moriarty 1985). While ground stone tools and scrapers are the most recognized tool types, coastal Encinitas Tradition sites also contain numerous utilized flakes, which may have been used to pry open shellfish. Artifact assemblages at coastal sites indicate a subsistence pattern focused on shellfish collection and nearshore fishing, suggesting an incipient maritime adaptation with regional similarities to more northern sites of the same period (Koerper et al. 1986). Other artifacts associated with Encinitas Tradition sites include stone bowls, doughnut stones, discoidals, stone balls, and stone, bone, and shell beads.

The coastal lagoons in southern California supported large Milling Stone Horizon populations circa 6,000 YBP, as shown by numerous radiocarbon dates from the many sites

adjacent to the lagoons. The ensuing millennia were not stable environmentally, and by 3,000 YBP, many of the coastal sites in central San Diego County had been abandoned (Gallegos 1987, 1992). The abandonment of the area is usually attributed to the sedimentation of coastal lagoons and the resulting deterioration of fish and mollusk habitat, a situation well documented at Batiquitos Lagoon (Miller 1966; Gallegos 1987). Over a period of two thousand years at Batiquitos Lagoon, dominant mollusk species occurring in archaeological middens shift from deep-water mollusks (*Argopecten* sp.) to species tolerant of tidal flat conditions (*Chione* sp.), indicating water depth and temperature changes (Miller 1966; Gallegos 1987). This situation likely occurred for other small drainages (Buena Vista, Agua Hedionda, San Marcos, and Escondido creeks) along the central San Diego coast, where low flow rates did not produce sufficient discharge to flush the lagoons they fed (Buena Vista, Agua Hedionda, Batiquitos, and San Elijo lagoons) (Byrd 1998). Drainages along the northern and southern San Diego coastline were larger and flushed the coastal hydrological features they fed, keeping them open to the ocean and allowing for continued human exploitation (Byrd 1998). Peñasquitos Lagoon exhibits dates as late as 2,355 YBP (Smith and Moriarty 1985). San Diego Bay showed continuous occupation until the close of the Milling Stone Horizon (Gallegos and Kyle 1988). Additionally, data from several drainages in Camp Pendleton indicate a continued occupation of shell midden sites until the close of the period, indicating that coastal sites were not entirely abandoned during this time (Byrd 1998).

By 5,000 YBP, an inland expression of the La Jolla Complex, which exhibits influences from the Campbell Tradition from the north, is evident in the archaeological record. These inland Milling Stone Horizon sites have been termed "Pauma Complex" (True 1958; Warren et al. 1961; Meighan 1954). By definition, Pauma Complex sites share a predominance of grinding implements (manos and metates), lack mollusk remains, have a greater tool variety (including atlatl dart points, quarry-based tools, and crescentics), and seem to express a more sedentary lifestyle with a subsistence economy based upon the use of a broad variety of terrestrial resources. Although originally viewed as a separate culture from the coastal La Jolla Complex (True 1980), it appears that these inland sites may be part of a subsistence and settlement system utilized by the coastal peoples. Evidence from the 4S Ranch Project in inland San Diego County suggests that these inland sites may represent seasonal components within an annual subsistence round by La Jolla Complex populations (Raven-Jennings et al. 1996). Including both coastal and inland sites of this time period in discussions of the Encinitas Tradition, therefore, provides a more complete appraisal of the settlement and subsistence system exhibited by this cultural complex.

Late Prehistoric Period (Late Holocene: 1,300 YBP to 1790)

Approximately 1,350 YBP, a Shoshonean-speaking group from the Great Basin region moved into Riverside County marking the transition to the Late Prehistoric Period. This period is characterized by higher population densities and elaborations in social, political, and technological systems. Economic systems diversified and intensified during this period, with the continued

elaboration of trade networks, the use of shell-bead currency, and the appearance of more labor-intensive, yet effective, technological innovations. Technological developments during this period included the introduction of the bow and arrow between A.D. 400 and 600, as well as the introduction of ceramics. Atlatl darts were replaced by smaller arrow darts, including the Cottonwood series points. Other hallmarks of the Late Prehistoric Period include extensive trade networks as far-reaching as the Colorado River Basin and cremation of the dead.

Protohistoric Period (Late Holocene: 1790 to Present)

Ethnohistorical and ethnographic evidence indicates that three Shoshonean-speaking groups occupied portions of Riverside County during the Protohistoric Period, including the Cahuilla, the Gabrielino, and the Luiseño. The geographic boundaries between these groups in pre- and proto-historic times are difficult to place.

At the time of Spanish contact in the sixteenth century, the Cahuilla occupied territory that included the San Bernardino Mountains, Orocopia Mountain, and the Chocolate Mountains to the east, the Salton Sea and Borrego Springs to the south, Palomar Mountain and Lake Mathews to the west, and the Santa Ana River to the north. The Cahuilla were a Takic-speaking people closely related to their Gabrielino and Luiseño neighbors, although relations with the Gabrielino were more intense than with the Luiseño. They differed from the Luiseño and Gabrielino in that their religion was more similar to the Mohave tribes of the eastern deserts than the *Chingichngish* cult of the Luiseño and Gabrielino.

The territory of the Gabrielino, at the time of Spanish contact in the sixteenth century, was located in much of present-day Los Angeles and Orange counties. The southern extent of this group was bounded by Aliso Creek, the eastern extent was located east of present-day San Bernardino along the Santa Ana River, the northern extent included the San Fernando Valley, and the western extent included portions of the Santa Monica Mountains. The Gabrielino also occupied several Channel Islands, including Santa Barbara Island, Santa Catalina Island, San Nicholas Island, and San Clemente Island. Because of their access to certain resources, including a steatite source from Santa Catalina Island, this group was among the wealthiest and most populous aboriginal groups in all of southern California. Trade of materials and resources controlled by the Gabrielino extended as far north as the San Joaquin Valley, as far east as the Colorado River, and as far south as Baja California (Bean and Smith 1978; Kroeber 1925).

The Luiseño were a seasonal hunting and gathering people with cultural elements that were very distinct from the Archaic Period peoples, including cremation, the use of the bow and arrow, and use of the acorn as a main food staple (Moratto 1984). Along the coast, the Luiseño made use of available marine resources by fishing and collecting mollusks for food. Seasonally available terrestrial resources, including acorns and game, were also sources of nourishment for Luiseño groups. The elaborate kinship and clan systems between the Luiseño and other groups facilitated a wide-reaching trade network that included trade of Obsidian Butte obsidian and other resources from the eastern deserts and steatite from the Channel Islands.

3.2.2 Historic Period

The historic background of the project area began with the Spanish colonization of Alta California. The first Spanish colonizing expedition reached southern California in 1769 with the intention of converting and civilizing the indigenous populations, as well as expanding the knowledge of and access to new resources in the region (Brigandi 1998). In the late eighteenth century, the San Gabriel (Los Angeles County), San Juan Capistrano (Orange County), and San Luis Rey (San Diego County) missions began colonizing southern California and gradually expanded their use of the interior valley (into what is now western Riverside County) for raising grain and cattle to support the missions (Riverside County n.d.). The San Gabriel Mission claimed lands in what is now Jurupa, Riverside, San Jacinto, and the San Gorgonio Pass, while the San Luis Rey Mission claimed land in what is now Lake Elsinore, Temecula, and Murrieta (American Local History Network: Riverside County, California 1998). The indigenous groups who occupied these lands were recruited by missionaries, converted, and put to work in the missions (Pourade 1964). Throughout this period, the Native American populations were decimated by introduced diseases, a drastic shift in diet resulting in poor nutrition, and social conflicts due to the introduction of an entirely new social order (Cook 1937).

In the mid- to late 1770s, Juan Bautista de Anza passed through much of Riverside County while searching for an overland route from Sonora, Mexico to San Gabriel and Los Angeles, and described fertile valleys, lakes, and sub-desert areas (American Local History Network: Riverside County, California 1998; Riverside County n.d.). In 1797, Father Presidente Lausen, Father Norberto de Santiago, and Corporal Pedro Lisalde led an expedition from Mission San Juan Capistrano through southwestern Riverside County in search of a new mission site before constructing Mission San Luis Rey in northern San Diego County (Brigandi 1998).

While no missions were ever built in what would become Riverside County (American Local History Network: Riverside County, California 1998), many mission outposts, or *asistencias,* were established in the early years of the nineteenth century to extend the missions' influence to the backcountry (Brigandi 1998). Two outposts that were located in Riverside County include San Jacinto and Temecula.

Mexico gained independence in 1822 and desecularized the missions in 1832, signifying the end of the Mission Period (Brigandi 1998; Riverside County n.d.). By this time, the missions owned some of the best and most fertile land in southern California. In order for California to develop, the land would have to be made productive enough to turn a profit (Brigandi 1998). The new government began distributing the vast mission holdings to wealthy and politically connected Mexican citizens. The "grants" were called "ranchos," of which Jurupa, El Rincon, La Sierra, El Sobrante de San Jacinto, La Laguna (Lake Elsinore), Santa Rosa, Temecula, Pauba, San Jacinto Nuevo y Potrero, and San Jacinto Viejo were located in present-day Riverside County. Many of these ranchos have lent their names to modern-day locales (American Local History Network: Riverside County, California 1998). The first grant in present-day Riverside County was Rancho Jurupa, given to Juan Bandini in 1838. The project area is located within this grant. The ranchos

included in the grant were all located in the valley environments typical of western Riverside County.

The treatment of Native Americans grew worse during the Rancho Period. Most of the Native Americans were forced off of their land or put to work on the now privately owned ranchos, most often as slave labor. In light of the brutal ranchos, the degree to which Native Americans had become dependent on the mission system is evident when, in 1838, a group of Native Americans from the San Luis Rey Mission petitioned government officials in San Diego to relieve suffering at the hands of the rancheros:

> We have suffered incalculable losses, for some of which we are in part to be blamed for because many of us have abandoned the Mission...We plead and beseech you...to grant us a Rev. Father for this place. We have been accustomed to the Rev. Fathers and to their manner of managing the duties. We labored under their intelligent directions, and we were obedient to the Fathers according to the regulations, because we considered it as good for us. (Brigandi 1998:21)

Native American culture had been disrupted to the point where they could no longer rely on prehistoric subsistence and social patterns. Not only does this illustrate how dependent the Native Americans had become on the missionaries, but it also indicates a marked contrast in the way the Spanish treated the Native Americans compared to the Mexican and United States ranchers. Spanish colonialism (missions) is based upon utilizing human resources while integrating them into their society. The ranchers, both Mexican and American, did not accept Native Americans into their social order and used them specifically for the extraction of labor, resources, and profit. Rather than being incorporated, they were either subjugated or exterminated (Cook 1976).

In 1846, war erupted between Mexico and the United States. In 1848, with the signing of the Treaty of Guadalupe Hidalgo, the region was annexed as a territory of the United States, and in 1850, California became a state. These events generated a steady flow of settlers into the area, including gold miners, entrepreneurs, health-seekers, speculators, politicians, adventurers, seekers of religious freedom, and individuals desiring to create utopian colonies.

In early 1852, the Native Americans of southern Riverside County, including the Luiseño and the Cahuilla, thought they had signed a treaty resulting in their ownership of all lands from Temecula to Aguanga east to the desert, including the San Jacinto Valley and the San Gorgonio Pass. The Temecula Treaty also included food and clothing provisions for the Indians. However, Congress never ratified the treaties, and the promise of one large reservation was rescinded (Brigandi 1998).

In 1852, following the law set forth in the Land Act of 1851, Juan Bandini filed a claim for a major portion of his original grant. This claim was confirmed in 1855 by the United States District Court. In 1857, Juan Bandini sold his portion of the Jurupa land grant to his son-in-law,

Abel Stearns (Elliot 1883 [1965]).

With the completion of the transcontinental railroad in 1869, land speculators, developers, and colonists began to invest in southern California. The first colony in what was to become Riverside County was Riverside itself. Judge John Wesley North, an abolitionist from Tennessee, brought a group of associates and co-investors out to southern California and founded Riverside on part of the Jurupa Rancho. A few years later the navel orange was planted and found to be such a success that it quickly became the agricultural staple of the region (American Local History Network: Riverside County, California 1998).

By the late 1880s and early 1890s, there was growing discontent between Riverside and San Bernardino, its neighbor 10 miles to the north, due to differences in opinion concerning religion, morality, the Civil War, politics, and fierce competition to attract settlers. After a series of instances in which charges were claimed about unfair use of tax monies to the benefit of the city of San Bernardino only, several people from Riverside decided to investigate the possibility of a new county. In May of 1893, voters living within portions of San Bernardino County (to the north) and San Diego County (to the south) approved the formation of Riverside County. Early business opportunities were linked to the agriculture industry but commerce, construction, manufacturing, transportation, and tourism also provided a healthy local economy. By the time of Riverside County's formation, Riverside had grown to become the wealthiest city per capita in the country due to the successful cultivation of the navel orange (American Local History Network: Riverside County, California 1998; Riverside County n.d.).

3.3 Applicable Regulations

Resource importance is assigned to districts, sites, buildings, structures, and objects that possess exceptional value or quality illustrating or interpreting the heritage of Riverside County in history, architecture, archaeology, engineering, and culture. A number of criteria are used in demonstrating resource importance. Specifically, criteria outlined in CEQA provide the guidance for making such a determination. The following sections detail the CEQA criteria that a resource must meet in order to be determined important.

3.3.1 California Environmental Quality Act

According to CEQA (§15064.5a), the term "historical resource" includes the following:

1) A resource listed in or determined to be eligible by the State Historical Resources Commission for listing in the California Register of Historical Resources (Pub. Res. Code SS5024.1, Title 14 CCR. Section 4850 et seq.).
2) A resource included in a local register of historical resources, as defined in Section 5020.1(k) of the Public Resources Code, or identified as significant in an historical resource survey meeting the requirements of Section 5024.1(g) of the Public Resources Code, shall be presumed to be historically or culturally significant. Public agencies

must treat any such resource as significant unless the preponderance of evidence demonstrates that it is not historically or culturally significant.

3) Any object, building, structure, site, area, place, record, or manuscript that a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California may be considered to be an historical resource, provided the lead agency's determination is supported by substantial evidence in light of the whole record. Generally, a resource shall be considered by the lead agency to be "historically significant" if the resource meets the criteria for listing on the California Register of Historical Resources (Pub. Res. Code SS5024.1, Title 14, Section 4852) including the following:

    a) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
    b) Is associated with the lives of persons important in our past;
    c) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
    d) Has yielded, or may be likely to yield, information important in prehistory or history.

4) The fact that a resource is not listed in, or determined eligible for listing in, the California Register of Historical Resources, not included in a local register of historical resources (pursuant to Section 5020.1(k) of the Public Resources Code), or identified in an historical resources survey (meeting the criteria in Section 5024.1(g) of the Public Resources Code) does not preclude a lead agency from determining that the resource may be an historical resource as defined in Public Resources Code Section 5020.1(j) or 5024.1.

According to CEQA (§15064.5b), a project with an effect that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment. CEQA defines a substantial adverse change as:

1) Substantial adverse change in the significance of an historical resource means physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired.
2) The significance of an historical resource is materially impaired when a project:
    a) Demolishes or materially alters in an adverse manner those physical

characteristics of an historical resource that convey its historical significance and that justify its inclusion in, or eligibility for inclusion in, the California Register of Historical Resources;

b) Demolishes or materially alters in an adverse manner those physical characteristics that account for its inclusion in a local register of historical resources pursuant to Section 5020.1(k) of the Public Resources Code or its identification in an historical resources survey meeting the requirements of Section 5024.1(g) of the Public Resources Code, unless the public agency reviewing the effects of the project establishes by a preponderance of evidence that the resource is not historically or culturally significant;

c) Demolishes or materially alters in an adverse manner those physical characteristics of an historical resource that convey its historical significance and that justify its eligibility for inclusion in the California Register of Historical Resources as determined by a lead agency for purposes of CEQA.

Section 15064.5(c) of CEQA applies to effects on archaeological sites and contains the following additional provisions regarding archaeological sites:

1. When a project will impact an archaeological site, a lead agency shall first determine whether the site is an historical resource, as defined in subsection (a).
2. If a lead agency determines that the archaeological site is an historical resource, it shall refer to the provisions of Section 21084.1 of the Public Resources Code, Section 15126.4 of the guidelines, and the limits contained in Section 21083.2 of the Public Resources Code do not apply.
3. If an archaeological site does not meet the criteria defined in subsection (a), but does meet the definition of a unique archaeological resource in Section 21803.2 of the Public Resources Code, the site shall be treated in accordance with the provisions of Section 21083.2. The time and cost limitations described in Public Resources Code Section 21083.2 (c-f) do not apply to surveys and site evaluation activities intended to determine whether the project location contains unique archaeological resources.
4. If an archaeological resource is neither a unique archaeological nor historical resource, the effects of the project on those resources shall not be considered a significant effect on the environment. It shall be sufficient that both the resource and the effect on it are noted in the Initial Study or Environmental Impact Report, if one is prepared to address impacts on other resources, but they need not be considered further in the CEQA process.

Section 15064.5 (d) & (e) contain additional provisions regarding human remains. Regarding Native American human remains, paragraph (d) provides:

(d) When an initial study identifies the existence of, or the probable likelihood of, Native American human remains within the project, a lead agency shall work with the appropriate Native Americans as identified by the NAHC, as provided in Public Resources Code SS5097.98. The applicant may develop an agreement for treating or disposing of, with appropriate dignity, the human remains and any items associated with Native American burials with the appropriate Native Americans as identified by the NAHC. Action implementing such an agreement is exempt from:

1) The general prohibition on disinterring, disturbing, or removing human remains from any location other than a dedicated cemetery (Health and Safety Code Section 7050.5)
2) The requirement of CEQA and the Coastal Act.

3.4 Research Design

The primary goal of the research design is to attempt to understand the way in which humans have used the land and resources within the project area through time, as well as to aid in the determination of resource significance. For the current project, the study area under investigation is the western portion of Riverside County and the southwestern section of the city of Moreno Valley. The scope of work for the archaeological program conducted for the Brodiaea Commerce Center Project included the survey of an approximately 11.8-acre area. Given the area involved in this Phase I survey, the research design for this project was limited and general in nature. Since the main objective of the investigation was to identify the presence of and potential impacts to cultural resources, the goal here is not necessarily to answer wide-reaching theories regarding the development of early southern California, but to investigate the role and importance of the identified resources. Nevertheless, the assessment of the significance of a resource must take into consideration a variety of characteristics, as well as the ability of the resource to address regional research topics and issues.

Although survey-level investigations are limited in terms of the amount of information available, several specific research questions were developed that could be used to guide the initial investigations of any observed cultural resources. The following research questions take into account the small size and location of the project area discussed above.

Research Questions

- Can located cultural resources be situated with a specific time period, population, or individual?
- Do the types of located cultural resources allow a site activity/function to be determined

from a preliminary investigation? What are the site activities? What is the site function? What resources were exploited?

- How do the located sites compare to others reported from different surveys conducted in the area?
- How do the located sites fit existing models of settlement and subsistence for valley environments of the region?

Data Needs

At the survey level, the principle research objective is a generalized investigation of changing settlement patterns in both the prehistoric and historic periods within the study area. The overall goal is to understand settlement and resource procurement patterns of the project area occupants. Therefore, adequate information on site function, context, and chronology from an archaeological perspective is essential for the investigation. The fieldwork and archival research was undertaken with these primary research goals in mind:

1) To identify cultural resources occurring within the project area;
2) To determine, if possible, site type and function, context of the deposit, and chronological placement of each cultural resource identified;
3) To place each cultural resource identified within a regional perspective; and
4) To provide recommendations for the treatment of each of the cultural resources identified.

4.0 METHODOLOGY

The cultural resources assessment conducted for the Brodiaea Commerce Center Project consisted of a reconnaissance-level survey of the property by qualified archaeologists and an institutional records search. This archaeological study conformed to City of Moreno Valley environmental guidelines, and the statutory requirements of CEQA were followed in evaluating potential impacts.

4.1 Field Methodology

The cultural resources survey of the project was conducted on September 7, 2017. The survey of the entire approximately 11.8-acre property was an intensive pedestrian reconnaissance consisting of a series of parallel transects spaced at approximately 10-meter intervals, which covered all areas of the project. The project is comprised of a generally rectangular APE that has recently had large swaths of land cleared of all vegetation. Ground visibility was excellent as approximately 85 percent of all land was visible for the majority of the property; however, visibility was limited in the portions where dense vegetation had not been cleared. The entire property was accessible and, except for the areas where vegetation had not been cleared, no constraints were encountered. Digital photographs were taken to document project conditions during the survey (see Section 5.2).

4.2 Records Search

The records search conducted by the EIC at UCR on September 20, 2017 was reviewed for an area of one mile surrounding the project in order to determine the presence of any previously recorded cultural resources. Results of the records search are provided in Appendix B and discussed in Section 5.1. The EIC also provided the standard review of the National Register of Historic Places and the Office of Historic Preservation Historic Property Directory. Land patent records held by the Bureau of Land Management (BLM) and accessible through the BLM General Land Office (GLO) website were also reviewed for pertinent project information. In addition, the BFSA research library and historic aerial photographs were also consulted for any relevant historical information.

4.3 Report Preparation and Recordation

This report contains information regarding previous studies, statutory requirements for the project, and a brief description of the setting, research methods employed, overall results, and recommendations. The report includes all appropriate illustrations and tabular information needed to make a complete and comprehensive presentation of these activities, including the methodologies employed and the personnel involved. A copy of this report will be placed at the EIC at UCR. Any newly recorded sites or sites requiring updated information will be recorded on

the appropriate Department of Parks and Recreation (DPR) forms, which will be filed with the EIC.

4.4 Native American Consultation

BFSA requested a review of the SLF at the NAHC on August 31, 2017 to determine if any recorded Native American sacred sites or locations of religious or ceremonial importance are present within one mile of the project. The search results received from the NAHC on September 1, 2017 did not indicate that any Native American religious, ritual, or other special activities occurred at this location. In accordance with the recommendations of the NAHC, BFSA contacted all Native American consultants listed in the NAHC response letter on September 6, 2017. As of the date of this report, the BFSA has received six responses. The Viejas Band of Kumeyaay Indians, San Manuel Band of Mission Indians, Twenty-Nine Palms Band of Mission Indians, San Pasqual Band of Mission Indians, and Augustine Band of Cahuilla Indians all stated that the project is out of their respective territory. The Pauma Band of Luiseño Indians also indicated that they were unaware of any cultural resources within the APE. Results of the review are provided in Appendix C and discussed in Section 5.1.

5.0 REPORT OF FINDINGS

5.1 Results of the Institutional Records Searches

A records search was conducted by the EIC at UCR on September 20, 2017, the results of which were reviewed by BFSA. The EIC reported that there are 39 cultural resources present within a one-mile radius of the project area. None of the 39 recorded cultural resources were recorded within the project boundaries. The resources identified by the EIC during the records search include one prehistoric isolate, and structures associated with historic World War II (WWII)-era March Air Reserve Base, including the National Register March Field Historic District, district contributing buildings, non-contributing ancillary buildings, and the former main entrance/security checkpoint to the military base.

Table 5.1–1
Cultural Resources Located Within a One-Mile Radius
of the Brodiaea Commerce Center Project

Site	Description
P-33-017967	Prehistoric isolated mano fragment
P-33-009191	March Field Historic District
P-33-009203, P-33-009211, P-33-009214, P-33-009215, P-33-009216, P-33-009217, P-33-009226, P-33-009236, P-33-009237, P-33-009238, P-33-009289, P-33-009291, P-33-009295, P-33-009297, P-33-009298, P-33-009299, P-33-009300, P-33-009301, P-33-009302, P-33-009303, P-33-009304, P-33-009305, P-33-009306, P-33-009307, P-33-009308, P-33-009309, P-33-009310, P-33-009311, P-33-009313, P-33-009315, P-33-009325, P-33-009326, and P-33-009334	Historic March Air Reserve Base WWII-era military buildings (March Field Historic District contributing building)
P-33-009444	Historic March Air Reserve Base WWII-era Stone Drainage Canal (March Field Historic District contributing structure)
P-33-017971 and P-33-017972	Historic March Air Reserve Base ancillary building
P-33-018039	Historic former March Air Reserve Base main entrance/security checkpoint

The records search also indicated that there have been 32 cultural resource studies conducted within a one-mile radius of the project. One of the studies covers the current project area (Foster et al. 1991). The 1991 study by Greenwood and Associates involved an intensive-

level survey of various Metropolitan Water District of Southern California pipeline alignments and alternatives (Foster et al. 1991). As such, the study included a small portion of the southwest corner of the current APE. Seven additional studies provide overviews of cultural resources in the general project vicinity. However, no cultural resources were identified on the project area as a result of any of these studies.

For the current project, the EIC reviewed the following historic sources:

- The National Register of Historic Places Index
- The Office of Historic Preservation, Archaeological Determinations of Eligibility
- The Office of Historic Preservation, Directory of Properties in the Historic Property Data File
- The 15' USGS *Riverside* topographic map (1897 and 1947)
- The 15' USGS *Perris* topographic map (1942)
- The 30' USGS *Elsinore* topographic map (1901)

The EIC reported that one historic district (P-33-009191 [March Field Historic District]), as well as 32 additional contributing properties were listed on the National Register of Historic Places as being located within the boundaries of the project area. However, March Air Reserve Base is located approximately 1,400 meters southwest of the property and neither the historic district nor any of the 32 contributing properties are mapped within or adjacent to the project APE. The complete records search results are provided in Appendix B.

An in-house assessment of historic aerial photographs show the property has historically been used for agriculture since at least 1966. The aerial photographs, as well as the historic USGS maps reviewed by the EIC, indicate that no structures have ever been located on the APE. BLM GLO records indicate that a patent (BLM serial number CACAAA 082784) was issued to William B. Bourn on September 20, 1870 under the authority of April 24, 1820: Sale-Cash Entry (3 Stat. 566). Under the patent, Bourn acquired 10,500.6 acres spanning across Township 3 South, Range 4 West, San Bernardino Base and Meridian.

A request for a SLF search was sent to the NAHC on August 31, 2017. The search results received from the NAHC on September 1, 2017 did not indicate that any Native American religious, ritual, or other special activities occurred at this location. In accordance with the recommendations of the NAHC, BFSA contacted all Native American consultants listed in the NAHC response letter on September 6, 2017. As of the date of this report, the BFSA has received six responses. The Viejas Band of Kumeyaay Indians, San Manuel Band of Mission Indians, Twenty-Nine Palms Band of Mission Indians, San Pasqual Band of Mission Indians, and Augustine Band of Cahuilla Indians all stated that the project is out of their respective territories. The Pauma Band of Luiseño Indians also indicated that they were unaware of any cultural resources within the APE. Original correspondence may be found in Appendix C.

Based on the record search results, the APE possesses a low sensitivity for cultural resources. Only one prehistoric isolate has been recorded within one-mile of the project and the majority of nearby resources are associated with March Field Air Force Base. The project is adjacent to the Heacock Channel, which likely would have been a natural intermittent source of water prehistorically. However, the APE does not contain bedrock outcrops or other landforms that are typically associated with prehistoric use areas. Therefore, given the valley setting and lack of exposed bedrock outcrops for the project area, predictive modeling would suggest that if prehistoric sites are present within the project area, they will likely be isolated artifacts, artifact scatters, or specialized resource processing loci that would have developed as a result of prehistoric resource extraction practices. In addition, as noted, no buildings were ever located on the property; as a result, any historic sites are likely to be surface deposits resulting from rural refuse dumping practices.

5.2 Results of the Field Survey

The cultural resources survey took place on September 7, 2017. The survey was directed by Principal Investigator Brian F. Smith and Project Archaeologist Andrew J. Garrison. The survey of the property was an intensive reconnaissance consisting of a series of parallel survey transects spaced at approximately 10-meter intervals, which covered all areas of the project. The project is comprised of a generally rectangular APE that has recently had large swaths of land cleared of all vegetation. Ground visibility was excellent as approximately 85 percent of all land was visible for the majority of the property; however, visibility was limited in the portions where dense vegetation had not been cleared. The entire property was accessible and, except for the areas where vegetation had not been cleared, no constraints were encountered.

The pedestrian survey indicated that the entirety of the project area had been disturbed by historic agricultural use, vegetation clearing, disking, and the development of the surrounding area. Modern trash and building material consisting of gravel, asphalt, and concrete fragments were noted throughout the property. Piles of building material were noted along the southern boundary of the property along Brodiaea Avenue. Photographs were taken to document project conditions at the time of the survey (Plates 5.2–1 and 5.2–2). The survey did not result in the identification of any cultural resources. No historic or prehistoric resources were observed during the survey. The potential for buried or masked cultural deposits within the project is considered low based upon the research results, lack of identified resources on this property, and previous impacts to the property.

Plate 5.2–1: Overview of the project area, facing north.

Plate 5.2–2: Overview of the project area, facing east.

6.0 RECOMMENDATIONS

The cultural resources study for the Brodiaea Commerce Center Project was negative for the presence of archaeological sites. The EIC records search showed that while 39 cultural resource sites have been recorded within a one-mile radius, no resources have ever been recorded within the APE. Furthermore, 32 studies and seven overview studies have been conducted within one mile of the project, including one that addresses a small portion of the APE (Foster et al. 1991). Previous studies on and near the APE did not identify any resources within the current project area. Therefore, as a result of the research results, the documented land use of the property, and the current survey, it is unlikely that any cultural resources exist within the project.

Given that no archaeological sites, features, or artifacts have been identified within the project, no potential impacts to cultural resources are associated with the proposed development of the project. The archaeological study was completed in accordance with the City of Moreno Valley environmental policies and CEQA significance evaluation criteria. Based upon the absence of any cultural resources within the APE, site-specific mitigation measures will not be required for this project. Further, as a result of previous ground-disturbing activities and the absence of recorded cultural resources within the project boundaries, there is little potential for cultural resources to be present or disturbed by the proposed development. No further archaeological study is recommended as a condition of permit approval based upon the records search and the results of the field survey.

7.0 CERTIFICATION

I hereby certify that the statements furnished above and in the attached exhibits present the data and information required for this archaeological report, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

September 26, 2017

Brian F. Smith
Principal Investigator

Date

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APPENDIX A

Qualifications of Key Personnel

Brian F. Smith, MA

Owner, Principal Investigator

Brian F. Smith and Associates, Inc.
14010 Poway Road • Suite A •
Phone: (858) 679-8218 • Fax: (858) 679-9896 • E-Mail: bsmith@bfsa-ca.com

Education

Master of Arts, History, University of San Diego, California **1982**

Bachelor of Arts, History, and Anthropology, University of San Diego, California **1975**

Professional Memberships

Society for California Archaeology

Experience

Principal Investigator **1977–Present**
Brian F. Smith and Associates, Inc. **Poway, California**

Brian F. Smith is the owner and principal historical and archaeological consultant for Brian F. Smith and Associates. Over the past 32 years, he has conducted over 2,500 cultural resource studies in California, Arizona, Nevada, Montana, and Texas. These studies include every possible aspect of archaeology from literature searches and large-scale surveys to intensive data recovery excavations. Reports prepared by Mr. Smith have been submitted to all facets of local, state, and federal review agencies, including the US Army Crops of Engineers, the Bureau of Land Management, the Bureau of Reclamation, the Department of Defense, and the Department of Homeland Security. In addition, Mr. Smith has conducted studies for utility companies (Sempra Energy) and state highway departments (CalTrans).

Professional Accomplishments

These selected major professional accomplishments represent research efforts that have added significantly to the body of knowledge concerning the prehistoric life ways of cultures once present in the Southern California area and historic settlement since the late 18th century. Mr. Smith has been principal investigator on the following select projects, except where noted.

Downtown San Diego Mitigation and Monitoring Reporting Programs: Large numbers of downtown San Diego mitigation and monitoring projects submitted to the Centre City Development Corporation, some of which included Strata (2008), Hotel Indigo (2008), Lofts at 707 10th Avenue Project (2007), Breeza (2007), Bayside at the Embarcadero (2007), Aria (2007), Icon (2007), Vantage Pointe (2007), Aperture (2007), Sapphire Tower (2007), Lofts at 655 Sixth Avenue (2007), Metrowork (2007), The Legend (2006), The Mark (2006), Smart Corner (2006), Lofts at 677 7th Avenue (2005), Aloft on Cortez Hill (2005), Front and

Beech Apartments (2003), Bella Via Condominiums (2003), Acqua Vista Residential Tower (2003), Northblock Lofts (2003), Westin Park Place Hotel (2001), Parkloft Apartment Complex (2001), Renaissance Park (2001), and Laurel Bay Apartments (2001).

Archaeology at the Padres Ballpark: Involved the analysis of historic resources within a seven-block area of the "East Village" area of San Diego, where occupation spanned a period from the 1870s to the 1940s. Over a period of two years, BFSA recovered over 200,000 artifacts and hundreds of pounds of metal, construction debris, unidentified broken glass, and wood. Collectively, the Ballpark Project and the other downtown mitigation and monitoring projects represent the largest historical archaeological program anywhere in the country in the past decade (2000-2007).

4S Ranch Archaeological and Historical Cultural Resources Study: Data recovery program consisted of the excavation of over 2,000 square meters of archaeological deposits that produced over one million artifacts, containing primarily prehistoric materials. The archaeological program at 4S Ranch is the largest archaeological study ever undertaken in the San Diego County area and has produced data that has exceeded expectations regarding the resolution of long-standing research questions and regional prehistoric settlement patterns.

Charles H. Brown Site: Attracted international attention to the discovery of evidence of the antiquity of man in North America. Site located in Mission Valley, in the city of San Diego.

Del Mar Man Site: Study of the now famous Early Man Site in Del Mar, California, for the San Diego Science Foundation and the San Diego Museum of Man, under the direction of Dr. Spencer Rogers and Dr. James R. Moriarty.

Old Town State Park Projects: Consulting Historical Archaeologist. Projects completed in the Old Town State Park involved development of individual lots for commercial enterprises. The projects completed in Old Town include Archaeological and Historical Site Assessment for the Great Wall Cafe (1992), Archaeological Study for the Old Town Commercial Project (1991), and Cultural Resources Site Survey at the Old San Diego Inn (1988).

Site W-20, Del Mar, California: A two-year-long investigation of a major prehistoric site in the Del Mar area of the city of San Diego. This research effort documented the earliest practice of religious/ceremonial activities in San Diego County (circa 6,000 years ago), facilitated the projection of major non-material aspects of the La Jolla Complex, and revealed the pattern of civilization at this site over a continuous period of 5,000 years. The report for the investigation included over 600 pages, with nearly 500,000 words of text, illustrations, maps, and photographs documenting this major study.

City of San Diego Reclaimed Water Distribution System: A cultural resource study of nearly 400 miles of pipeline in the city and county of San Diego.

Master Environmental Assessment Project, City of Poway: Conducted for the City of Poway to produce a complete inventory of all recorded historic and prehistoric properties within the city. The information was used in conjunction with the City's General Plan Update to produce a map matrix of the city showing areas of high, moderate, and low potential for the presence of cultural resources. The effort also included the development of the City's Cultural Resource Guidelines, which were adopted as City policy.

Draft of the City of Carlsbad Historical and Archaeological Guidelines: Contracted by the City of Carlsbad to produce the draft of the City's historical and archaeological guidelines for use by the Planning Department of the City.

The Mid-Bayfront Project for the City of Chula Vista: Involved a large expanse of undeveloped agricultural land situated between the railroad and San Diego Bay in the northwestern portion of the city. The study included the analysis of some potentially historic features and numerous prehistoric sites.

Cultural Resources Survey and Test of Sites Within the Proposed Development of the Audie Murphy Ranch, Riverside County, California: Project manager/director of the investigation of 1,113.4 acres and 43 sites, both prehistoric and historic—included project coordination; direction of field crews; evaluation of sites for significance based on County of Riverside and CEQA guidelines; assessment of cupule, pictograph, and rock shelter sites, co-authoring of cultural resources project report. February-September 2002.

Cultural Resources Evaluation of Sites Within the Proposed Development of the Otay Ranch Village 13 Project, San Diego County, California: Project manager/director of the investigation of 1,947 acres and 76 sites, both prehistoric and historic—included project coordination and budgeting; direction of field crews; assessment of sites for significance based on County of San Diego and CEQA guidelines; co-authoring of cultural resources project report. May-November 2002.

Cultural Resources Survey for the Remote Video Surveillance Project, El Centro Sector, Imperial County: Project manager/director for a survey of 29 individual sites near the U.S./Mexico Border for proposed video surveillance camera locations associated with the San Diego Border barrier Project—project coordination and budgeting; direction of field crews; site identification and recordation; assessment of potential impacts to cultural resources; meeting and coordinating with U.S. Army Corps of Engineers, U.S. Border Patrol, and other government agencies involved; co-authoring of cultural resources project report. January, February, and July 2002.

Cultural Resources Survey and Test of Sites Within the Proposed Development of the Menifee West GPA, Riverside County, California: Project manager/director of the investigation of nine sites, both prehistoric and historic—included project coordination and budgeting; direction of field crews; assessment of sites for significance based on County of Riverside and CEQA guidelines; historic research; co-authoring of cultural resources project report. January-March 2002.

Mitigation of An Archaic Cultural Resource for the Eastlake III Woods Project for the City of Chula Vista, California: Project archaeologist/ director—included direction of field crews; development and completion of data recovery program including collection of material for specialized faunal and botanical analyses; assessment of sites for significance based on CEQA guidelines; management of artifact collections cataloging and curation; data synthesis; co-authoring of cultural resources project report, in prep. September 2001-March 2002.

Cultural Resources Survey and Test of Sites Within the Proposed French Valley Specific Plan/EIR, Riverside County, California: Project manager/director of the investigation of two prehistoric and three historic sites—included project coordination and budgeting; survey of project area; Native American consultation; direction of field crews; assessment of sites for significance based on CEQA guidelines; cultural resources project report in prep. July-August 2000.

Cultural Resources Survey and Test of Sites Within the Proposed Lawson Valley Project, San Diego County, California: Project manager/director of the investigation of 28 prehistoric and two historic sites—included project coordination; direction of field crews; assessment of sites for significance based on CEQA guidelines; cultural resources project report in prep. July-August 2000.

Cultural Resource Survey and Geotechnical Monitoring for the Mohyi Residence Project, La Jolla, California: Project manager/director of the investigation of a single-dwelling parcel—included project coordination; field survey; assessment of parcel for potentially buried cultural deposits; monitoring of geotechnichal borings; authoring of cultural resources project report. Brian F. Smith and Associates, San Diego, California. June 2000.

Enhanced Cultural Resource Survey and Evaluation for the Prewitt/Schmucker/Cavadias Project, La Jolla, California: Project manager/director of the investigation of a single-dwelling parcel—included project coordination; direction of field crews; assessment of parcel for potentially buried cultural deposits; authoring of cultural resources project report. June 2000.

Cultural Resources Survey and Test of Sites Within the Proposed Development of the Menifee Ranch, Riverside County, California: Project manager/director of the investigation of one prehistoric and five historic sites—included project coordination and budgeting; direction of field crews; feature recordation; historic structure assessments; assessment of sites for significance based on CEQA guidelines; historic research; co-authoring of cultural resources project report. February-June 2000.

Salvage Mitigation of a Portion of the San Diego Presidio Identified During Water Pipe Construction for the City of San Diego, California: Project archaeologist/director—included direction of field crews; development and completion of data recovery program; management of artifact collections cataloging and curation; data synthesis and authoring of cultural resources project report in prep. April 2000.

Enhanced Cultural Resource Survey and Evaluation for the Tyrian 3 Project, La Jolla, California: Project manager/director of the investigation of a single-dwelling parcel—included project coordination; assessment of parcel for potentially buried cultural deposits; authoring of cultural resources project report. April 2000.

Enhanced Cultural Resource Survey and Evaluation for the Lamont 5 Project, Pacific Beach, California: Project manager/director of the investigation of a single-dwelling parcel—included project coordination; assessment of parcel for potentially buried cultural deposits; authoring of cultural resources project report. April 2000.

Enhanced Cultural Resource Survey and Evaluation for the Reiss Residence Project, La Jolla, California: Project manager/director of the investigation of a single-dwelling parcel—included project coordination; assessment of parcel for potentially buried cultural deposits; authoring of cultural resources project report. March-April 2000.

Salvage Mitigation of a Portion of Site SDM-W-95 (CA-SDI-211) for the Poinsettia Shores Santalina Development Project and Caltrans, Carlsbad, California: Project achaeologist/ director—included direction of field crews; development and completion of data recovery program; management of artifact collections cataloging and curation; data synthesis and authoring of cultural resources project report in prep. December 1999-January 2000.

Survey and Testing of Two Prehistoric Cultural Resources for the Airway Truck Parking Project, Otay Mesa, California: Project archaeologist/director—included direction of field crews; development and completion of testing recovery program; assessment of site for significance based on CEQA guidelines; authoring of cultural resources project report, in prep. December 1999-January 2000.

Cultural Resources Phase I and II Investigations for the Tin Can Hill Segment of the Immigration and Naturalization Services Triple Fence Project Along the International Border, San Diego County, California: Project manager/director for a survey and testing of a prehistoric quarry site along the border—NRHP eligibility assessment; project coordination and budgeting; direction of field crews; feature recordation; meeting and coordinating with U.S. Army Corps of Engineers; co-authoring of cultural resources project report. December 1999-January 2000.

Mitigation of a Prehistoric Cultural Resource for the Westview High School Project for the City of San Diego, California: Project archaeologist/ director—included direction of field crews; development and completion of data recovery program including collection of material for specialized faunal and botanical analyses; assessment of sites for significance based on CEQA guidelines; management of artifact collections cataloging and curation; data synthesis; co-authoring of cultural resources project report, in prep. October 1999-January 2000.

Mitigation of a Prehistoric Cultural Resource for the Otay Ranch SPA-One West Project for the City of Chula Vista, California: Project archaeologist/director—included direction of field crews; development of data recovery program; management of artifact collections cataloging and curation; assessment of

site for significance based on CEQA guidelines; data synthesis; authoring of cultural resources project report, in prep. September 1999-January 2000.

Monitoring of Grading for the Herschel Place Project, La Jolla, California: Project archaeologist/ monitor—included monitoring of grading activities associated with the development of a single-dwelling parcel. September 1999.

Survey and Testing of a Historic Resource for the Osterkamp Development Project, Valley Center, California: Project archaeologist/ director—included direction of field crews; development and completion of data recovery program; budget development; assessment of site for significance based on CEQA guidelines; management of artifact collections cataloging and curation; data synthesis; authoring of cultural resources project report. July-August 1999.

Survey and Testing of a Prehistoric Cultural Resource for the Proposed College Boulevard Alignment Project, Carlsbad, California: Project manager/director —included direction of field crews; development and completion of testing recovery program; assessment of site for significance based on CEQA guidelines; management of artifact collections cataloging and curation; data synthesis; authoring of cultural resources project report, in prep. July-August 1999.

Survey and Evaluation of Cultural Resources for the Palomar Christian Conference Center Project, Palomar Mountain, California: Project archaeologist—included direction of field crews; assessment of sites for significance based on CEQA guidelines; management of artifact collections cataloging and curation; data synthesis; authoring of cultural resources project report. July-August 1999.

Survey and Evaluation of Cultural Resources at the Village 2 High School Site, Otay Ranch, City of Chula Vista, California: Project manager/director —management of artifact collections cataloging and curation; assessment of site for significance based on CEQA guidelines; data synthesis; authoring of cultural resources project report. July 1999.

Cultural Resources Phase I, II, and III Investigations for the Immigration and Naturalization Services Triple Fence Project Along the International Border, San Diego County, California: Project manager/director for the survey, testing, and mitigation of sites along border—supervision of multiple field crews, NRHP eligibility assessments, Native American consultation, contribution to Environmental Assessment document, lithic and marine shell analysis, authoring of cultural resources project report. August 1997-January 2000.

Phase I, II, and II Investigations for the Scripps Poway Parkway East Project, Poway California: Project archaeologist/project director—included recordation and assessment of multicomponent prehistoric and historic sites; direction of Phase II and III investigations; direction of laboratory analyses including prehistoric and historic collections; curation of collections; data synthesis; coauthorship of final cultural resources report. February 1994; March-September 1994; September-December 1995.

Archaeological Evaluation of Cultural Resources Within the Proposed Corridor for the San Elijo Water Reclamation System Project, San Elijo, California: Project manager/director —test excavations; direction of artifact identification and analysis; graphics production; coauthorship of final cultural resources report. December 1994-July 1995.

Evaluation of Cultural Resources for the Environmental Impact Report for the Rose Canyon Trunk Sewer Project, San Diego, California: Project manager/Director —direction of test excavations; identification and analysis of prehistoric and historic artifact collections; data synthesis; co-authorship of final cultural resources report, San Diego, California. June 1991-March 1992.

Reports/Papers

Author, coauthor, or contributor to over 2,500 cultural resources management publications, a selection of which are presented below.

2015 An Archaeological/Historical Study for the Safari Highlands Ranch Project, City of Escondido, County of San Diego.

2015 A Phase I and II Cultural Resources Assessment for the Decker Parcels II Project, Planning Case No. 36962, Riverside County, California.

2015 A Phase I and II Cultural Resources Assessment for the Decker Parcels I Project, Planning Case No. 36950, Riverside County, California.

2015 Cultural Resource Data Recovery and Mitigation Monitoring Program for Site SDI-10,237 Locus F, Everly Subdivision Project, El Cajon, California.

2015 Phase I Cultural Resource Survey for the Woodward Street Senior Housing Project, City of San Marcos, California (APN 218-120-31).

2015 An Updated Cultural Resource Survey for the Box Springs Project (TR 33410), APNs 255-230-010, 255-240-005, 255-240-006, and Portions of 257-180-004, 257-180-005, and 257-180-006.

2015 A Phase I and II Cultural Resource Report for the Lake Ranch Project, TR 36730, Riverside County, California.

2015 A Phase II Cultural Resource Assessment for the Munro Valley Solar Project, Inyo County, California.

2014 Cultural Resources Monitoring Report for the Diamond Valley Solar Project, Community of Winchester, County of Riverside.

2014 National Historic Preservation Act Section 106 Compliance for the Proposed Saddleback Estates Project, Riverside County, California.

2014 A Phase II Cultural Resource Evaluation Report for RIV-8137 at the Toscana Project, TR 36593, Riverside County, California.

2014 Cultural Resources Study for the Estates at Del Mar Project, City of Del Mar, San Diego, California (TTM 14-001).

2014 Cultural Resources Study for the Aliso Canyon Major Subdivision Project, Rancho Santa Fe, San Diego County, California.

2014 Cultural Resources Due Diligence Assessment of the Ocean Colony Project, City of Encinitas.

2014 A Phase I and Phase II Cultural Resource Assessment for the Citrus Heights II Project, TTM 36475, Riverside County, California.

2013 A Phase I Cultural Resource Assessment for the Modular Logistics Center, Moreno Valley, Riverside County, California.

2013 A Phase I Cultural Resources Survey of the Ivey Ranch Project, Thousand Palms, Riverside County, California.

2013 Cultural Resources Report for the Emerald Acres Project, Riverside County, California.

2013 A Cultural Resources Records Search and Review for the Pala Del Norte Conservation Bank Project, San Diego County, California.

2013 An Updated Phase I Cultural Resources Assessment for Tentative Tract Maps 36484 and 36485, Audie Murphy Ranch, City of Menifee, County of Riverside.

2013 El Centro Town Center Industrial Development Project (EDA Grant No. 07-01-06386); Result of Cultural Resource Monitoring.

2013 Cultural Resources Survey Report for the Renda Residence Project, 9521 La Jolla Farms Road, La Jolla, California.

2013 A Phase I Cultural Resource Study for the Ballpark Village Project, San Diego, California.

2013 Archaeological Monitoring and Mitigation Program, San Clemente Senior Housing Project, 2350 South El Camino Real, City of San Clemente, Orange County, California (CUP No. 06-065; APN-060-032-04).

2012 Mitigation Monitoring Report for the Los Peñasquitos Recycled Water Pipeline.

2012 Cultural Resources Report for Menifee Heights (Tract 32277).

2012 A Phase I Cultural Resource Study for the Altman Residence at 9696 La Jolla Farms Road, La Jolla, California 92037.

2012 Mission Ranch Project (TM 5290-1/MUP P87-036W3): Results of Cultural Resources Monitoring During Mass Grading.

2012 A Phase I Cultural Resource Study for the Payan Property Project, San Diego, California.

2012 Phase I Archaeological Survey of the Rieger Residence, 13707 Durango Drive, Del Mar, California 92014, APN 300-369-49.

2011 Mission Ranch Project (TM 5290-1/MUP P87-036W3): Results of Cultural Resources Monitoring During Mass Grading.

2011 Mitigation Monitoring Report for the 1887 Viking Way Project, La Jolla, California.

2011 Cultural Resource Monitoring Report for the Sewer Group 714 Project.

2011 Results of Archaeological Monitoring at the 10th Avenue Parking Lot Project, City of San Diego, California (APNs 534-194-02 and 03).

2011 Archaeological Survey of the Pelberg Residence for a Bulletin 560 Permit Application; 8335 Camino Del Oro; La Jolla, California 92037 APN 346-162-01-00 .

2011 A Cultural Resources Survey Update and Evaluation for the Robertson Ranch West Project and an Evaluation of National Register Eligibility of Archaeological sites for Sites for Section 106 Review (NHPA).

2011 Mitigation Monitoring Report for the 43rd and Logan Project.

2011 Mitigation Monitoring Report for the Sewer Group 682 M Project, City of San Diego Project #174116.

2011 A Phase I Cultural Resource Study for the Nooren Residence Project, 8001 Calle de la Plata, La Jolla, California, Project No. 226965.

2011 A Phase I Cultural Resource Study for the Keating Residence Project, 9633 La Jolla Farms Road, La Jolla, California 92037.

2010 Mitigation Monitoring Report for the 15th & Island Project, City of San Diego; APNs 535-365-01, 535-365-02 and 535-392-05 through 535-392-07.

2010 Archaeological Resource Report Form: Mitigation Monitoring of the Sewer and Water Group 772 Project, San Diego, California, W.O. Nos. 187861 and 178351.

2010 Pottery Canyon Site Archaeological Evaluation Project, City of San Diego, California, Contract No. H105126.

2010 Archaeological Resource Report Form: Mitigation Monitoring of the Racetrack View Drive Project, San Diego, California; Project No. 163216.

2010 A Historical Evaluation of Structures on the Butterfield Trails Property.

2010 Historic Archaeological Significance Evaluation of 1761 Haydn Drive, Encinitas, California (APN 260-276-07-00).

2010 Results of Archaeological Monitoring of the Heller/Nguyen Project, TPM 06-01, Poway, California.

2010 Cultural Resource Survey and Evaluation Program for the Sunday Drive Parcel Project, San Diego County, California, APN 189-281-14.

2010 Archaeological Resource Report Form: Mitigation Monitoring of the Emergency Garnet Avenue Storm Drain Replacement Project, San Diego, California, Project No. B10062

2010 An Archaeological Study for the 1912 Spindrift Drive Project

2009 Cultural Resource Assessment of the North Ocean Beach Gateway Project City of San Diego #64A-003A; Project #154116.

2009 Archaeological Constraints Study of the Morgan Valley Wind Assessment Project, Lake County, California.

2008 Results of an Archaeological Review of the Helen Park Lane 3.1-acre Property (APN 314-561-31), Poway, California.

2008 Archaeological Letter Report for a Phase I Archaeological Assessment of the Valley Park Condominium Project, Ramona, California; APN 282-262-75-00.

2007 Archaeology at the Ballpark. Brian F. Smith and Associates, San Diego, California. Submitted to the Centre City Development Corporation.

2007 Result of an Archaeological Survey for the Villages at Promenade Project (APNs 115-180-007-3,115-180-049-1, 115-180-042-4, 115-180-047-9) in the City of Corona, Riverside County.

2007 Monitoring Results for the Capping of Site CA-SDI-6038/SDM-W-5517 within the Katzer Jamul Center Project; P00-017.

2006 Archaeological Assessment for The Johnson Project (APN 322-011-10), Poway, California.

2005 Results of Archaeological Monitoring at the El Camino Del Teatro Accelerated Sewer Replacement Project (Bid No. K041364; WO # 177741; CIP # 46-610.6.

2005 Results of Archaeological Monitoring at the Baltazar Draper Avenue Project (Project No. 15857; APN: 351-040-09).

2004 TM 5325 ER #03-14-043 Cultural Resources.

2004 An Archaeological Survey and an Evaluation of Cultural Resources at the Salt Creek Project. Report on file at Brian F. Smith and Associates.

2003 An Archaeological Assessment for the Hidden Meadows Project, San Diego County, TM 5174, Log No. 99-08-033. Report on file at Brian F. Smith and Associates.

2003 An Archaeological Survey for the Manchester Estates Project, Coastal Development Permit #02-009, Encinitas, California. Report on file at Brian F. Smith and Associates.

2003 Archaeological Investigations at the Manchester Estates Project, Coastal Development Permit #02-009, Encinitas, California. Report on file at Brian F. Smith and Associates.

2003 Archaeological Monitoring of Geological Testing Cores at the Pacific Beach Christian Church Project. Report on file at Brian F. Smith and Associates.

2003 San Juan Creek Drilling Archaeological Monitoring. Report on file at Brian F. Smith and Associates.

2003 Evaluation of Archaeological Resources Within the Spring Canyon Biological Mitigation Area, Otay Mesa, San Diego County, California. Brian F. Smith and Associates, San Diego, California.

2002 An Archaeological/Historical Study for the Otay Ranch Village 13 Project (et al.). Brian F. Smith and Associates, San Diego, California.

2002 An Archaeological/Historical Study for the Audie Murphy Ranch Project (et al.). Brian F. Smith and Associates, San Diego, California.

2002 Results of an Archaeological Survey for the Remote Video Surveillance Project, El Centro Sector, Imperial County, California. Brian F. Smith and Associates, San Diego, California.

2002 A Cultural Resources Survey and Evaluation for the Proposed Robertson Ranch Project, City of Carlsbad. Brian F. Smith and Associates, San Diego, California.

2002 Archaeological Mitigation of Impacts to Prehistoric Site SDI-7976 for the Eastlake III Woods Project, Chula Vista, California. Brian F. Smith and Associates, San Diego, California.

2002 An Archaeological/Historical Study for Tract No. 29777, Menifee West GPA Project, Perris Valley, Riverside County. Brian F. Smith and Associates, San Diego, California.

2002 An Archaeological/Historical Study for Tract No. 29835, Menifee West GPA Project, Perris Valley, Riverside County. Brian F. Smith and Associates, San Diego, California.

2001 An Archaeological Survey and Evaluation of a Cultural Resource for the Moore Property, Poway. Brian F. Smith and Associates, San Diego, California.

2001 An Archaeological Report for the Mitigation, Monitoring, and Reporting Program at the Water and Sewer Group Job 530A, Old Town San Diego. Brian F. Smith and Associates, San Diego, California.

2001 A Cultural Resources Impact Survey for the High Desert Water District Recharge Site 6 Project, Yucca Valley. Brian F. Smith and Associates, San Diego, California.

2001 Archaeological Mitigation of Impacts to Prehistoric Site SDI-13,864 at the Otay Ranch SPA-One West Project. Brian F. Smith and Associates, San Diego, California.

2001 A Cultural Resources Survey and Site Evaluations at the Stewart Subdivision Project, Moreno Valley, County of San Diego. Brian F. Smith and Associates, San Diego, California.

2000 An Archaeological/Historical Study for the French Valley Specific Plan/EIR, French Valley, County of Riverside. Brian F. Smith and Associates, San Diego, California.

2000 Results of an Archaeological Survey and the Evaluation of Cultural Resources at The TPM#24003–Lawson Valley Project. Brian F. Smith and Associates, San Diego, California.

2000 Archaeological Mitigation of Impacts to Prehistoric Site SDI-5326 at the Westview High School Project for the Poway Unified School District. Brian F. Smith and Associates, San Diego, California.

2000 An Archaeological/Historical Study for the Menifee Ranch Project. Brian F. Smith and Associates, San Diego, California.

2000 An Archaeological Survey and Evaluation of Cultural Resources for the Bernardo Mountain Project, Escondido, California. Brian F. Smith and Associates, San Diego, California.

2000 A Cultural Resources Impact Survey for the Nextel Black Mountain Road Project, San Diego, California. Brian F. Smith and Associates, San Diego, California.

2000 A Cultural Resources Impact Survey for the Rancho Vista Project, 740 Hilltop Drive, Chula Vista, California. Brian F. Smith and Associates, San Diego, California.

2000 A Cultural Resources Impact Survey for the Poway Creek Project, Poway, California. Brian F. Smith and Associates, San Diego, California.

2000 Cultural Resource Survey and Geotechnical Monitoring for the Mohyi Residence Project. Brian F. Smith and Associates, San Diego, California.

2000 Enhanced Cultural Resource Survey and Evaluation for the Prewitt/Schmucker/ Cavadias Project. Brian F. Smith and Associates, San Diego, California.

2000 Enhanced Cultural Resource Survey and Evaluation for the Lamont 5 Project. Brian F. Smith and Associates, San Diego, California.

2000 Salvage Excavations at Site SDM-W-95 (CA-SDI-211) for the Poinsettia Shores Santalina Development Project, Carlsbad, California. Brian F. Smith and Associates, San Diego, California.

2000 Enhanced Cultural Resource Survey and Evaluation for the Reiss Residence Project, La Jolla, California. Brian F. Smith and Associates, San Diego, California.

2000 Enhanced Cultural Resource Survey and Evaluation for the Tyrian 3 Project, La Jolla, California. Brian F. Smith and Associates, San Diego, California.

2000 A Report for an Archaeological Evaluation of Cultural Resources at the Otay Ranch Village Two SPA, Chula Vista, California. Brian F. Smith and Associates, San Diego, California.

2000 An Archaeological Evaluation of Cultural Resources for the Airway Truck Parking Project, Otay Mesa, County of San Diego. Brian F. Smith and Associates, San Diego, California.

2000 Results of an Archaeological Survey and Evaluation of a Resource for the Tin Can Hill Segment of the Immigration and Naturalization and Immigration Service Border Road, Fence, and Lighting Project, San Diego County, California. Brian F. Smith and Associates, San Diego, California.

1999 An Archaeological Survey of the Home Creek Village Project, 4600 Block of Home Avenue, San Diego, California. Brian F. Smith and Associates, San Diego, California.

1999 An Archaeological Survey for the Sgobassi Lot Split, San Diego County, California. Brian F. Smith and Associates, San Diego, California.

1999 An Evaluation of Cultural Resources at the Otay Ranch Village 11 Project. Brian F. Smith and Associates, San Diego, California.

1999 An Archaeological/Historical Survey and Evaluation of a Cultural Resource for The Osterkamp Development Project, Valley Center, California. Brian F. Smith and Associates, San Diego, California.

1999 An Archaeological Survey and Evaluation of Cultural Resources for the Palomar Christian Conference Center Project, Palomar Mountain, California. Brian F. Smith and Associates, San Diego, California.

1999 An Archaeological Survey and Evaluation of a Cultural Resource for the Proposed College Boulevard Alignment Project. Brian F. Smith and Associates, San Diego, California.

1999 Results of an Archaeological Evaluation for the Anthony's Pizza Acquisition Project in Ocean Beach, City of San Diego (with L. Pierson and B. Smith). Brian F. Smith and Associates, San Diego, California.

1996 An Archaeological Testing Program for the Scripps Poway Parkway East Project. Brian F. Smith and Associates, San Diego, California.

1995 Results of a Cultural Resources Study for the 4S Ranch. Brian F. Smith and Associates, San Diego, California.

1995 Results of an Archaeological Evaluation of Cultural Resources Within the Proposed Corridor for the San Elijo Water Reclamation System. Brian F. Smith and Associates, San Diego, California.

1994 Results of the Cultural Resources Mitigation Programs at Sites SDI-11,044/H and SDI-12,038 at the Salt Creek Ranch Project . Brian F. Smith and Associates, San Diego, California.

1993 Results of an Archaeological Survey and Evaluation of Cultural Resources at the Stallion Oaks Ranch Project. Brian F. Smith and Associates, San Diego, California.

1992 Results of an Archaeological Survey and the Evaluation of Cultural Resources at the Ely Lot Split Project. Brian F. Smith and Associates, San Diego, California.

1991 The Results of an Archaeological Study for the Walton Development Group Project. Brian F. Smith and Associates, San Diego, California.

Andrew J. Garrison, M.A., RPA

Senior Project Archaeologist

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Education

Master of Arts, Public History, University of California, Riverside **2009**

Bachelor of Science, Anthropology, University of California, Riverside **2005**

Bachelor of Arts, History, University of California, Riverside **2005**

Professional Memberships

Register of Professional Archaeologists
Society for California Archaeology
Society for American Archaeology
California Council for the Promotion of History
Society of Primitive Technology
Lithic Studies Society
California Preservation Foundation
Pacific Coast Archaeological Society

Experience

Senior Project Archaeologist **June 2017–Present**
Brian F. Smith and Associates, Inc. **Poway, California**

Project management of all phases of archaeological investigations for local, state, and federal agencies including National Register of Historic Places (NRHP) and California Environmental Quality Act (CEQA) level projects interacting with clients, sub-consultants, and lead agencies. Supervise and perform fieldwork including archaeological survey, monitoring, site testing, comprehensive site records checks, and historic building assessments. Perform and oversee technological analysis of prehistoric lithic assemblages. Author or co-author cultural resource management reports submitted to private clients and lead agencies.

Senior Archaeologist and GIS Specialist **2009–2017**
Scientific Resource Surveys, Inc. **Orange, California**

Served as Project Archaeologist or Principal Investigator on multiple projects, including archaeological monitoring, cultural resource surveys, test excavations, and historic building assessments. Directed projects from start to finish, including budget and personnel hours proposals, field and laboratory direction, report writing, technical editing, Native American consultation, and final report submittal. Oversaw all GIS projects including data collection, spatial analysis, and map creation.

Preservation Researcher **2009**
City of Riverside Modernism Survey **Riverside, California**

Completed DPR Primary, District, and Building, Structure and Object Forms for five sites for a grant-funded project to survey designated modern architectural resources within the City of Riverside.

Information Officer **2005, 2008–2009**
Eastern Information Center (EIC), University of California, Riverside **Riverside, California**

Processed and catalogued restricted and unrestricted archaeological and historical site record forms. Conducted research projects and records searches for government agencies and private cultural resource firms.

Reports/Papers

2017 A Phase I Cultural Resources Assessment for the Marbella Villa Project, City of Desert Hot Springs, Riverside County, California. Brian F. Smith and Associates, Inc.

2017 Phase I Cultural Resources Survey for TTM 37109, City of Jurupa Valley, County of Riverside. Brian F. Smith and Associates, Inc.

2017 A Phase I Cultural Resources Survey for the Jefferson & Ivy Project, City of Murrieta, California. Brian F. Smith and Associates, Inc.

2017 A Phase I Cultural Resources Assessment for the Nuevo Dollar General Store Project, Riverside County, California. Brian F. Smith and Associates, Inc.

2017 A Phase I Cultural Resource Study for the Westmont Project, Encinitas, California. Brian F. Smith and Associates, Inc.

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2015 Historic Resource Report: 807-813 Harvard Boulevard, Los Angeles. Scientific Resource Surveys, Inc. On file at the South Central Coastal Information Center, California State University, Fullerton.

2015 Exploring a Traditional Rock Cairn: Test Excavation at CA-SDI-13/RBLI-26: The Rincon Indian Reservation, San Diego County, California. Scientific Resource Surveys, Inc.

2015 Class III Scientific Resource Surveys, Inc. Survey for The Lynx Cat Granite Quarry and Water Valley Road Widening Project County of San Bernardino, California, Near the Community of Hinkley. Scientific Resource Surveys, Inc. On file at the South Central Coastal Information Center, California State University, Fullerton.

2014 Archaeological Phase I: Cultural Resource Survey of the South West Quadrant of Fairview Park, Costa Mesa. Scientific Resource Surveys, Inc. On file at the South Central Coastal Information Center, California State University, Fullerton.

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2010 Phase II Cultural Resources Report Site CA=RIV-2160 PM No. 35164. Scientific Resource Surveys, Inc. On file at the Eastern Information Center, University of California, Riverside.

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Presentations

2017 "Repair and Replace: Lithic Production Behavior as Indicated by the Debitage Assemblage from CA-MRP-283 the Hackney Site." Presented at the Society for California Archaeology Annual Meeting, Fish Camp, California.

2016 "Bones, Stones, and Shell at Bolsa Chica: A Ceremonial Relationship?" Presented at the Society for California Archaeology Annual Meeting, Ontario, California.

2016 "Markers of Time: Exploring Transitions in the Bolsa Chica Assemblage." Presented at the Society for California Archaeology Annual Meeting, Ontario, California.

2016 "Dating Duress: Understanding Prehistoric Climate Change at Bolsa Chica." Presented at the Society for California Archaeology Annual Meeting, Ontario, California.

2015 "Successive Cultural Phasing Of Prehistoric Northern Orange County, California." Presented at the Society for California Archaeology Annual Meeting, Redding, California.

2015 "Southern California Cogged Stone Replication: Experimentation and Results." Presented at the Society for California Archaeology Annual Meeting, Redding, California.

2015 "Prehistoric House Keeping: Lithic Analysis of an Intermediate Horizon House Pit." Presented at the Society for California Archaeology Annual Meeting, Redding, California.

2015 "Pits and Privies: The Use and Disposal of Artifacts from Historic Los Angeles." Presented at the Society for California Archaeology Annual Meeting, Redding, California.

2015 "Grooving in the Past: A Demonstration of the Manufacturing of OGR beads and a look at Past SRS, Inc. Replicative Studies." Demonstration of experimental manufacturing techniques at the January meeting of The Pacific Coast Archaeological Society, Irvine, California.

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2012 "Connecting Production Industries at Bolsa Chica: Lithic Reduction and Bead Manufacturing." Presented at the Society for California Archaeology Annual Meeting, San Diego, California.

2011 Bolsa Chica Archaeology: Part Four: Mesa Production Industries. Co-presenter at the April meeting of The Pacific Coast Archaeological Society, Irvine, California.

2011 "Hammerstones from Bolsa Chica and Their Relationship towards Site Interpretation." Presented at the Society for California Archaeology Annual Meeting, Rohnert Park, California.

2011 "Exploring Bipolar Reduction at Bolsa Chica: Debitage Analysis and Replication." Presented at the Society for California Archaeology Annual Meeting, Rohnert Park, California.

APPENDIX B

Archaeological Records Search Results

(Deleted for Public Review; Bound Separately)

APPENDIX C

NAHC Sacred Lands File Search Results

(Deleted for Public Review; Bound Separately)

Brian F. Smith and Associates, Inc.
Archaeology / Biology / History / Paleontology / Air Quality / Traffic / Acoustics

14 September 2017

Ms. Tracy Zinn
T&B Planning, Inc.
17542 East 17th Street, Suite 100
Tustin, California 92780

Subject: Paleontological Resource and Monitoring Assessment, Brodiaea Commerce Center Project, City of Moreno Valley, Riverside County, California

Dear Ms. Zinn:

Site Location: A paleontological resource assessment has been completed for the Brodiaea Commerce Center Project located north of March Field Air Force Base and northwest of the Perris Reservoir in the City of Moreno Valley, Riverside County, California (Attachments 1 and 2). The project site is bounded on the south and east by Brodiaea Avenue and Heacock Street, respectively, and is south of Alessandro Boulevard. The property and land to the immediate west of the site is currently fallow agricultural land. On the U. S. Geological Survey 7.5-minute, 1:24,000-scale Sunnymead, California topographic quadrangle map, the subject property is located in the northeast quarter of the northeast quarter of Section 13, Township 3 South, Range 4 West, San Bernardino Base and Meridian. The proposed project involves construction of an approximately 262,100-square-foot industrial warehouse/logistics building with approximately 10,000 square feet of office space and 35 dock doors positioned on the western side. Additional project improvements include approximately 37 truck trailer stalls, approximately 128 passenger vehicle parking stalls, water detention basins, drive aisles, a bicycle path, and associated landscaping.

Geology: Published geologic reports and maps of the project area and immediate surrounding areas include those of D. M. Morton and B. Cox, 2001a (Geologic map of the Riverside East 7.5' quadrangle, Riverside County, California), and D. M. Morton and J. C. Matti, 2001b (Preliminary geologic map of the Sunnymead 7.5' quadrangle, Riverside County, California). The maps indicate that the project site is underlain by lower Pleistocene (approximately 1.8 million to perhaps 200,000 to 300,000 year old) very old alluvial fan deposits ($Qvof_a$, shown in brown on Attachment 3). Nearby deposits include Holocene and upper Pleistocene (10,000 to perhaps 100,000 year old) young alluvial fan deposits (Qyf_a, shown in pale yellow on Attachment 3). A geotechnical report prepared for a nearby project (R. G. Trazo and J. A. Seminara, 2014) identified alluvial sediments to a depth of 30 feet below ground level, but did

14010 Poway Road, Suite A, Poway, CA 92064; Phone (858) 679-8218 or (951) 681-9950; Fax (858) 679-9896; www.bfsa-ca.com
Business Office: 14678 Ibex Court, San Diego, CA 92129; Phone (858) 484-0915; Fax (858) 484-0988

not comment on the age of the sediments (*i.e.*, whether or not they were Holocene ["modern"] in age or older, being early to late Pleistocene). The age of the sediments is important in determining if they should be accorded a low paleontological sensitivity (Holocene) or a high paleontological sensitivity (Pleistocene).

Paleontological Sensitivity: Previous paleontological sensitivity maps generated by the Riverside County Land Information System ranked the Moreno Valley area as having a "High Potential/Sensitivity (High B)," which was "based on [the presence of] geologic formations or mappable rock units that contain[ed] fossilized body elements, and trace fossils such as tracks, nests and eggs. These fossils occur on or below the surface." The category "High B" indicated that fossils were likely to be encountered at or below four feet of depth, and could be impacted during excavation by construction activities. The terminology previously used for a "High B" paleontological sensitivity has since been changed (2017) and is now referred to as "Medium" sensitivity (Attachment 4). Alluvial fan sediments with a Medium resource potential or Medium resource sensitivity to yield nonrenewable paleontological resources (*i.e.*, fossils) are shown in amber tint on Attachment 4.

Records Search Results: Based on a paleontological literature review and a collections and records search conducted by the Geological Sciences Division of the San Bernardino County Museum in Redlands, California for a nearby project site (E. G. Scott, March 12, 2015, attached), older Pleistocene alluvial fan deposits ($Qvof_a$ on Attachment 3) have a high potential to contain significant nonrenewable paleontological resources (*i.e.*, fossils), and were thus assigned a "high paleontological resource sensitivity" by Scott (2015). Similar older Pleistocene sediments throughout the lowland (valley) areas of western Riverside County and the Inland Empire have been reported to yield significant fossils of extinct terrestrial mammals from the last Ice Age (see references in Scott, 2015), such as mammoths, mastodons, giant ground sloths, dire wolves, short-faced bears, saber-toothed cats, large and small horses, camels, and bison. A collections and records search report solicited from the Vertebrate Paleontology Section of the Natural History Museum of Los Angeles County (LACM) for the Brodiaea Commerce Center project site (S. A. McLeod, 2017, attached) also did not identify any known fossil localities within the boundaries of the proposed project, nor within at least one mile in any direction. The closest recorded fossil locality cited by McLeod (2017) is LACM loc. 4540, which yielded fossil horse remains (*Equus* sp.) from a location more than eight miles distant to the east in the San Timoteo Badlands east of the city of Moreno Valley. The San Timoteo Badlands have yielded a considerable number of Tertiary vertebrate and plant fossils. However, the closest recorded fossil locality may be that reported by R. E. Reynolds (2004) from a location several miles northeast of the current project site. The only fossil recovered there was a limb bone of an unidentified species of *Bison*.

Recommendations: Because of the Medium paleontological sensitivity (previously High B) assigned to the lower Pleistocene older alluvial fan deposits across the site ($Qvof_a$ on Attachment 3), full-time paleontological monitoring of mass grading and excavation (utility trenching, etc.) activities in areas so mapped should be required in order to mitigate any adverse impacts (loss or destruction) to potential nonrenewable paleontological resources. The age of these sediments is more important in determining the need for paleontological monitoring than the possible depth of their current burial. The mitigation program should be consistent with the provisions of the

California Environmental Quality Act (CEQA), regulations currently implemented by the City of Moreno Valley (as the lead agency for the project), the County of Riverside, and the proposed guidelines of the Society of Vertebrate Paleontology (see page 5, following).

If you have any questions concerning this evaluation, please feel free to contact us at our Poway address. Thank you for the opportunity to have provided paleontological services for this project.

Sincerely,

George L. Kennedy, Ph.D.
Senior Paleontologist

Todd Wirths, M.S.
California Professional Geologist No. 7588

Attachments: Index maps, geologic map, paleontological sensitivity map, and LACM and SBCM records search reports

PROFESSIONAL GEOLOGIST
TODD A. WIRTHS
No. 7588
STATE OF CALIFORNIA

References:

McLeod, S. A. 2017. Paleontological resources records search for the proposed Brodiaea Avenue & Heacock Street Warehouse project, BFSA Project # 17-166, in Moreno Valley, Riverside County, project area. Unpublished paleontological records search report prepared for Brian F. Smith and Associates, Inc., Poway by the Section of Vertebrate Paleontology, Natural History Museum of Los Angeles County, Los Angeles. (Copy attached.)

Morton, D. M., and Cox, B. 2001a. Geologic map of the Riverside East 7.5' quadrangle, Riverside County, California: U. S. Geological Survey Open-File Report 01-452, scale 1:24,000.

Morton, D. M., and Matti, J. C. 2001b. Preliminary geologic map of the Sunnymead 7.5' quadrangle, Riverside County, California: U. S. Geological Survey Open-File Report 01-450, scale 1:24,000.

Reynolds, R. E. 2004. Paleontological resource investigation, Moreno Highlands fault investigation. *In* unpublished geologic report prepared by Leighton & Associates, 2004, Preliminary fault investigation, Tentative Tract Map No. 32501, Moreno Highlands, City of Moreno Valley, Project No. 111061-1031.

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Trazo, R. G., and Seminara, J. A. 2014. Geotechnical investigation, proposed Moreno Valley Logistics Center, SWC Krameria Avenue and Indian Street, Moreno Valley, California. Unpublished geotechnical report prepared for ProLogis, Ontario, California, by Southern California Geotechnical, Inc., Yorba Linda, California.

Paleontological Mitigation Program

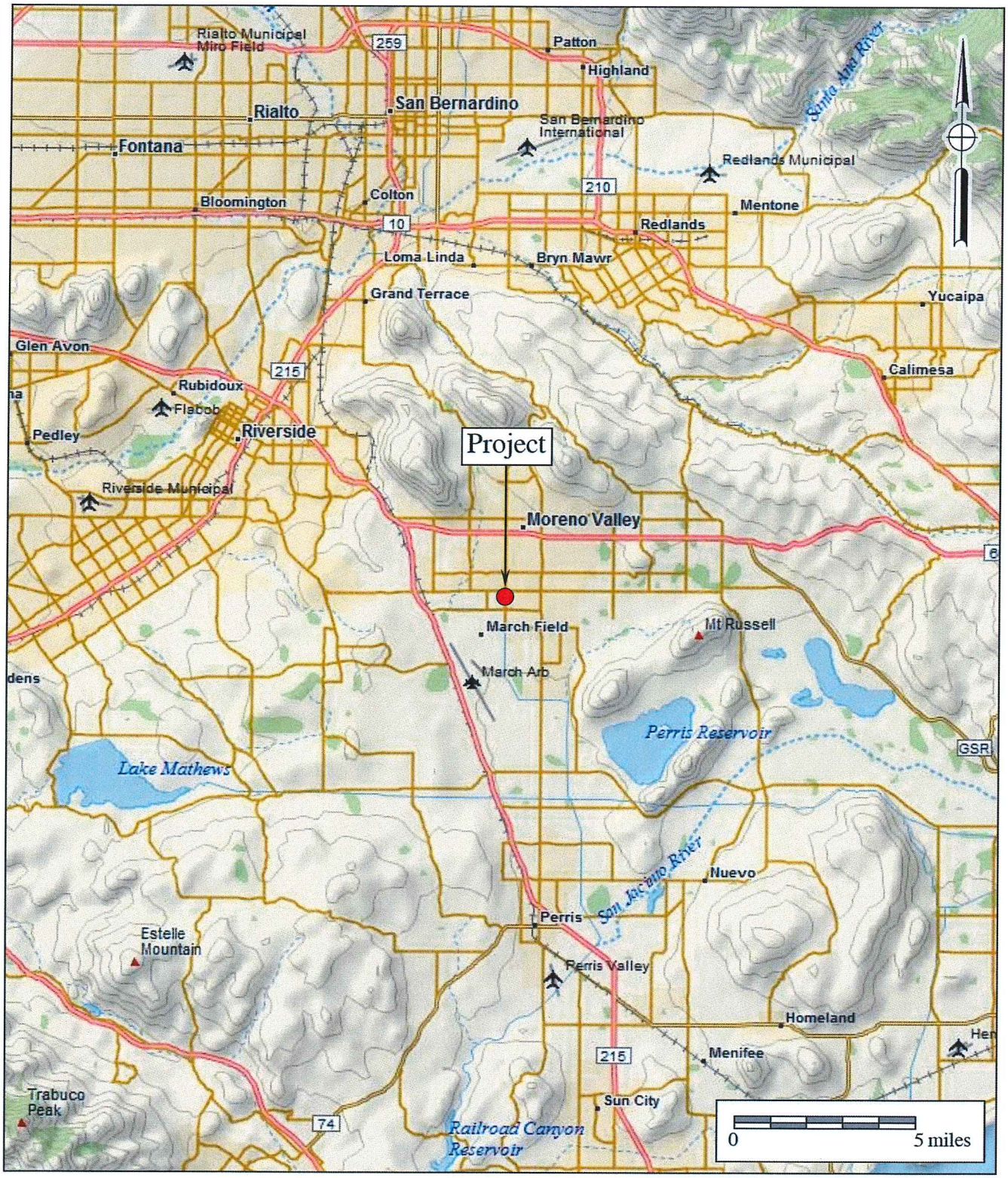
Brodiaea Commerce Center Project

1. Monitoring of mass grading and excavation activities in areas identified as likely to contain paleontological resources by a qualified paleontologist or paleontological monitor. Full-time monitoring will be conducted in areas of grading or excavation in undisturbed, very old alluvial fan sediments ($Qvof_a$ on Attachment 3). Paleontological monitors will be equipped to salvage fossils as they are unearthed to avoid construction delays and to remove samples of sediments that are likely to contain the remains of small fossil invertebrates and vertebrates. The monitor must be empowered to temporarily halt or divert equipment to allow for the removal of abundant or large specimens in a timely manner. Monitoring may be reduced if the potentially fossiliferous units are not present in the subsurface, or if present, are determined upon exposure and examination by qualified paleontological personnel to have a low potential to contain or yield fossil resources.

2. Preparation of recovered specimens to a point of identification and permanent preservation, including screen washing sediments to recover small invertebrates and vertebrates, if necessary. Preparation of individual vertebrate fossils is often more time-consuming than for accumulations of invertebrate fossils.

3. Identification and curation of specimens into a professional, accredited public museum repository with a commitment to archival conservation and permanent retrievable storage (*e.g.*, the Western Science Center Museum, 2345 Searl Parkway, Hemet, California 92543). The paleontological program should include a written repository agreement prior to the initiation of mitigation activities.

4. Preparation of a final monitoring and mitigation report of findings and significance, including lists of all fossils recovered and necessary maps and graphics to accurately record their original location. The report, when submitted to the appropriate lead agency (City of Moreno Valley), will signify satisfactory completion of the project program to mitigate impacts to any paleontological resources.

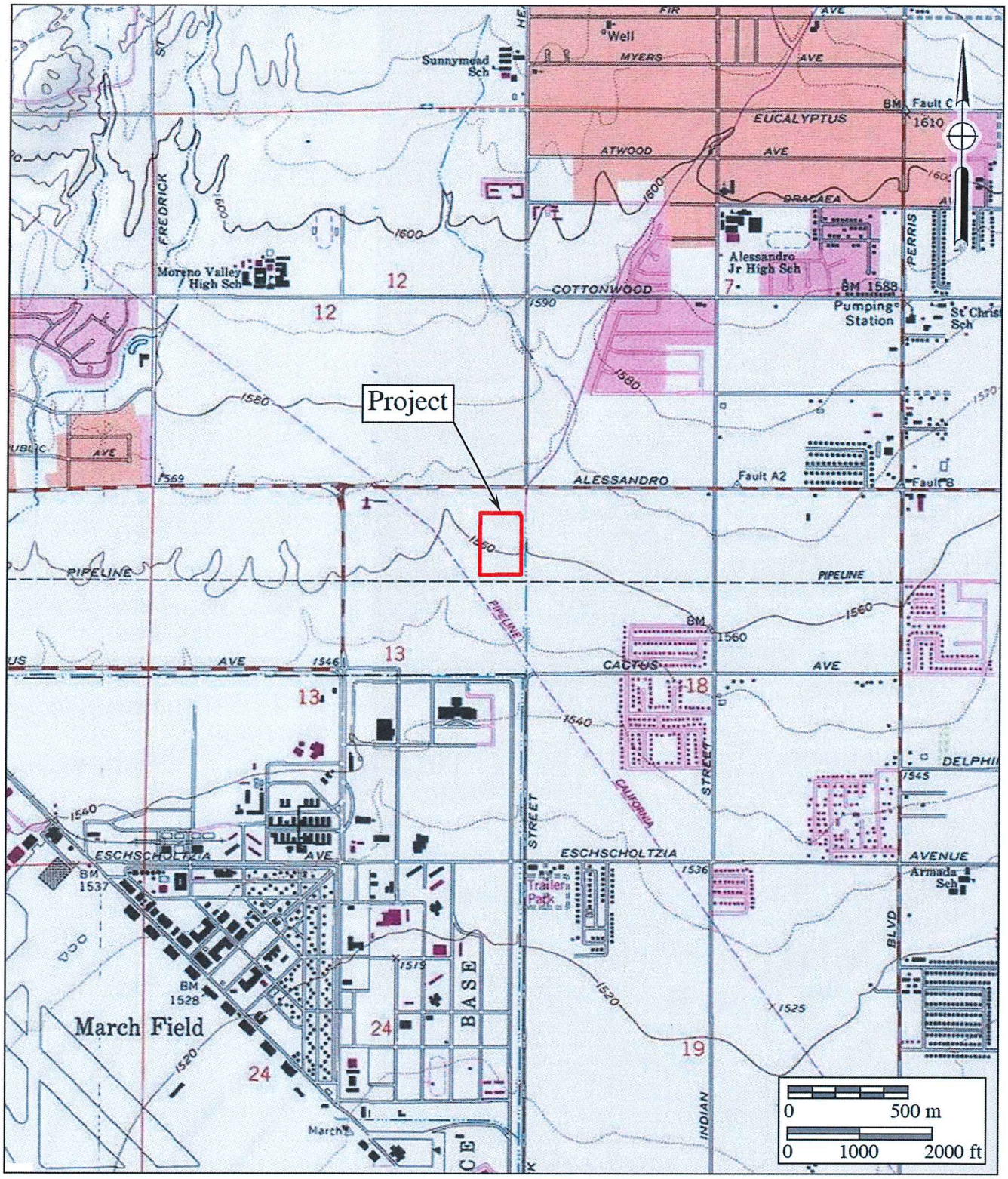


Attachment 1

General Location Map

The Brodiaea Commerce Center Project

DeLorme (1:250,000)

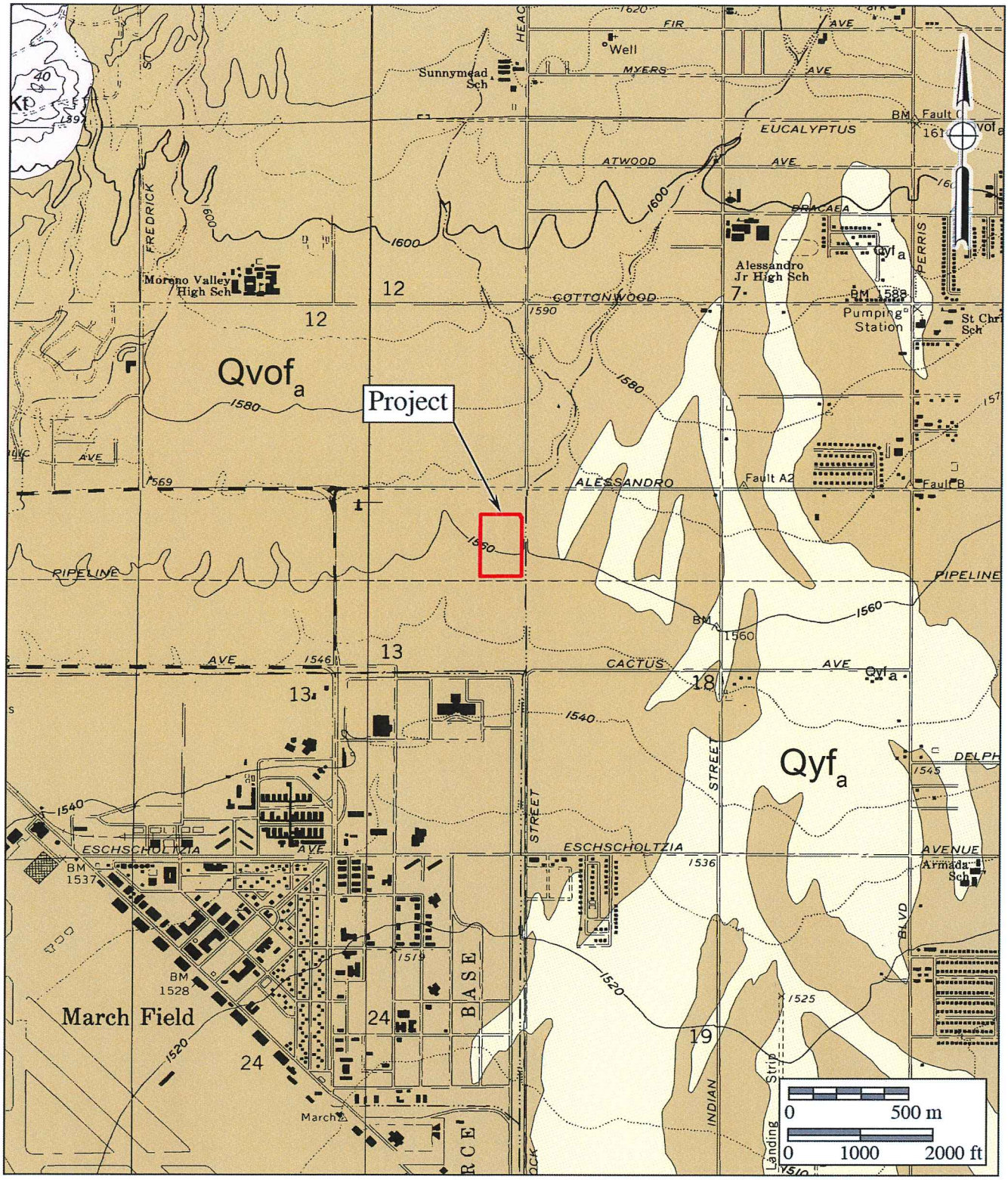


Attachment 2

Project Location Map

The Brodiaea Commerce Center Project

USGS *Riverside East* and *Sunnymead* Quadrangles (7.5-minute series)

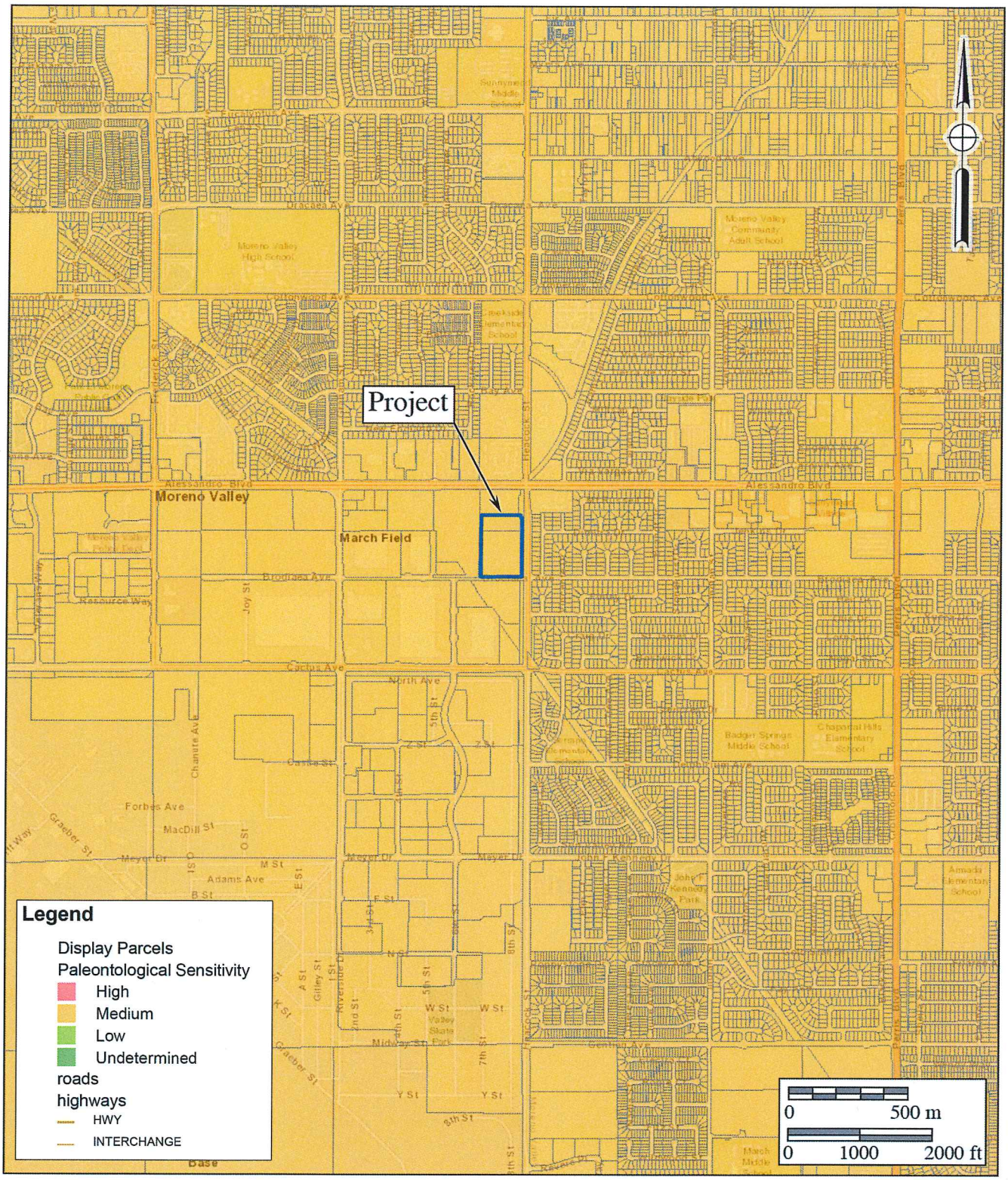


Attachment 3

Geologic Map

The Brodiaea Commerce Center Project

Geology after U.S. Geological Survey (2001a, b)



Attachment 4

Paleontological Sensitivity Map

The Brodiaea Commerce Center Project

Natural History Museum
of Los Angeles County
900 Exposition Boulevard
Los Angeles, CA 90007

tel 213.763.DINO
www.nhm.org

Vertebrate Paleontology Section
Telephone: (213) 763-3325

e-mail: smcleod@nhm.org

14 September 2017

Brian F. Smith & Associates, Inc.
14010 Poway Road, Suite A
Poway, CA 92064

Attn: George L. Kennedy, Ph.D., Senior Paleontologist

re: Paleontological Resources Records Search for the proposed Brodiaea Avenue & Heacock Street Warehouse Project, BFSA Project # 17-166, in Moreno Valley, Riverside County, project area

Dear Dr. Kennedy:

I have thoroughly searched our paleontology collection records for the locality and specimen data for the proposed Brodiaea Avenue & Heacock Street Warehouse Project, BFSA Project # 17-166, in Moreno Valley, Riverside County, project area as outlined on the portion of the Sunnymead USGS topographic quadrangle map that you sent to me via e-mail on 31 August 2017. We do not have any vertebrate fossil localities that lie directly within the proposed project area boundaries, but we do have localities farther afield from sedimentary deposits similar to those that may occur subsurface in the proposed project area.

Surface deposits in the entire proposed project area consist of younger Quaternary Alluvium, derived as alluvial fan deposits from the more elevated terrain to the north. These sedimentary deposits typically do not contain significant vertebrate fossils, at least in the uppermost layers, but they may be underlain by finer-grained older Quaternary deposits that do contain significant vertebrate fossils. Our closest vertebrate fossil locality from somewhat similar deposits is LACM 4540, from the gravel pits just west of Jack Rabbit Trail east-southeast of the proposed project area on the eastern side of the San Jacinto Valley, that produced a specimen of fossil horse, *Equus*.

Shallow excavations in younger Quaternary Alluvium in the proposed project area are unlikely to uncover significant vertebrate fossil remains. Deeper excavations in the proposed project area that extend down into older Quaternary deposits, however, may well encounter significant vertebrate fossils. Any substantial excavations in the proposed project area, therefore, should be monitored closely to quickly and professionally recover any fossil remains discovered while not impeding development. Also, sediment samples should be collected and processed to determine the small fossil potential in the proposed project area. Any fossils recovered during mitigation should be deposited in an accredited and permanent scientific institution for the benefit of current and future generations.

This records search covers only the vertebrate paleontology records of the Natural History Museum of Los Angeles County. It is not intended to be a thorough paleontological survey of the proposed project area covering other institutional records, a literature survey, or any potential on-site survey.

Sincerely,

Samuel A. McLeod

Samuel A. McLeod, Ph.D.
Vertebrate Paleontology

enclosure: invoice

2024 Orange Tree Lane, Redlands, California 92374 | Phone: 909.798.8608
www.SBCounty.gov

SAN BERNARDINO COUNTY

Museum

Leonard X. Hernandez
Interim Museum Director

12 March 2015

Brian F. Smith and Associates
attn: George L. Kennedy, Ph.D., Senior Paleontologist
14010 Poway Road, Suite A
Poway, CA 92064

re: **PALEONTOLOGY LITERATURE AND RECORDS REVIEW, MORENO VALLEY LOGISTICS CENTER, CITY OF MORENO VALLEY, RIVERSIDE COUNTY, CALIFORNIA**

Dear Dr. Kennedy,

The Division of Geological Sciences of the San Bernardino County Museum (SBCM) has completed a literature review and records search for the above-named project in the City of Moreno Valley, Riverside County, California. Specifically, the proposed study area is located in the southwestern quadrant of section 30, Township 3 South, Range 3 West, San Bernardino Base and Meridian, as seen on the Perris, California and the Sunnymead, California 7.5' United States Geological Survey topographic quadrangle maps (1967 editions, photorevised 1973 and 1980, respectively).

Previous mapping of the proposed property (Rogers, 1965; Morton and Matti, 2001; Morton, 2003) indicates that the study area is situated entirely upon surface exposures of early Pleistocene alluvial fan deposits (= unit $\mathbf{Qvof_a}$). These Pleistocene fan deposits may have high paleontologic sensitivity, depending upon their lithology. Pleistocene alluvium elsewhere throughout Riverside County and the Inland Empire has repeatedly been reported to yield significant fossils of extinct animals from the Ice Age (Jefferson, 1991; Reynolds, 1991; Anderson and others, 2002; Scott and Cox, 2008; Springer and others, 2009, 2010; Scott, 2010). Fossils recovered from these Pleistocene sediments represent extinct taxa including mammoths, mastodons, ground sloths, dire wolves, sabre-toothed cats, large and small horses, large and small camels, and bison (Jefferson, 1991; Reynolds, 1991; Scott and Cox, 2008; Springer and others, 2009, 2010; Scott, 2010), as well as plant macro- and microfossils (Anderson and others, 2002). If not previously disturbed by development, and depending upon the lithology exhibited, these sediments have high potential to contain significant nonrenewable paleontologic resources.

For this review, I conducted a search of the Regional Paleontologic Locality Inventory (RPLI) at the SBCM. The results of this search indicate that no previously-recorded fossil resource

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localities from Pleistocene older alluvium are present within the boundaries of the proposed development property, nor from at least within one mile in any direction.

Recommendations

The results of the literature review and the search of the RPLI at the SBCM demonstrate that the proposed study area is situated upon Pleistocene older alluvial deposits that, if not previously disturbed by development and depending upon their lithology, have high potential to contain paleontologic resources. Excavation in this older alluvium therefore has high potential to impact paleontologic resources. A qualified vertebrate paleontologist must develop a program to mitigate impacts to nonrenewable paleontologic resources. This mitigation program must be consistent with the provisions of the California Environmental Quality Act (Scott and Springer, 2003), as well as with regulations currently implemented by the County of Riverside. This program should include, but not be limited to:

1. Monitoring of excavation in areas identified as likely to contain paleontologic resources by a qualified paleontologic monitor. Areas requiring monitoring include all previously-undisturbed Pleistocene older alluvial sediments present, at the surface or at depth, within the boundaries of the property. Paleontologic monitors should be equipped to salvage fossils as they are unearthed, to avoid construction delays, and to remove samples of sediments that are likely to contain the remains of small fossil invertebrates and vertebrates. Monitors must be empowered to temporarily halt or divert equipment to allow removal of abundant or large specimens. Monitoring may be reduced or eliminated if the potentially-fossiliferous units described herein are determined upon exposure and examination by qualified paleontologic personnel to have low potential to contain fossil resources.

2. Preparation of recovered specimens to a point of identification and permanent preservation, including washing of sediments to recover small invertebrates and vertebrates. Preparation and stabilization of all recovered fossils are essential in order to fully mitigate adverse impacts to the resources (Scott and others, 2004).

3. Identification and curation of specimens into an established, accredited museum repository with permanent retrievable paleontologic storage. These procedures are also essential steps in effective paleontologic mitigation (Scott and others, 2004) and CEQA compliance (Scott and Springer, 2003). The paleontologist must have a written repository agreement in hand prior to the initiation of mitigation activities. Mitigation of adverse impacts to significant paleontologic resources is not complete until such curation into an established, accredited museum repository has been fully completed and documented.

4. Preparation of a report of findings with an appended itemized inventory of specimens. The report and inventory, when submitted to the appropriate Lead Agency along with confirmation of the curation of recovered specimens into an established, accredited museum

repository, would signify completion of the program to mitigate impacts to paleontologic resources.

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Please do not hesitate to contact us with any further questions you may have.

Sincerely,

Eric Scott, Curator of Paleontology
Division of Geological Sciences
San Bernardino County Museum

GEOTECHNICAL INVESTIGATION

Proposed Warehouse Building Development
Northwest Corner Heacock Street and
Brodiaea Street
Moreno Valley, California

Alere Property Group, LLC
100 Bayview Circle, Suite 310
Newport Beach, California 92660

Project Number 19803-17
August 16, 2017

NorCal Engineering

NorCal Engineering

SOILS AND GEOTECHNICAL CONSULTANTS
10641 HUMBOLT STREET LOS ALAMITOS, CA 90720
(562)799-9469 FAX (562)799-9459

August 17, 2017 Project Number 19803-17

Alere Property Group, LLC
100 Bayview Circle, Suite 310
Newport Beach, California 92660

Attn: Clark Neuhoff

RE: **GEOTECHNICAL INVESTIGATION** - Proposed Warehouse Building Development - Located at the Northwest Corner of Heacock Street and Brodiaea Street, in the City of Moreno Valley, California

Dear Mr. Neuhoff:
Pursuant to your request, this firm has performed this Geotechnical Investigation for the above referenced project. The purpose of this investigation is to evaluate the geotechnical conditions of subject property and to provide recommendations for the proposed development. This geotechnical engineering report presents the findings of our study along with conclusions and recommendations for development.

1.0 STRUCTURAL CONSIDERATIONS

1.1 Proposed Development

It is currently proposed to a new concrete tilt-up structure totaling 262,000 square feet on the property. Asphaltic and concrete pavement areas and landscaping will also be installed. Grading for the development will include cut and fill procedures. Final building plans shall be reviewed by this firm prior to submittal for city approval to determine the need for any additional study and revised recommendations pertinent to the proposed development, if necessary.

2.0 SITE DESCRIPTION

2.1 **Location:** The rectangular shaped property is located at the northwest intersection of Heacock Street and Brodiaea Street, in the City of Moreno Valley, as shown on the Vicinity Map, Figure 1. Alessandro Boulevard borders approximately 300 feet north of the site. The Heacock Channel, a concrete-lined storm drain channel, is located along the east property line between the property and the roadway. Vacant land is located to the west.

2.2 **Existing Improvements:** The property is currently vacant and is covered with a low growth of vegetation.

2.3 **Drainage:** The site topography is generally flat and drainage pattern is not readily discernible.

3.0 SEISMICITY EVALUATION

The proposed development lies outside of any Alquist Priolo Special Studies Zone and the potential for damage due to direct fault rupture is considered unlikely.

The following seismic design parameters are provided and are in accordance with the 2016 California Building Code (CBC) as determined using the USGS Seismic Design tool (http://geohazards.usgs.gov/designmaps/us/application.php) for the referenced project. Design map summary report and the detailed report from the website are included in Appendix A.

Seismic Design Parameters

Site Location – Region 1	Latitude	33.9152°
	Longitude	-117.2450°
Seismic Use Group		II
Site Class		D
Risk Category		I/II/III
Maximum Spectral Response Acceleration	S_S	1.504g
	S_1	0.627g
Adjusted Maximum Acceleration	S_{MS}	1.504g
	S_{M1}	0.941g
Design Spectral Response Acceleration Parameters	S_{DS}	1.003g
	S_{D1}	0.627g

The San Jacinto (San Bernardino) Fault zone is located approximately 8.5 kilometers northeast of the site and is capable of producing a Magnitude 6.9 earthquake. Ground shaking originating from earthquakes along other active faults in the region is expected to induce lower horizontal accelerations due to smaller anticipated earthquakes and/or greater distances to other faults.

4.0 FIELD INVESTIGATION

4.1 Site Exploration

The investigation consisted of the placement of three (3) subsurface exploratory boring by hollow-stem auger drill rig and fifteen (15) excavations by backhoe. Explorations extended to a maximum depth of 51.5 feet below current ground elevations. The explorations were placed at accessible locations throughout the site.

The explorations were visually classified and logged by a field engineer with locations of the subsurface excavations are shown on the attached Figure 2. Detailed descriptions of the subsurface conditions are listed on the logs in Appendix B. It should be noted that the transition from one soil type to another as shown on the excavation logs is approximate and may in fact be a gradual transition. The soils encountered are described as follows:

Fill/Disturbed Top Soils– Fill and disturbed top soils classifying as clayey SAND to sandy, clayey SILT with some gravel, concrete pieces and roots were encountered in the explorations to depths ranging from 1 to 2 feet. These soils were noted to be loose/soft and dry.

Native Soils – Native soils classifying as clayey SAND were encountered beneath the upper fill soils. These soils were noted to be medium dense and damp to moist. Sand, silt and clay content varied with depth of exploration.

4.2 Groundwater

Groundwater was encountered at a depth of approximately 28 feet at the site.

5.0 LABORATORY TESTS

Relatively undisturbed samples of the subsurface soils were obtained to perform laboratory testing and analysis for direct shear, consolidation tests, and to determine in-place moisture/densities. These relatively undisturbed ring samples were obtained by driving a thin-walled steel sampler lined with one-inch long brass rings with an inside diameter of 2.42 inches into the undisturbed soils.

Bulk bag samples were obtained in the upper soils for expansion index tests, corrosion tests, resistance value and maximum density tests. Wall loadings on the order of 4,000 lbs./lin.ft. and maximum compression loads on the order of 100 kips were utilized for testing and design purposes. All test results are included in Appendix C, unless otherwise noted.

5.1 **Field moisture content** (ASTM:D 2216-10) and the dry density of the ring samples were determined in the laboratory. This data is listed on the logs of explorations.

5.2 **Maximum density tests** (ASTM: D-1557-12) were performed on typical samples of the upper soils. Results of these tests are shown on Table I.

5.3 **Expansion index tests** (ASTM: D-4829-11) were performed on remolded samples of the upper soils to determine the expansive characteristics and to provide any necessary recommendations for reinforcement of the slabs-on-grade and the foundations. Results of these tests are provided on Table II and are discussed later in this report.

5.4 **Direct shear tests** (ASTM: D-3080-11) were performed on undisturbed and/or remolded samples of the subsurface soils. These tests were performed to determine parameters for the calculation of the allowable soil bearing capacity. The test is performed under saturated conditions at loads of 1,000 lbs./sq.ft., 2,000 lbs./sq.ft., and 3,000 lbs./sq.ft. with results shown on Plates A - C.

5.5 **Consolidation tests** (ASTM: D-2435-11) were performed on undisturbed samples to determine the differential and total settlement which may be anticipated based upon the proposed loads. Water was added to the samples at a surcharge of one KSF and the settlement curves are plotted on Plates D - F.

5.6 **Soluble sulfate, pH, Resistivity and Chloride tests** to determine potential corrosive effects of soils on concrete and metal structures were performed in the laboratory. Test results are given in Tables III – VI and are discussed later in this report.

5.7 **Resistance 'R' Value tests** (CA 301) were conducted on a representative soil sample to determine preliminary pavement section design for the proposed pavement areas. Test results are provided in Table VII and recommended pavement sections are provided later within the text of this report.

6.0 LIQUEFACTION EVALUATION

The site is expected to experience ground shaking and earthquake activity that is typical of Southern California area. It is during severe ground shaking that loose, granular soils below the groundwater table can liquefy. A review of the exploratory boring log B-1 and the laboratory test results on selected soil samples obtained indicate the following soil classifications, field blowcounts and amounts of fines passing through the No. 200 sieve.

Field Blowcount and Gradation Data – *Boring B-1*

Location	Classification	Blowcounts (blows/ft)*	Relative Density	% Passing No. 200 Sieve
B-1 @ 5'	SC	26	Dense	42
B-1 @ 10'	SC	50+	Very Dense	51
B-1 @ 15'	SC	59	Very Dense	43
B-1 @ 20'	SC	27	Dense	42
B-1 @ 25'	SC	41	Very Dense	51
B-1 @ 30'	SM	54	Very Dense	29
B-1 @ 35'	SM	41	Very Dense	20
B-1 @ 40'	ML	25	Very Stiff	49
B-1 @ 45'	SM	49	Very Dense	20
B-1 @ 50'	SW	47	Very Dense	7

Our liquefaction evaluation indicates the potential for liquefaction at this site is low due to dense to very dense sand soils and groundwater at 28 feet. Based on a Magnitude 6.7 earthquake with a peak ground acceleration of 0.578g at the site, seismic-induced settlements should be on the order of less than 1 inch. These settlements should occur rather uniformly across the lot with differential settlements on the order of less than ½ inch over a 100 feet (horizontal) distance in the building pad area.

7.0 CONCLUSIONS AND RECOMMENDATIONS

Based upon our evaluations, the proposed development is acceptable from a geotechnical engineering standpoint. By following the recommendations and guidelines set forth in our report, the structures and grading will be safe from excessive settlements under the anticipated design loadings and conditions. The proposed grading and development shall meet all requirements of the City Building Ordinance and will not impose any adverse effect on existing adjacent land or structures.

The following recommendations are based upon soil conditions encountered in our field investigation; these near-surface soil conditions could vary across the site. Variations in the soil conditions may not become evident until the commencement of grading operations for the proposed development and revised recommendations from the soils engineer may be necessary based upon the conditions encountered.

7.1 Site Grading Recommendations

It is recommended that site inspections be performed by a representative of this firm during all grading and construction of the development to verify the findings and recommendations documented in this report. Any unusual conditions which may be encountered in the course of the project development may require the need for additional study and revised recommendations.

Any vegetation and organic laden soils shall be removed and hauled from proposed grading areas prior to and during the grading operations if encountered. Existing vegetation shall not be mixed or disced into the soils. Any removed soils may be reutilized as compacted fill once any deleterious material or oversized materials (in excess of eight inches) is removed. Grading operations shall be performed in accordance with the attached *Specifications for Placement of Compacted Fill.*

7.1.1 **Removal and Recompaction Recommendations**

The upper existing fill soils (1 to 2 feet) shall be removed to competent native materials, the exposed surface scarified to a depth of 8 inches, brought to within 2% of optimum moisture content and compacted to a minimum of 90% of the laboratory standard (ASTM: D-1557-07) prior to placement of any additional compacted fill soils and pavement. *The upper 12 inches of soils beneath building pad and concrete paving shall be compacted to a minimum of 95%.* Grading shall extend a minimum of 5 horizontal feet outside the edges of foundations or equidistant to the depth of fill placed, whichever is greater. Care should be taken to provide or maintain adequate lateral support for all adjacent improvements and structures at all times during the grading operations and construction phase.

Adequate drainage away from the structures, pavement and slopes should be provided at all times.

It is likely that isolated areas of undiscovered fill not described in this report or materials disturbed during demolition operations will be encountered on site; if found, these areas should be treated as discussed earlier. A diligent search shall also be conducted during grading operations in an effort to uncover any underground structures, irrigation or utility lines. If encountered, these structures and lines shall be either removed or properly abandoned prior to the proposed construction. Abandonment procedures will be provided once underground structures are encountered.

If placement of slabs-on-grade and pavement is not performed immediately upon completion of grading operations, additional testing and grading of the areas may be necessary prior to continuation of construction operations. Likewise, if adverse weather conditions occur which may damage the subgrade soils, additional assessment by the soils engineer as to the suitability of the supporting soils may be needed.

7.1.2 Fill Blanket Recommendations

Due to the potential for differential settlement of structures supported on both compacted fill and native soils, it is recommended that all foundations be underlain by a uniform compacted fill blanket at least 3 feet in thickness. The fill blanket shall extend a minimum of 5 horizontal feet outside the edges of foundations or equidistant to the depth of fill placed, whichever is greater.

Building floor slabs should be underlain by a minimum of 2 feet of compacted fill soils.

7.1.3 Shrinkage and Subsidence

Results of our in-place density tests reveal that the soil shrinkage will be on the order of 8 to 10% due to excavation and recompaction, based upon the assumption that the fill is compacted to 92% of the maximum dry density per ASTM standards. Subsidence should be 0.10 feet due to earthwork operations. The volume change does not include any allowance for vegetation or organic stripping, removal of subsurface improvements or topographic approximations.

Although these values are only approximate, they represent our best estimate of shrinkage values which will likely occur during grading. If more accurate shrinkage and subsidence factors are needed, it is recommended that field testing using the actual equipment and grading techniques should be conducted.

7.2 Temporary Excavations and Shoring Design

Temporary unsurcharged excavations less than 4 feet in height may be excavated at vertical inclinations. Excavations over 4 feet in height in the existing site materials may be trimmed at a 1 to 1 (horizontal to vertical) gradient for the entire height of the cut. In areas where soils with little or no binder are encountered, where adverse geological conditions are exposed, or where excavations are adjacent to existing structures, shoring, slot-cutting, or flatter excavations may be required.

The temporary cut slope gradients given above do not preclude local raveling and sloughing. All excavations shall be made in accordance with the requirements of the soils engineer, CAL-OSHA and other public agencies having jurisdiction.

Temporary shoring design may utilize an active earth pressure of 25 pcf without any surcharge due to adjacent traffic, equipment or structures. The passive fluid pressures of 250 pcf may be doubled to 500 pcf for temporary design.

7.3 Foundation Design

All foundations may be designed utilizing the following allowable soil bearing capacities for an embedded depth of 18 inches into approved compacted fill materials with the corresponding widths. Footings shall not traverse from compacted fill to native soils due to the potential for differential settlement of structures.

\Allowable Soil Bearing Capacity (psf)

Width (ft)	Continuous Foundation	Isolated Foundation
1.5	2000	2500
2.0	2100	2600
4.0	2400	2900
6.0	2800	3300

The bearing value may be increased by 500 psf for each additional foot of depth in excess of the 18-inch minimum depth, up to a maximum of 4500 psf. Property line screen wall foundations where proper overexcavation and recompaction is not possible due to property line restrictions may be designed using a reduced allowable soil bearing capacity of 1,500 psf for foundations a minimum of 18 inches in depth *and* at least 8 inches into the underlying competent native soils. A one-third increase may be used when considering short term loading from wind and seismic forces.

All continuous foundations shall be reinforced with a minimum of 2 #4 steel bars top and bottom. Additional reinforcement may be necessary due to soil expansion or proposed loadings and shall be further evaluated by the project engineers and/or architect. A representative of this firm shall observe foundation excavations prior placement of steel reinforcement and concrete.

7.4 Settlement Analysis

Resultant pressure curves for the consolidation tests are shown on Plates D-F. Computations utilizing these curves and the recommended allowable soil bearing capacities reveal that the foundations will experience normal settlements on the order of ¾ inch and differential settlements of less than ¼ inch.

7.5 Lateral Resistance

The following values may be utilized in resisting lateral loads imposed on the structure. Requirements of the California Building Code should be adhered to when the coefficient of friction and passive pressures are combined.

Coefficient of Friction - 0.40
Equivalent Passive Fluid Pressure = 250 lbs./cu.ft.
Maximum Passive Pressure = 2,500 lbs./cu.ft.

The passive pressure recommendations are valid only for approved compacted fill soils or competent native ground.

7.6 Retaining Wall Design Parameters

Active earth pressures against retaining walls will be equal to the pressures developed by the following fluid densities. These values are for **granular backfill material** placed behind the walls at various ground slopes above the walls.

Surface Slope of Retained Materials (Horizontal to Vertical)	Equivalent Fluid Density (lb./cu.ft.)
Level	30
5 to 1	35
4 to 1	38
3 to 1	40
2 to 1	45

Any applicable short-term construction surcharges and seismic forces should be added to the above lateral pressure values. All walls shall be waterproofed as needed and protected from hydrostatic pressure by a reliable permanent subdrain system.

During a local Magnitude 6.9 earthquake along the San Jacinto fault zone, additional lateral pressures will occur along the back of walls retaining6 feet or more of soil. The seismic-induced lateral soil pressure may be computed using a triangular pressure distribution with the maximum value at the top of the wall. The maximum lateral pressure of (20 pcf) H where H is the height of the retained soils above the wall footing should be used in final design of retaining walls.

Sliding resistance values and passive fluid pressure values given in our previous report may be increased by 1/3 during short-term wind and seismic loading conditions.

7.7 Floor Slab Design

Concrete floor slabs-on-grade shall be a minimum of 4 and 6 inches in thickness in office and warehouse areas, respectively, and may be placed upon fill soils compacted to a minimum of *95%* relative compaction. Additional reinforcement requirements and an increase in thickness of the slabs-on-grade may be necessary based upon soils expansion potential and proposed loading conditions in the structures and should be evaluated further by the project engineers and/or architect.

A vapor retarder should be utilized in areas which would be sensitive to the infiltration of moisture. This retarder shall meet requirements of ASTM E 96, *Water Vapor Transmission of Materials* and ASTM E 1745, *Standard Specification for Water Vapor Retarders used in Contact with Soil or Granular Fill Under Concrete Slabs.* The vapor retarder shall be installed in accordance with procedures stated in ASTM E 1643, *Standard practice for Installation of Water Vapor Retarders used in Contact with Earth or Granular Fill Under Concrete Slabs*.

The moisture retarder may be placed upon 4 inches of sand or gravel. The surface upon which the retarder is placed shall be smooth and free of rocks, gravel or other protrusions which may damage the retarder. Use of sand above the retarder is under the purview of the structural engineer; if sand is used over the retarder, it should be placed in a dry condition.

All concrete slab areas to receive floor coverings should be moisture tested to meet all manufacturer requirements prior to placement.

7.8 Expansive Soil

The upper soils at the site are low (Expansion Index = 21-50) in expansion potential. Sites with expansive soils (Expansion Index >20) require special attention during project design and maintenance. The attached *Expansive Soil Guidelines* should be reviewed by the engineers, architects, owner, maintenance personnel and other interested parties and considered during the design of the project and future property maintenance.

7.9 Utility Trench and Excavation Backfill

Trenches from installation of utility lines and other excavations may be backfilled with on-site soils or approved imported soils compacted to a minimum of 90% relative compaction. All utility lines shall be properly bedded and shaded with clean sand having a sand equivalency rating of 30 or more. This material shall be thoroughly water jetted around the pipe structure prior to placement of compacted backfill soils.

7.10 Corrosion Design Criteria

Representative samples of the surficial soils revealed negligible sulfate concentrations and no special concrete design recommendations are deemed necessary at this time. It is recommended that additional sulfate tests be performed at the completion of rough grading to assure that the as graded conditions are consistent with the recommendations stated in this design. Sulfate test results may be found on the attached Table III.

Tests were also conducted on a random representative sample of soils to determine the potential corrosive effects on buried metallic structures. Tests for pH, resistivity and chloride are included on Tables IV – VI. Soil pH indicates a slightly acidic condition. Resistivity is representative of mildly corrosive soils and metallic structures should be protected as necessary. Chloride content measured 218 ppm.

7.11 Preliminary Pavement Design

The table below provides a preliminary pavement design based upon a tested R-Value of 28 for the proposed pavement areas. Final pavement design should be based on R-Value testing of the subgrade soils near the conclusion of rough grading to assure that the as-graded conditions are consistent with those used in this preliminary design.

On-Site Flexible (Asphaltic) Pavement Section Design

Type of Traffic	Traffic Index	Inches Asphalt	Inches Base
Auto Parking/Circulation	5.0	3.5	5.0
Truck	7.0	5.0	9.0

Subgrade soils to receive base material shall be compacted to a minimum of 90% relative compaction; base material shall be compacted to at least 95%. Any concrete slab-on-grade in pavement areas shall be a minimum of 6 inches in thickness and may be placed on subgrade soils compacted to at least 95% relative compaction. An increase in slab thickness and placement of steel reinforcement due to loading conditions and soil expansion may be necessary and should be reviewed by the structural engineer.

The above recommendations are based upon estimated traffic loadings. Client should submit anticipated traffic loadings for the pavement areas to the soils engineer, when available, so that pavement sections may be reviewed to determine adequacy to support the proposed loadings.

8.0 CLOSURE

The recommendations and conclusions contained in this report are based upon the soil conditions uncovered in our test excavations. No warranty of the soil condition between our excavations is implied. NorCal Engineering should be notified for possible further recommendations if unexpected to unfavorable conditions are encountered during construction phase. It is the responsibility of the owner to ensure that all information within this report is submitted to the Architect and appropriate Engineers for the project.

This firm should have the opportunity to review the final plans (72 hours for review required) to verify that all our recommendations are incorporated. This report and all conclusions are subject to the review of the controlling authorities for the project.

A preconstruction conference should be held between the developer, general contractor, grading contractor, city inspector, architect, and soil engineer to clarify any questions relating to the grading operations and subsequent construction. Our representative should be present during the grading operations and construction phase to certify that such recommendations are complied within the field.

This geotechnical investigation has been conducted in a manner consistent with the level of care and skill exercised by members of our profession currently practicing under similar conditions in the Southern California area. No other warranty, expressed or implied is made.

We appreciate this opportunity to be of service to you. If you have any further questions, please do not hesitate to contact the undersigned.

Respectfully submitted,
NORCAL ENGINEERING

REGISTERED PROFESSIONAL ENGINEER
KEITH D. TUCKER
No. 841
Exp. 12/31/18
GEOTECHNICAL
STATE OF CALIFORNIA

Keith D. Tucker
Project Engineer
R.G.E. 841

Mark A. Burkholder
Project Manager

SPECIFICATIONS FOR PLACEMENT OF COMPACTED FILL

Excavation
Any existing low density soils and/or saturated soils shall be removed to competent natural soil under the inspection of the Soils Engineering Firm. After the exposed surface has been cleansed of debris and/or vegetation, it shall be scarified until it is uniform in consistency, brought to the proper moisture content and compacted to a minimum of 90% relative compaction (in accordance with ASTM: D-1557-12).

In any area where a transition between fill and native soil or between bedrock and soil are encountered, additional excavation beneath foundations and slabs will be necessary in order to provide uniform support and avoid differential settlement of the structure. Verification of elevations during grading operations will be the responsibility of the owner or his designated representative.

Material For Fill
The on-site soils or approved import soils may be utilized for the compacted fill provided they are free of any deleterious materials and shall not contain any rocks, brick, asphaltic concrete, concrete or other hard materials greater than eight inches in maximum dimensions. Any import soil must be approved by the Soils Engineering firm a minimum of 72 hours prior to importation of site.

Placement of Compacted Fill Soils
The approved fill soils shall be placed in layers not excess of six inches in thickness. Each lift shall be uniform in thickness and thoroughly blended. The fill soils shall be brought to within 2% of the optimum moisture content, unless otherwise specified by the Soils Engineering firm. Each lift shall be compacted to a minimum of 90% relative compaction (in accordance with ASTM: D-1557-12) and approved prior to the placement of the next layer of soil. Compaction tests shall be obtained at the discretion of the Soils Engineering firm but to a minimum of one test for every 500 cubic yards placed and/or for every 2 feet of compacted fill placed.

The minimum relative compaction shall be obtained in accordance with accepted methods in the construction industry. The final grade of the structural areas shall be in a dense and smooth condition prior to placement of slabs-on-grade or pavement areas. No fill soils shall be placed, spread or compacted during unfavorable weather conditions. When the grading is interrupted by heavy rains, compaction operations shall not be resumed until approved by the Soils Engineering firm.

Grading Observations

The controlling governmental agencies should be notified prior to commencement of any grading operations. This firm recommends that the grading operations be conducted under the observation of a Soils Engineering firm as deemed necessary. A 24-hour notice must be provided to this firm prior to the time of our initial inspection.

Observation shall include the clearing and grubbing operations to assure that all unsuitable materials have been properly removed; approve the exposed subgrade in areas to receive fill and in areas where excavation has resulted in the desired finished grade and designate areas of overexcavation; and perform field compaction tests to determine relative compaction achieved during fill placement. In addition, all foundation excavations shall be observed by the Soils Engineering firm to confirm that appropriate bearing materials are present at the design grades and recommend any modifications to construct footings.

EXPANSIVE SOIL GUIDELINES

The following expansive soil guidelines are provided for your project. The intent of these guidelines is to inform you, the client, of the importance of proper design and maintenance of projects supported on expansive soils. ***You, as the owner or other interested party, should be warned that you have a duty to provide the information contained in the soil report including these guidelines to your design engineers, architects, landscapers and other design parties in order to enable them to provide a design that takes into consideration expansive soils.***

In addition, you should provide the soil report with these guidelines to any property manager, lessee, property purchaser or other interested party that will have or assume the responsibility of maintaining the development in the future.

Expansive soils are fine-grained silts and clays which are subject to swelling and contracting. The amount of this swelling and contracting is subject to the amount of fine-grained clay materials present in the soils and the amount of moisture either introduced or extracted from the soils. Expansive soils are divided into five categories ranging from "very low" to "very high". Expansion indices are assigned to each classification and are included in the laboratory testing section of this report. *If the expansion index of the soils on your site, as stated in this report, is 21 or higher, you have expansive soils.* The classifications of expansive soils are as follows:

Classification of Expansive Soil*

Expansion Index	Potential Expansion
0-20	Very Low
21-50	Low
51-90	Medium
91-130	High
Above 130	Very High

*From Table 18A-I-B of California Building Code (1988)

When expansive soils are compacted during site grading operations, care is taken to place the materials at or slightly above optimum moisture levels and perform proper compaction operations. Any subsequent excessive wetting and/or drying of expansive soils will cause the soil materials to expand and/or contract. These actions are likely to cause distress of foundations, structures, slabs-on-grade, sidewalks and pavement over the life of the structure. ***It is therefore imperative that even after construction of improvements, the moisture contents are maintained at relatively constant levels, allowing neither excessive wetting or drying of soils.***

Evidence of excessive wetting of expansive soils may be seen in concrete slabs, both interior and exterior. Slabs may lift at construction joints producing a trip hazard or may crack from the pressure of soil expansion. Wet clays in foundation areas may result in lifting of the structure causing difficulty in the opening and closing of doors and windows, as well as cracking in exterior and interior wall surfaces. In extreme wetting of soils to depth, settlement of the structure may eventually result. Excessive wetting of soils in landscape areas adjacent to concrete or asphaltic pavement areas may also result in expansion of soils beneath pavement and resultant distress to the pavement surface.

Excessive drying of expansive soils is initially evidenced by cracking in the surface of the soils due to contraction. Settlement of structures and on-grade slabs may also eventually result along with problems in the operation of doors and windows.

Projects located in areas of expansive clay soils will be subject to more movement and "hairline" cracking of walls and slabs than similar projects situated on non-expansive sandy soils. There are, however, measures that developers and property owners may take to reduce the amount of movement over the life the development. The following guidelines are provided to assist you in both design and maintenance of projects on expansive soils:

- Drainage away from structures and pavement is essential to prevent excessive wetting of expansive soils. Grades of at least 3% should be designed and maintained to allow flow of irrigation and rain water to approved drainage devices or to the street. Any "ponding" of water adjacent to buildings, slabs and pavement after rains is evidence of poor drainage; the installation of drainage devices or regrading of the area may be required to assure proper drainage. Installation of rain gutters is also recommended to control the introduction of moisture next to buildings. Gutters should discharge into a drainage device or onto pavement which drains to roadways.

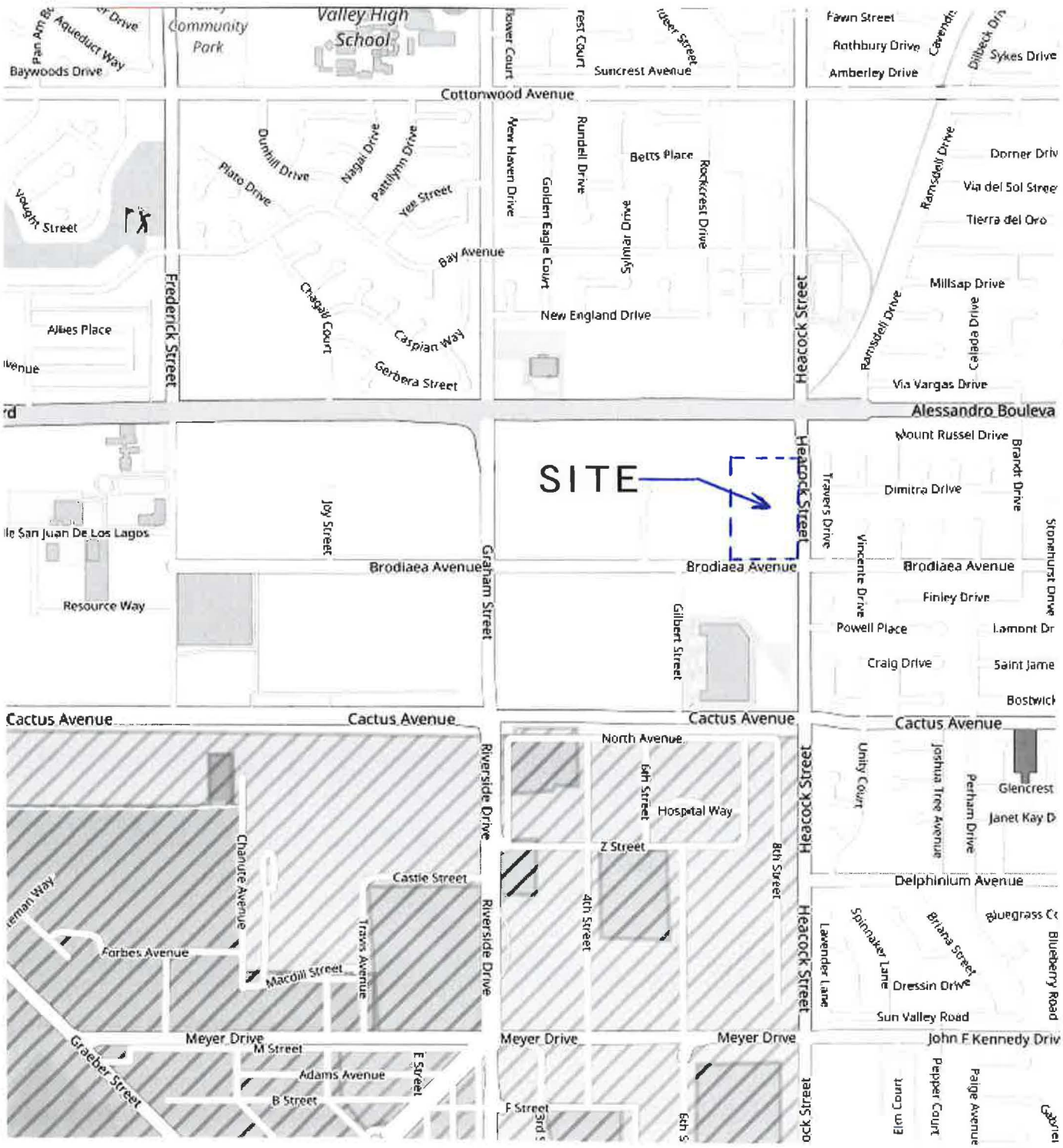
- Irrigation should be strictly controlled around building foundations, slabs and pavement and may need to be adjusted depending upon season. This control is essential to maintain a relatively uniform moisture content in the expansive soils and to prevent swelling and contracting. Over-watering adjacent to improvements may result in damage to those improvements. NorCal Engineering makes no specific recommendations regarding landscape irrigation schedules.

- Planting schemes for landscaping around structures and pavement should be analyzed carefully. Plants (including sod) requiring high amounts of water may result in excessive wetting of soils. Trees and large shrubs may actually extract moisture from the expansive soils, thus causing contraction of the fine-grained soils.

- Thickened edges on exterior slabs will assist in keeping excessive moisture from entering directly beneath the concrete. A six-inch thick or greater deepened edge on slabs may be considered. Underlying interior and exterior slabs with 6 to 12 inches or more of non-expansive soils and providing presaturation of the underlying clayey soils as recommended in the soil report will improve the overall performance of on-grade slabs.

- Increase the amount of steel reinforcing in concrete slabs, foundations and other structures to resist the forces of expansive soils. The precise amount of reinforcing should be determined by the appropriate design engineers and/or architects.

- Recommendations of the soil report should always be followed in the development of the project. Any recommendations regarding presaturation of the upper subgrade soils in slab areas should be performed in the field and verified by the Soil Engineer.

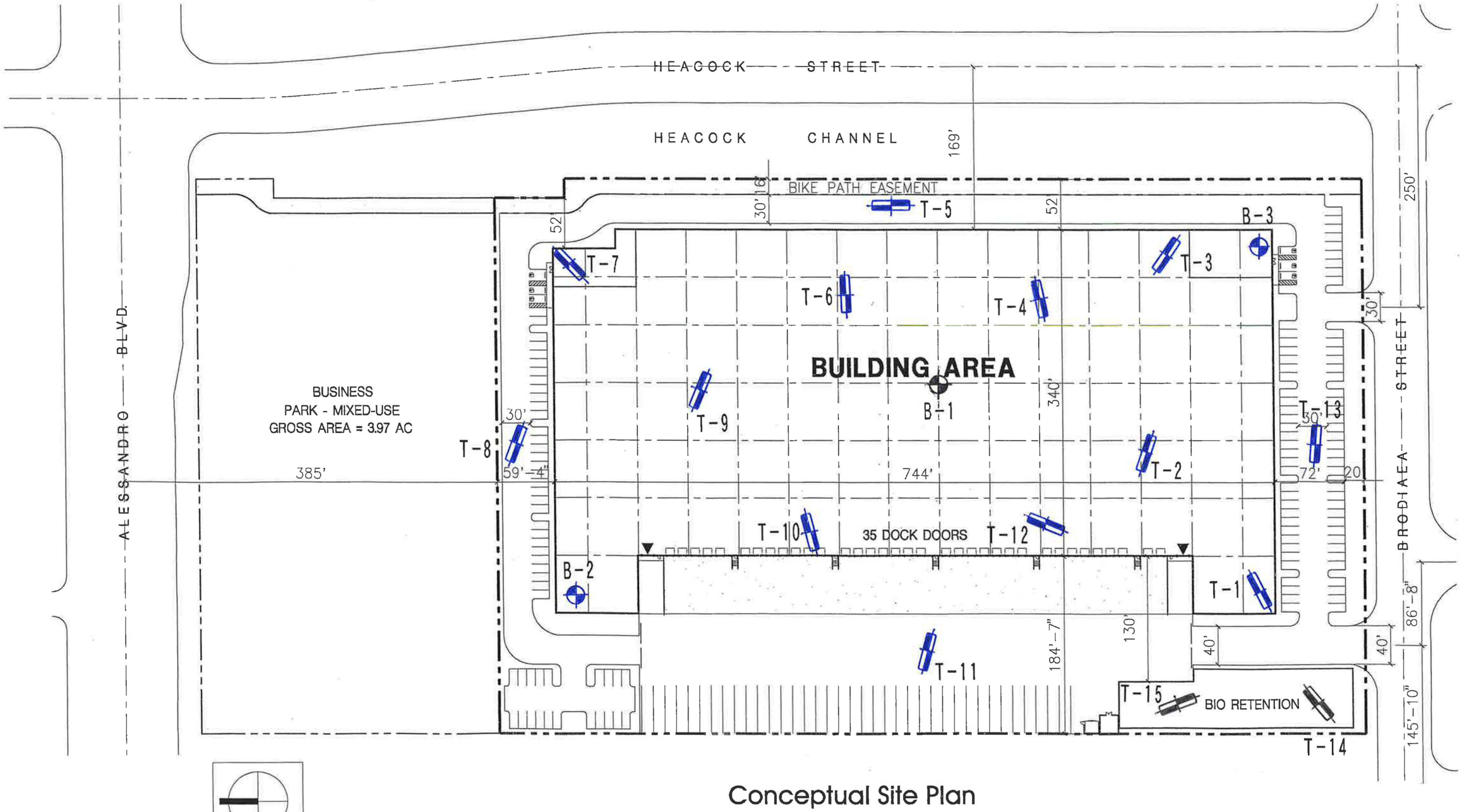


NorCal Engineering

SOILS AND GEOTECHNICAL CONSULTANTS

VICINITY MAP

PROJECT 19803-17	DATE 8/2017	FIG. 1



Conceptual Site Plan

NorCal Engineering
SOILS AND GEOTECHNICAL CONSULTANTS

APPROXIMATE LOCATIONS OF SOIL BORINGS

PROJECT 19803-17 | DATE 8/2017

FIG. 2

APPENDICES

(In order of appearance)

Appendix A – Seismic Design

Appendix B - Logs of Test Explorations
- *Logs of Borings B-1 to B-3
- *Logs of Test Pits T-1 to T-15

Appendix C - Laboratory Analysis
- *Table I - Maximum Dry Density Tests
- *Table II - Expansion Index Tests
- *Table III - Sulfate Tests
- *Table IV - pH Tests
- *Table V - Resistivity Tests
- *Table VI - Chloride Tests
- *Table VII - Resistance 'R' Value Tests

- *Plates A - C - Direct Shear Tests
- *Plates D - F - Consolidation Tests

APPENDIX A

USGS Design Maps Summary Report

User–Specified Input

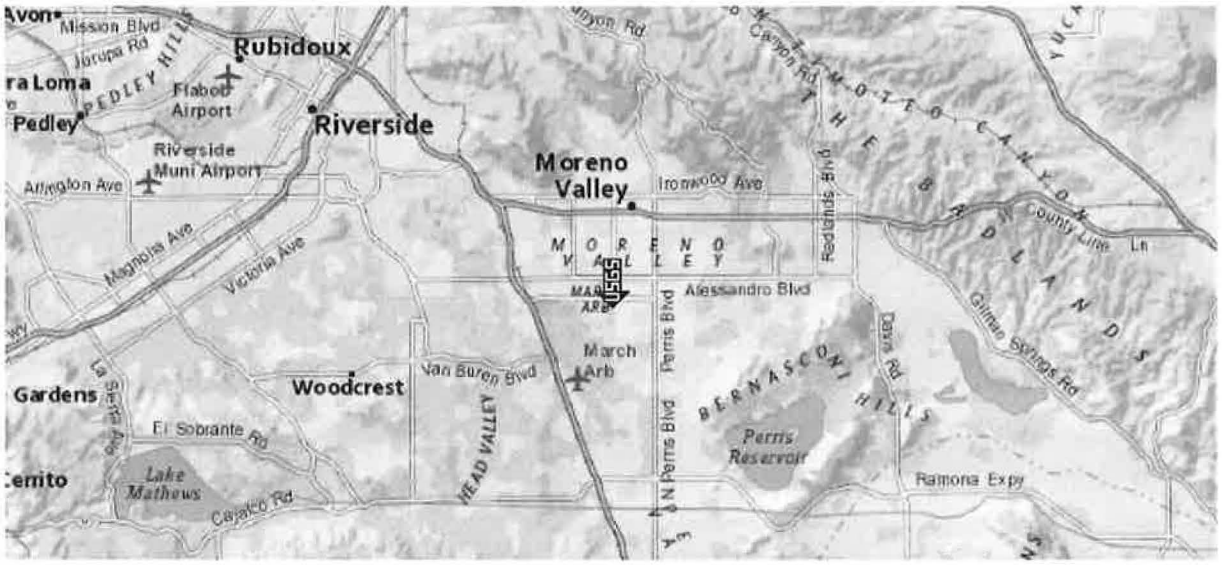
Report Title 19803-17
Wed August 16, 2017 21:25:01 UTC

Building Code Reference Document ASCE 7-10 Standard
(which utilizes USGS hazard data available in 2008)

Site Coordinates 33.9152°N, 117.245°W

Site Soil Classification Site Class D – "Stiff Soil"

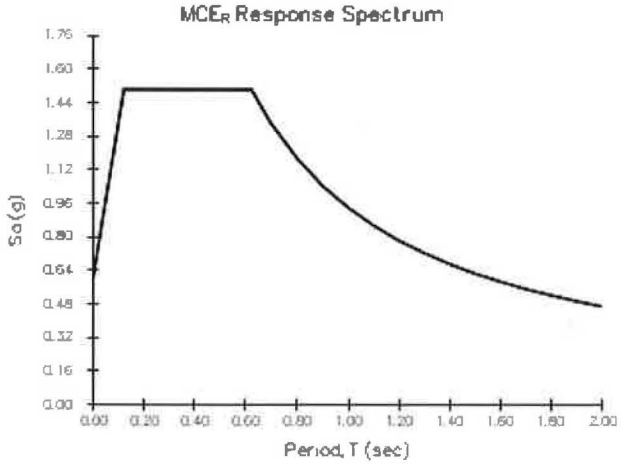
Risk Category I/II/III

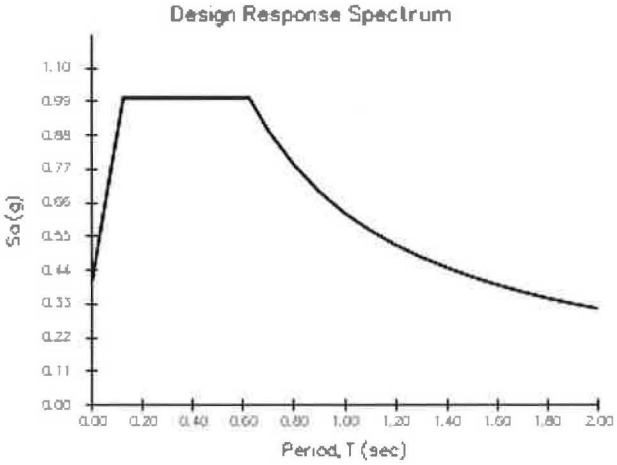


USGS–Provided Output

S_S =	1.504 g	S_{MS} =	1.504 g	S_{DS} =	1.003 g
S_1 =	0.627 g	S_{M1} =	0.941 g	S_{D1} =	0.627 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.





For PGA_M, T_L, C_{RS}, and C_{R1} values, please view the detailed report.

Although this information is a product of the U.S. Geological Survey, we provide no warranty, expressed or implied, as to the accuracy of the data contained therein. This tool is not a substitute for technical subject-matter knowledge.

USGS Design Maps Detailed Report

ASCE 7-10 Standard (33.9152°N, 117.245°W)

Site Class D – "Stiff Soil", Risk Category I/II/III

Section 11.4.1 — Mapped Acceleration Parameters

Note: Ground motion values provided below are for the direction of maximum horizontal spectral response acceleration. They have been converted from corresponding geometric mean ground motions computed by the USGS by applying factors of 1.1 (to obtain S_S) and 1.3 (to obtain S_1). Maps in the 2010 ASCE-7 Standard are provided for Site Class B. Adjustments for other Site Classes are made, as needed, in Section 11.4.3.

From Figure 22-1 [1] $S_S = 1.504$ g

From Figure 22-2 [2] $S_1 = 0.627$ g

Section 11.4.2 — Site Class

The authority having jurisdiction (not the USGS), site-specific geotechnical data, and/or the default has classified the site as Site Class D, based on the site soil properties in accordance with Chapter 20.

Table 20.3–1 Site Classification

Site Class	$\bar{v}_s$	$\bar{N}$ or $\bar{N}_{ch}$	$\bar{s}_u$
A. Hard Rock	>5,000 ft/s	N/A	N/A
B. Rock	2,500 to 5,000 ft/s	N/A	N/A
C. Very dense soil and soft rock	1,200 to 2,500 ft/s	>50	>2,000 psf
D. Stiff Soil	600 to 1,200 ft/s	15 to 50	1,000 to 2,000 psf
E. Soft clay soil	<600 ft/s	<15	<1,000 psf
	Any profile with more than 10 ft of soil having the characteristics: • Plasticity index $PI > 20$, • Moisture content $w \geq 40\%$, and • Undrained shear strength $\bar{s}_u < 500$ psf		
F. Soils requiring site response analysis in accordance with Section 21.1	See Section 20.3.1		

For SI: 1ft/s = 0.3048 m/s 1lb/ft² = 0.0479 kN/m²

Section 11.4.3 — Site Coefficients and Risk-Targeted Maximum Considered Earthquake (MCE_R) Spectral Response Acceleration Parameters

Table 11.4-1: Site Coefficient F_a

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at Short Period				
	$S_S \leq 0.25$	$S_S = 0.50$	$S_S = 0.75$	$S_S = 1.00$	$S_S \geq 1.25$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight-line interpolation for intermediate values of S_S

For Site Class = D and S_S = 1.504 g, F_a = 1.000

Table 11.4-2: Site Coefficient F_v

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at 1-s Period				
	$S_1 \leq 0.10$	$S_1 = 0.20$	$S_1 = 0.30$	$S_1 = 0.40$	$S_1 \geq 0.50$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.7	1.6	1.5	1.4	1.3
D	2.4	2.0	1.8	1.6	1.5
E	3.5	3.2	2.8	2.4	2.4
F	See Section 11.4.7 of ASCE 7				

Note: Use straight-line interpolation for intermediate values of S_1

For Site Class = D and S_1 = 0.627 g, F_v = 1.500

Equation (11.4–1): $S_{MS} = F_a S_S = 1.000 \times 1.504 = 1.504$ g

Equation (11.4–2): $S_{M1} = F_v S_1 = 1.500 \times 0.627 = 0.941$ g

Section 11.4.4 — Design Spectral Acceleration Parameters

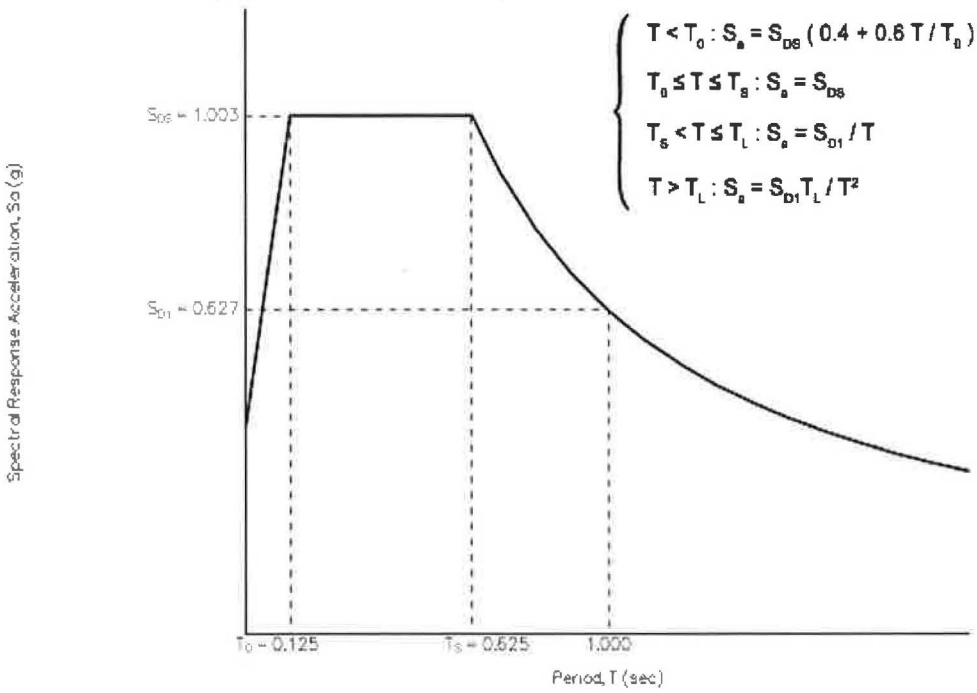
Equation (11.4–3): $S_{DS} = ⅔\ S_{MS} = ⅔ \times 1.504 = 1.003$ g

Equation (11.4–4): $S_{D1} = ⅔\ S_{M1} = ⅔ \times 0.941 = 0.627$ g

Section 11.4.5 — Design Response Spectrum

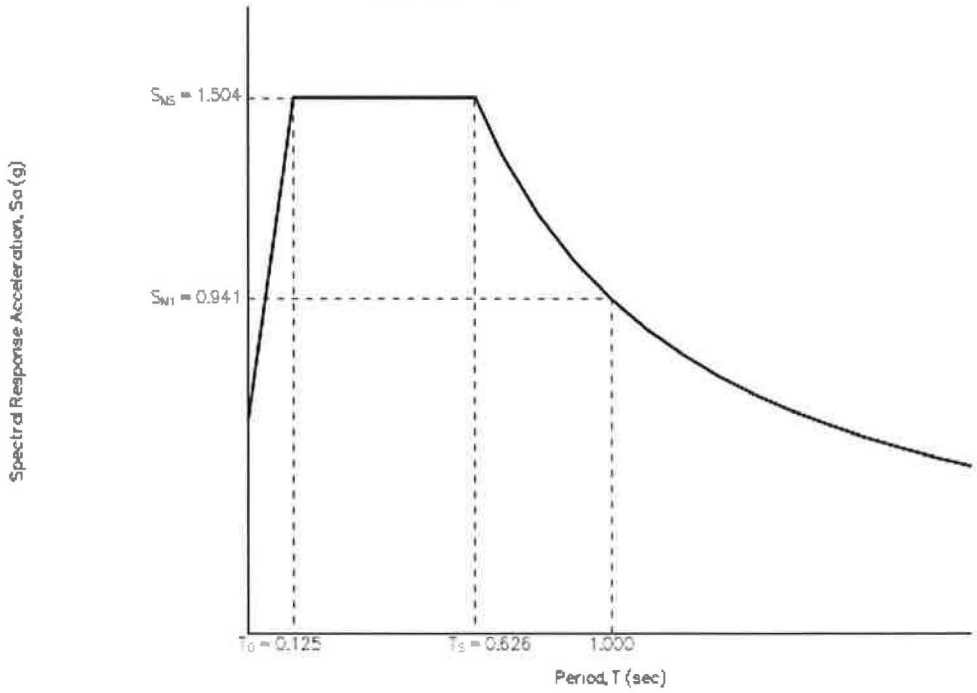
From Figure 22-12 [3] $T_L = 8$ seconds

Figure 11.4-1: Design Response Spectrum



Section 11.4.6 — Risk-Targeted Maximum Considered Earthquake (MCE_R) Response Spectrum

The MCE_R Response Spectrum is determined by multiplying the design response spectrum above by 1.5.



Section 11.8.3 — Additional Geotechnical Investigation Report Requirements for Seismic Design Categories D through F

From Figure 22-7 [4] PGA = 0.578

Equation (11.8–1): $PGA_M = F_{PGA}PGA = 1.000 \times 0.578 = 0.578$ g

Table 11.8–1: Site Coefficient F_{PGA}

Site Class	Mapped MCE Geometric Mean Peak Ground Acceleration, PGA				
	PGA ≤ 0.10	PGA = 0.20	PGA = 0.30	PGA = 0.40	PGA ≥ 0.50
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of PGA

For Site Class = D and PGA = 0.578 g, F_{PGA} = 1.000

Section 21.2.1.1 — Method 1 (from Chapter 21 – Site-Specific Ground Motion Procedures for Seismic Design)

From Figure 22-17 [5] C_{RS} = 1.044

From Figure 22-18 [6] C_{R1} = 1.013

Section 11.6 — Seismic Design Category

Table 11.6-1 Seismic Design Category Based on Short Period Response Acceleration Parameter

VALUE OF S_{DS}	RISK CATEGORY		
	I or II	III	IV
$S_{DS} < 0.167g$	A	A	A
$0.167g \le S_{DS} < 0.33g$	B	B	C
$0.33g \le S_{DS} < 0.50g$	C	C	D
$0.50g \le S_{DS}$	D	D	D

For Risk Category = I and S_{DS} = 1.003 g, Seismic Design Category = D

Table 11.6-2 Seismic Design Category Based on 1-S Period Response Acceleration Parameter

VALUE OF S_{D1}	RISK CATEGORY		
	I or II	III	IV
$S_{D1} < 0.067g$	A	A	A
$0.067g \le S_{D1} < 0.133g$	B	B	C
$0.133g \le S_{D1} < 0.20g$	C	C	D
$0.20g \le S_{D1}$	D	D	D

For Risk Category = I and S_{D1} = 0.627 g, Seismic Design Category = D

Note: When S_1 is greater than or equal to 0.75g, the Seismic Design Category is **E** for buildings in Risk Categories I, II, and III, and **F** for those in Risk Category IV, irrespective of the above.

Seismic Design Category ≡ "the more severe design category in accordance with Table 11.6-1 or 11.6-2" = D

Note: See Section 11.6 for alternative approaches to calculating Seismic Design Category.

References

1. *Figure 22-1*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-1.pdf
2. *Figure 22-2*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-2.pdf
3. *Figure 22-12*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-12.pdf
4. *Figure 22-7*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-7.pdf
5. *Figure 22-17*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-17.pdf
6. *Figure 22-18*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-18.pdf

APPENDIX B

MAJOR DIVISION			GRAPHIC SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL. SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	SAND AND SANDY SOILS	CLEAN SAND (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	SANDS WITH FINE (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND-SILT MIXTURES
				SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

UNIFIED SOIL CLASSIFICATION SYSTEM

KEY:

- ■ Indicates 2.5-inch Inside Diameter. Ring Sample.
- ☒ Indicates 2-inch OD Split Spoon Sample (SPT).
- ⧅ Indicates Shelby Tube Sample.
- ◫ Indicates No Recovery.
- ◧ Indicates SPT with 140# Hammer 30 in. Drop.
- ✉ Indicates Bulk Sample.
- ◩ Indicates Small Bag Sample.
- ◨ Indicates Non-Standard
- ☒ Indicates Core Run.

COMPONENT PROPORTIONS

DESCRIPTIVE TERMS	RANGE OF PROPORTION
Trace	1 - 5%
Few	5 - 10%
Little	10 - 20%
Some	20 - 35%
And	35 - 50%

COMPONENT DEFINITIONS

COMPONENT	SIZE RANGE
Boulders	Larger than 12 in
Cobbles	3 in to 12 in
Gravel	3 in to No 4 (4.5mm)
Coarse gravel	3 in to 3/4 in
Fine gravel	3/4 in to No 4 (4.5mm)
Sand	No. 4 (4.5mm) to No. 200 (0.074mm)
Coarse sand	No. 4 (4.5 mm) to No. 10 (2.0 mm)
Medium sand	No. 10 (2.0 mm) to No. 40 (0.42 mm)
Fine sand	No. 40 (0.42 mm) to No. 200 (0.074 mm)
Silt and Clay	Smaller than No. 200 (0.074 mm)

MOISTURE CONTENT

DRY	Absence of moisture, dusty, dry to the touch.
DAMP	Some perceptible moisture; below optimum
MOIST	No visible water; near optimum moisture content
WET	Visible free water, usually soil is below water table.

RELATIVE DENSITY OR CONSISTENCY VERSUS SPT N -VALUE

COHESIONLESS SOILS		COHESIVE SOILS		
Density	N (blows/ft)	Consistency	N (blows/ft)	Approximate Undrained Shear Strength (psf)
Very Loose	0 to 4	Very Soft	0 to 2	< 250
Loose	4 to 10	Soft	2 to 4	250 - 500
Medium Dense	10 to 30	Medium Stiff	4 to 8	500 - 1000
Dense	30 to 50	Stiff	8 to 15	1000 - 2000
Very Dense	over 50	Very Stiff	15 to 30	2000 - 4000
		Hard	over 30	> 4000

Alere Property Group, LLC
19803-17

Log of Boring B-1

Boring Location: Heacock and Brodiaea, Moreno Valley	
Date of Drilling: 8/5/17	Groundwater Depth: 28'
Drilling Method: Hollowstem Auger	
Hammer Weight: 140 lbs	Drop: 30"
Surface Elevation: Not Measured	

Depth (feet)	Lith-ology	Material Description	Samples Type	Samples Blow Counts	Laboratory Moisture	Laboratory Dry Density	Laboratory Fines Content %
0		FILL SOILS Clayey SAND with organics Brown, loose, dry					
		NATURAL SOILS Clayey SAND Brown, medium dense to dense, damp to moist					
5				20/12/14	5.3		42
10				20/50+	9.5		52
15				17/30/29	8.5		43
20				10/12/15	18.0		42
25				15/19/22	19.3		51
30		Silty SAND Brown, dense, wet; some gravel		27/30/24	18.9		29
35							

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NorCal Engineering

Alere Property Group, LLC 19803-17	Log of Boring B-1

Boring Location: Heacock and Brodiaea, Moreno Valley	
Date of Drilling: 8/5/17	Groundwater Depth: 28'
Drilling Method: Hollowstem Auger	
Hammer Weight: 140 lbs	Drop: 30"
Surface Elevation: Not Measured	

Depth (feet)	Lith-ology	Material Description	Samples Type	Samples Blow Counts	Laboratory Moisture	Laboratory Dry Density	Laboratory Fines Content %
35		Silty SAND Brown, dense, wet; some gravel	X	17/19/22	14.7		20
40		Sandy SILT with occasional gravel Brown, stiff, very moist	X	18/12/15	21.8		49
45		Silty SAND with occasional gravel Brown, dense, wet	X	20/27/22	17.6		20
50		slightly silty @ 50'	X	17/22/25	23.4		7
		Boring completed at depth of 51.5'					
55							
60							
65							
70							

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NorCal Engineering

Alere Property Group, LLC
19803-17

Log of Boring B-2

Boring Location: Heacock and Brodiaea, Moreno Valley	
Date of Drilling: 8/5/17	Groundwater Depth: None Encountered
Drilling Method: Hollowstem Auger	
Hammer Weight: 140 lbs	Drop: 30"
Surface Elevation: Not Measured	

Depth (feet)	Lith-ology	Material Description	Samples Type	Samples Blow Counts	Laboratory Moisture	Laboratory Dry Density	Laboratory Relative Compaction
0		FILL SOILS Clayey sandy SILT to Clayey SAND with organics Brown, soft/loose, dry					
		NATURAL SOILS Clayey SAND Brown, medium dense to dense, damp to moist					
5			■	6/14	5.2	109.8	
10			■	44/50+	9.3	118.2	
15		Slightly silty SAND Brown, dense, moist	■	11/16	11.1	108.8	
		Clayey SAND Brown, dense, moist					
20			■	34/50+	12.9	115.2	
		Boring completed at depth of 21'					
25							
30							
35							

GWT not encountered

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NorCal Engineering

Alere Property Group, LLC
19803-17

Log of Boring B-3

Boring Location: Heacock and Brodiaea, Moreno Valley	
Date of Drilling: 8/5/17	Groundwater Depth: None Encountered
Drilling Method: Hollowstem Auger	
Hammer Weight: 140 lbs	Drop: 30"
Surface Elevation: Not Measured	

Depth (feet)	Lith-ology	Material Description	Samples Type	Samples Blow Counts	Laboratory Moisture	Laboratory Dry Density	Laboratory Relative Compaction
0		FILL SOILS Clayey SAND with gravel, organics, roots Brown, loose, dry					
		NATURAL SOILS Clayey SAND Brown, medium dense to dense, damp Some variation in clay, silt content with depth					
5			■	18/28	6.6	109.5	
10			■	17/22	4.4	107.8	
		Sandy SILT with clay Brown, very stiff, moist					
15			■	32/50+	9.6	121.3	
20			■	20/31	9.4	131.6	
		Boring completed at depth of 21'					
25							
30							
35							

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NorCal Engineering

Alere Property Group, LLC 19803-17	Log of Test Excavation T-1

Boring Location: Heacock and Brodiaea, Moreno Valley	
Date of Drilling: 8/5/17	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:
Surface Elevation: Not Measured	

Depth (feet)	Lith-ology	Material Description	Samples Type	Samples Blow Counts	Laboratory Moisture	Laboratory Dry Density	Laboratory Relative Compaction
0		FILL SOILS Clayey SAND with occasional gravel, roots Brown, loose, dry	■		5.2	114.7	
		NATURAL SOILS Clayey SAND Brown, medium dense to dense, damp					
5			■		3.9	117.1	
10		Clayey sandy SILT Brown, stiff, moist	■		11.6	105.1	
			■		12.6	116.3	
		Boring completed at depth of 12.5'					
15							
20							
25							
30							
35							

GWT not encountered

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NorCal Engineering

Alere Property Group, LLC 19803-17	Log of Test Excavation T-2

Boring Location: Heacock and Brodiaea, Moreno Valley	
Date of Drilling: 8/5/17	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:
Surface Elevation: Not Measured	

Depth (feet)	Lith-ology	Material Description	Samples Type	Samples Blow Counts	Laboratory Moisture	Laboratory Dry Density	Laboratory Relative Compaction
0		FILL SOILS					
		Clayey SAND with occasional gravel, roots					
		Brown, loose, dry					
		NATURAL SOILS					
		Sandy CLAY					
5		Brown, medium stiff, damp	■		6.2	105.2	
		Clayey SAND					
		Brown, dense, damp	■		7.1	114.2	
		Boring completed at depth of 8'					
10							
15							
20							
25							
30							
35							

GWT not encountered

SuperLog CivilTech Software, USA www.civiltech.com File: C:\Superlog4\PROJECT\19803-17.log Date: 8/17/2017

NorCal Engineering

Alere Property Group, LLC 19803-17	Log of Test Excavation T-3

Boring Location: Heacock and Brodiaea, Moreno Valley	
Date of Drilling: 8/5/17	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:
Surface Elevation: Not Measured	

Depth (feet)	Lith-ology	Material Description	Samples		Laboratory		
			Type	Blow Counts	Moisture	Dry Density	Relative Compaction
0		FILL SOILS Clayey SAND with occasional gravel, roots, concrete pieces Brown, loose, dry					
		NATURAL SOILS Clayey SAND Brown, medium dense to dense, damp					
5		Boring completed at depth of 4'					
10							
15							
20							
25							
30							
35							

GWT not encountered

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NorCal Engineering

Alere Property Group, LLC 19803-17	Log of Test Excavation T-4

Boring Location: Heacock and Brodiaea, Moreno Valley	
Date of Drilling: 8/5/17	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:
Surface Elevation: Not Measured	

Depth (feet)	Lith-ology	Material Description	Samples Type	Samples Blow Counts	Laboratory Moisture	Laboratory Dry Density	Laboratory Relative Compaction
0		FILL SOILS Clayey SAND with occasional gravel, roots Brown, loose, dry					
		NATURAL SOILS Clayey SAND Brown, medium dense to dense, damp to moist	■		8.8	109.9	
5			■		9.3	115.7	
		Clayey sandy SILT Brown, stiff, moist	■		8.3	110.4	
10		Boring completed at depth of 10'					
15							
20							
25							
30							
35							

GWT not encountered

Date: 8/17/2017 File: C:\Superlog4\PROJECT\19803-17.log SuperLog CivilTech Software, USA www.civiltech.com

NorCal Engineering

Alere Property Group, LLC 19803-17	Log of Test Excavation T-5

Boring Location: Heacock and Brodiaea, Moreno Valley	
Date of Drilling: 8/5/17	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:
Surface Elevation: Not Measured	

Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: Relative Compaction
0		FILL SOILS Clayey SAND with occasional gravel, roots Brown, loose, dry					
		NATURAL SOILS Clayey SAND Brown, medium dense to dense, damp					
5		Boring completed at depth of 4'					
10							
15							
20							
25							
30							
35							

GWT not encountered

SuperLog CivilTech Software, USA www.civiltech.com File: C:\Superlog4\PROJECT\19803-17.log Date: 8/17/2017

NorCal Engineering

Alere Property Group, LLC 19803-17	Log of Test Excavation T-6

Boring Location: Heacock and Brodiaea, Moreno Valley	
Date of Drilling: 8/5/17	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:
Surface Elevation: Not Measured	

Depth (feet)	Lith-ology	Material Description	Samples Type	Samples Blow Counts	Laboratory Moisture	Laboratory Dry Density	Laboratory Relative Compaction
0		FILL SOILS Clayey SAND with occasional gravel, roots Brown, loose, dry					
		NATURAL SOILS Clayey SAND Brown, medium dense to dense, damp					
5			■		5.5	109.8	
		Boring completed at depth of 8'					
10							
15							
20							
25							
30							
35							

GWT not encountered

SuperLog CivilTech Software, USA www.civiltech.com File: C:\Superlog4\PROJECT\19803-17.log Date: 8/17/2017

NorCal Engineering

Alere Property Group, LLC
19803-17

Log of Test Excavation T-7

Boring Location: Heacock and Brodiaea, Moreno Valley	
Date of Drilling: 8/5/17	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:
Surface Elevation: Not Measured	

Depth (feet)	Lith-ology	Material Description	Samples Type	Samples Blow Counts	Laboratory Moisture	Laboratory Dry Density	Laboratory Relative Compaction
0		FILL SOILS					
		Clayey SAND with occasional gravel, roots					
		Brown, loose, dry	■		9.2	123.1	
		NATURAL SOILS					
		Clayey SAND					
5		Brown, medium dense to dense, damp	■		2.9	111.3	
		Silty SAND					
		Brown, medium dense to dense, damp					
		Clayey SAND					
		Brown, dense, damp to moist	■		10.5	120.6	
10		Boring completed at depth of 10'					
15							
20							
25							
30							
35							

GWT not encountered

SuperLog CivilTech Software, USA www.civiltech.com File: C:\Superlog4\PROJECT\19803-17.log Date: 8/17/2017

NorCal Engineering

Alere Property Group, LLC 19803-17	Log of Test Excavation T-8

Boring Location: Heacock and Brodiaea, Moreno Valley	
Date of Drilling: 8/5/17	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:
Surface Elevation: Not Measured	

Depth (feet)	Lith-ology	Material Description	Samples Type	Samples Blow Counts	Laboratory Moisture	Laboratory Dry Density	Laboratory Relative Compaction
0		FILL SOILS Clayey SAND with occasional gravel, roots Brown, loose, dry					
	GWT not encountered	NATURAL SOILS Clayey SAND Brown, medium dense to dense, damp					
5		Boring completed at depth of 5'					
10							
15							
20							
25							
30							
35							

SuperLog CivilTech Software, USA www.civiltech.com File: C:\Superlog4\PROJECT\19803-17.log Date: 8/17/2017

NorCal Engineering

Alere Property Group, LLC 19803-17	Log of Test Excavation T-9

Boring Location: Heacock and Brodiaea, Moreno Valley	
Date of Drilling: 8/5/17	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:
Surface Elevation: Not Measured	

Depth (feet)	Lith-ology	Material Description	Samples Type	Samples Blow Counts	Laboratory Moisture	Laboratory Dry Density	Laboratory Relative Compaction
0		FILL SOILS Clayey SAND with occasional gravel, roots Brown, loose, dry					
		NATURAL SOILS Clayey SAND Brown, medium dense to dense, damp					
5		Silty SAND Brown, dense, damp	■		6.6	111.0	
		Clayey SAND Brown, dense, damp					
10		Boring completed at depth of 10.5'	■		7.7	120.1	
15							
20							
25							
30							
35							

GWT not encountered

SuperLog CivilTech Software, USA www.civiltech.com File: C:\Superlog4\PROJECT\19803-17.log Date: 8/17/2017

NorCal Engineering

Alere Property Group, LLC 19803-17	Log of Test Excavation T-10

Boring Location: Heacock and Brodiaea, Moreno Valley	
Date of Drilling: 8/5/17	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:
Surface Elevation: Not Measured	

Depth (feet)	Lith-ology	Material Description	Samples Type	Samples Blow Counts	Laboratory Moisture	Laboratory Dry Density	Laboratory Relative Compaction
0		FILL SOILS Clayey SAND with occasional gravel, roots Brown, loose, dry	■		7.9	107.9	
		NATURAL SOILS Clayey sandy SILT Brown, medium stiff, damp	■		6.6	106.9	
5							
		Slightly silty SAND with small gravel Brown, medium dense, damp	■		2.1	105.9	
10		Clayey SAND with occasional gravel Brown, medium dense, moist	■		10.4	104.1	
		Boring completed at depth of 12.5'					
15							
20							
25							
30							
35							

GWT not encountered

SuperLog CivilTech Software, USA www.civiltech.com File: C:\Superlog4\PROJECT\19803-17.log Date: 8/17/2017

NorCal Engineering

Alere Property Group, LLC 19803-17	Log of Test Excavation T-11

Boring Location: Heacock and Brodiaea, Moreno Valley	
Date of Drilling: 8/5/17	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:
Surface Elevation: Not Measured	

Depth (feet)	Lith-ology	Material Description	Samples Type	Samples Blow Counts	Laboratory Moisture	Laboratory Dry Density	Laboratory Relative Compaction
0		FILL SOILS Clayey SAND with occasional gravel, roots Brown, loose, dry			4.9	106.9	
		Sandy CLAY Brown, medium stiff, damp					
5		Boring completed at depth of 5'					
10							
15							
20							
25							
30							
35							

GWT not encountered

SuperLog CivilTech Software, USA www.civiltech.com File: C:\Superlog4\PROJECT\19803-17.log Date: 8/17/2017

NorCal Engineering

Alere Property Group, LLC 19803-17	Log of Test Excavation T-12

Boring Location: Heacock and Brodiaea, Moreno Valley	
Date of Drilling: 8/5/17	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:
Surface Elevation: Not Measured	

Depth (feet)	Lith-ology	Material Description	Samples Type	Samples Blow Counts	Laboratory Moisture	Laboratory Dry Density	Laboratory Relative Compaction
0		FILL SOILS Clayey SAND with occasional gravel, roots Brown, loose, dry					
		GWT not encountered					
		NATURAL SOILS Clayey SAND Brown, medium dense to dense, damp	■		7.7	110.4	
5							
		Boring completed at depth of 6'					
10							
15							
20							
25							
30							
35							

SuperLog CivilTech Software, USA www.civiltech.com File: C:\Superlog4\PROJECT\19803-17.log Date: 8/17/2017

NorCal Engineering

Alere Property Group, LLC 19803-17	Log of Test Excavation T-13

Boring Location: Heacock and Brodiaea, Moreno Valley	
Date of Drilling: 8/5/17	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:
Surface Elevation: Not Measured	

Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: Relative Compaction
0		FILL SOILS Clayey SAND with occasional gravel, roots Brown, loose, dry					
		NATURAL SOILS Clayey SAND Brown, medium dense to dense, damp					
5		Boring completed at depth of 4'					
10							
15							
20							
25							
30							
35							

GWT not encountered

SuperLog CivilTech Software, USA www.civiltech.com File: C:\Superlog4\PROJECT\19803-17.log Date: 8/17/2017

NorCal Engineering

Alere Property Group, LLC 19803-17	Log of Test Excavation T-14

Boring Location: Heacock and Brodiaea, Moreno Valley	
Date of Drilling: 8/5/17	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:
Surface Elevation: Not Measured	

Depth (feet)	Lith-ology	Material Description	Samples		Laboratory		
			Type	Blow Counts	Moisture	Dry Density	Relative Compaction
0		FILL SOILS Clayey SAND with occasional gravel, roots Brown, loose, dry					
		NATURAL SOILS Clayey SAND Brown, medium dense to dense, damp					
5		Boring completed at depth of 6'					
10							
15							
20							
25							
30							
35							

GWT not encountered

SuperLog CivilTech Software, USA www.civiltech.com File: C:\Superlog4\PROJECT\19803-17.log Date: 8/17/2017

NorCal Engineering

Alere Property Group, LLC 19803-17	Log of Test Excavation T-15

Boring Location: Heacock and Brodiaea, Moreno Valley	
Date of Drilling: 8/5/17	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:
Surface Elevation: Not Measured	

Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: Relative Compaction
0		FILL SOILS Clayey SAND with occasional gravel, roots Brown, loose, dry					
		NATURAL SOILS Clayey SAND Brown, medium dense to dense, damp					
5		Boring completed at depth of 4'					
10							
15							
20							
25							
30							
35							

GWT not encountered

SuperLog CivilTech Software, USA www.civiltech.com File: C:\Superlog4\PROJECT\19803-17.log Date: 8/17/2017

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APPENDIX C

TABLE I
MAXIMUM DENSITY TESTS
(ASTM: D-1557-12)

Sample	Classification	Optimum Moisture	Maximum Dry Density (lbs./cu.ft.)
B-1 @ 2-4'	clayey SAND	9.5	126.0

TABLE II
EXPANSION INDEX TESTS
(ASTM: D-4829-11)

Sample	Classification	Expansion Index
B-1 @ 2-4'	clayey SAND	25

TABLE III
SOLUBLE SULFATE TESTS
(CT 417)

Sample	Sulfate Concentration (%)
B-1 @ 1-2'	.0013

TABLE IV
pH TESTS

Sample	pH
B-1 @ 1-2'	6.5

TABLE V
RESISTIVITY TESTS
(CT 643)

Sample	Resistivity (ohm-cm)
B-1 @ 1-2'	7693

TABLE VI
CHLORIDE TESTS
(CT 422))

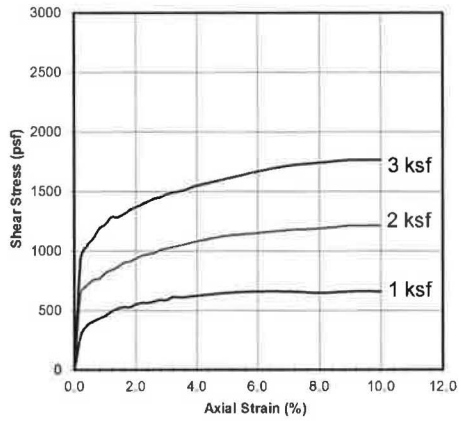
Sample	Concentration (ppm)
B-1 @ 1-2'	218

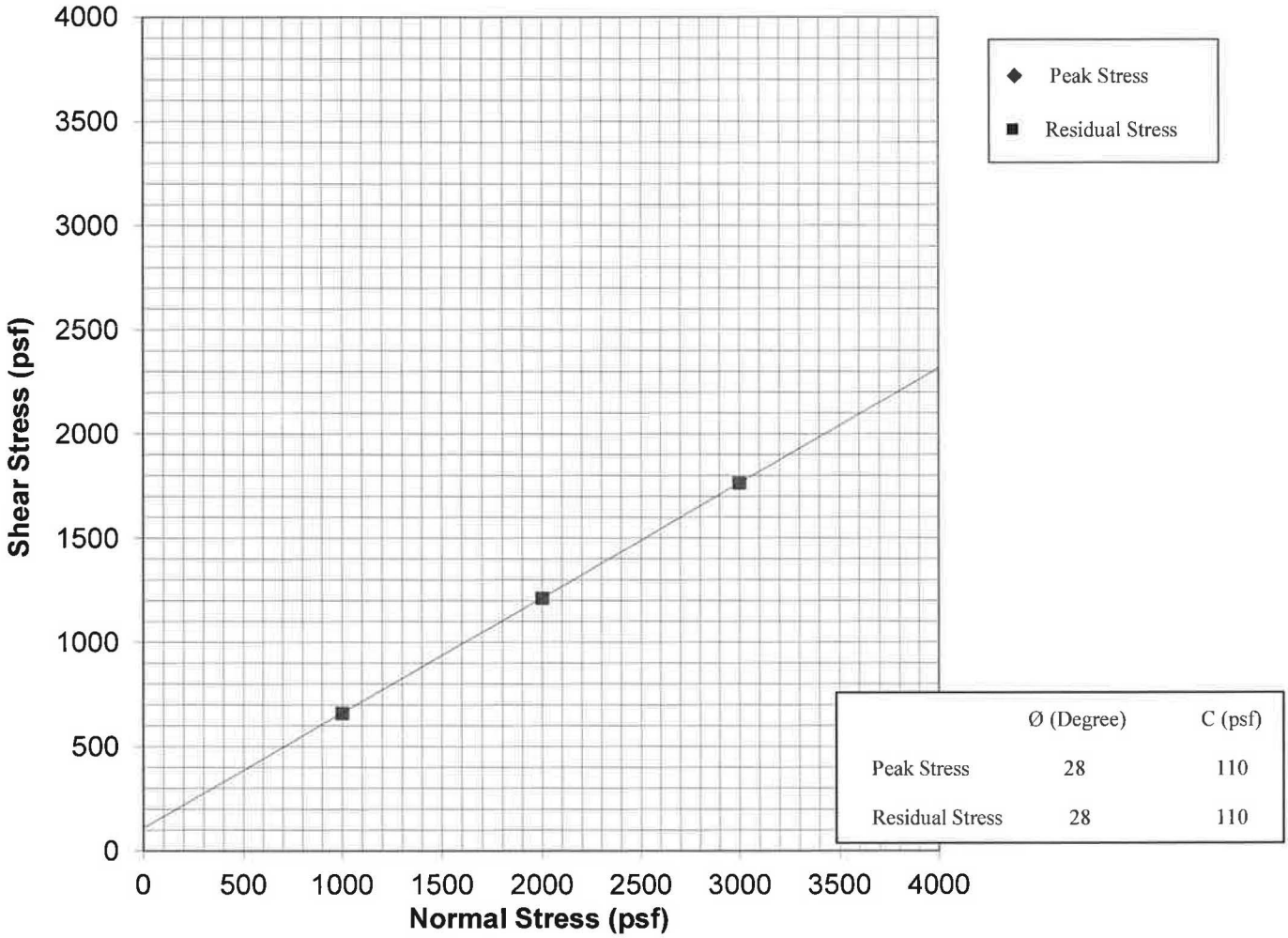
TABLE VII
RESISTANCE 'R' VALUE TESTS
(CA 301))

Sample	'R' Value
T-11 @ 1-2'	28

Sample No.	B1@2-5'	
Sample Type:	Remolded/Saturated	
Soil Description:	Silty Sand & Clay	

		1	2	3
Normal Stress	(psf)	1000	2000	3000
Peak Stress	(psf)	660	1212	1764
Displacement	(in)	0.150	0.225	0.225
Residual Stress	(psf)	660	1212	1764
Displacement	(in.)	0.250	0.250	0.250
In Situ Dry Density	(pcf)	117.0	117.0	117.0
In Situ Water Content	(%)	9.0	9.0	9.0
Saturated Water Content	(%)	16.1	16.1	16.1
Strain Rate	(in/min)	0.020	0.020	0.020





	Ø (Degree)	C (psf)
Peak Stress	28	110
Residual Stress	28	110

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SOILS AND GEOTECHNICAL CONSULTANTS

Alere Property Group, LLC

PROJECT NUMBER: 19803-17 DATE: 8/16/2017

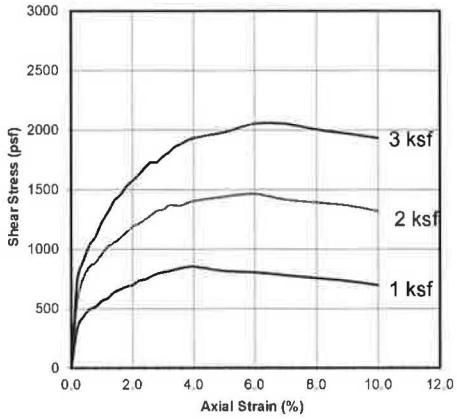
DIRECT SHEAR TEST

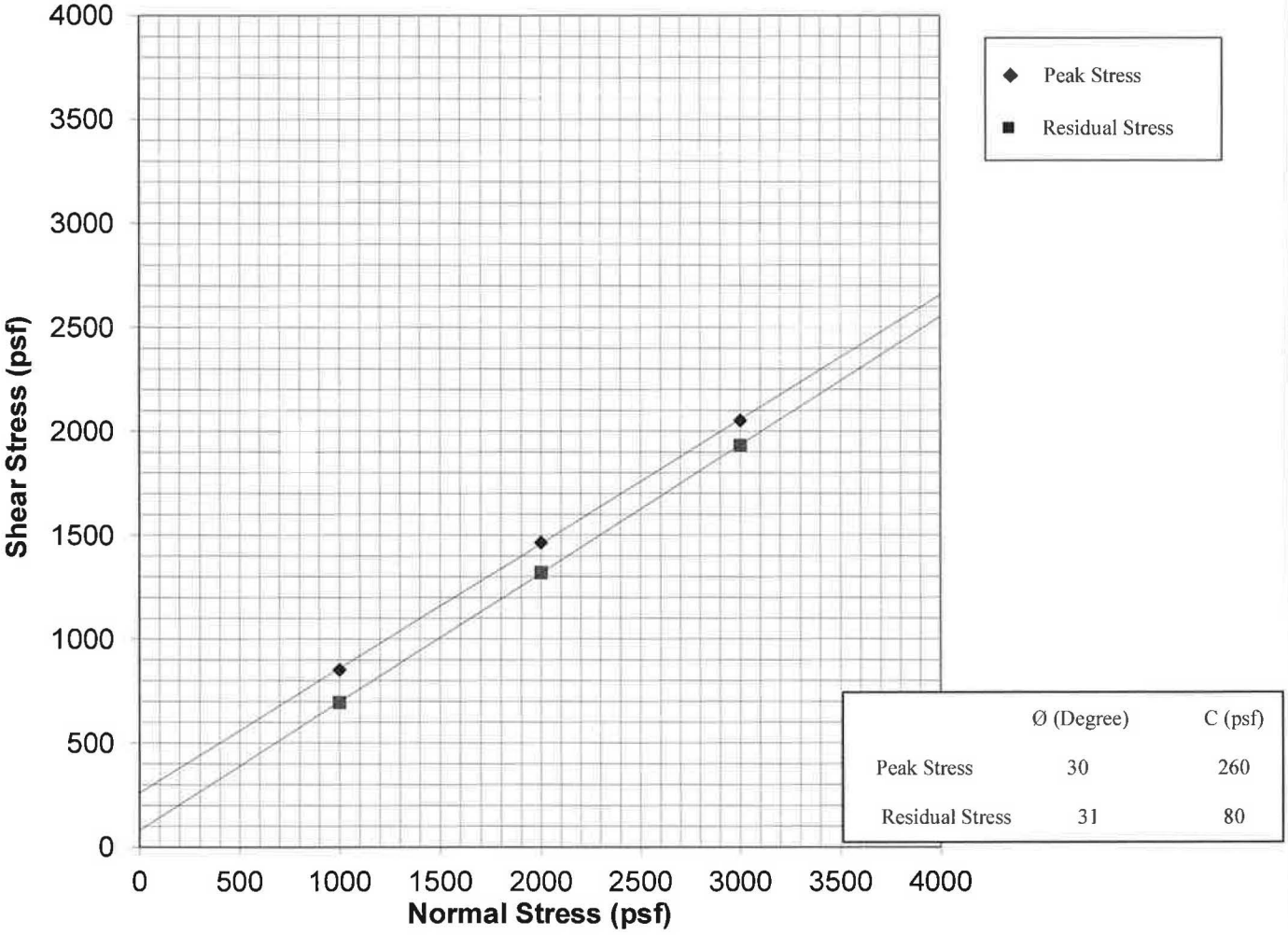
ASTM D3080

Plate A

Sample No.	T4@8'
Sample Type:	Undisturbed/Saturated
Soil Description:	Sandy Clay w/ Some Silt

		1	2	3
Normal Stress	(psf)	1000	2000	3000
Peak Stress	(psf)	852	1464	2052
Displacement	(in.)	0.100	0.150	0.150
Residual Stress	(psf)	696	1320	1932
Displacement	(in.)	0.250	0.250	0.250
In Situ Dry Density	(pcf)	110.4	110.4	110.4
In Situ Water Content	(%)	8.3	8.3	8.3
Saturated Water Content	(%)	19.3	19.3	19.3
Strain Rate	(in/min)	0.020	0.020	0.020





	Ø (Degree)	C (psf)
Peak Stress	30	260
Residual Stress	31	80

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SOILS AND GEOTECHNICAL CONSULTANTS

Alere Property Group, LLC

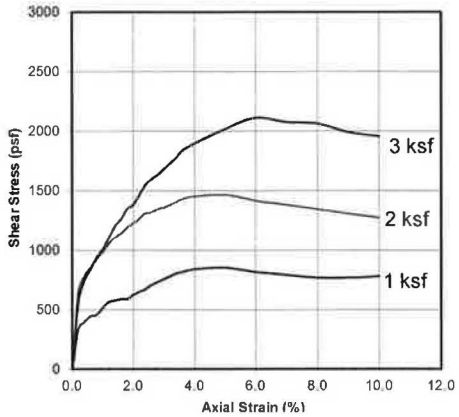
PROJECT NUMBER: 19803-17 DATE: 8/16/2017

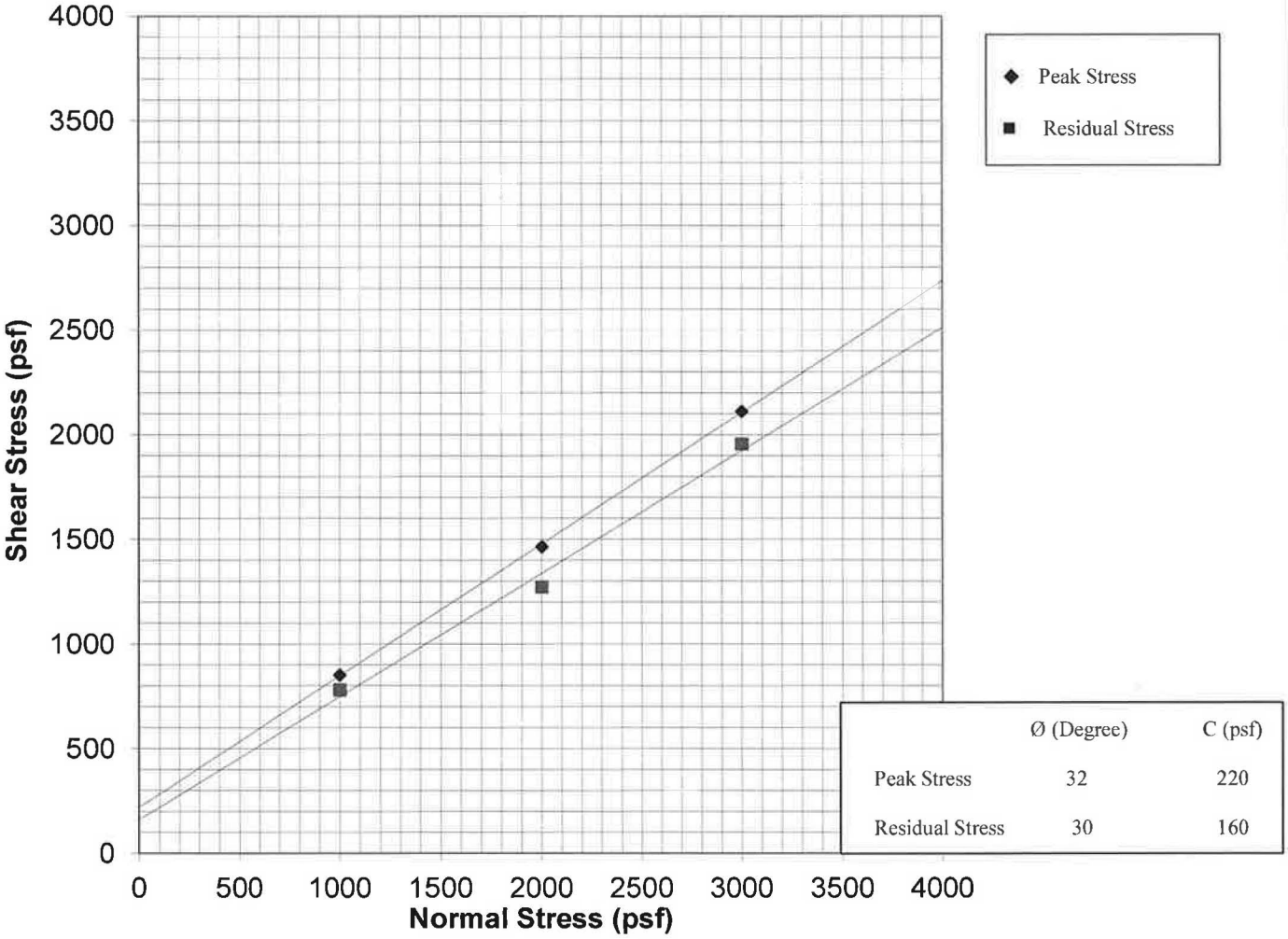
DIRECT SHEAR TEST

ASTM D3080

Plate B

Sample No.		T7@4'		
Sample Type:		Undisturbed/Saturated		
Soil Description:		Silty Fine-Very Coarse Grained Sand w/ Some Small Gravel		
		1	2	3
Normal Stress	(psf)	1000	2000	3000
Peak Stress	(psf)	852	1464	2112
Displacement	(in.)	0.125	0.125	0.150
Residual Stress	(psf)	780	1272	1956
Displacement	(in.)	0.250	0.250	0.250
In Situ Dry Density	(pcf)	111.3	111.3	111.3
In Situ Water Content	(%)	2.9	2.9	2.9
Saturated Water Content	(%)	19.0	19.0	19.0
Strain Rate	(in/min)	0.020	0.020	0.020





	Ø (Degree)	C (psf)
Peak Stress	32	220
Residual Stress	30	160

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Alere Property Group, LLC

PROJECT NUMBER: 19803-17 DATE: 8/16/2017

DIRECT SHEAR TEST

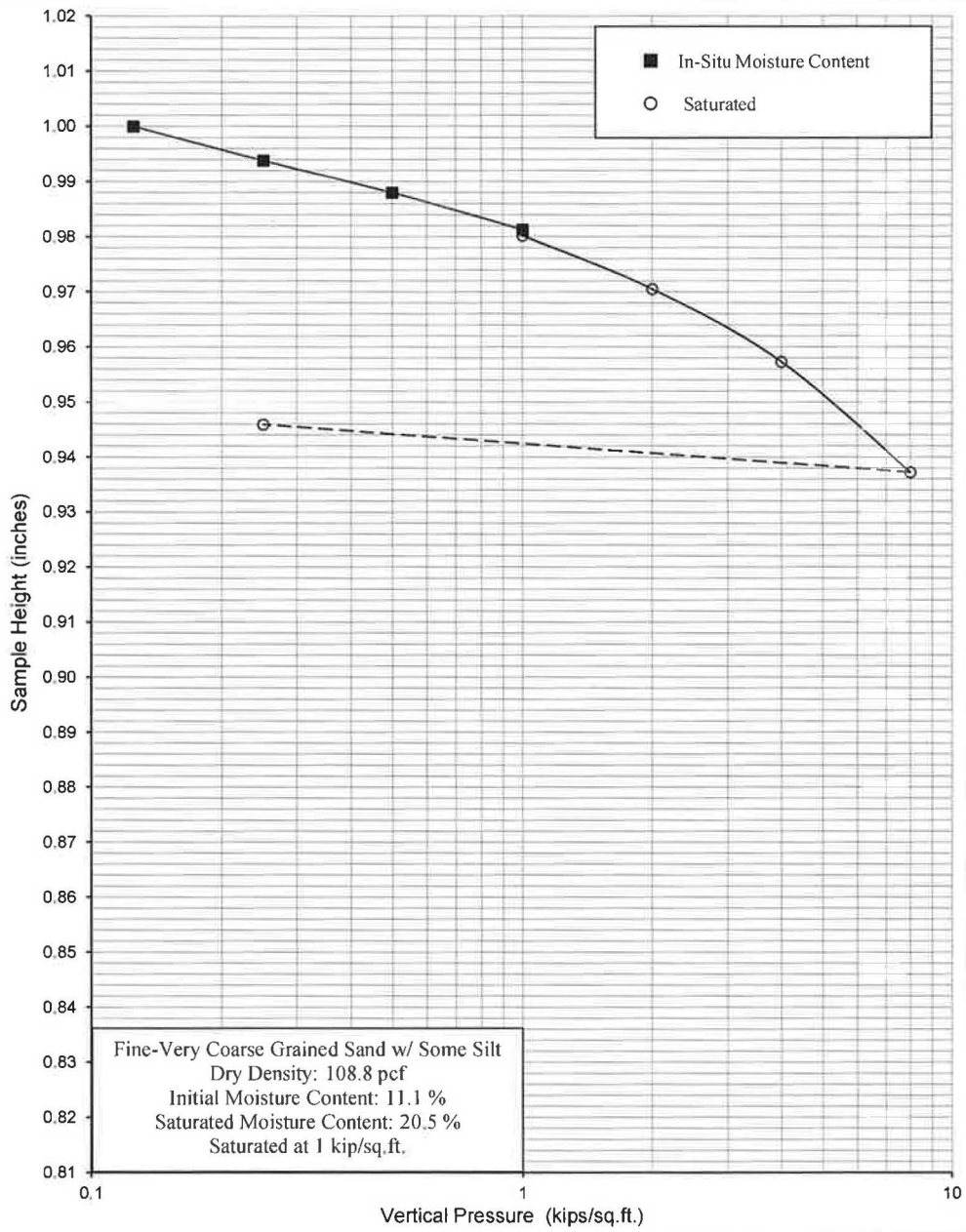
ASTM D3080

Plate C

Vertical Pressure (kips/sq.ft.)	Sample Height (inches)	Consolidation (percent)	
0.125	1.0000	0.0	
0.25	0.9938	0.6	
0.5	0.9880	1.2	
1	0.9813	1.9	
1	0.9802	2.0	Saturated
2	0.9705	3.0	
4	0.9573	4.3	
8	0.9372	6.3	
0.25	0.9459	5.4	

Sample No.	B2	Depth	15'	Date	8/16/2017

Date Tested: 8/14/2017
Sample: B2
Depth: 15'



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SOILS AND GEOTECHNICAL CONSULTANTS

Alere Property Group, LLC

PROJECT NUMBER: 19803-17 DATE: 8/16/2017

CONSOLIDATION TEST

ASTM D2435

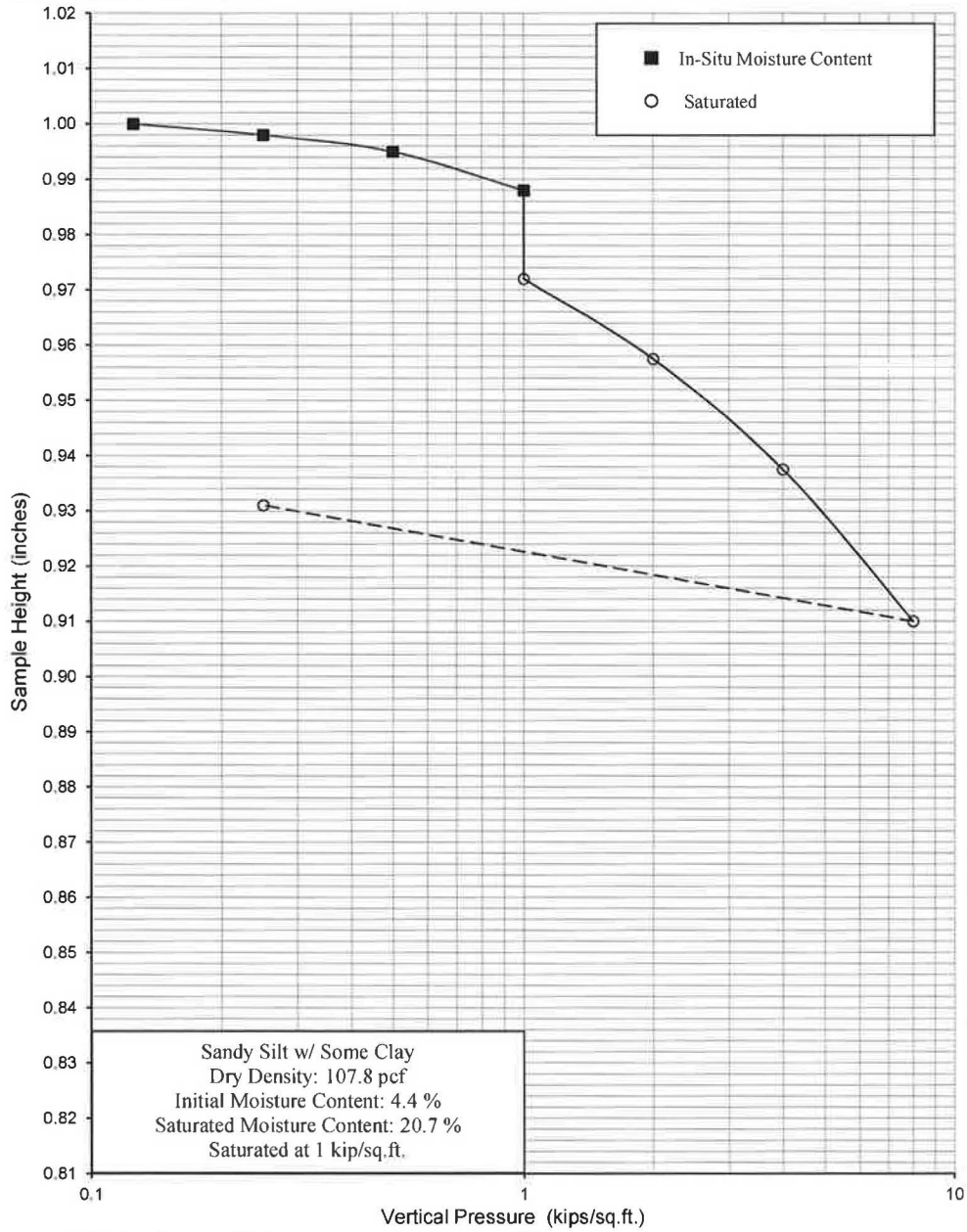
Plate D

Vertical Pressure (kips/sq.ft.)	Sample Height (inches)	Consolidation (percent)
0.125	1.0000	0.0
0.25	0.9980	0.2
0.5	0.9950	0.5
1	0.9880	1.2
1	0.9720	2.8
2	0.9575	4.3
4	0.9375	6.3
8	0.9100	9.0
0.25	0.9310	6.9

Saturated

Sample No.	B3	Depth	10'	Date	8/16/2017

Date Tested: 8/15/2017
Sample: B3
Depth: 10'



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SOILS AND GEOTECHNICAL CONSULTANTS

Alere Property Group, LLC

PROJECT NUMBER: 19803-17 DATE: 8/16/2017

CONSOLIDATION TEST

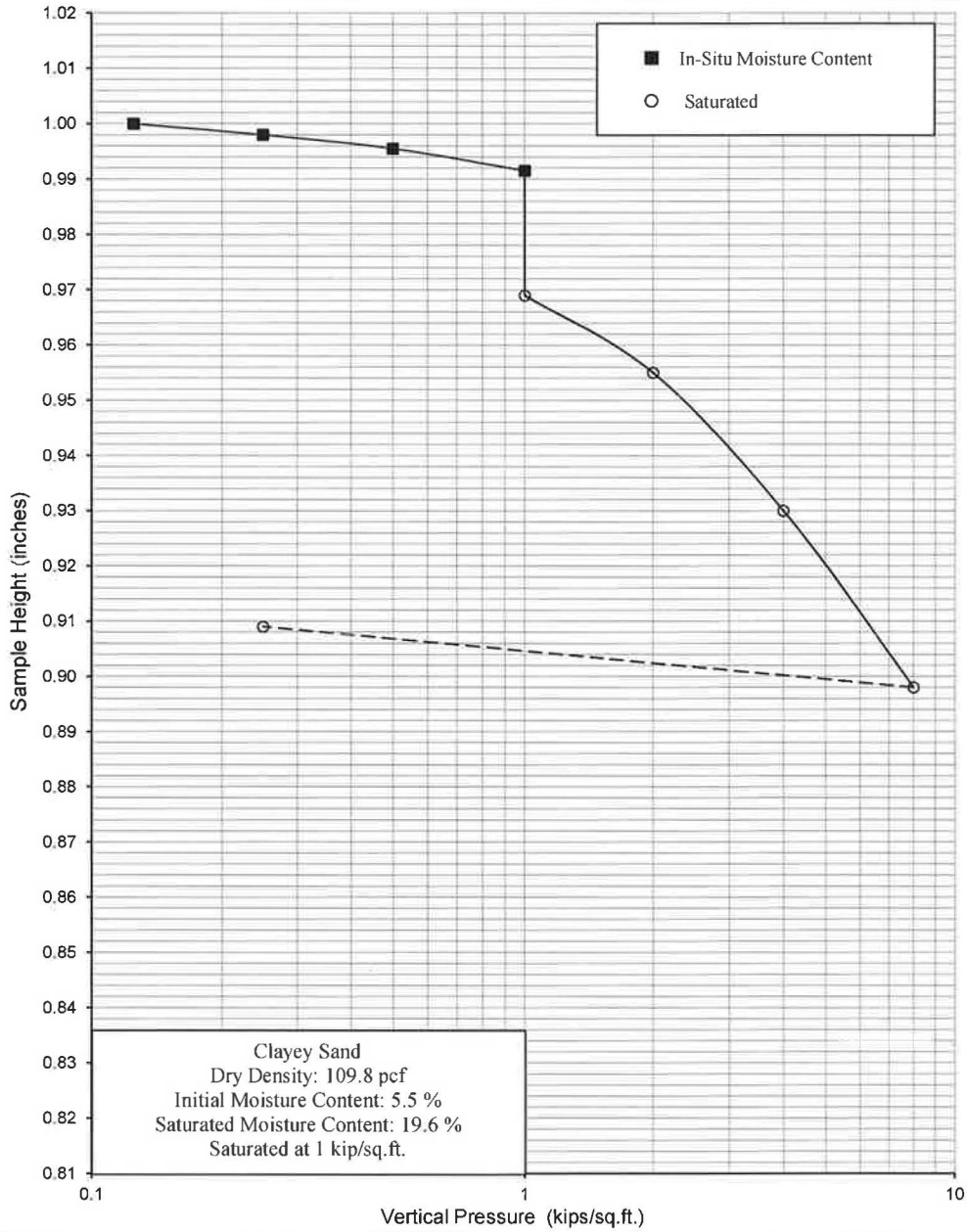
ASTM D2435

Plate E

Vertical Pressure (kips/sq.ft.)	Sample Height (inches)	Consolidation (percent)	
0.125	1.0000	0.0	
0.25	0.9980	0.2	
0.5	0.9955	0.4	
1	0.9915	0.8	
1	0.9690	3.1	
2	0.9550	4.5	
4	0.9300	7.0	
8	0.8980	10.2	Saturated
0.25	0.9090	9.1	

Sample No.	T6	Depth	5'	Date	8/16/2017

Date Tested: 8/15/2017
Sample: T6
Depth: 5'



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SOILS AND GEOTECHNICAL CONSULTANTS

Alere Property Group, LLC

PROJECT NUMBER: 19803-17 DATE: 8/16/2017

CONSOLIDATION TEST

ASTM D2435

Plate F

NorCal Engineering

Soils and Geotechnical Consultants
10641 Humbolt Street Los Alamitos, CA 90720
(562) 799-9469 Fax (562) 799-9459

August 18, 2017 Project Number 19803-17

Alere Property Group, LLC
100 Bayview Circle, Suite 310
Newport Beach, California 92660

Attn: Clark Neuhoff

RE: **Soil Infiltration Study** - Proposed Warehouse Building Development - Located at the Northwest Corner of Heacock Street and Brodiaea Street, in the City of Moreno Valley, California

Dear Mr. Neuhoff:
Pursuant to your request, this firm has performed a Soil Infiltration Study for the above referenced project. The purpose of this study is to evaluate the feasibility of on-site drainage disposal systems on the subject site. The scope of current work included the following: 1) site reconnaissance; 2) subsurface geotechnical exploration; 3) double ring infiltration testing at two locations; 4) engineering analysis of field test data; and 5) preparation of this report.

Proposed Development

It is currently proposed to a new concrete tilt-up structure totaling 262,000 square feet on the property. Asphaltic and concrete pavement areas and landscaping will also be installed. It is also proposed to install detention/infiltration basin in the southwest corner of the property to capture and infiltrate storm water runoff. Depth of system will be on the order of 4 to 6 feet below existing grades, per Thienes Engineering.

Site Description

The rectangular shaped property is located at the northwest intersection of Heacock Street and Brodiaea Street, in the City of Moreno Valley, as shown on the Vicinity Map, Figure 1. Alessandro Boulevard borders approximately 300 feet north of the site. The Heacock Channel, a concrete-lined storm drain channel, is located along the east property line between the property and the roadway. Vacant land is located to the west.

The property is currently vacant and is covered with a low growth of vegetation.

The site topography is generally flat and drainage pattern is not readily discernible.

Field Exploration

The excavations were completed on August 5, 2017 and testing was completed on that day. The testing consisted of using the double ring infiltrometer at two locations to determine the infiltration rate of the proposed retention/infiltration system. The locations of the tests are shown on the attached Figure 2. The test locations were excavated by backhoe to depths of 4 and 6 feet below existing ground surface (bgs). Excavations were trimmed at 1:1 (horizontal to vertical) inclinations in order to provide safe entry into the excavations. No significant caving occurred to the depths of these test excavations. Detailed descriptions of the subsurface soils are given in the attached test excavations logs in Appendix B. The excavations were backfilled at the conclusion of testing with the soil cuttings and tamped, but were *not* compacted to 90% relative compaction.

In general, the test areas were found to be underlain by surficial fill soils overlying native soils. The soils at test locations consisted of clayey SANDS. These soils were noted to be medium dense to dense and damp.

Groundwater

Groundwater was *not* encountered in our either of our test excavations which extended to a maximum depth of 6 feet. An additional boring was advanced to a depth of 51.5 feet pursuant to the completion of our report titled *Geotechnical Investigation…*, dated August 17, 2017 for the planned development. Groundwater was encountered at a depth of 28 feet in this boring. A copy of the boring log is included in Appendix A for reference and the location of the boring shown on Figure 2.

Infiltration Test Procedure

The infiltration test consisted of the double ring infiltration test per ASTM Method D 3385. The double ring infiltrometer method consists of driving two open cylinders, one inside the other, into the ground, partially filling the ring with water, and then maintaining the liquid at a constant level. The volume of liquid added to the inner ring, to maintain the liquid level constant is the measure of the volume of liquid that infiltrates into the soil.

The volume infiltrated during timed intervals is converted to an incremental infiltration velocity, usually expressed in centimeters per hour or inches per hour and plotted verses elapsed time. The maximum-steady state or average incremental infiltration velocity, depending on the purpose/application of the test is equivalent to the infiltration rate.

Water levels were maintained at a constant level in both the inner ring and annular space between rings throughout the test, to prevent flow of water from one ring to the other.

The volume of liquid used during each measured time interval was converted into an incremental infiltration velocity of both the inner ring in the annular space using the following equations:

For the inner ring calculated as follows:

$$Vir = \Delta Vir / (Air \Delta t)$$

where:

Vir = inner ring incremental infiltration velocity, cm/hr

ΔVir = volume of water used during time interval to maintain constant head in the inner ring, cm^3

Air = internal area of the inner ting, cm^2

Δt = time interval, hr

The last reading obtained was used for design purposes in each of the basin. The testing data sheets are attached in Appendix B and summarized in the *Discussion of Results* section below.

Discussion of Results

The use of on-site disposal system by means of retention/infiltration basins appears to be geotechnically feasible for future development. The field infiltration rates given below may be utilized in the basin design with a safety factor of 2.0 or greater.

Test No.	Depth (feet bgs)	Soil Type	Infiltration Rate (cm/hr)	Infiltration Rate (in/hr)
IT-1	6	clayey SAND	3.3	1.3
IT-2	4	clayey SAND	1.1	0.4

It is our opinion that the site is suitable for stormwater infiltration without increasing the potential of settlement of proposed and existing structures or adversely affecting retaining/basement walls located either on or adjacent to the subject site. In addition, the potential for hydro-consolidation and the susceptibility for any ground settlements are considered low. All systems shall meet the California Regional Water Quality Control Board (CRWQCB) requirements.

Closure

The recommendations and conclusions contained in this report are based upon the soil conditions uncovered in our test excavations. No warranty of the soil condition between our excavations is implied. NorCal Engineering should be notified for possible further recommendations if unexpected to unfavorable conditions are encountered during construction phase. This firm should have the opportunity to review the final plans to verify that all our recommendations are incorporated.

This report and all conclusions are subject to the review of the controlling authorities for the project. Our representative should be present during the grading operations and construction phase to certify that such recommendations are complied within the field.

This infiltration study has been conducted in a manner consistent with the level of care and skill exercised by members of our profession currently practicing under similar conditions in the Southern California area. All work was performed under the supervision of the Geotechnical Engineer. No other warranty, expressed or implied is made. No other warranty, expressed or implied is made.

We appreciate this opportunity to be of service to you. If you have any further questions, please do not hesitate to contact the undersigned.

Respectfully submitted,
NORCAL ENGINEERING

REGISTERED PROFESSIONAL ENGINEER
KEITH D. TUCKER
No. 841
Exp. 12/31/18
GEOTECHNICAL
STATE OF CALIFORNIA

Keith D. Tucker
Project Engineer
R.G.E. 841

Mark A. Burkholder
Project Manager

List of Appendices
(in order of appearance)

Appendix A

Vicinity Map and Test Location Exhibits – Figures 1 and 2

Appendix B

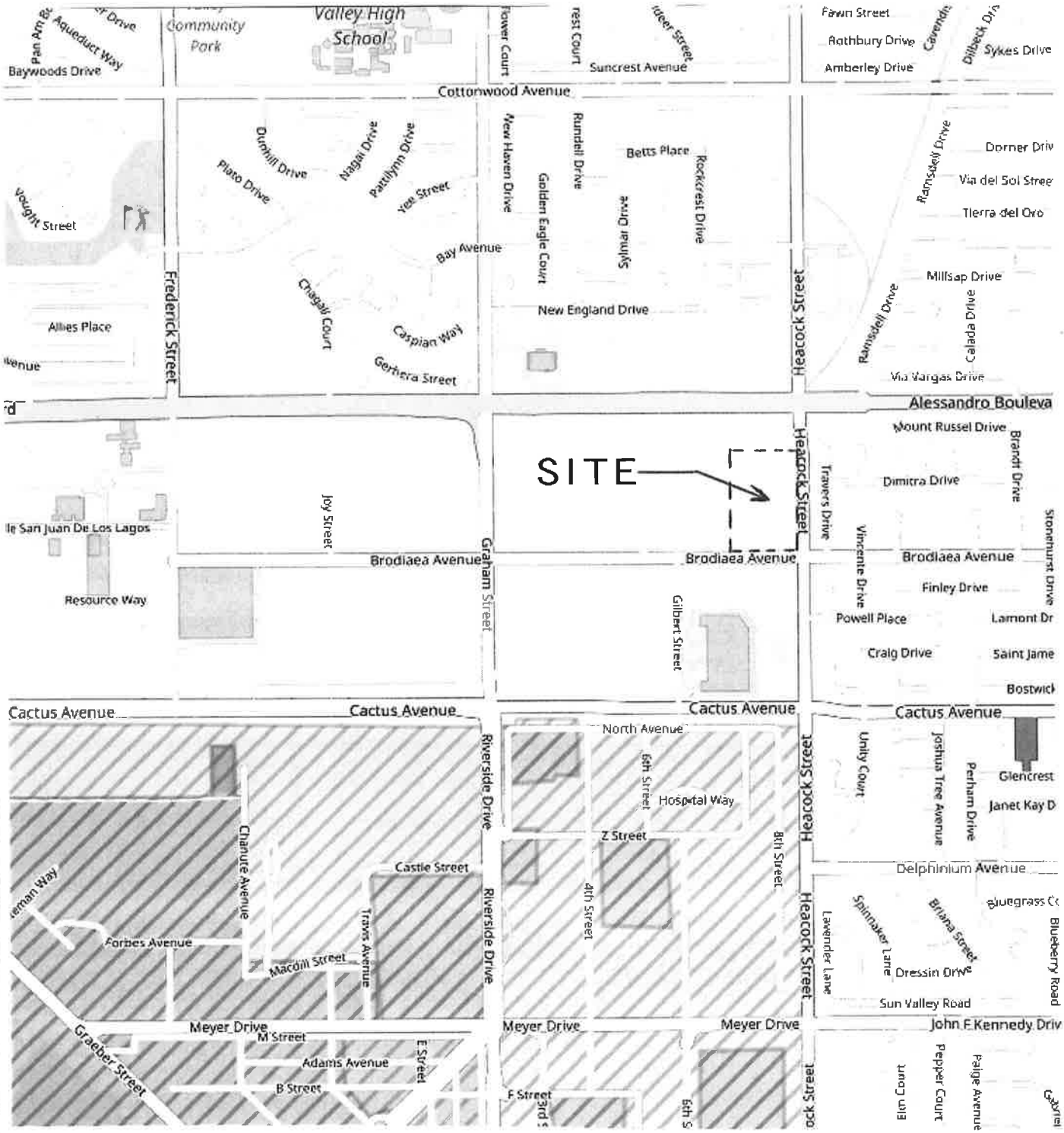
Logs of Test Excavations IT-1 and IT-2

Log of Groundwater Verification Boring B-1

Field Test Data

Calculations

Appendix A



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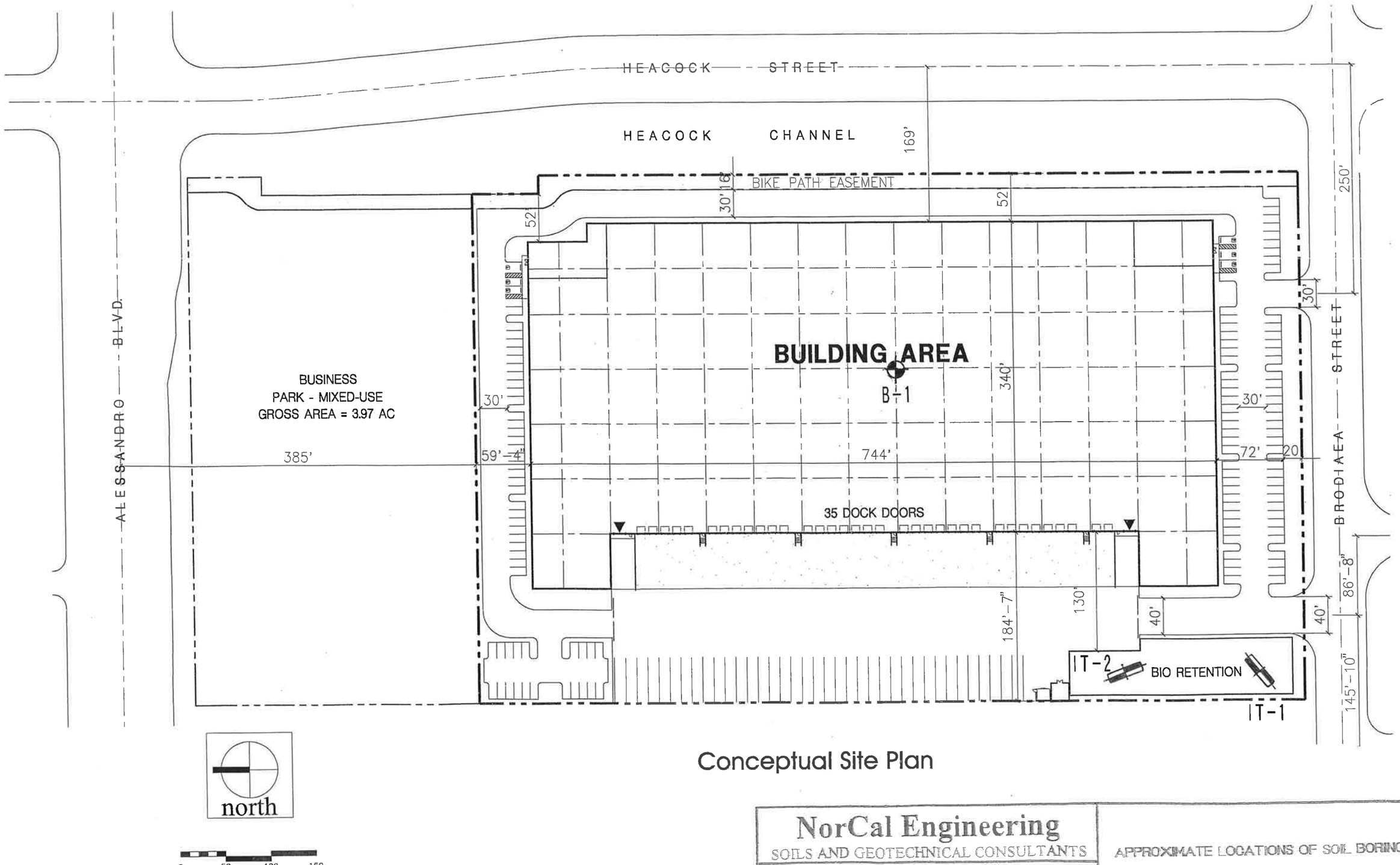
SOILS AND GEOTECHNICAL CONSULTANTS

VICINITY MAP

PROJECT 19803-17	DATE 8/2017

FIG. 1



Conceptual Site Plan

NorCal Engineering
SOILS AND GEOTECHNICAL CONSULTANTS

PROJECT 19803-17 | DATE 8/2017

APPROXIMATE LOCATIONS OF SOIL BORINGS

FIG. 2

Appendix B

MAJOR DIVISION			GRAPHIC SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL, SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	SAND AND SANDY SOILS	CLEAN SAND (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	SANDS WITH FINE (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND-SILT MIXTURES
				SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

UNIFIED SOIL CLASSIFICATION SYSTEM

KEY:

- ■ Indicates 2.5-inch Inside Diameter. Ring Sample.
- ☒ Indicates 2-inch OD Split Spoon Sample (SPT).
- ⧅ Indicates Shelby Tube Sample.
- ◫ Indicates No Recovery.
- ◧ Indicates SPT with 140# Hammer 30 in. Drop.
- ✉ Indicates Bulk Sample.
- ◩ Indicates Small Bag Sample.
- ◨ Indicates Non-Standard
- ☒ Indicates Core Run.

COMPONENT PROPORTIONS

DESCRIPTIVE TERMS	RANGE OF PROPORTION
Trace	1 - 5%
Few	5 - 10%
Little	10 - 20%
Some	20 - 35%
And	35 - 50%

COMPONENT DEFINITIONS

COMPONENT	SIZE RANGE
Boulders	Larger than 12 in
Cobbles	3 in to 12 in
Gravel	3 in to No 4 (4.5mm)
Coarse gravel	3 in to 3/4 in
Fine gravel	3/4 in to No 4 (4.5mm)
Sand	No. 4 (4.5mm) to No. 200 (0.074mm)
Coarse sand	No. 4 (4.5 mm) to No. 10 (2.0 mm)
Medium sand	No. 10 (2.0 mm) to No. 40 (0.42 mm)
Fine sand	No. 40 (0.42 mm) to No. 200 (0.074 mm)
Silt and Clay	Smaller than No. 200 (0.074 mm)

MOISTURE CONTENT

DRY	Absence of moisture, dusty, dry to the touch.
DAMP	Some perceptible moisture; below optimum
MOIST	No visible water; near optimum moisture content
WET	Visible free water, usually soil is below water table.

RELATIVE DENSITY OR CONSISTENCY VERSUS SPT N -VALUE

COHESIONLESS SOILS		COHESIVE SOILS		
Density	N (blows/ft)	Consistency	N (blows/ft)	Approximate Undrained Shear Strength (psf)
Very Loose	0 to 4	Very Soft	0 to 2	< 250
Loose	4 to 10	Soft	2 to 4	250 - 500
Medium Dense	10 to 30	Medium Stiff	4 to 8	500 - 1000
Dense	30 to 50	Stiff	8 to 15	1000 - 2000
Very Dense	over 50	Very Stiff	15 to 30	2000 - 4000
		Hard	over 30	> 4000

Alere Property Group, LLC
19803-17

Log of Test Excavation IT-1

Boring Location: Heacock and Brodiaea, Moreno Valley	
Date of Drilling: 8/5/17	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:
Surface Elevation: Not Measured	

Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: Relative Compaction
0		FILL SOILS Clayey SAND with occasional gravel, roots Brown, loose, dry					
		NATURAL SOILS Clayey SAND Brown, medium dense to dense, damp					
5		GWT not encountered					
		Boring completed at depth of 6'					
10							
15							
20							
25							
30							
35							

NorCal Engineering

SuperLog CivilTech Software, USA www.civiltech.com File: C:\Superlog4\PROJECT\19803-17.log Date: 8/17/2017

Alere Property Group, LLC
19803-17

Log of Test Excavation IT-2

Boring Location: Heacock and Brodiaea, Moreno Valley	
Date of Drilling: 8/5/17	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:
Surface Elevation: Not Measured	

Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: Relative Compaction
0		FILL SOILS Clayey SAND with occasional gravel, roots Brown, loose, dry					
		NATURAL SOILS Clayey SAND Brown, medium dense to dense, damp					
5		Boring completed at depth of 4'					
10							
15							
20							
25							
30							
35							

GWT not encountered

SuperLog CivilTech Software, USA www.civiltech.com File: C:\Superlog4\PROJECT\19803-17.log Date: 8/17/2017

NorCal Engineering

NORCAL ENGINEERING

SOILS AND GEOTECHNICAL CONSULTANTS

Project:	**Alere, LLC**
Project No:	19803-17
Date:	8/5/17
Test No.	IT-1
Depth:	6'
Tested By:	P.L.

	TIME (hr/min)	CHANGE TIME (min)	CUMULATIVE TIME (min)	INNER RING READING (cm)	INNER RING CHANGE	INNER RING FLOW (cc)	OUTER RING READING (cm)	OUTER RING CHANGE (cm)	OUTER RING FLOW (cc)	INNER RING INF RATE (cm/hr)	OUTER RING INF RATE (cm/hr)	INNER RING INF RATE (ft/hr)
1	8:03			41.8			105.1					
	8:13	10	10	42.6	0.8		105.9	0.8				
2	8:13			42.6			105.9					
	8:23	10	20	43.5	0.9		106.7	0.8				
3	8:23			43.5			106.7					
	8:33	10	30	44.3	0.8		107.5	0.8				
4	8:33			44.3			107.5					
	8:43	10	40	45.0	0.7		108.1	0.6				
5	8:43			45.0			108.1					
	8:53	10	50	45.6	0.6		108.9	0.8				
6	8:53			45.6			108.9					
	9:03	10	60	46.3	0.7		109.5	0.6				
7	9:03			46.3			109.5					
	9:13	10	70	46.9	0.6		110.0	0.5				
8	9:13			46.9			110.0					
	9:23	10	80	47.4	0.5		110.6	0.6				
9	9:23			47.4			110.6					
	9:33	10	90	47.9	0.5		111.2	0.6				
10	9:33			47.9			111.2					
	9:43	10	100	48.4	0.5		111.7	0.5				
11	9:43			48.4			111.7					
	9:53	10	110	48.9	0.5		112.1	0.4				
12	9:53			48.9			112.1					
	10:03	10	120	49.5	0.6		112.6	0.5				

NORCAL ENGINEERING

SOILS AND GEOTECHNICAL CONSULTANTS

Project:	**Alere, LLC**
Project No:	19803-17
Date:	8/5/17
Test No.	IT-2
Depth:	4'
Tested By:	P.L.

	TIME (hr/min)	CHANGE TIME (min)	CUMULATIVE TIME (min)	INNER RING READING (cm)	INNER RING CHANGE	INNER RING FLOW (cc)	OUTER RING READING (cm)	OUTER RING CHANGE (cm)	OUTER RING FLOW (cc)	INNER RING INF RATE (cm/hr)	OUTER RING INF RATE (cm/hr)	INNER RING INF RATE (ft/hr)
1	10:28			106.8			49.6					
	10:38	10	10	107.2	0.4		50.4	0.8				
2	10:38			107.2			50.4					
	10:48	10	20	107.5	0.5		50.8	0.4				
3	10:48			107.5			50.8					
	10:58	10	30	107.9	0.4		51.2	0.4				
4	10:58			107.9			51.2					
	11:08	10	40	108.1	0.2		51.3	0.1				
5	11:08			108.1			51.3					
	11:18	10	50	108.3	0.2		51.6	0.3				
6	11:18			108.3			51.6					
	11:28	10	60	108.5	0.2		51.8	0.2				
7	11:28			108.5			51.8					
	11:38	10	70	108.7	0.2		52.0	0.2				
8	11:38			108.7			52.0					
	11:48	10	80	108.8	0.1		52.2	0.2				
9	11:48			108.8			52.2					
	11:58	10	90	109.0	0.2		52.3	0.1				
10	11:58			109.0			52.3					
	12:08	10	100	109.2	0.2		52.5	0.2				
11	12:08			109.2			52.5					
	12:18	10	110	109.4	0.2		52.7	0.2				
12	12:18			109.4			52.7					
	12:28	10	120	109.6	0.1		52.8	0.1				

Brodiaea Commerce Center

GREENHOUSE GAS ANALYSIS

CITY OF MORENO VALLEY

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JANUARY 24, 2018

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LIST OF ABBREVIATED TERMS

(1)	Reference
ARB	California Air Resources Board
AQIA	Air Quality Impact Analysis
CAA	Federal Clean Air Act
CalEEMod	California Emissions Estimator Model
CalEPA	California Environmental Protection Agency
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resource Board
CAT	Climate Action Team
CBSC	California Building Standards Commission
CEC	California Energy Commission
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CFC	Chlorofluorocarbons
CFR	Code of Federal Regulations
CH4	Methane
CO	Carbon Monoxide
CO2	Carbon Dioxide
CO2e	Carbon Dioxide Equivalent
CPUC	California Public Utilities Commission
EPA	Environmental Protection Agency
EPS	Emission Performance Standard
GCC	Global Climate Change
GHGA	Greenhouse Gas Analysis
GWP	Global Warming Potential
HFC	Hydrofluorocarbons
LCA	Life-Cycle Analysis
MMs	Mitigation Measures
MMTCO2e	Million Metric Ton of Carbon Dioxide Equivalent
MTCO2e	Metric Ton of Carbon Dioxide Equivalent
N20	Nitrogen Dioxide
NIOSH	National Institute for Occupational Safety and Health
NOx	Oxides of Nitrogen
PFC	Perfluorocarbons
PM10	Particulate Matter 10 microns in diameter or less
PM2.5	Particulate Matter 2.5 microns in diameter or less

PPM	Parts Per Million
Project	Brodiaea Commerce Center
RTP	Regional Transportation Plan
SB	Senate Bill
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
UNFCCC	United Nations' Framework Convention on Climate Change
VOC	Volatile Organic Compounds

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EXECUTIVE SUMMARY

The City of Moreno Valley does not have an adopted threshold of significance for GHG emissions. For CEQA purposes, the City has discretion to select an appropriate significance criterion, based on substantial evidence. The Air Quality Management District's (AQMD)'s adopted numerical threshold of 10,000 metric tons carbon dioxide equivalent (MTCO2e) per year for industrial stationary source emissions is selected as the significance criterion. The AQMD-adopted industrial threshold was selected by the City because the proposed Project is analogous to an industrial use much more closely than any other land use such as commercial or residential in terms of its expected operating characteristics. The Project proposes a single high-cube warehouse/distribution center that will serve mid- stream functions in the goods movement chain between manufacturers and consumers, characteristic of an industrial operation. Further, analysis of the Project's traffic generation in this EIR is based on the Institute of Transportation Engineers (ITE) Trip Generation Manual, 9th Edition, 2012 for industrial and warehouse uses. Also, 10,000 MTCO2e has been used as the significance threshold by many local government lead agencies for logistics projects throughout the SCAG region since the AQMD adopted this threshold for its own use. Further, to ensure that the threshold is conservative in its application, although the AQMD uses their adopted 10,000 MTCO2e threshold to determine the significance of stationary source emissions for industrial projects, the 10,000 MTCO2e threshold used in this CEQA document is applied to all sources of Project-related GHG emissions whether stationary source, mobile source, area source, or other.

Use of this threshold is also consistent with guidance provided in the CAPCOA *CEQA and Climate Change* handbook, as such the City has opted to use a non-zero threshold approach based on Approach 2 of the handbook. Threshold 2.5 (Unit-Based Thresholds Based on Market Capture) establishes a numerical threshold based on capture of approximately 90 percent of emissions from future development. The latest threshold developed by SCAQMD using this method is 10,000 MTCO2e based on the review of 711 CEQA projects.

The Project will result in approximately 777.67 MTCO2e per year from construction, area, energy, waste, and water usage. In addition, the Project has the potential to result in an additional 5,651.85 MTCO2e per year from mobile sources if the assumption is made that all of the vehicle trips to and from the Project are "new" trips resulting from the development of the Project. As shown on Table ES-1, the Project has the potential to generate a total of approximately 6,429.52 MTCO2e per year. As such, the Project would not exceed the SCAQMD's numeric threshold of 10,000 MTCO2e if it were applied. Thus, the Project would not have the potential to result in a cumulatively considerable impact with respect to GHG emissions.

TABLE ES-1: PROJECT GREENHOUSE GAS EMISSIONS (ANNUAL)

Emission Source	**Emissions (metric tons per year)**			
	CO_2	**CH_4**	**N_2O**	**Total CO_2E**
Annual construction-related emissions amortized over 30 years	36.08	0.01	0.00	36.23
Area	0.01	3.00E-05	0.00	0.01
Energy	253.89	0.01	0.00	254.87
Mobile Sources (Trucks)	495.24	0.01	0.00	495.52
Mobile Sources (Passenger Cars)	5,150.18	0.25	0.00	5,156.33
On-site Equipment	27.06	0.01	0.00	27.27
Waste	50.07	2.96	0.00	124.05
Water Usage	271.00	0.99	0.05	335.24
Total CO_2E (All Sources)	**6,429.52**			
Screening Threshold (CO_2E)	**10,000**			
Threshold Exceeded?	**NO**			

1 INTRODUCTION

This report presents the results of the greenhouse gas analysis (GHGA) prepared by Urban Crossroads, Inc., for the proposed Brodiaea Commerce Center ("Project"). The purpose of this GHGA is to evaluate Project-related construction and operational emissions and determine the level of greenhouse gas (GHG) impacts as a result of constructing and operating the proposed Project.

1.1 SITE LOCATION

The proposed Brodiaea Commerce Center site is located on the northwest corner of Heacock St. and Brodiaea Ave. in the City of Moreno Valley, as shown on Exhibit 1-A. The Project site is bounded by business park-designated land use to the south and west, residential land uses to the east, and commercial land use to the north. The March Air Reserve Base/Inland Port Airport (MARB/IPA) is located approximately a mile southwest of the Project site, and the Interstate 215 (I-215) Freeway is located roughly two miles to the west of the Project site.

1.2 PROJECT DESCRIPTION

The Project is proposed to consist of a 262,398 square feet (sf) High-Cube Warehouse / Distribution Center use within a single building, as shown on Exhibit 1-A. The current site plan shows a total square footage of 261,807 sf, however, the higher square footage was evaluated for the purposes of this analysis in an effort to conduct a conservative analysis. The Project is anticipated to have an Opening Year of 2019[1].

As part of the Project's design, all on-site outdoor cargo handling equipment (CHE) (including yard trucks, hostlers, yard goats, pallet jacks, forklifts, and other on-site equipment) will be powered by non-diesel fueled engines and all on-site indoor forklifts shall be powered by electricity, compressed natural gas, or propane.

The Project site is currently vacant. The City of Moreno Valley's General Plan Land Use designation for the Project site is Business Park/Light Industrial (BP/LI). The land uses and development proposed by the Project are permitted/conditionally permitted under the Project site's current BP/LI Land Use designations. The Project is proposed to consist of a 262,398 square-foot (sf) high-cube warehouse/distribution center use within a single building. As such, the Project's land uses and development are permitted/conditionally permitted under the City General Plan Land Use designations. The Project site is zoned Business Park-Mixed Use (MPX)

[1] The Traffic Impact Analysis (TIA) prepared for the Project evaluates an Opening Year of 2022 since the City of Moreno Valley traffic study guidelines require the Opening Year to be a minimum of 5 years from baseline (2017) conditions. Utilizing a 2019 Opening Year for purposes of this GHGA would generate more emissions than if the Project utilized a 2022 Opening Year consistent with the traffic study because as the analysis year increases, vehicle emission factors would decrease as a result of emissions regulations becoming more stringent. Utilizing a 2019 Opening Year for purposes of the GHGA herein represents a conservative estimate of emissions compared to if a 2022 Opening Year, consistent with the traffic study, were utilized.

with the "Mixed-Use Neighborhood" (MUN) overlay. The Project would change the zoning for this area to Light Industrial (LI) to match the rest of the Project site.

1.3 REGULATORY REQUIREMENTS

The Project would be required to comply with all mandates imposed by the State of California and the South Coast Air Quality Management District aimed at the reduction of air quality emissions. Those that are applicable to the Project and that would assist in the reduction of greenhouse gas emissions are:

- Global Warming Solutions Act of 2006 (AB32) (1)
- Regional GHG Emissions Reduction Targets/Sustainable Communities Strategies (SB 375) (2)
- Pavely Fuel Efficiency Standards (AB1493). Establishes fuel efficiency ratings for new vehicles (3).
- Title 24 California Code of Regulations (California Building Code). Establishes energy efficiency requirements for new construction (4).
- Title 20 California Code of Regulations (Appliance Energy Efficiency Standards). Establishes energy efficiency requirements for appliances (5).
- Title 17 California Code of Regulations (Low Carbon Fuel Standard). Requires carbon content of fuel sold in California to be 10% less by 2020 (6).
- California Water Conservation in Landscaping Act of 2006 (AB1881). Requires local agencies to adopt the Department of Water Resources updated Water Efficient Landscape Ordinance or equivalent by January 1, 2010 to ensure efficient landscapes in new development and reduced water waste in existing landscapes (7).
- Statewide Retail Provider Emissions Performance Standards (SB 1368). Requires energy generators to achieve performance standards for GHG emissions (8).
- Renewable Portfolio Standards (SB 1078). Requires electric corporations to increase the amount of energy obtained from eligible renewable energy resources to 20 percent by 2010 and 33 percent by 2020 (9).

Promulgated regulations that will affect the Project's emissions are accounted for in the Project's GHG calculations provided in this report. In particular, the Pavley Standards, Low Carbon Fuel Standards, and Renewable Portfolio Standards (RPS) will be in effect for the AB 32 target year of 2020, and therefore are accounted for in the Project's emission calculations.

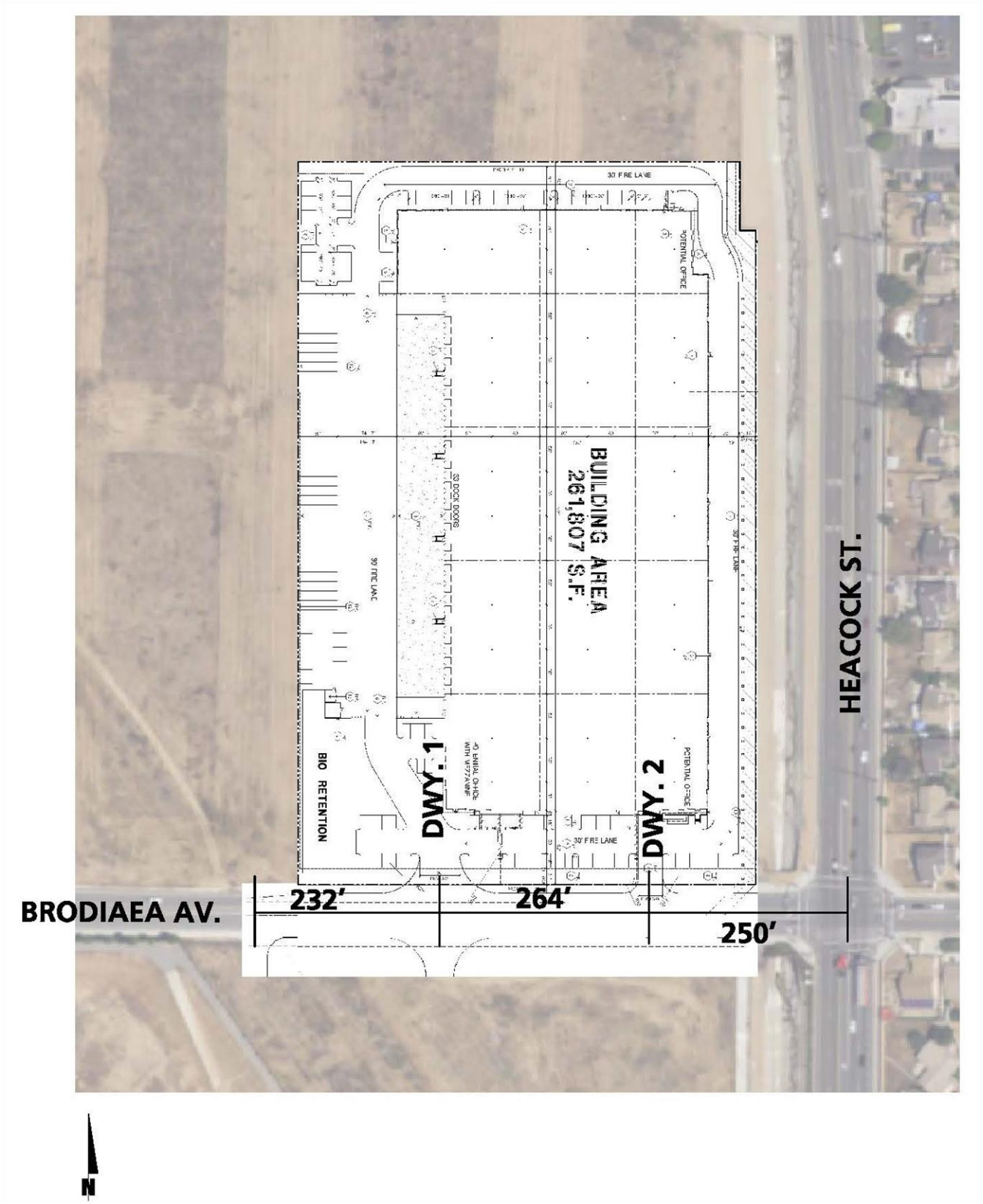
1.4 CONSTRUCTION-SOURCE AIR POLLUTANT EMISSIONS MITIGATION MEASURES

The Project Air Quality Impact Analysis (AQIA) establishes construction activity mitigation measures that would globally reduce air pollutant emissions generated by subsequent development proposals within the Project site. Although these measures could act to reduce GHG emissions, there is insufficient data to support any reductions associated with the construction activity mitigation measures identified in the AQIA. Thus, as a conservative measure no reduction in GHG emissions are taken for construction activity mitigation measures identified in the AQIA.

1.5 OPERATIONAL-SOURCE MITIGATION MEASURES

The Project would not result in a significant impact with respect to greenhouse gas emissions. Therefore, no mitigation measures are proposed.

EXHIBIT 1-A -SITE MAP



2 CLIMATE CHANGE SETTING

2.1 INTRODUCTION TO GLOBAL CLIMATE CHANGE

Global Climate Change (GCC) is defined as the change in average meteorological conditions on the earth with respect to temperature, precipitation, and storms. GCC is currently one of the most controversial environmental issues in the United States, and much debate exists within the scientific community about whether or not GCC is occurring naturally or as a result of human activity. Some data suggests that GCC has occurred in the past over the course of thousands or millions of years. These historical changes to the Earth's climate have occurred naturally without human influence, as in the case of an ice age. However, many scientists believe that the climate shift taking place since the industrial revolution (1900) is occurring at a quicker rate and magnitude than in the past. Scientific evidence suggests that GCC is the result of increased concentrations of greenhouse gases in the earth's atmosphere, including carbon dioxide, methane, nitrous oxide, and fluorinated gases. Many scientists believe that this increased rate of climate change is the result of greenhouse gases resulting from human activity and industrialization over the past 200 years.

An individual project like the proposed Project evaluated in this GHGA cannot generate enough greenhouse gas emissions to affect a discernible change in global climate. However, the proposed Project may participate in the potential for GCC by its incremental contribution of greenhouse gasses combined with the cumulative increase of all other sources of greenhouse gases, which when taken together constitute potential influences on GCC. Because these changes may have serious environmental consequences, Section 3.0 will evaluate the potential for the proposed Project to have a significant effect upon the environment as a result of its potential contribution to the greenhouse effect.

2.2 GREENHOUSE GAS EMISSIONS INVENTORIES

Global

Worldwide anthropogenic (human) GHG emissions are tracked by the Intergovernmental Panel on Climate Change for industrialized nations (referred to as Annex I) and developing nations (referred to as Non-Annex I). Human GHG emissions data for Annex I nations are available through 2015. For the Year 2015, the sum of these emissions totaled approximately 28,872,564 Gg CO2e[2] (10) (11). The GHG emissions in more recent years may differ from the inventories presented in Table 2-1; however, the data is representative of currently available inventory data.

United States

As noted in Table 2-1, the United States, as a single country, was the number two producer of GHG emissions in 2012. The primary greenhouse gas emitted by human activities in the United

[2] The global emissions are the sum of Annex I and non-Annex I countries, without counting Land-Use, Land-Use Change and Forestry (LULUCF). For countries without 2005 data, the UNFCCC data for the most recent year were used. United Nations Framework Convention on Climate Change, "Annex I Parties – GHG total without LULUCF,"

States was CO2, representing approximately 83 percent of total greenhouse gas emissions (12). Carbon dioxide from fossil fuel combustion, the largest source of US greenhouse gas emissions, accounted for approximately 78 percent of the GHG emissions.

TABLE 2-1: TOP GHG PRODUCER COUNTRIES AND THE EUROPEAN UNION [3]

Emitting Countries	GHG Emissions (Gg CO2e)
China	11,895,765
United States	6,586,655
European Union (27 member countries)	4,315,773
India	2,650,954
Russian Federation	2,100,849
Japan	1,322,568
Total	**28,872,564**

State of California

CARB compiles GHG inventories for the State of California. Based upon the 2017 GHG inventory data (i.e., the latest year for which data are available) for the 2000-2015 greenhouse gas emissions inventory, California emitted 440.4 MMTCO2e including emissions resulting from imported electrical power in 2015 (13). Based on the CARB inventory data and GHG inventories compiled by the World Resources Institute, California's total statewide GHG emissions rank second in the United States (Texas is number one) with emissions of 417 MMTCO2e excluding emissions related to imported power (14).

2.3 GLOBAL CLIMATE CHANGE DEFINED

Global Climate Change (GCC) refers to the change in average meteorological conditions on the earth with respect to temperature, wind patterns, precipitation and storms. Global temperatures are regulated by naturally occurring atmospheric gases such as water vapor, CO2 (Carbon Dioxide), N2O (Nitrous Oxide), CH4 (Methane), hydrofluorocarbons, perfluorocarbons and sulfur hexafluoride. These particular gases are important due to their residence time (duration they stay) in the atmosphere, which ranges from 10 years to more than 100 years. These gases allow solar radiation into the Earth's atmosphere, but prevent radioactive heat from escaping, thus warming the Earth's atmosphere. GCC can occur naturally as it has in the past with the previous ice ages. According to the California Air Resources Board (CARB), the climate change since the industrial revolution differs from previous climate changes in both rate and magnitude (15).

Gases that trap heat in the atmosphere are often referred to as greenhouse gases. Greenhouse gases are released into the atmosphere by both natural and anthropogenic (human) activity. Without the natural greenhouse gas effect, the Earth's average temperature would be approximately 61° Fahrenheit (F) cooler than today's current condition. The cumulative

[3] Used http://unfccc.int data for Annex I countries. Consulted the CAIT Climate Data Explorer in http://www.wri.org site to reference Non-Annex I countries such as China and India.

accumulation of these gases in the earth's atmosphere is considered to be the cause for the observed increase in the earth's temperature.

Although California's rate of growth of greenhouse gas emissions is slowing, the state is still a substantial contributor to the U.S. emissions inventory total. In 2004, California is estimated to have produced 492 million gross metric tons of carbon dioxide equivalent (CO2e) greenhouse gas emissions. Despite a population increase of 16 percent between 1990 and 2004, California has significantly slowed the rate of growth of greenhouse gas emissions due to the implementation of energy efficiency programs as well as adoption of strict emission controls (16).

2.4 GREENHOUSE GASES

For the purposes of this analysis, emissions of carbon dioxide, methane, and nitrous oxide were evaluated (see Table 3-4 later in this report) because these gasses are the primary contributors to GCC from development projects. Although other substances such as fluorinated gases also contribute to GCC, sources of fluorinated gases are not well-defined and no accepted emissions factors or methodology exist to accurately calculate these gases.

Greenhouse gases have varying global warming potential (GWP) values; GWP values represent the potential of a gas to trap heat in the atmosphere. Carbon dioxide is utilized as the reference gas for GWP, and thus has a GWP of 1.

The atmospheric lifetime and GWP of selected greenhouse gases are summarized at Table 2-2. As shown in the table below, GWP for the SAR range from 1 for carbon dioxide to 23,900 for sulfur hexafluoride and GWP for the AR4 range from 1 for carbon dioxide to 22,800 for sulfur hexafluoride.

TABLE 2-2: GLOBAL WARMING POTENTIAL AND ATMOSPHERIC LIFETIME OF SELECT GHGS

Gas	Atmospheric Lifetime (years)	Global Warming Potential (100 year time horizon)	
		Second Assessment Report (SAR)	4th Assessment Report (AR4)
Carbon Dioxide	50-200	1	1
Methane	12 ± 3	21	25
Nitrous Oxide	120	310	298
HFC-23	264	11,700	14,800
HFC-134a	14.6	1,300	1,430
HFC-152a	1.5	140	124
Sulfur Hexafluoride (SF6)	3,200	23,900	22,800

Source: Table 2.14 of the IPCC Fourth Assessment Report, 2007

Water Vapor: Water vapor (H20) is the most abundant, important, and variable greenhouse gas in the atmosphere. Water vapor is not considered a pollutant; in the atmosphere it maintains a

climate necessary for life. Changes in its concentration are primarily considered to be a result of climate feedbacks related to the warming of the atmosphere rather than a direct result of industrialization. A climate feedback is an indirect, or secondary, change, either positive or negative, that occurs within the climate system in response to a forcing mechanism. The feedback loop in which water is involved is critically important to projecting future climate change.

As the temperature of the atmosphere rises, more water is evaporated from ground storage (rivers, oceans, reservoirs, soil). Because the air is warmer, the relative humidity can be higher (in essence, the air is able to 'hold' more water when it is warmer), leading to more water vapor in the atmosphere. As a GHG, the higher concentration of water vapor is then able to absorb more thermal indirect energy radiated from the Earth, thus further warming the atmosphere. The warmer atmosphere can then hold more water vapor and so on and so on. This is referred to as a "positive feedback loop." The extent to which this positive feedback loop will continue is unknown as there are also dynamics that hold the positive feedback loop in check. As an example, when water vapor increases in the atmosphere, more of it will eventually also condense into clouds, which are more able to reflect incoming solar radiation (thus allowing less energy to reach the Earth's surface and heat it up).

There are no human health effects from water vapor itself; however, when some pollutants come in contact with water vapor, they can dissolve and the water vapor can then act as a pollutant-carrying agent. The main source of water vapor is evaporation from the oceans (approximately 85 percent). Other sources include: evaporation from other water bodies, sublimation (change from solid to gas) from sea ice and snow, and transpiration from plant leaves.

Carbon Dioxide: Carbon dioxide (CO2) is an odorless and colorless GHG. Outdoor levels of carbon dioxide are not high enough to result in negative health effects. Carbon dioxide is emitted from natural and manmade sources. Natural sources include: the decomposition of dead organic matter; respiration of bacteria, plants, animals and fungus; evaporation from oceans; and volcanic outgassing. Anthropogenic sources include: the burning of coal, oil, natural gas, and wood. Carbon dioxide is naturally removed from the air by photosynthesis, dissolution into ocean water, transfer to soils and ice caps, and chemical weathering of carbonate rocks (17).

Since the industrial revolution began in the mid-1700s, the sort of human activity that increases GHG emissions has increased dramatically in scale and distribution. Data from the past 50 years suggests a corollary increase in levels and concentrations. As an example, prior to the industrial revolution, CO2 concentrations were fairly stable at 280 parts per million (ppm). Today, they are around 370 ppm, an increase of more than 30 percent. Left unchecked, the concentration of carbon dioxide in the atmosphere is projected to increase to a minimum of 540 ppm by 2100 as a direct result of anthropogenic sources (18).

Methane: Methane (CH4) is an extremely effective absorber of radiation, though its atmospheric concentration is less than carbon dioxide and its lifetime in the atmosphere is brief (10-12 years), compared to other GHGs.

Methane has both natural and anthropogenic sources. It is released as part of the biological processes in low oxygen environments, such as in swamplands or in rice production (at the roots of the plants). Over the last 50 years, human activities such as growing rice, raising cattle, using natural gas, and mining coal have added to the atmospheric concentration of methane. Other anthropocentric sources include fossil-fuel combustion and biomass burning.

Nitrous Oxide: Nitrous oxide (N2O), also known as laughing gas, is a colorless greenhouse gas. Nitrous oxide can cause dizziness, euphoria, and sometimes slight hallucinations. In small doses, it is considered harmless. However, in some cases, heavy and extended use can cause Olney's Lesions (brain damage) (19).

Concentrations of nitrous oxide also began to rise at the beginning of the industrial revolution. In 1998, the global concentration was 314 parts per billion (ppb). Nitrous oxide is produced by microbial processes in soil and water, including those reactions which occur in fertilizer containing nitrogen. In addition to agricultural sources, some industrial processes (fossil fuel-fired power plants, nylon production, nitric acid production, and vehicle emissions) also contribute to its atmospheric load. It is used as an aerosol spray propellant, i.e., in whipped cream bottles. It is also used in potato chip bags to keep chips fresh. It is used in rocket engines and in race cars. Nitrous oxide can be transported into the stratosphere, be deposited on the Earth's surface, and be converted to other compounds by chemical reaction

Chlorofluorocarbons: Chlorofluorocarbons (CFCs) are gases formed synthetically by replacing all hydrogen atoms in methane or ethane (C2H6) with chlorine and/or fluorine atoms. CFCs are nontoxic, nonflammable, insoluble and chemically unreactive in the troposphere (the level of air at the Earth's surface). CFCs are no longer being used; therefore, it is not likely that health effects would be experienced. Nonetheless, in confined indoor locations, working with CFC-113 or other CFCs is thought to result in death by cardiac arrhythmia (heart frequency too high or too low) or asphyxiation.

CFCs have no natural source, but were first synthesized in 1928. They were used for refrigerants, aerosol propellants and cleaning solvents. Due to the discovery that they are able to destroy stratospheric ozone, a global effort to halt their production was undertaken and was extremely successful, so much so that levels of the major CFCs are now remaining steady or declining. However, their long atmospheric lifetimes mean that some of the CFCs will remain in the atmosphere for over 100 years.

Hydrofluorocarbons: Hydrofluorocarbons (HFCs) are synthetic, man-made chemicals that are used as a substitute for CFCs. Out of all the greenhouse gases, they are one of three groups with the highest global warming potential. The HFCs with the largest measured atmospheric abundances are (in order), HFC-23 (CHF3), HFC-134a (CF3CH2F), and HFC-152a (CH3CHF2). Prior to 1990, the only significant emissions were of HFC-23. HFC-134a emissions are increasing due to its use as a refrigerant. The U.S. EPA estimates that concentrations of HFC-23 and HFC-134a are now about 10 parts per trillion (ppt) each; and that concentrations of HFC-152a are about 1 ppt (20). No health effects are known to result from exposure to HFCs, which are manmade for applications such as automobile air conditioners and refrigerants.

Perfluorocarbons: Perfluorocarbons (PFCs) have stable molecular structures and do not break down through chemical processes in the lower atmosphere. High-energy ultraviolet rays, which occur about 60 kilometers above Earth's surface, are able to destroy the compounds. Because of this, PFCs have very long lifetimes, between 10,000 and 50,000 years. Two common PFCs are tetrafluoromethane (CF4) and hexafluoroethane (C2F6). The U.S. EPA estimates that concentrations of CF4 in the atmosphere are over 70 ppt.

No health effects are known to result from exposure to PFCs. The two main sources of PFCs are primary aluminum production and semiconductor manufacture.

Sulfur Hexafluoride: Sulfur hexafluoride (SF6) is an inorganic, odorless, colorless, nontoxic, nonflammable gas. It also has the highest GWP of any gas evaluated (22,800). The U.S. EPA indicates that concentrations in the 1990s were about 4 ppt. In high concentrations in confined areas, the gas presents the hazard of suffocation because it displaces the oxygen needed for breathing.

Sulfur hexafluoride is used for insulation in electric power transmission and distribution equipment, in the magnesium industry, in semiconductor manufacturing, and as a tracer gas for leak detection.

2.5 EFFECTS OF CLIMATE CHANGE IN CALIFORNIA

Public Health

Higher temperatures may increase the frequency, duration, and intensity of conditions conducive to air pollution formation. For example, days with weather conducive to ozone formation could increase from 25 to 35 percent under the lower warming range (3-5.5°F) to 75 to 85 percent under the medium warming range (5.5-8°F). In addition, if global background ozone levels increase as predicted in some scenarios, it may become impossible to meet local air quality standards. Air quality could be further compromised by increases in wildfires, which emit fine particulate matter that can travel long distances, depending on wind conditions. The Climate Scenarios report indicates that large wildfires could become up to 55 percent more frequent if GHG emissions are not significantly reduced.

In addition, under the higher warming range scenario (8-10.5°F), there could be up to 100 more days per year with temperatures above 90oF in Los Angeles and 95oF in Sacramento by 2100. This is a large increase over historical patterns and approximately twice the increase projected if temperatures remain within or below the lower warming range. Rising temperatures could increase the risk of death from dehydration, heat stroke/exhaustion, heart attack, stroke, and respiratory distress caused by extreme heat.

Water Resources

A vast network of man-made reservoirs and aqueducts captures and transports water throughout the state from northern California rivers and the Colorado River. The current distribution system relies on Sierra Nevada snowpack to supply water during the dry spring and summer months.

Rising temperatures, potentially compounded by decreases in precipitation, could severely reduce spring snowpack, increasing the risk of summer water shortages.

If temperatures continue to increase, more precipitation could fall as rain instead of snow, and the snow that does fall could melt earlier, reducing the Sierra Nevada spring snowpack by as much as 70 to 90 percent. Under the lower warming range scenario, snowpack losses could be only half as large as those possible if temperatures were to rise to the higher warming range. How much snowpack could be lost depends in part on future precipitation patterns, the projections for which remain uncertain. However, even under the wetter climate projections, the loss of snowpack could pose challenges to water managers and hamper hydropower generation. It could also adversely affect winter tourism. Under the lower warming range, the ski season at lower elevations could be reduced by as much as a month. If temperatures reach the higher warming range and precipitation declines, there might be many years with insufficient snow for skiing and snowboarding.

The State's water supplies are also at risk from rising sea levels. An influx of saltwater could degrade California's estuaries, wetlands, and groundwater aquifers. Saltwater intrusion caused by rising sea levels is a major threat to the quality and reliability of water within the southern edge of the Sacramento/San Joaquin River Delta – a major fresh water supply.

Agriculture

Increased temperatures could cause widespread changes to the agriculture industry reducing the quantity and quality of agricultural products statewide. First, California farmers could possibly lose as much as 25 percent of the water supply they need. Although higher CO2 levels can stimulate plant production and increase plant water-use efficiency, California's farmers could face greater water demand for crops and a less reliable water supply as temperatures rise. Crop growth and development could change, as could the intensity and frequency of pest and disease outbreaks. Rising temperatures could aggravate O3 pollution, which makes plants more susceptible to disease and pests and interferes with plant growth.

Plant growth tends to be slow at low temperatures, increasing with rising temperatures up to a threshold. However, faster growth can result in less-than-optimal development for many crops, so rising temperatures could worsen the quantity and quality of yield for a number of California's agricultural products. Products likely to be most affected include wine grapes, fruits and nuts.

In addition, continued global climate change could shift the ranges of existing invasive plants and weeds and alter competition patterns with native plants. Range expansion could occur in many species while range contractions may be less likely in rapidly evolving species with significant populations already established. Should range contractions occur, new or different weed species could fill the emerging gaps. Continued global climate change could alter the abundance and types of many pests, lengthen pests' breeding season, and increase pathogen growth rates.

Forests and Landscapes

Global climate change has the potential to intensify the current threat to forests and landscapes by increasing the risk of wildfire and altering the distribution and character of natural vegetation.

If temperatures rise into the medium warming range, the risk of large wildfires in California could increase by as much as 55 percent, which is almost twice the increase expected if temperatures stay in the lower warming range. However, since wildfire risk is determined by a combination of factors, including precipitation, winds, temperature, and landscape and vegetation conditions, future risks will not be uniform throughout the state. In contrast, wildfires in northern California could increase by up to 90 percent due to decreased precipitation.

Moreover, continued global climate change has the potential to alter natural ecosystems and biological diversity within the state. For example, alpine and subalpine ecosystems could decline by as much as 60 to 80 percent by the end of the century as a result of increasing temperatures. The productivity of the state's forests has the potential to decrease as a result of global climate change.

Rising Sea Levels

Rising sea levels, more intense coastal storms, and warmer water temperatures could increasingly threaten the state's coastal regions. Under the higher warming range scenario, sea level is anticipated to rise 22 to 35 inches by 2100. Elevations of this magnitude would inundate low-lying coastal areas with salt water, accelerate coastal erosion, threaten vital levees and inland water systems, and disrupt wetlands and natural habitats. Under the lower warming range scenario, sea level could rise 12-14 inches.

2.6 HUMAN HEALTH EFFECTS

The potential health effects related directly to the emissions of carbon dioxide, methane, and nitrous oxide as they relate to development projects such as the proposed Project are still being debated in the scientific community. Their cumulative effects to global climate change have the potential to cause adverse effects to human health. Increases in Earth's ambient temperatures would result in more intense heat waves, causing more heat-related deaths. Scientists also purport that higher ambient temperatures would increase disease survival rates and result in more widespread disease. Climate change will likely cause shifts in weather patterns, potentially resulting in devastating droughts and food shortages in some areas (21). Exhibit 2-A presents the potential impacts of global warming.

Specific health effects associated with directly emitted GHG emissions are as follows:

Water Vapor: There are no known direct health effects related to water vapor at this time. It should be noted however that when some pollutants react with water vapor, the reaction forms a transport mechanism for some of these pollutants to enter the human body through water vapor.

Carbon Dioxide: According to the National Institute for Occupational Safety and Health (NIOSH) high concentrations of carbon dioxide can result in health effects such as: headaches, dizziness, restlessness, difficulty breathing, sweating, increased heart rate, increased cardiac output, increased blood pressure, coma, asphyxia, and/or convulsions. It should be noted that current concentrations of carbon dioxide in the earth's atmosphere are estimated to be approximately 370 parts per million (ppm), the actual reference exposure level (level at which adverse health

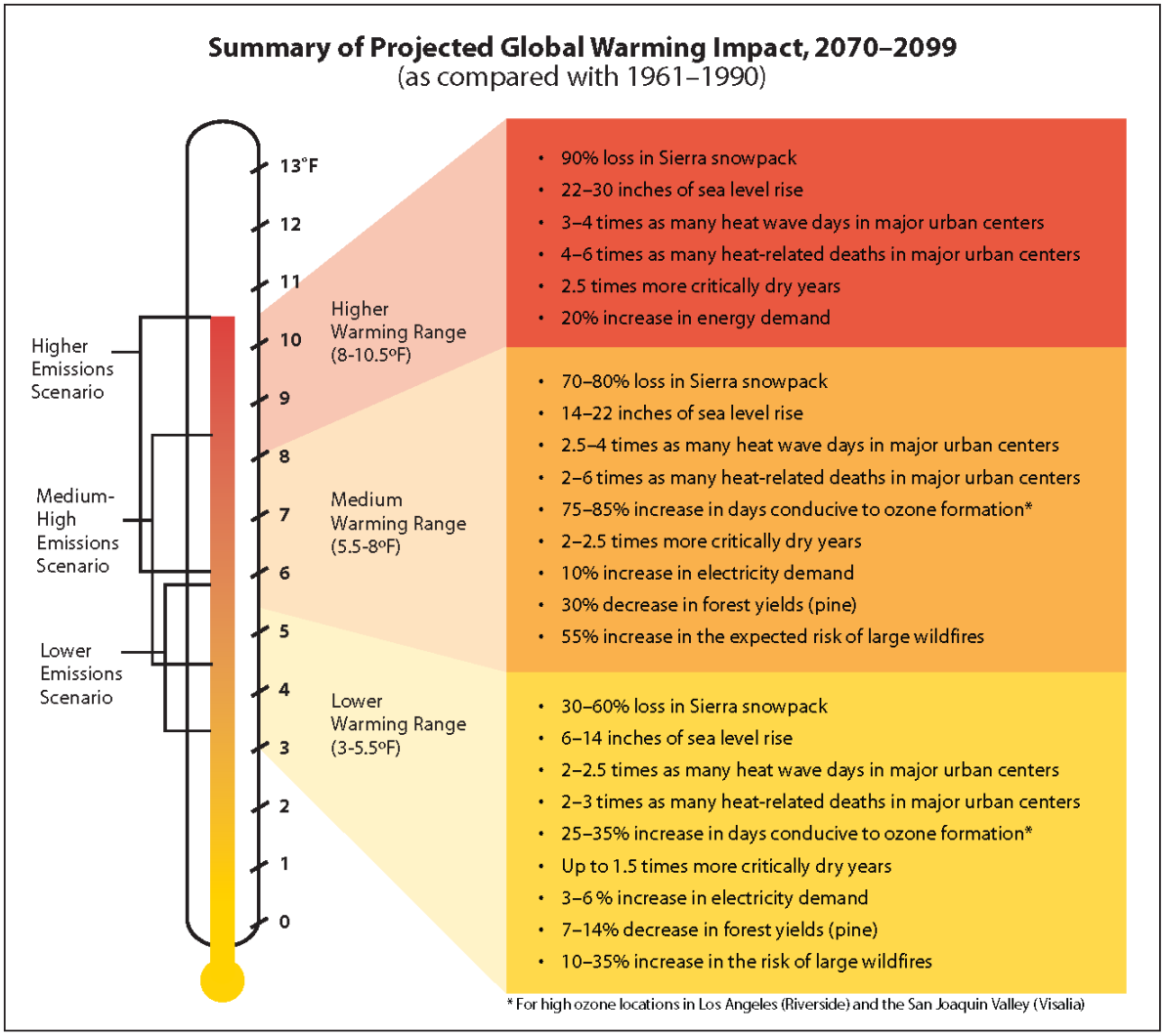
effects typically occur) is at exposure levels of 5,000 ppm averaged over 10 hours in a 40-hour workweek and short-term reference exposure levels of 30,000 ppm averaged over a 15 minute period (22).

Methane: Methane is extremely reactive with oxidizers, halogens, and other halogen-containing compounds. Methane is also an asphyxiant and may displace oxygen in an enclosed space (23).

Nitrous Oxide: Nitrous Oxide is often referred to as laughing gas; it is a colorless greenhouse gas. The health effects associated with exposure to elevated concentrations of nitrous oxide include dizziness, euphoria, slight hallucinations, and in extreme cases of elevated concentrations nitrous oxide can also cause brain damage (23).

Fluorinated Gases: High concentrations of fluorinated gases can also result in adverse health effects such as asphyxiation, dizziness, headache, cardiovascular disease, cardiac disorders, and in extreme cases, increased mortality (22).

EXHIBIT 2-A: SUMMARY OF PROJECTED GLOBAL WARMING IMPACT



Aerosols: The health effects of aerosols are similar to that of other fine particulate matter. Thus aerosols can cause elevated respiratory and cardiovascular diseases as well as increased mortality (24).

2.7 REGULATORY SETTING

International Regulation and the Kyoto Protocol:

In 1988, the United Nations established the Intergovernmental Panel on Climate Change to evaluate the impacts of global warming and to develop strategies that nations could implement to curtail global climate change. In 1992, the United States joined other countries around the world in signing the United Nations' Framework Convention on Climate Change (UNFCCC) agreement with the goal of controlling greenhouse gas emissions. As a result, the Climate Change Action Plan was developed to address the reduction of GHGs in the United States. The Plan currently consists of more than 50 voluntary programs for member nations to adopt.

The Kyoto protocol is a treaty made under the UNFCCC and was the first international agreement to regulate GHG emissions. Some have estimated that if the commitments outlined in the Kyoto protocol are met, global GHG emissions could be reduced an estimated five percent from 1990 levels during the first commitment period of 2008-2012. Notably, while the United States is a signatory to the Kyoto protocol, Congress has not ratified the Protocol and the United States is not bound by the Protocol's commitments. In December 2009, international leaders from 192 nations met in Copenhagen to address the future of international climate change commitments post-Kyoto.

2015 United Nations Paris Climate Change Conference

On December 12, 2015, which marks the 11th meeting of the Parties to the Kyoto Protocol, 195 nations, including the United States and China, agreed upon a strategy for combatting global climate change to be in effect in 2020. This historic meeting, known as the 21st annual Conference of the Parties (COP21), focused on five key elements: mitigation, a transparency system and global stock-take, adaptation, loss and damage, and support.

In mitigating global climate change, COP 21 participating nations agreed upon a universal long-term goal of keeping the global temperature to well below 2°C or 3.6°F well above pre-industrial levels. The agreement also encouraged participating nations to limit temperature increases even further to 1.5°C or 2.7°F above pre-industrial levels. In addition to that, nations agreed to peak their GHG emissions as soon as possible, with the recognition that developing countries may take longer than developed countries. Thereafter, nations are to undergo rapid reductions in accordance to best available technological advances. The nations are to submit national climate action plans that detail future objectives to address climate change.

In supporting a transparency system and global stock-take, the participating nations agreed to meet every 5 years to set more ambitious targets on global climate change as technologically feasible. The nations are to report to each other and to the public on their progress towards implementing targets and goals through a transparency and accountability system.

In adaptation, participating nations are to strengthen the ability of nations to deal with climate impacts and provide continued international support for adaptation to developing countries.

In supporting loss and damage, participating nations understand the importance of minimizing and addressing the loss and damage associated with adverse effects of global climate change. These nations acknowledge the need to cooperate with each other and support each other through safeguards, such as early warning systems, emergency preparedness, and risk insurance.

Participating nations are to support each other in their efforts to fight against global climate change. Developed countries within the COP21 are to continue their existing collective goal of utilizing 100 billion per year in support of the poorest and most vulnerable participating nations, known as climate finance, until 2025, when a new collective goal will be set (25) (26).

In accordance with Article 21, paragraph 1, of the Paris Agreement, the Agreement shall enter into force on the thirtieth day after the date on which at least 55 Parties to the COP21 accounting in total for at least an estimated 55% of the total global greenhouse gas emissions have deposited their instruments of ratification, acceptance, approval, or accession with the Depositary.

On October 5, 2016, the threshold for entry into force of the Paris Agreement was achieved. The Paris Agreement will enter into force on November 4, 2016 (27).

Federal Regulation and the Clean Air Act:

Coinciding 2009 meeting in Copenhagen, on December 7, 2009, the U.S. Environmental Protection Agency (EPA) issued an Endangerment Finding under Section 202(a) of the Clean Air Act, opening the door to federal regulation of GHGs. The Endangerment Finding notes that GHGs threaten public health and welfare and are subject to regulation under the Clean Air Act. To date, the EPA has not promulgated regulations on GHG emissions, but it has already begun to develop them.

Previously the EPA had not regulated GHGs under the Clean Air Act (28) because it asserted that the Act did not authorize it to issue mandatory regulations to address global climate change and that such regulation would be unwise without an unequivocally established causal link between GHGs and the increase in global surface air temperatures. In Massachusetts v. Environmental Protection Agency et al. (127 S. Ct. 1438 (2007), however, the U.S. Supreme Court held that GHGs are pollutants under the Clean Air Act and directed the EPA to decide whether the gases endangered public health or welfare. The EPA had also not moved aggressively to regulate GHGs because it expected Congress to make progress on GHG legislation, primarily from the standpoint of a cap-and-trade system. However, proposals circulated in both the House of Representative and Senate have been controversial and it may be some time before the U.S. Congress adopts major climate change legislation. The EPA's Endangerment Finding paves the way for federal regulation of GHGs with or without Congress.

Although global climate change did not become an international concern until the 1980s, efforts to reduce energy consumption began in California in response to the oil crisis in the 1970s, resulting in the unintended reduction of greenhouse gas emissions. In order to manage the

state's energy needs and promote energy efficiency, AB 1575 created the California Energy Commission (CEC) in 1975.

Title 24 Energy Standards:

The California Energy Commission (CEC) first adopted Energy Efficiency Standards for Residential and Nonresidential Buildings (29) in 1978 in response to a legislative mandate to reduce energy consumption in the state. Although not originally intended to reduce GHG emissions, increased energy efficiency, and reduced consumption of electricity, natural gas, and other fuels would result in fewer GHG emissions from residential and nonresidential buildings subject to the standard. The standards are updated periodically to allow for the consideration and inclusion of new energy efficiency technologies and methods. The Energy Commission's most recent standard, 2013 Building Energy Efficiency Standard, is 25 percent more efficient than previous standards for residential construction and 30 percent better for nonresidential construction. The Standards, which took effect on July 1, 2014, offer builders better windows, insulation, lighting, ventilation systems and other features that reduce energy consumption in homes and businesses. Some improved measures in the Standards include:

Residential:

- Solar-ready roofs to allow homeowners to add solar photovoltaic panels at a future date
- More efficient windows to allow increased sunlight, while decreasing heat gain
- Insulated hot water pipes, to save water and energy and reduce the time it takes to deliver hot water
- Whole house fans to cool homes and attics with evening air reducing the need for air conditioning load
- Air conditioner installation verification to insure efficient operation

Nonresidential:

- High performance windows, sensors and controls that allow buildings to use "daylighting"
- Efficient process equipment in supermarkets, computer data centers, commercial kitchens, laboratories, and parking garages
- Advanced lighting controls to synchronize light levels with daylight and building occupancy, and provide demand response capability
- Solar-ready roofs to allow businesses to add solar photovoltaic panels at a future date
- Cool roof technologies

It should be noted that the 2016 Building Energy Efficiency Standards were released in June 2015. The 2016 Standards, which will take effect on January 1, 2017, will continue to improve upon the 2013 Standards for new construction of and additions and alterations to residential and nonresidential buildings. The Impact Analysis for the 2016 Standards, which estimates the percent savings for residential and nonresidential buildings from the previous Standards, have not yet been released. As such, the 2013 Title 24 Standards are utilized in the report.

CALGreen:

Part 11 of the Title 24 Building Standards Code is referred to as the California Green Building Standards Code (CALGreen Code) (30). The purpose of the CALGreen Code is to "improve public health, safety and general welfare by enhancing the design and construction of buildings through the use of building concepts having a positive environmental impact and encouraging sustainable construction practices in the following categories: (1) Planning and design; (2) Energy efficiency; (3) Water efficiency and conservation; (4) Material conservation and resource efficiency; and (5) Environmental air quality." The CALGreen Code is not intended to substitute or be identified as meeting the certification requirements of any green building program that is not established and adopted by the California Building Standards Commission (CBSC). The CBSC has released the 2010 California Green Building Standards Code on its Web site. Unless otherwise noted in the regulation, all newly constructed buildings in California are subject of the requirements of the CALGreen Code.

CALGreen contains both mandatory and voluntary measures, for Non-Residential land uses there are 39 mandatory measures including, but not limited to: exterior light pollution reduction, wastewater reduction by 20%, and commissioning of projects over 10,000 sf. There are two tiers of voluntary measures for Non-Residential land uses for a total of 36 additional elective measures.

The 2013 CALGreen includes additions and amendments to the water efficiency standards for non residential buildings in order to comply with the reduced flow rate table. The 2013 CALGreen has also been rewritten to clarify and definitively identify the requirements and applicability for residential and nonresidential buildings.

California Assembly Bill No. 1493 (AB 1493):

AB 1493 requires CARB to develop and adopt the nation's first greenhouse gas emission standards for automobiles. The Legislature declared in AB 1493 that global warming was a matter of increasing concern for public health and environment in California (3). Further, the legislature stated that technological solutions to reduce greenhouse gas emissions would stimulate the California economy and provide jobs.

To meet the requirements of AB 1493, ARB approved amendments to the California Code of Regulations (CCR) adding GHG emission standards to California's existing motor vehicle emission standards in 2004. Amendments to CCR Title 13 Sections 1900 (CCR 13 1900) and 1961 (CCR 13 1961) and adoption of Section 1961.1 (CCR 13 1961.1) require automobile manufacturers to meet fleet average GHG emission limits for all passenger cars, light-duty trucks within various weight criteria, and medium-duty passenger vehicle weight classes beginning with the 2009 model year. Emission limits are further reduced each model year through 2016.

In December 2004 a group of car dealerships, automobile manufacturers, and trade groups representing automobile manufacturers filed suit against ARB to prevent enforcement of CCR 13 1900 and CCR 13 1961 as amended by AB 1493 and CCR 13 1961.1 (Central Valley Chrysler-Jeep et al. v. Catherine E. Witherspoon, in her official capacity as Executive Director of the California Air Resources Board, et al.). The suit, heard in the U.S. District Court for the Eastern District of

California, contended that California's implementation of regulations that in effect regulate vehicle fuel economy violates various federal laws, regulations, and policies. In January 2007, the judge hearing the case accepted a request from the State Attorney General's office that the trial be postponed until a decision is reached by the U.S. Supreme Court on a separate case addressing GHGs. In the Supreme Court Case, Massachusetts vs. EPA, the primary issue in question is whether the federal CAA provides authority for USEPA to regulate CO2 emissions. In April 2007, the U.S. Supreme Court ruled in Massachusetts' favor, holding that GHGs are air pollutants under the CAA. On December 11, 2007, the judge in the Central Valley Chrysler-Jeep case rejected each plaintiff's arguments and ruled in California's favor. On December 19, 2007, the USEPA denied California's waiver request. California filed a petition with the Ninth Circuit Court of Appeals challenging USEPA's denial on January 2, 2008.

The Obama administration subsequently directed the USEPA to re-examine their decision. On May 19, 2009, challenging parties, automakers, the State of California, and the federal government reached an agreement on a series of actions that would resolve these current and potential future disputes over the standards through model year 2016. In summary, the USEPA and the U.S. Department of Transportation agreed to adopt a federal program to reduce GHGs and improve fuel economy, respectively, from passenger vehicles in order to achieve equivalent or greater greenhouse gas benefits as the AB 1493 regulations for the 2012–2016 model years. Manufacturers agreed to ultimately drop current and forego similar future legal challenges, including challenging a waiver grant, which occurred on June 30, 2009. The State of California committed to (1) revise its standards to allow manufacturers to demonstrate compliance with the fleet-average GHG emission standard by "pooling" California and specified State vehicle sales; (2) revise its standards for 2012–2016 model year vehicles so that compliance with USEPA-adopted GHG standards would also comply with California's standards; and (3) revise its standards, as necessary, to allow manufacturers to use emissions data from the federal CAFE program to demonstrate compliance with the AB 1493 regulations (CARB 2009, http://www.arb.ca.gov/regact/2009/ghgpv09/ghgpvisor.pdf) both of these programs are aimed at light-duty auto and light-duty trucks.

Executive Order S-3-05:

Executive Order S-3-05, which was signed by Governor Schwarzenegger in 2005, proclaims that California is vulnerable to the impacts of climate change (31). It declares that increased temperatures could reduce the Sierra's snowpack, further exacerbate California's air quality problems, and potentially cause a rise in sea levels. To combat those concerns, the Executive Order established total greenhouse gas emission targets. Specifically, emissions are to be reduced to the 1990 level by 2020, and to 80% below the 1990 level by 2050. The Executive Order directed the Secretary of the California Environmental Protection Agency (CalEPA) to coordinate a multi-agency effort to reduce greenhouse gas emissions to the target levels. The Secretary also is required to submit biannual reports to the Governor and state Legislature describing: (1) progress made toward reaching the emission targets; (2) impacts of global warming on California's resources; and (3) mitigation and adaptation plans to combat these impacts. To comply with the Executive Order, the Secretary of the CalEPA created a Climate Action Team (CAT) made up of members from various state agencies and commission. CAT released its first

report in March 2006. The report proposed to achieve the targets by building on voluntary actions of California businesses, local government and community actions, as well as through state incentive and regulatory programs.

California Assembly Bill 32 (AB 32):

In September 2006, Governor Arnold Schwarzenegger signed AB 32, the California Climate Solutions Act of 2006. AB 32 requires that statewide GHG emissions be reduced to 1990 levels by the year 2020 (1). This reduction will be accomplished through an enforceable statewide cap on GHG emissions that will be phased in starting in 2012. To effectively implement the cap, AB 32 directs CARB to develop and implement regulations to reduce statewide GHG emissions from stationary sources. AB 32 specifies that regulations adopted in response to AB 1493 should be used to address GHG emissions from vehicles. However, AB 32 also includes language stating that if the AB 1493 regulations cannot be implemented, then CARB should develop new regulations to control vehicle GHG emissions under the authorization of AB 32.

AB 32 requires that CARB adopt a quantified cap on GHG emissions representing 1990 emissions levels and disclose how it arrives at the cap; institute a schedule to meet the emissions cap; and develop tracking, reporting, and enforcement mechanisms to ensure that the state achieves reductions in GHG emissions necessary to meet the cap. AB 32 also includes guidance to institute emissions reductions in an economically efficient manner and conditions to ensure that businesses and consumers are not unfairly affected by the reductions.

In November 2007, CARB completed its estimates of 1990 GHG levels. Net emission 1990 levels were estimated at 427 MMTs (emission sources by sector were: transportation – 35 percent; electricity generation – 26 percent; industrial – 24 percent; residential – 7 percent; agriculture – 5 percent; and commercial – 3 percent). Accordingly, 427 MMTs of CO2 equivalent was established as the emissions limit for 2020. For comparison, CARB's estimate for baseline GHG emissions was 473 MMT for 2000 and 532 MMT for 2010. "Business as usual" conditions (without the 28.4 percent reduction to be implemented by CARB regulations) for 2020 were projected to be 596 MMTs.

In December 2007, CARB approved a regulation for mandatory reporting and verification of GHG emissions for major sources. This regulation covered major stationary sources such as cement plants, oil refineries, electric generating facilities/providers, and co-generation facilities, which comprise 94 percent of the point source CO2 emissions in the State.

On December 11, 2008, CARB adopted a scoping plan to reduce GHG emissions to 1990 levels. The Scoping Plan's recommendations for reducing GHG emissions to 1990 levels by 2020 include emission reduction measures, including a cap-and-trade program linked to Western Climate Initiative partner jurisdictions, green building strategies, recycling and waste-related measures, as well as Voluntary Early Actions and Reductions. Implementation of individual measures must begin no later than January 1, 2012, so that the emissions reduction target can be fully achieved by 2020.

Table 2-3 shows the proposed reductions from regulations and programs outlined in the Scoping Plan. While local government operations were not accounted for in achieving the 2020 emissions reduction,

local land use changes are estimated to result in a reduction of 5 MMTons of CO2e, which is approximately 3 percent of the 2020 GHG emissions reduction goal. In recognition of the critical role local governments will play in successful implementation of AB 32, CARB is recommending GHG reduction goals of 15 percent of 2006 levels by 2020 to ensure that municipal and community-wide emissions match the state's reduction target. According to the Measure Documentation Supplement to the Scoping Plan, local government actions and targets are anticipated to reduce vehicle miles by approximately 2 percent through land use planning, resulting in a potential GHG reduction of 2 MMTons tons of CO2e (or approximately 1.2 percent of the GHG reduction target).

Overall, CARB determined that achieving the 1990 emission level in 2020 would require a reduction in GHG emissions of approximately 28.5 percent in the absence of new laws and regulations (referred to as "Business-As-Usual" [BAU]). The Scoping Plan evaluates opportunities for sector-specific reductions, integrates all CARB and California Climate Action Team early actions and additional GHG reduction measures, identifies additional measures to be pursued as regulations, and outlines the role of the cap-and-trade program.

In connection with its preparation of the August 2011 Final Supplement to the Scoping Plan's Functional Equivalent Document, CARB released revised estimates of the 2020 emissions level projection in light of the economic recession and the availability of updated information from development of measure-specific regulations. Based on the new economic data, CARB determined the 2020 emissions level projection in the BAU condition would be reduced from 596 metric tons of CO2 equivalent (MTCO2e) to 545 MTCO2e. (32) Under this scenario, achieving the 1990 emissions level in 2020 would require a reduction of GHG emissions of 118 MTCO2e, or 21.7 percent (down from 28.5 percent), from the BAU condition.

When the 2020 emissions level projection also was updated to account for implemented regulatory measures, including Pavley (vehicle model-years 2009 - 2016) and the renewable portfolio standard (12% - 20%), the 2020 projection in the BAU condition was reduced further to 507 MTCO2e. As a result, based on the updated economic and regulatory data, CARB determined that achieving the 1990 emissions level in 2020 would now only require a reduction of GHG emissions of 80 MTCO2e, or approximately 16 percent (down from 28.5 percent), from the BAU condition. (32) (33)

On February 10, 2014, CARB released a Draft Proposed First Update of the Scoping Plan. The draft recalculates 1990 GHG emissions using new global warming potentials identified in the IPCC Fourth Assessment Report released in 2007. Using those GWPs, the 427 MTCO2e 1990 emissions level and 2020 GHG emissions limit identified in the 2008 Scoping Plan would be slightly higher, at 431 MTCO2e. (34) Based on the revised 2020 emissions level projection identified in the 2011 Final Supplement and the updated 1990 emissions levels identified in the discussion draft of the First Update, achieving the 1990 emissions level in 2020 would require a reduction of 78 MTCO2e (down from 509 MTCO2e), or approximately 15.3 percent (down from 28.5 percent), from the BAU condition. (32) (33) (34)

TABLE 2-3: SCOPING PLAN GHG REDUCTION MEASURES TOWARDS 2020 TARGET

Recommended Reduction Measures	*Reductions Counted toward 2020 Target of 169 MMT CO2e*	*Percentage of Statewide 2020 Target*
Cap and Trade Program and Associated Measures		
California Light-Duty Vehicle GHG Standards	31.7	19%
Energy Efficiency	26.3	16%
Renewable Portfolio Standard (33 percent by 2020)	21.3	13%
Low Carbon Fuel Standard	15	9%
Regional Transportation-Related GHG Targets[1]	5	3%
Vehicle Efficiency Measures	4.5	3%
Goods Movement	3.7	2%
Million Solar Roofs	2.1	1%
Medium/Heavy Duty Vehicles	1.4	1%
High Speed Rail	1.0	1%
Industrial Measures	0.3	0%
Additional Reduction Necessary to Achieve Cap	34.4	20%
Total Cap and Trade Program Reductions	146.7	87%
Uncapped Sources/Sectors Measures		
High Global Warming Potential Gas Measures	20.2	12%
Sustainable Forests	5	3%
Industrial Measures (for sources not covered under cap and trade program)	1.1	1%
Recycling and Waste (landfill methane capture)	1	1%
Total Uncapped Sources/Sectors Reductions	27.3	16%
Total Reductions Counted toward 2020 Target	174	100%
Other Recommended Measures – Not Counted toward 2020 Target		
State Government Operations	1.0 to 2.0	1%
Local Government Operations	To Be Determined[2]	NA
Green Buildings	26	15%
Recycling and Waste	9	5%
Water Sector Measures	4.8	3%
Methane Capture at Large Dairies	1	1%
Total Other Recommended Measures – Not Counted toward 2020 Target	42.8	NA

Source: CARB. 2008, MMTons CO2e: million metric tons of CO2e
[1]Reductions represent an estimate of what may be achieved from local land use changes. It is not the SB 375 regional target.
[2]According to the Measure Documentation Supplement to the Scoping Plan, local government actions and targets are anticipated to reduce vehicle miles by approximately 2 percent through land use planning, resulting in a potential GHG reduction of 2 million metric tons of CO2e (or approximately 1.2 percent of the GHG reduction target). However, these reductions were not included in the Scoping Plan reductions to achieve the 2020 Target

Although CARB has released an update to the Scoping Plan and reduction targets from BAU, it is still appropriate to utilize the previous 28.5% reduction from BAU since the modeling tools available are not able to easily segregate the inclusion of the renewable portfolio standards, and Pavley requirements that are now included in the revised BAU scenario.

California Senate Bill No. 1368 (SB 1368):

In 2006, the State Legislature adopted Senate Bill 1368 ("SB 1368"), which was subsequently signed into law by the Governor (8). SB 1368 directs the California Public Utilities Commission ("CPUC") to adopt a greenhouse gas emission performance standard ("EPS") for the future power purchases of California utilities. SB 1368 seeks to limit carbon emissions associated with electrical energy consumed in California by forbidding procurement arrangements for energy longer than five years from resources that exceed the emissions of a relatively clean, combined cycle natural gas power plant. Due to the carbon content of its fuel source, a coal-fired plant cannot meet this standard because such plants emit roughly twice as much carbon as natural gas, combined cycle plants.

Accordingly, the new law will effectively prevent California's utilities from investing in, otherwise financially supporting, or purchasing power from new coal plants located in or out of the State. Thus, SB 1368 will lead to dramatically lower greenhouse gas emissions associated with California energy demand, as SB 1368 will effectively prohibit California utilities from purchasing power from out of state producers that cannot satisfy the EPS standard required by SB 1368.

CEQA Guidelines

CEQA Guideline § 15064.4(a) “A lead agency shall have discretion to determine, in the context of a particular project, whether to: 1. Use a model or methodology to quantify greenhouse gas emissions resulting from a project, and which model or methodology to use . . .; or 2. Rely on a qualitative analysis or performance based standards.”

Also amended were CEQA Guidelines Sections 15126.4 and 15130, which address mitigation measures and cumulative impacts respectively. Greenhouse gas mitigation measures are referenced in general terms, but no specific measures are championed. The revision to the cumulative impact discussion requirement (Section 15130) simply directs agencies to analyze greenhouse gas emissions in an EIR when a Project’s incremental contribution of emissions may be cumulatively considerable, however it does not answer the question of when emission are cumulatively considerable.

Section 15183.5 permits programmatic greenhouse gas analysis and later project-specific tiering, as well as the preparation of Greenhouse Gas Reduction Plans. Compliance with such plans can support determination that a Project’s cumulative effect is not cumulatively considerable, according to proposed Section 15183.5(b).

CEQA emphasizes that the effects of greenhouse gas emissions are cumulative, and should be analyzed in the context of CEQA's requirements for cumulative impacts analysis. (See CEQA Guidelines Section 15130(f)).

Section 15064.4(b) of the CEQA Guidelines provides direction for lead agencies for assessing the significance of impacts of greenhouse gas emissions:

1. The extent to which the project may increase or reduce greenhouse gas emissions as compared to the existing environmental setting;

2. Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project; or
3. The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions. Such regulations or requirements must be adopted by the relevant public agency through a public review process and must include specific requirements that reduce or mitigate the project's incremental contribution of greenhouse gas emissions. If there is substantial evidence that the possible effects of a particular project are still cumulatively considerable notwithstanding compliance with the adopted regulations or requirements, an EIR must be prepared for the project.

Executive Order S-01-07:

On January 18, 2007 California Governor Arnold Schwarzenegger, through Executive Order S-01-07, mandated a statewide goal to reduce the carbon intensity of California's transportation fuel by at least ten percent by 2020 (35). The order also requires that a California specific Low Carbon Fuel Standard be established for transportation fuels.

Senate Bills 1078 and 107 and Executive Order S-14-08:

SB 1078 (Chapter 516, Statutes of 2002) requires retail sellers of electricity, including investor-owned utilities and community choice aggregators, to provide at least 20% of their supply from renewable sources by 2017 (36). SB 107 (Chapter 464, Statutes of 2006) changed the target date to 2010 (35). In November 2008 Governor Schwarzenegger signed Executive Order S-14-08, which expands the state's Renewable Energy Standard to 33% renewable power by 2020 (37).

Executive Order B-30-15:

On April 29, 2015, Governor Edmund G. Brown Jr. issued an executive order to establish a California greenhouse gas reduction target of 40 percent below 1990 levels by 2030. The Governor's executive order aligns California's greenhouse gas reduction targets with those of leading international governments ahead of the United Nations Climate Change Conference in Paris late 2015. The executive order sets a new interim statewide greenhouse gas emission reduction target to reduce greenhouse gas emissions to 40 percent below 1990 levels by 2030 in order to ensure California meets its target of reducing greenhouse gas emissions to 80 percent below 1990 levels by 2050 and directs the ARB to update the Climate Change Scoping Plan to express the 2030 target in terms of million metric tons of CO2 equivalent (MMCO2e). The executive order also requires the state's climate adaptation plan to be updated every three years and for the state to continue its climate change research program, among other provisions. As with Executive Order S-3-05, this executive order is not legally enforceable for local governments and the private sector. Legislation that would update AB 32 to make post 2020 targets and requirements a mandate is in process in the State Legislature.

Senate Bill 32:

On September 8, 2016, Governor Jerry Brown signed the Senate Bill (SB) 32 and its companion bill, Assembly Bill (AB) 197. SB 32 requires the state to reduce statewide greenhouse gas

emissions to 40% below 1990 levels by 2030, a reduction target that was first introduced in Executive Order B-30-15. The new legislation builds upon the AB 32 goal of 1990 levels by 2020 and provides an intermediate goal to achieving S-3-05, which sets a statewide greenhouse gas reduction target of 80% below 1990 levels by 2050 (38) (39).

According to research conducted by the Lawrence Berkeley National Laboratory and supported by the CARB, California, under its existing and proposed GHG reduction policies, is on track to meet the 2020 reduction targets under AB 32 and could achieve the 2030 goals under SB 32. The research utilized a new, validated model known as the California LBNL GHG Analysis of Policies Spreadsheet (CALGAPS), which simulates GHG and criteria pollutant emissions in California from 2010 to 2050 in accordance to existing and future GHG-reducing policies. The CALGAPS model showed that GHG emissions through 2020 could range from 317 to 415 MTCO2e per year, "indicating that existing state policies will likely allow California to meet its target [of 2020 levels under AB 32]." CALGAPS also showed that by 2030, emissions could range from 211 to 428 MTCO2e per year, indicating that "even if all modeled policies are not implemented, reductions could be sufficient to reduce emissions 40 percent below the 1990 level [of SB 32]." CALGAPS analyzed emissions through 2050 even though it did not generally account for policies that might be put in place after 2030. Though the research indicated that the emissions would not meet the state's 80 percent reduction goal by 2050, various combinations of policies could allow California's cumulative emissions to remain very low through 2050 (40) (41).

The Project reduces its GHG emissions to the maximum extent feasible as discussed in this document. At this time, no further analysis is necessary or required by CEQA as it pertains to Executive Order B-30-15 and SB 32.

Additionally, as described previously, the project applicant would not actively interfere with any future City-mandated, state-mandated, or federally-mandated retrofit obligations enacted or promulgated to legally require development City-wide, state-wide, or nation-wide to assist in meeting state-adopted greenhouse gas emissions reduction targets, including that established under Executive Order S-3-05, Executive Order B-30-15, or SB 32.

Based on the foregoing, the Project does not interfere with the state's implementation of (i) Executive Order B-30-15 and SB 32's target of reducing statewide GHG emissions to 40% below 1990 levels by 2030 or (ii) Executive Order S-3-05's target of reducing statewide GHG emissions to 80% below 1990 levels by 2050 because it does not interfere with the state's implementation of GHG reduction plans described in the CARB's Updated Scoping Plan, including the state providing for 12,000 MW of renewable distributed generation by 2020, the California Building Commission mandating net zero energy homes in the building code after 2020, or existing building retrofits under AB 758. Therefore, the project's impacts on greenhouse gas emissions in the 2030 and 2050 horizon years are less than significant.

Senate Bill 375:

SB 375, signed in September 2008 (Chapter 728, Statutes of 2008), aligns regional transportation planning efforts, regional GHG reduction targets, and land use and housing allocation. SB 375 requires metropolitan planning organizations (MPOs) to adopt a sustainable communities

strategy (SCS) or alternative planning strategy (APS) that will prescribe land use allocation in that MPO's regional transportation plan. ARB, in consultation with MPOs, will provide each affected region with reduction targets for GHGs emitted by passenger cars and light trucks in the region for the years 2020 and 2035.

These reduction targets will be updated every 8 years but can be updated every 4 years if advancements in emissions technologies affect the reduction strategies to achieve the targets. ARB is also charged with reviewing each MPO's SCS or APS for consistency with its assigned targets. If MPOs do not meet the GHG reduction targets, transportation projects will not be eligible for funding programmed after January 1, 2012.

This law also extends the minimum time period for the regional housing needs allocation cycle from 5 years to 8 years for local governments located within an MPO that meets certain requirements. City or county land use policies (including general plans) are not required to be consistent with the regional transportation plan (and associated SCS or APS). However, new provisions of CEQA would incentivize (through streamlining and other provisions) qualified projects that are consistent with an approved SCS or APS, categorized as "transit priority projects."

The Southern California Association of Governments (SCAG) is required by law to update the Southern California Regional Transportation Plan (RTP) every four years. The 2012 draft plan has been released, this draft plan differs from past plans because it includes development of a SCS. The RTP/SCS incorporates land use and housing policies to meet the greenhouse gas emissions targets established by the California Air Resource Board (CARB) for 2020 (8% reduction) and 2035 (13% reduction). On April 4, 2012, the Regional Council of the Southern California Association of Governments (SCAG) adopted the 2012-2035 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS): Towards a Sustainable Future.

South Coast Air Quality Management District Recommendations for Significance Thresholds:

In April 2008, the South Coast Air Quality Management District (SCAQMD), in order to provide guidance to local lead agencies on determining the significance of GHG emissions identified in CEQA documents, convened a "GHG CEQA Significance Threshold Working Group." The goal of the working group is to develop and reach consensus on an acceptable CEQA significance threshold for GHG emissions that would be utilized on an interim basis until CARB (or some other state agency) develops statewide guidance on assessing the significance of GHG emissions under CEQA.

Initially, SCAQMD staff presented the working group with a significance threshold that could be applied to various types of projects—residential; non-residential; industrial; etc (42). However, the threshold is still under development. In December 2008, staff presented the SCAQMD Governing Board with a significance threshold for stationary source projects where it is the lead agency. This threshold uses a tiered approach to determine a project's significance, with 10,000 metric tons of carbon dioxide equivalent (MTCO2e) as a screening numerical threshold for stationary sources. More importantly it should be noted that when setting the 10,000 MTCO2e threshold, the SCAQMD did not consider mobile sources (vehicular travel), rather the threshold

is based mainly on stationary source generators such as boilers, refineries, power plants, etc. Therefore it would be misleading to apply a threshold that was developed without consideration for mobile sources to a Project where the majority of emissions are related to mobile sources.

In September 2010 (43), the Working Group released additional revisions that consist of the following recommended tiered approach:

- Tier 1 consists of evaluating whether or not the Project qualifies for applicable CEQA exemptions.
- Tier 2 consists of determining whether or not a Project is consistent with a greenhouse gas reduction plan. If a Project is consistent with a greenhouse gas reduction plan, it would not have a significant impact.
- Tier 3 consists of screening values at the discretion of the lead agency; however they should be consistent for all projects within its jurisdiction. Project-related construction emissions should be amortized over 30 years and should be added back the Project's operational emissions. The following thresholds are proposed for consideration:
    - 3,000 MTCO2e per year for all land use types

      or
    - 3,500 MTCO2e per year for residential; 1,400 MTCO2e per year for commercial; or 3,000 MTCO2e per year for mixed-use projects
- Tier 4 has the following options:
    - Option 1: Reduce emissions from business as usual by a certain percentage (currently undefined)
    - Option 2: Early implementation of applicable AB 32 Scoping Plan measures
    - Option 3: A project-level efficiency target of 4.8 MTCO2e per service population as a 2020 target and 3.0 MTCO2e per service population as a 2035 target. The recommended plan-level target for 2020 is 6.6 MTCO2e and the plan level target for 2035 is 4.1 MTCO2e
- Tier 5 involves mitigation offsets to achieve target significance thresholds

The SCAQMD has also adopted Rules 2700, 2701, and 2702 that address GHG reductions. However, these rules address boilers and process heater, forestry, and manure management projects, none of which are required by the Project

2.8 SCAG Regional Transportation Plan/Sustainable Communities Strategy

The 2016 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) for the SCAG region was prepared to ensure that the Southern California region attains the per capita vehicle miles targets for passenger vehicles identified by CARB, as required by Senate Bill 375 (44). The Project would be consistent with the plan for integrating the transportation network and related strategies with an overall land use pattern that responds to projected growth, housing needs, changing demographics, and transportation demands. The Project's consistency with the proposed RTP strategies would therefore not conflict with GHG reduction goals set forth in the SCAG 2016 RTP/SCS.

2.9 CITY OF MORENO VALLEY GENERAL PLAN MEASURES

Although the City of Moreno Valley General Plan does not identify specific GHG or climate change policies or goal, a number of the measures identified in the General Plan's Air Quality Element act to reduce or control criteria pollutant emissions and peripherally reduce GHG emissions. The proposed Project has been evaluated for consistency with the City's General Plan Air Quality Element, as shown on Table 2-4.

TABLE 2-4: CITY OF MORENO VALLEY GENERAL PLAN CONSISTENCY

Objective 6.6: Promote land use patterns that reduce daily automotive trips and reduce trip distance for work, shopping, school, and recreation.	**Consistent.** *The Project site is providing employment opportunities to Moreno Valley and the surrounding area.*
Objective 6.7: Reduce mobile and stationary source air pollutant emissions.	**Consistent.** *The Project site is located proximate to existing and proposed major roadways, acting to generally reduce vehicle trip lengths, thereby reducing mobile source emissions. The Project will further reduce mobile source emissions by creating local employment opportunities, reducing commuter vehicle miles traveled (VMT) within the region. Additionally, the Project will implement energy efficient designs and operational programs meeting or surpassing California Code of Regulations (CCR) Title 24 Building Standards, including but not limited to compliance with or betterment of, energy conservation requirements identified at CCR Title 24, Part 6, Energy Code. Energy efficient designs and programs implemented by the Project reduce resources consumption with correlating reductions in stationary-source emissions.*
Policy 6.7.5: Require grading activities to comply with South Coast Air Quality Management District's Rule 403 regarding the control of fugitive dust.	**Consistent.** *The Project will be required to implement fugitive dust control measures consistent with SCAQMD Rule 403.*
Policy 6.7.6: Require building construction to comply with the energy conservation requirements of Title 24 of the California Administrative Code [California Code of Regulations].	**Consistent.** *Pursuant to City and State Building Code requirements, the Project will meet or surpass applicable CCR Title 24 energy conservation requirements.*

Source: City of Moreno Valley General Plan, Safety Element

2.10 CITY OF MORENO VALLEY ENERGY EFFICIENCY AND CLIMATE ACTION STRATEGY

The City of Moreno Valley released an Energy Efficiency and Climate Action Strategy (CAS) as well as a Greenhouse Gas Analysis for public review on May 8, 2012. The documents were approved on October 9, 2012. The CAS identifies ways that the City can reduce energy and water consumption and greenhouse gas emissions as an organization (its employees and the operation of its facilities) and outlines the actions that the City can encourage and community members can employ to reduce their own energy and water consumption and greenhouse gas emissions. The policies in the document are to reduce greenhouse gas emissions in 2010 by 15 percent by 2020. The following consists of an analysis of project consistency with the policies in the CAS.

- R2-T1: Land Use Based Trips and VMT Reduction Policies. Encourage the development of Transit Priority Projects along High Quality Transit Corridors identified in the SCAG Sustainable Communities Plan, to allow a reduction in vehicle miles traveled.

  Project consistency: Not applicable.

- R2-T3: Employment-Based Trip Reductions. Require a Transportation Demand Management (TDM) program for new development to reduce automobile travel by encouraging ride-sharing, carpooling, and alternative modes of transportation.

Project consistency: Consistent with Project design features.

- R2-E1: New Construction Residential Energy Efficiency Requirements. Require energy efficient design for all new residential buildings to be 10 percent beyond the current Title 24 standards. (Reach Code)

  Project consistency: Not applicable; this measure applies to residential projects.

- R2-E2: New Construction Residential Renewable Energy. Facilitate the use of renewable energy (such as solar (photovoltaic) panels or small wind turbines) for new residential developments. Alternative approach would be the purchase of renewable energy resources offsite.

  Project consistency: Not applicable; this measure applies to residential projects.

- R2-E5: New Construction Commercial Energy Efficiency Requirements. Require energy efficient design for all new commercial buildings to be 10% beyond the 2008 Title 24 standards (which were in effect at the time the CAP was adopted). (Reach Code)

  Project consistency: Consistent; Current 2013 Title 24 requirements would achieve greater reduction than envisioned by the City's Climate Action Strategy. Further, the Project would be required to comply with any adopted municipal code requirements set forth by the City of Moreno Valley. As such the Project would be consistent with R2-E5.

- R3-E1: Energy Efficient Development, and Renewable Energy Deployment Facilitation and Streamlining. Updating of codes and zoning requirements and guidelines to further implement green building practices. This could include incentives for energy efficient projects.
- Project consistency: Not applicable on a project-level.
- R3-L2: Heat Island Plan. Develop measures that address "heat islands." Potential measures include using strategically placed shade trees, using paving materials with a Solar Reflective Index of at least 29, an open grid pavement system, or covered parking.

  Project consistency: Consistent; the Project will comply with the City of Moreno Valley's landscaping requirements.

- R2-W1: Water Use Reduction Initiative. Consider adopting a per capita water use reduction goal, which mandates the reduction of water use of 20 percent per capita with requirements applicable to new development and with cooperative support of the water agencies.

  Project consistency: Consistent. California Green Building Standards Code, Chapter 5, Division 5.3, Section 5.303.2 requires that indoor water use be reduced by 20 percent. Section 5.304.3 requires irrigation controllers and sensors. MM AQ-4 also requires water conservation.

- R3-W1: Water Efficiency Training and Education. Work with EMWD and local water companies to implement a public information and education program that promotes water conservation.

  Project consistency: Not applicable at a project-level.

- R2-S1: City Diversion Program. For Solid Waste, consider a target of increasing the waste diverted from the landfill to a total of 75 percent by 2020.

  Project consistency: Consistent; the Project will comply with the City of Moreno Valley's citywide goal of solid waste reduction. Additionally, the Project will be compliant with the City of Moreno Valley's Municipal Code 8.80.030 by implementing a Waste Management Plan.

2.11 CONSISTENCY WITH CARB SCOPING PLAN

Table 2-5 below, presents the 39 Recommended Actions (qualitative measures) identified to date by CARB in its Climate Change Proposed Scoping Plan. Of the 39 measures identified, those that would be considered to be applicable to the Project would primarily be those actions related to transportation, electricity and natural gas use, green building design and industrial uses. Consistency of the Project with these measures is evaluated by each source-type measure below. Table 2-5 identifies which CARB Recommended Actions apply to the Project, and of those, whether the Project is consistent therewith. A discussion of how the Project is consistent with each applicable CARB Recommended Action is set forth after Table 2-5.

TABLE 2-5: RECOMMENDED ACTIONS FOR CLIMATE CHANGED PROPOSED SCOPING PLAN

ID #	Sector	Strategy Name	Applicable to Project?	Will Project Conflict With Implementation?
T-1	Transportation	Pavley I and II – Light-Duty Vehicle GHG Standards	NO	NO
T-2	Transportation	Low Carbon Fuel Standard (Discrete Early Action)	NO	NO
T-3	Transportation	Regional Transportation-Related GHG Targets	NO	NO
T-4	Transportation	Vehicle Efficiency Measures	NO	NO
T-5	Transportation	Ship Electrification at Ports (Discrete Early Action)	NO	NO
T-6	Transportation	Goods-movement Efficiency Measures	NO	NO
T-7	Transportation	Heavy Duty Vehicle Greenhouse Gas Emission Reduction Measure – Aerodynamic Efficiency (Discrete Early Action)	NO	NO
T-8	Transportation	Medium and Heavy-Duty Vehicle Hybridization	NO	NO
T-9	Transportation	High Speed Rail	NO	NO
E-1	Electricity and Natural Gas	Increased Utility Energy efficiency programs More stringent Building and Appliance Standards	YES	NO
E-2	Electricity and Natural Gas	Increase Combined Heat and Power Use by 30,000GWh	NO	NO
E-3	Electricity and Natural Gas	Renewable Portfolio Standard	NO	NO
E-4	Electricity and Natural Gas	Million Solar Roofs	YES	NO
CR-1	Electricity and Natural Gas	Energy Efficiency	YES	NO
CR-2	Electricity and Natural Gas	Solar Water Heating	NO	NO
GB-1	Green Buildings	Green Buildings	YES	NO
W-1	Water	Water Use Efficiency	YES	NO
W-2	Water	Water Recycling	NO	NO
W-3	Water	Water System Energy Efficiency	YES	NO
W-4	Water	Reuse Urban Runoff	NO	NO
W-5	Water	Increase Renewable Energy Production	NO	NO
W-6	Water	Public Goods Charge (Water)	NO	NO
I-1	Industry	Energy Efficiency and Co-benefits Audits for Large Industrial Sources	YES	NO
I-2	Industry	Oil and Gas Extraction GHG Emission Reduction	NO	NO
I-3	Industry	GHG Leak Reduction from Oil and Gas Transmission	NO	NO
I-4	Industry	Refinery Flare Recovery Process Improvements	NO	NO
I-5	Industry	Removal of Methane Exemption from Existing Refinery Regulations	NO	NO
RW-1	Recycling and Waste Management	Landfill Methane Control (Discrete Early Action)	NO	NO
RW-2	Recycling and Waste Management	Additional Reductions in Landfill Methane – Capture Improvements	NO	NO
RW-3	Recycling and Waste Management	High Recycling/Zero Waste	NO	NO
F-1	Forestry	Sustainable Forest Target	NO	NO

ID #	Sector	Strategy Name	Applicable to Project?	Will Project Conflict With Implementation?
H-1	High Global Warming Potential Gases	Motor Vehicle Air Conditioning Systems (Discrete Early Action)	NO	NO
H-2	High Global Warming Potential Gases	SF_6 Limits in Non-Utility and Non-Semiconductor Applications (Discrete Early Action)	NO	NO
H-3	High Global Warming Potential Gases	Reduction in Perfluorocarbons in Semiconductor Manufacturing (Discrete Early Action)	NO	NO
H-4	High Global Warming Potential Gases	Limit High GWP Use in Consumer Products (Discrete Early Action, Adopted June 2008)	NO	NO
H-5	High Global Warming Potential Gases	High GWP Reductions from Mobile Sources	NO	NO
H-6	High Global Warming Potential Gases	High GWP Reductions from Stationary Sources	NO	NO
H-7	High Global Warming Potential Gases	Mitigation Fee on High GWP Gases	NO	NO
A-1	Agriculture	Methane Capture at Large Dairies	NO	NO

SOURCE: CARB, 2008.

Discussion of the applicability of each measure and Project consistency with or support of its implementation follows. It also noted that certain measures and enforcement actions listed below are beyond the scope of control of the Project. Notwithstanding implementation and enforcement of these measures by the State or other responsible entity will act to reduce areawide GHG emissions.

Transportation

CARB's Scoping Plan identifies nine transportation-related recommended actions. Action T-1 concerns improvements to light-duty vehicle technology for the purposes of reducing GHG emissions. This action focuses on legislating improved controls for vehicle manufacturers and would not generally be considered applicable to the proposed Project. Implementation of the Pavley standards is dependent on implementation by the State on vehicle fuel economy standards.

Implementation of such a standard is not within the purview of this Project. Therefore, the proposed Project would not conflict with measures concerning the Pavley standards.

Action T-2 concerns implementation of a low carbon fuel standard. To reduce the carbon intensity of transportation fuels, CARB is developing a Low Carbon Fuel Standard (LCFS), which would reduce the carbon intensity of California's transportation fuels by at least ten percent by 2020 as called for by Governor Schwarzenegger in Executive Order S-01-07. LCFS will incorporate compliance mechanisms that provide flexibility to fuel providers in how they meet the requirements to reduce greenhouse gas emissions.

Implementation of such a standard is not within the purview of this Project. Therefore, the proposed Project would not conflict with measures concerning the use of low carbon fuels.

Action T-3 addresses regional transportation targets for reducing GHG emissions. SB 375 requires CARB to develop, in consultation with metropolitan planning organizations (MPOs), passenger vehicle greenhouse gas emissions reduction targets for 2020 and 2035. It sets forth a collaborative process to establish these targets, including the appointment by CARB of a Regional

Targets Advisory Committee to recommend factors to be considered and methodologies for setting greenhouse gas emissions reduction targets. SB 375 also provides incentives – relief from certain California Environmental Quality Act (CEQA) requirements for development projects that are consistent with regional plans that achieve the targets.

Implementation of such a standard is not within the purview of this Project. Therefore, the proposed Project would not conflict with measures concerning SB375.

Action T-4 is concerned with vehicle efficiency measures. The California Integrated Waste Management Board (CIWMB) with various partners continues to conduct a public awareness campaign to promote sustainable tire practices. CARB is pursuing a regulation to ensure that tires are properly inflated when vehicles are serviced. In addition, CEC in consultation with CIWMB is developing an efficient tire program focusing first on data gathering and outreach, then on potential adoption of minimum fuel-efficient tire standards, and lastly on the development of consumer information requirements for replacing tires. CARB is also pursuing ways to reduce engine load via lower friction oil and reducing the need for air conditioner use. ARB is actively engaged in the regulatory development process for the tire inflation component of this measure.

Implementation of such a standard is not within the purview of this Project. Therefore, the proposed Project would not conflict with applicable measures.

Action T-5 addresses electrification of ships at ports and is not applicable to the proposed Project.

Action T-6 also primarily addresses port operations and is not applicable to the proposed Project.

Action T-7 requires existing trucks/trailers to be retrofitted with the best available technology and/or CARB-approved technology.

Implementation of such a standard is not within the purview of the proposed Project since various trucks fleets from numerous commercial entities may access the site. Therefore, the proposed Project would not conflict with this measure.

Action T-8 focuses on hybridization of medium- and heavy-duty vehicles. The implementation approach to Action T-8 is to adopt a regulation and/or incentive program that reduces GHG emissions by encouraging hybrid technology as applied to vocational applications that have significant urban, stop-and-go driving, idling, and power take-off operations in their duty cycle. Such applications include parcel delivery trucks and vans.

Implementation of such a standard is not within the purview of the proposed Project since various trucks fleets from numerous commercial entities may access the site. Therefore, the proposed Project would not conflict with this measure.

Action T-9 concerns implementation of a high speed rail system. This measure is not applicable to the Project.

<u>Electricity and Natural Gas</u>

Action E-1/CR-1, together with Action GB-1 (Green Building), aims to reduce electricity demand by increased efficiency of Utility Energy Programs and adoption of more stringent building and appliance standards.

The Project will comply with or surpass incumbent Title 24 Energy Efficiency Standards. Therefore, the proposed Project would not conflict with this measure.

Action E-2 encourages an increase in the use of combined heat and power (CHP) use, or co-generation, facilities. California has supported CHP for many years, but market and other barriers continue to keep CHP from reaching its full market potential. Increasing the deployment of efficient CHP will require a multi-pronged approach that includes addressing significant barriers and instituting incentives or mandates where appropriate.

Implementation of such a standard is not within the purview of the proposed Project; therefore, the proposed Project would not conflict with this measure.

Action E-3 concerns Renewable Portfolio Standards for utilities and does not apply to development projects.

Action E-4 strives to promote solar generated electricity.

Project building designs will accommodate renewable energy sources, such as photovoltaic solar electricity systems, appropriate to their architectural design(s). The Project would therefore not conflict with the recommended measure.

Action CR-2 strives to promote solar water heaters (SWH). The ARB recommends that California pursue approaches with the goal of developing a viable SWH industry for 2020 and beyond.

Implementation of such a standard is not within the purview of the Project; therefore, the proposed Project would not conflict with this measure.

Water Use

Implementation of all but two of the Recommended Actions related to water use are not within the purview of the proposed Project. The two measures that apply are measures W-1 (Water Use Efficiency) and W-3 (Water System Energy Efficiency). However, since the proposed Project would not exceed the audit threshold of 25,000 MT CO_2 (45) from on-site combustion and related activities, the proposed Project is consistent with and would not obstruct the recommended actions.

Industrial Use

All but one of the Recommended Actions related to industrial use are specific to oil and gas extraction, refining and transmission and are not applicable to the proposed Project. The one other Action I-1 targets large emitters of GHGs (in excess of 0.5 million metric tons (MMT)/year of CO_2E (equivalent)) for auditing[4] (46). Because the proposed Project would not exceed the audit

[4] Certain "covered sectors" of activities in California account for 85% of GHG emissions. Each source in these sectors will be subject to a system of declining GHG emissions allowances issued by CARB under a total emissions cap, as well as an

threshold, as set forth in Section 3.0, the proposed Project is consistent with and would not obstruct the recommended actions.

As stated above, the CARB Scoping Plan recommends strategies for implementation at the statewide level to meet the goals of AB 32. The CARB Scoping Plan recommendations serve as statewide measures to reduce GHG emissions levels. The Project would be consistent with the applicable measures established in the Scoping Plan, as detailed above.

Consistency with SB 32

Senate Bill 32 (SB 32) requires the state to reduce statewide greenhouse gas emissions to 40% below 1990 levels by 2030, a reduction target that was first introduced in Executive Order B-30-15. The new legislation builds upon the AB 32 goal of 1990 levels by 2020 and provides an intermediate goal to achieving S-3-05, which sets a statewide greenhouse gas reduction target of 80% below 1990 levels by 2050 (38) (39).

According to research conducted by the Lawrence Berkeley National Laboratory and supported by the CARB, California, under its existing and proposed GHG reduction policies, is on track to meet the 2020 reduction targets under AB 32 and could achieve the 2030 goals under SB 32. (40) (41).

The Project reduces its GHG emissions to the maximum extent feasible as discussed in this document. Additionally, the project applicant would not actively interfere with any future County-mandated, state-mandated, or federally-mandated retrofit obligations enacted or promulgated to legally require development County-wide, state-wide, or nation-wide to assist in meeting state-adopted greenhouse gas emissions reduction targets, including that established under Executive Order S-3-05, Executive Order B-30-15, or SB 32.

The Project does not interfere with the state's implementation of (i) Executive Order B-30-15 and SB 32's target of reducing statewide GHG emissions to 40% below 1990 levels by 2030 or (ii) Executive Order S-3-05's target of reducing statewide GHG emissions to 80% below 1990 levels by 2050 because it does not interfere with the state's implementation of GHG reduction plans described in the CARB's Updated Scoping Plan, including the state providing for 12,000 MW of renewable distributed generation by 2020, the California Building Commission mandating net zero energy homes in the building code after 2020, or existing building retrofits under AB 758. Therefore, the project's impacts on greenhouse gas emissions in the 2030 and 2050 horizon years are less than significant.

allowance trading system. The Plan's lynch-pin is a cap-and-trade program that would apply to the electricity sector, the transportation sector, the commercial and residential sector, and large industrial sources (those emitting more than 0.5 million metric tons per year of carbon dioxide ("CO2") equivalents).

3 PROJECT GREENHOUSE GAS IMPACT

3.1 INTRODUCTION

The Project has been evaluated to determine if it will result in a significant greenhouse gas impact. The significance of these potential impacts is described in the following section.

3.2 STANDARDS OF SIGNIFICANCE

The criteria used to determine the significance of potential Project-related greenhouse gas impacts are taken from the Initial Study Checklist in Appendix G of the State CEQA Guidelines (14 California Code of Regulations §§15000, et seq.). Based on these thresholds, a project would result in a significant impact related to air quality if it would:

- Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?
- Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

The City of Moreno Valley does not have an adopted threshold of significance for GHG emissions. For CEQA purposes, the City has discretion to select an appropriate significance criterion, based on substantial evidence. The AQMD's adopted numerical threshold of 10,000 MTCO2e per year for industrial stationary source emissions is selected as the significance criterion. The AQMD-adopted industrial threshold was selected by the City because the proposed Project is analogous to an industrial use much more closely than any other land use such as commercial or residential in terms of its expected operating characteristics. The Project proposes a single high-cube warehouse/distribution center that will serve mid- stream functions in the goods movement chain between manufacturers and consumers, characteristic of an industrial operation. Further, analysis of the Project's traffic generation in this EIR is based on the Institute of Transportation Engineers (ITE) Trip Generation Manual, 9th Edition, 2012 for industrial and warehouse uses. Also, 10,000 MTCO2e has been used as the significance threshold by many local government lead agencies for logistics projects throughout the SCAG region since the AQMD adopted this threshold for its own use. Further, to ensure that the threshold is conservative in its application, although the AQMD uses their adopted 10,000 MTCO2e threshold to determine the significance of stationary source emissions for industrial projects, the 10,000 MTCO2e threshold used in this EIR is applied to all sources of Project-related GHG emissions whether stationary source, mobile source, area source, or other.

Use of this threshold is also consistent with guidance provided in the CAPCOA *CEQA and Climate Change* handbook, as such the City has opted to use a non-zero threshold approach based on Approach 2 of the handbook. Threshold 2.5 (Unit-Based Thresholds Based on Market Capture) establishes a numerical threshold based on capture of approximately 90 percent of emissions from future development. The latest threshold developed by SCAQMD using this method is 10,000 metric tons carbon dioxide equivalent (MTCO2E) per year for industrial projects. This threshold is based on the review of 711 CEQA projects.

3.3 PROJECT RELATED GREENHOUSE GAS EMISSIONS

CEQA Guidelines 15064.4 (b) (1) states that a lead agency may use a model or methodology to quantify greenhouse gas emissions associated with a project (47).

On October 17, 2017, the SCAQMD in conjunction with the California Air Pollution Control Officers Association (CAPCOA) and other California air districts, released the latest version of the California Emissions Estimator Model™ (CalEEMod™) v2016.3.2. The purpose of this model is to calculate construction-source and operational-source criteria pollutant (NO_x, VOC, PM_{10}, $PM_{2.5}$, SO_x, and CO) and greenhouse gas (GHG) emissions from direct and indirect sources; and quantify applicable air quality and GHG reductions achieved from mitigation measures (48). Accordingly, the latest version of CalEEMod™ has been used for this Project to determine construction and operational air quality emissions. Output from the model runs for both construction and operational activity are provided in Appendix 3.1 and Appendix 3.2.

3.4 CONSTRUCTION AND OPERATIONAL LIFE-CYCLE ANALYSIS

A full life-cycle analysis (LCA) for construction and operational activity is not included in this analysis due to the lack of consensus guidance on LCA methodology at this time. Life-cycle analysis (i.e., assessing economy-wide GHG emissions from the processes in manufacturing and transporting all raw materials used in the project development, infrastructure and on-going operations) depends on emission factors or econometric factors that are not well established for all processes. At this time a LCA would be extremely speculative and thus has not been prepared.

Additionally, the SCAQMD recommends analyzing direct and indirect project GHG emissions generated within California and not life-cycle emissions because the life-cycle effects from a project could occur outside of California, might not be very well understood or documented, and would be challenging to mitigate (49). Additionally, the science to calculate life cycle emissions is not yet established or well defined, therefore SCAQMD has not recommended, and is not requiring, life-cycle emissions analysis.

3.5 CONSTRUCTION EMISSIONS

Construction activities associated with the proposed Project will result in emissions of CO2 and CH4 from construction activities.

The report Brodiaea Commerce Center Air Quality Impact Analysis Report, Urban Crossroads, Inc. (2017) contains detailed information regarding construction activity (50).

For construction phase Project emissions, GHGs are quantified and amortized over the life of the Project. To amortize the emissions over the life of the Project, the SCAQMD recommends calculating the total greenhouse gas emissions for the construction activities, dividing it by the 30-year project life then adding that number to the annual operational phase GHG emissions (51). As such, construction emissions were amortized over a 30-year period and added to the annual operational phase GHG emissions.

3.6 OPERATIONAL EMISSIONS

Operational activities associated with the proposed Project will result in emissions of CO2, CH4, and N2O from the following primary sources:

- Area Source Emissions
- Energy Source Emissions
- Mobile Source Emissions
- Solid Waste
- Water Supply, Treatment and Distribution
- On-Site Equipment Emissions

3.6.1 AREA SOURCE EMISSIONS

Landscape Maintenance Equipment

Landscape maintenance equipment would generate emissions from fuel combustion and evaporation of unburned fuel. Equipment in this category would include lawnmowers, shedders/grinders, blowers, trimmers, chain saws, and hedge trimmers used to maintain the landscaping of the Project. The emissions associated with landscape maintenance equipment were calculated based on assumptions provided in the CalEEMod model.

3.6.2 ENERGY SOURCE EMISSIONS

Combustion Emissions Associated with Natural Gas and Electricity

GHGs are emitted from buildings as a result of activities for which electricity and natural gas are typically used as energy sources. Combustion of any type of fuel emits CO2 and other GHGs directly into the atmosphere; these emissions are considered direct emissions associated with a building. GHGs are also emitted during the generation of electricity from fossil fuels; these emissions are considered to be indirect emissions. Unless otherwise noted, CalEEMod™ default parameters were used.

3.6.3 MOBILE SOURCE EMISSIONS

Vehicles

Project mobile source greenhouse gas are dependent on both overall daily vehicle trip generation and the effect of the Project on peak hour traffic volumes and traffic operations in the vicinity of the Project. The Project related operational greenhouse gas impacts derive primarily from vehicle trips generated by the Project. Trip characteristics available from the report, Brodiaea Commerce Center Traffic Impact Analysis (Urban Crossroads) 2017 were utilized in this analysis (52). It should be noted that the Project's traffic study presents the total Project vehicle trips in terms of Passenger Car Equivalents (PCEs) in an effort to recognize and acknowledge the effects of heavy vehicles at the study area intersections. Notwithstanding, for purposes of the greenhouse gas study, the PCE trips were not used. Rather, to more accurately estimate and

model vehicular-source emissions, the actual number of vehicles, by vehicle classification (e.g., passenger cars (including light trucks), heavy trucks) were used in the analysis.

ITE land use code 152 (High-Cube Warehousing) has been used to derive site specific trip generation. High-cube warehouse/distribution centers (ITE Land Use Code 152) are a unique land use type within the larger, more generalized industrial land use category. ITE's most recent edition of the Trip Generation manual (ITE 9th Edition), published in 2012, defines "high-cube warehouses" as "…used for storage of materials, goods and merchandise prior to their distribution to retail outlets, distribution centers or other warehouses. These facilities are typically characterized by ceiling heights of at least 24 feet with small employment counts due to a high level of mechanization." The average square footage for the sites surveyed for high-cube warehouse/distribution center (Land Use 152) use is above 500,000 square feet. The number of sites observed in the compilation of this data ranges from 57-70 sites of which more than 20 sites exceed 1,000,000 square feet in gross floor area. The weighted average daily trip generation rate for high-cube warehouse (Land Use 152) use is 1.68 trips per thousand square feet (TSF). Total vehicle mix percentages were also obtained from the ITE Trip Generation manual in conjunction with the South Coast Air Quality Management District's (SCAQMD) recommended truck mix, by axle type (53). The SCAQMD is currently recommending the use of the ITE Trip Generation manual in conjunction with their truck mix by axle-type to better quantify trip rates associated with local warehouse and distribution projects, as truck emission represent more than 90 percent of air quality impacts from these projects. This recommended procedure has been utilized for the purposes of this analysis in effort to be consistent with other technical studies being prepared for the Project. The percentage of trucks has been determined from the table shown on page 267 of the ITE Trip Generation manual. As shown on page 267, the truck trip generation rate for weekday daily traffic is 0.64 or 38.1% of the total traffic. Trip generation for heavy trucks was further broken down by truck type (or axle type). The total truck percentage is comprised of 3 different truck types: 2-axle, 3-axle, and 4+-axle trucks. For the purposes of this analysis, the percentage of trucks, by axle type, were obtained from the SCAQMD interim recommended truck mix. The SCAQMD has recently performed surveys of existing facilities and compiled the data to provide interim guidance on the mix of heavy trucks for these types of high-cube warehousing/distribution facilities.

3.5.3.1 Trip Length

Background

A technical deficiency inherent in calculating the projected vehicle emissions associated with any project is related to the estimation of trip length and vehicle miles traveled (VMT). VMT for a given project is calculated by the total number of vehicle trips to/from the Project x average trip length. This method of estimating VMT for use in calculating vehicle emissions likely results in the over-estimation and double-counting of emissions because, for a distribution warehouse center such as the Project, the land use is likely to attract (divert) existing vehicle trips that are already on the circulation system as opposed to generating new trips. In this regard, the Project would, to a large extent, redistribute existing mobile-source emissions rather than generate additional emissions within the Basin. As such, the estimation of the Brodiaea Commerce Center

Project's vehicular-source emissions are likely overstated in that no credit for, or reduction in, emissions is assumed based on diversion of existing trips.

Provided below is a summary of the VMT recommendations of the SCAQMD and SCAG, followed by a description of the methodology used to calculate the VMT rates used in this GHGA.

SCAQMD Recommendation

In the last five years, the SCAQMD has provided numerous comments on the trip length for warehouse/distribution and industrial land use projects (54). The SCAQMD asserts that the model-default trip length in CalEEMod™ and the URBan EMISsions (URBEMIS) 2007 model (version 9.2.4) would underestimate emissions. The SCAQMD asserts that for warehouse, distribution center, and industrial land use projects, most of the heavy-duty trucks would be hauling consumer goods, often from the Ports of Long Beach and Los Angeles (POLA and POLB) and/or to destinations outside of California. The SCAQMD states that for this reason, the CalEEMod™ and the URBan EMISsions model default trip length (approximately 12.6 miles) would not be representative of activities at like facilities. The SCAQMD generally recommends the use of a 40-mile one-way trip length.

Southern California Association of Government (SCAG) Heavy Duty Truck Model

SCAG is comprised of six counties (Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura) and 190 cities in Southern California, and is the organization charged with addressing and resolving short- and long-term regional policy issues. The SCAG region also consists of 14 sub-regional entities recognized by the Regional Council as partners in the regional policy planning process. The SCAG region has more than 19 million residents and encompasses more than 38,000 square miles, representing the largest and most diverse region in the country.

SCAG maintains a regional transportation model. In its most recent (2008) transportation validation for the 2003 Regional Model, SCAG indicates the average internal truck trip length for the SCAG region is 5.92 miles for Light Duty Trucks, 13.06 miles for Medium Duty Trucks, and 24.11 miles for Heavy Duty Trucks.

Approach for Analysis of the Project

Trip lengths and VMT estimates employed in this GHGA report generate vehicular-source emissions that would represent a maximum impact scenario. Other Environmental Impact Reports (EIRs) for similar land use projects within the region have utilized these same or similar estimates. Though the VMT analyzed in this analysis may differ from the Project's traffic impact analysis, to maintain analytic consistency and establish the maximum impact scenario noted above, the following approach has been utilized in calculating emissions associated with vehicles accessing the Project. This approach is consistent with professional industry practice (55) (56) (57).

For passenger car trips, the CalEEMod default for a one-way trip length of 16.6 miles was assumed. For heavy duty trucks, an average trip length was derived from distances from the Project site to the far edges of the South Coast Air Basin (SCAB) as follows.

- Project site to the Port of Los Angeles/Long Beach: 80 miles;
- Project site to East on State Route 60: 30 miles;
- Project site to San Diego County line: 60 miles;
- Project site to Inland Empire: 50 miles;
- Project site to Perris destinations: 10 miles;
- Project site to Moreno Valley destinations: 10 miles;

Assuming that 50% of all delivery trips will travel to and from the Project and the Port of Los Angeles/Long Beach, 10% go East on the State Route 60, 20% go to San Diego, 10% go to the Inland Empire, 5% go to Perris destinations and the remainder as Moreno Valley destinations. The average truck trip length is calculated as 61 miles.

For the High-Cube Warehouse land use, two separate model runs were utilized in order to more accurately model emissions resulting from vehicle operations. The first run analyzed passenger car emissions, which incorporated a default trip length of 16.6 miles for passenger cars and a fleet mix of 100% Light-Duty-Auto vehicles (LDA). The second run analyzed truck emissions, which incorporated an average truck trip length of 61 miles. A fleet mix of 22% LHD, 18% MHD, and 60% HHD was used for High-Cube Warehouse. The estimated emissions resulting from vehicle operations are summarized in Table 3-7 (presented later in this report.) Detailed emission calculations are provided in Appendix 3.1 and Appendix 3.2.

3.6.4 Solid Waste

Industrial land uses will result in the generation and disposal of solid waste. A large percentage of this waste will be diverted from landfills by a variety of means, such as reducing the amount of waste generated, recycling, and/or composting. The remainder of the waste not diverted will be disposed of at a landfill. GHG emissions from landfills are associated with the anaerobic breakdown of material. GHG emissions associated with the disposal of solid waste associated with the proposed Project were calculated by the CalEEMod™ model using default parameters.

3.6.5 Water Supply, Treatment and Distribution

Indirect GHG emissions result from the production of electricity used to convey, treat and distribute water and wastewater. The amount of electricity required to convey, treat and distribute water depends on the volume of water as well as the sources of the water. Water demand rates from the Moreno Valley WSA were utilized. The WSA determined a 550 gallons per day per acre (gpd/ac), which is equivalent to approximately 0.62 AFY[5].

3.6.6 On-Site Equipment Emissions

It is common for an industrial warehouse project to require cargo handling equipment to move empty containers and empty chassis to and from the various pieces of cargo handling equipment

5 At the time the GHGA was prepared, a Water Supply Assessment (WSA) for the Project was unavailable. Water demand rates from Eastern Municipal Water District (EMWD) for a similar project in the City of Moreno Valley, Modular Logistics, was utilized. EMWD provided a 0.75 demand per unit of acre-feet per year (AFY).

that receive and distribute containers. The most common type of cargo handling equipment is the yard truck which is designed for moving cargo containers. Yard trucks are also known as yard goats, utility tractors (UTRs), hustlers, yard hostlers, and yard tractors. Yard trucks have a horsepower (hp) range of approximately 175 hp to 200 hp (58). Based on the latest available information from SCAQMD (59); high-cube warehouse projects typically have 3.6 yard trucks per million square feet of building space. For this particular Project, on-site modeled operational equipment includes two (2) yard tractors operating at 4 hours a day (60) for 365 days of the year[6]. In addition to the use of yard trucks operating at the Project site, forklifts are a common piece of equipment used in warehouse operations. The Project includes one 89 hp yard forklift operating at 4 hours a day and one tractor/loader/backhoe operating at 4 hours a day for 365 days of the year interior to the building. However, for purposes of the GHGA forklifts are not included in the health risk calculations since there is no diesel exhaust associated with the forklifts as they are assumed to be non-diesel consistent with industry standards.

As part of the Project's design, all on-site outdoor cargo handling equipment (CHE) (including yard trucks, hostlers, yard goats, pallet jacks, forklifts, and other on-site equipment) will be powered by non-diesel fueled engines and all on-site indoor forklifts shall be powered by electricity, compressed natural gas, or propane.

3.7 EMISSIONS SUMMARY

The Project will result in approximately 777.67 MTCO2e per year from construction, area, energy, waste, and water usage. In addition, the Project has the potential to result in an additional 5,561.85 MTCO2e per year from mobile sources if the assumption is made that all of the vehicle trips to and from the Project are "new" trips resulting from the development of the Project. As shown on Table 3-1, the Project has the potential to generate a total of approximately 6,429.52 MTCO2e per year. As such, the Project would not exceed the SCAQMD's numeric threshold of 10,000 MTCO2e if it were applied. Thus, the Project would not have the potential to result in a cumulatively considerable impact with respect to GHG emissions.

TABLE 3-1: PROJECT GREENHOUSE GAS EMISSIONS (ANNUAL)

Emission Source	Emissions (metric tons per year)			
	CO_2	CH_4	N_2O	Total CO_2E

[6] 4 hour daily on-site operation of the yard trucks is based on the Southern California International Gateway Recirculated Draft EIR. Table C1.2-BL-17 *Activity Data for Existing Business CHE – 2010 Baseline* indicates that the average annual hours of operation for all diesel Container Handling Equipment, Forklifts, and Yard Tractors totaled 72,187 annual operating hours. The total number of pieces of equipment equals 52. As such, 72,187/52 = 1,388 annual hours per piece of equipment. 1,388 annual hours per piece of equipment/365 days = an average of 3.80 hours per day per piece of equipment. As a conservative measure this is rounded up to 4 hours for analytical purposes.

Annual construction-related emissions amortized over 30 years	36.08	0.01	0.00	36.23
Area	0.01	3.00E-05	0.00	0.01
Energy	253.89	0.01	0.00	254.87
Mobile Sources (Trucks)	495.24	0.01	0.00	495.52
Mobile Sources (Passenger Cars)	5,150.18	0.25	0.00	5,156.33
On-site Equipment	27.06	0.01	0.00	27.27
Waste	50.07	2.96	0.00	124.05
Water Usage	271.00	0.99	0.05	335.24
Total CO_2E (All Sources)	**6,429.52**			
Screening Threshold (CO_2E)	**10,000**			
Threshold Exceeded?	**NO**			

4 FINDINGS & CONCLUSIONS

The City of Moreno Valley does not have an adopted threshold of significance for GHG emissions. For CEQA purposes, the City has discretion to select an appropriate significance criterion, based on substantial evidence. The AQMD's adopted numerical threshold of 10,000 MTCO2e per year for industrial stationary source emissions is selected as the significance criterion. The AQMD-adopted industrial threshold was selected by the City because the proposed Project is analogous to an industrial use much more closely than any other land use such as commercial or residential in terms of its expected operating characteristics. The Project proposes large buildings with loading bays and fenced truck courts that are expected to house businesses that serve mid- stream functions in the goods movement chain between manufacturers and consumers, characteristic of an industrial operation. Further, analysis of the Project's traffic generation in this EIR is based on the ITE Trip Generation Manual, 9th Edition, 2012 for industrial and warehouse uses. Also, 10,000 MTCO2e has been used as the significance threshold by many local government lead agencies for logistics projects throughout the SCAG region since the AQMD adopted this threshold for its own use. Further, to ensure that the threshold is conservative in its application, although the AQMD uses their adopted 10,000 MTCO2e threshold to determine the significance of stationary source emissions for industrial projects, the 10,000 MTCO2e threshold used in this EIR is applied to all sources of Project-related GHG emissions whether stationary source, mobile source, area source, or other.

Use of this threshold is also consistent with guidance provided in the CAPCOA *CEQA and Climate Change* handbook, as such the City has opted to use a non-zero threshold approach based on Approach 2 of the handbook. Threshold 2.5 (Unit-Based Thresholds Based on Market Capture) establishes a numerical threshold based on capture of approximately 90 percent of emissions from future development. The latest threshold developed by SCAQMD using this method is 10,000 MTCO2e per year for industrial projects. This threshold is based on the review of 711 CEQA projects.

The Project will result in approximately 777.6774 MTCO2e per year from construction, area, energy, waste, and water usage. In addition, the Project has the potential to result in an additional 5,651.85 MTCO2e per year from mobile sources if the assumption is made that all of the vehicle trips to and from the Project are "new" trips resulting from the development of the Project. As shown on Table 4-1, the Project has the potential to generate a total of approximately 6,429.52 MTCO2e per year. As such, the Project would not exceed the SCAQMD's numeric threshold of 10,000 MTCO2e if it were applied. Thus, the Project would not have the potential to result in a cumulatively considerable impact with respect to GHG emissions.

TABLE 4-1: PROJECT GREENHOUSE GAS EMISSIONS (ANNUAL)

Emission Source	**Emissions (metric tons per year)**			
	CO_2	**CH_4**	**N_2O**	**Total CO_2E**
Annual construction-related emissions amortized over 30 years	36.08	0.01	0.00	36.23
Area	0.01	3.00E-05	0.00	0.01
Energy	253.89	0.01	0.00	254.87
Mobile Sources (Trucks)	495.24	0.01	0.00	495.52
Mobile Sources (Passenger Cars)	5,150.18	0.25	0.00	5,156.33
On-site Equipment	27.06	0.01	0.00	27.27
Waste	50.07	2.96	0.00	124.05
Water Usage	271.00	0.99	0.05	335.24
Total CO_2E (All Sources)	**6,429.52**			
Screening Threshold (CO_2E)	**10,000**			
Threshold Exceeded?	**NO**			

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6 CERTIFICATION

The contents of this GHGA represent an accurate depiction of the greenhouse gas impacts associated with the proposed Brodiaea Commerce Center Project. The information contained in this greenhouse gas report is based on the best available data at the time of preparation. If you have any questions, please contact me directly at (949) 336-5987.

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EDUCATION

Master of Science in Environmental Studies
California State University, Fullerton • May, 2010

Bachelor of Arts in Environmental Analysis and Design
University of California, Irvine • June, 2006

PROFESSIONAL AFFILIATIONS

AEP – Association of Environmental Planners
AWMA – Air and Waste Management Association
ASTM – American Society for Testing and Materials

PROFESSIONAL CERTIFICATIONS

Environmental Site Assessment – American Society for Testing and Materials • June, 2013
Planned Communities and Urban Infill – Urban Land Institute • June, 2011
Indoor Air Quality and Industrial Hygiene – EMSL Analytical • April, 2008
Principles of Ambient Air Monitoring – California Air Resources Board • August, 2007
AB2588 Regulatory Standards – Trinity Consultants • November, 2006
Air Dispersion Modeling – Lakes Environmental • June, 2006

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APPENDIX 3.1:

CALEEMOD OPERATIONAL EMISSIONS MODEL OUTPUTS (TRUCKS)

Brodiaea Warehouse (Construction - Mitigated)

South Coast AQMD Air District, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Unrefrigerated Warehouse-No Rail	262.40	1000sqft	6.02	262,400.00	0
Parking Lot	252.46	1000sqft	5.80	252,460.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	10			**Operational Year**	2019
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Construction schedule adjusted as per Client.

Off-road Equipment - Crawler Tractors used in lieu of Tractors/Loaders/Backhoes.

Off-road Equipment - Crawler Tractors used in lieu of Tractors/Loaders/Backhoes.

Off-road Equipment - Crawler Tractors used in lieu of Tractors/Loaders/Backhoes.

Off-road Equipment -

Off-road Equipment - Hours are based on an 8-hour workday.

Grading -

Vehicle Trips - Construction (Unmitigated) Run Only.

Fleet Mix - Construction (Unmitigated) Run Only.

Energy Use - Construction (Unmitigated) Run Only.

Water And Wastewater - Construction (Unmitigated) Run Only.

Solid Waste - Construction (Unmitigated) Run Only.

Construction Off-road Equipment Mitigation -

Architectural Coating - Use Low VOC Paint (50 g/L)

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	100.00	50.00
tblArchitecturalCoating	EF_Nonresidential_Interior	100.00	50.00
tblArchitecturalCoating	EF_Parking	100.00	50.00
tblConstructionPhase	NumDays	300.00	230.00
tblConstructionPhase	PhaseEndDate	11/11/2019	7/8/2019
tblConstructionPhase	PhaseEndDate	9/16/2019	5/13/2019
tblConstructionPhase	PhaseEndDate	7/23/2018	6/25/2018
tblConstructionPhase	PhaseEndDate	10/14/2019	6/10/2019
tblConstructionPhase	PhaseEndDate	6/11/2018	5/14/2018

tblConstructionPhase	PhaseStartDate	10/15/2019	6/11/2019
tblConstructionPhase	PhaseStartDate	7/24/2018	6/26/2018
tblConstructionPhase	PhaseStartDate	6/12/2018	5/15/2018
tblConstructionPhase	PhaseStartDate	9/17/2019	5/14/2019
tblConstructionPhase	PhaseStartDate	5/29/2018	5/1/2018
tblEnergyUse	LightingElect	0.35	0.00
tblEnergyUse	LightingElect	1.17	0.00
tblEnergyUse	NT24E	0.82	0.00
tblEnergyUse	NT24NG	0.03	0.00
tblEnergyUse	T24E	0.37	0.00
tblEnergyUse	T24NG	2.00	0.00
tblFleetMix	HHD	0.03	0.00
tblFleetMix	HHD	0.03	0.00
tblFleetMix	LDA	0.55	1.00
tblFleetMix	LDA	0.55	1.00
tblFleetMix	LDT1	0.04	0.00
tblFleetMix	LDT1	0.04	0.00
tblFleetMix	LDT2	0.20	0.00
tblFleetMix	LDT2	0.20	0.00
tblFleetMix	LHD1	0.02	0.00
tblFleetMix	LHD1	0.02	0.00
tblFleetMix	LHD2	5.8700e-003	0.00
tblFleetMix	LHD2	5.8700e-003	0.00
tblFleetMix	MCY	4.7240e-003	0.00
tblFleetMix	MCY	4.7240e-003	0.00
tblFleetMix	MDV	0.12	0.00
tblFleetMix	MDV	0.12	0.00

tblFleetMix	MH	9.9100e-004	0.00
tblFleetMix	MH	9.9100e-004	0.00
tblFleetMix	MHD	0.02	0.00
tblFleetMix	MHD	0.02	0.00
tblFleetMix	OBUS	1.9990e-003	0.00
tblFleetMix	OBUS	1.9990e-003	0.00
tblFleetMix	SBUS	7.0400e-004	0.00
tblFleetMix	SBUS	7.0400e-004	0.00
tblFleetMix	UBUS	2.0270e-003	0.00
tblFleetMix	UBUS	2.0270e-003	0.00
tblOffRoadEquipment	OffRoadEquipmentType		Crawler Tractors
tblOffRoadEquipment	OffRoadEquipmentType		Crawler Tractors
tblOffRoadEquipment	OffRoadEquipmentType		Crawler Tractors
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblSolidWaste	SolidWasteGenerationRate	246.66	0.00
tblVehicleTrips	CC_TL	8.40	0.00
tblVehicleTrips	CC_TL	8.40	0.00
tblVehicleTrips	CNW_TL	6.90	0.00
tblVehicleTrips	CNW_TL	6.90	0.00
tblVehicleTrips	CNW_TTP	41.00	0.00
tblVehicleTrips	CW_TL	16.60	0.00
tblVehicleTrips	CW_TL	16.60	0.00

tblVehicleTrips	CW_TTP	59.00	0.00
tblVehicleTrips	DV_TP	5.00	0.00
tblVehicleTrips	PB_TP	3.00	0.00
tblVehicleTrips	PR_TP	92.00	0.00
tblVehicleTrips	ST_TR	1.68	0.00
tblVehicleTrips	SU_TR	1.68	0.00
tblVehicleTrips	WD_TR	1.68	0.00
tblWater	IndoorWaterUseRate	60,680,000.00	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2018	0.4774	4.9162	2.8132	7.3200e-003	0.4363	0.1950	0.6313	0.1593	0.1816	0.3409	0.0000	668.7244	668.7244	0.1199	0.0000	671.7208
2019	0.8925	2.5684	1.6492	4.5600e-003	0.1441	0.1002	0.2443	0.0388	0.0937	0.1325	0.0000	413.5978	413.5978	0.0660	0.0000	415.2482
Maximum	**0.8925**	**4.9162**	**2.8132**	**7.3200e-003**	**0.4363**	**0.1950**	**0.6313**	**0.1593**	**0.1816**	**0.3409**	**0.0000**	**668.7244**	**668.7244**	**0.1199**	**0.0000**	**671.7208**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2018	0.4774	4.9162	2.8132	7.3200e-003	0.2922	0.1950	0.4871	0.0950	0.1816	0.2766	0.0000	668.7240	668.7240	0.1199	0.0000	671.7204
2019	0.8925	2.5684	1.6492	4.5600e-003	0.1441	0.1002	0.2443	0.0388	0.0937	0.1325	0.0000	413.5975	413.5975	0.0660	0.0000	415.2480
Maximum	**0.8925**	**4.9162**	**2.8132**	**7.3200e-003**	**0.2922**	**0.1950**	**0.4871**	**0.0950**	**0.1816**	**0.2766**	**0.0000**	**668.7240**	**668.7240**	**0.1199**	**0.0000**	**671.7204**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**24.84**	**0.00**	**16.46**	**32.43**	**0.00**	**13.57**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**5-1-2018**	**7-31-2018**	2.1294	2.1294
2	**8-1-2018**	**10-31-2018**	1.9528	1.9528
3	**11-1-2018**	**1-31-2019**	1.9094	1.9094
4	**2-1-2019**	**4-30-2019**	1.7537	1.7537
5	**5-1-2019**	**7-31-2019**	1.0887	1.0887
		Highest	2.1294	2.1294

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1.0903	6.0000e-005	6.6400e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0128	0.0128	3.0000e-005	0.0000	0.0136
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.0903**	**6.0000e-005**	**6.6400e-003**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0128**	**0.0128**	**3.0000e-005**	**0.0000**	**0.0136**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1.0903	6.0000e-005	6.6400e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0128	0.0128	3.0000e-005	0.0000	0.0136
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.0903**	**6.0000e-005**	**6.6400e-003**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0128**	**0.0128**	**3.0000e-005**	**0.0000**	**0.0136**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	5/1/2018	5/14/2018	5	10	
2	Grading	Grading	5/15/2018	6/25/2018	5	30	
3	Building Construction	Building Construction	6/26/2018	5/13/2019	5	230	
4	Paving	Paving	5/14/2019	6/10/2019	5	20	
5	Architectural Coating	Architectural Coating	6/11/2019	7/8/2019	5	20	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 105

Acres of Paving: 5.8

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 393,600; Non-Residential Outdoor: 131,200; Striped Parking Area: 15,148 (Architectural Coating – sqft)

OffRoad Equipment

Brodiaea Warehouse (Construction - Mitigated) - South Coast AQMD Air District, Annual

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	8.00	78	0.48
Site Preparation	Crawler Tractors	4	0.00	212	0.43
Grading	Crawler Tractors	2	8.00	212	0.43
Grading	Excavators	2	8.00	158	0.38
Building Construction	Cranes	1	8.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Paving	Pavers	2	8.00	130	0.42
Paving	Rollers	2	8.00	80	0.38
Building Construction	Crawler Tractors	3	8.00	212	0.43
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Grading	Graders	1	8.00	187	0.41
Grading	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Paving	Paving Equipment	2	8.00	132	0.36
Site Preparation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Building Construction	Welders	1	8.00	46	0.45
Grading	Scrapers	2	8.00	367	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	216.00	84.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	43.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Site Preparation - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0903	0.0000	0.0903	0.0497	0.0000	0.0497	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0175	0.1884	0.0657	1.3000e-004		9.1600e-003	9.1600e-003		8.4300e-003	8.4300e-003	0.0000	11.7050	11.7050	3.6400e-003	0.0000	11.7961
Total	**0.0175**	**0.1884**	**0.0657**	**1.3000e-004**	**0.0903**	**9.1600e-003**	**0.0995**	**0.0497**	**8.4300e-003**	**0.0581**	**0.0000**	**11.7050**	**11.7050**	**3.6400e-003**	**0.0000**	**11.7961**

3.2 Site Preparation - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.8000e-004	3.9000e-004	4.2000e-003	1.0000e-005	9.9000e-004	1.0000e-005	1.0000e-003	2.6000e-004	1.0000e-005	2.7000e-004	0.0000	0.9473	0.9473	3.0000e-005	0.0000	0.9481
Total	**4.8000e-004**	**3.9000e-004**	**4.2000e-003**	**1.0000e-005**	**9.9000e-004**	**1.0000e-005**	**1.0000e-003**	**2.6000e-004**	**1.0000e-005**	**2.7000e-004**	**0.0000**	**0.9473**	**0.9473**	**3.0000e-005**	**0.0000**	**0.9481**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0352	0.0000	0.0352	0.0194	0.0000	0.0194	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0175	0.1884	0.0657	1.3000e-004		9.1600e-003	9.1600e-003		8.4300e-003	8.4300e-003	0.0000	11.7050	11.7050	3.6400e-003	0.0000	11.7961
Total	**0.0175**	**0.1884**	**0.0657**	**1.3000e-004**	**0.0352**	**9.1600e-003**	**0.0444**	**0.0194**	**8.4300e-003**	**0.0278**	**0.0000**	**11.7050**	**11.7050**	**3.6400e-003**	**0.0000**	**11.7961**

3.2 Site Preparation - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.8000e-004	3.9000e-004	4.2000e-003	1.0000e-005	9.9000e-004	1.0000e-005	1.0000e-003	2.6000e-004	1.0000e-005	2.7000e-004	0.0000	0.9473	0.9473	3.0000e-005	0.0000	0.9481
Total	**4.8000e-004**	**3.9000e-004**	**4.2000e-003**	**1.0000e-005**	**9.9000e-004**	**1.0000e-005**	**1.0000e-003**	**2.6000e-004**	**1.0000e-005**	**2.7000e-004**	**0.0000**	**0.9473**	**0.9473**	**3.0000e-005**	**0.0000**	**0.9481**

3.3 Grading - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1460	0.0000	0.1460	0.0557	0.0000	0.0557	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0876	1.0691	0.5360	1.0700e-003		0.0436	0.0436		0.0401	0.0401	0.0000	97.9715	97.9715	0.0305	0.0000	98.7340
Total	**0.0876**	**1.0691**	**0.5360**	**1.0700e-003**	**0.1460**	**0.0436**	**0.1896**	**0.0557**	**0.0401**	**0.0958**	**0.0000**	**97.9715**	**97.9715**	**0.0305**	**0.0000**	**98.7340**

3.3 Grading - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.5900e-003	1.3000e-003	0.0140	3.0000e-005	3.2900e-003	3.0000e-005	3.3200e-003	8.7000e-004	2.0000e-005	9.0000e-004	0.0000	3.1575	3.1575	1.1000e-004	0.0000	3.1602
Total	**1.5900e-003**	**1.3000e-003**	**0.0140**	**3.0000e-005**	**3.2900e-003**	**3.0000e-005**	**3.3200e-003**	**8.7000e-004**	**2.0000e-005**	**9.0000e-004**	**0.0000**	**3.1575**	**3.1575**	**1.1000e-004**	**0.0000**	**3.1602**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0569	0.0000	0.0569	0.0217	0.0000	0.0217	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0876	1.0691	0.5360	1.0700e-003		0.0436	0.0436		0.0401	0.0401	0.0000	97.9714	97.9714	0.0305	0.0000	98.7339
Total	**0.0876**	**1.0691**	**0.5360**	**1.0700e-003**	**0.0569**	**0.0436**	**0.1005**	**0.0217**	**0.0401**	**0.0618**	**0.0000**	**97.9714**	**97.9714**	**0.0305**	**0.0000**	**98.7339**

3.3 Grading - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.5900e-003	1.3000e-003	0.0140	3.0000e-005	3.2900e-003	3.0000e-005	3.3200e-003	8.7000e-004	2.0000e-005	9.0000e-004	0.0000	3.1575	3.1575	1.1000e-004	0.0000	3.1602
Total	**1.5900e-003**	**1.3000e-003**	**0.0140**	**3.0000e-005**	**3.2900e-003**	**3.0000e-005**	**3.3200e-003**	**8.7000e-004**	**2.0000e-005**	**9.0000e-004**	**0.0000**	**3.1575**	**3.1575**	**1.1000e-004**	**0.0000**	**3.1602**

3.4 Building Construction - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2682	2.8926	1.3323	2.9000e-003		0.1359	0.1359		0.1270	0.1270	0.0000	259.8608	259.8608	0.0703	0.0000	261.6172
Total	**0.2682**	**2.8926**	**1.3323**	**2.9000e-003**		**0.1359**	**0.1359**		**0.1270**	**0.1270**	**0.0000**	**259.8608**	**259.8608**	**0.0703**	**0.0000**	**261.6172**

3.4 Building Construction - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0246	0.7010	0.1806	1.4700e-003	0.0357	5.0500e-003	0.0408	0.0103	4.8300e-003	0.0152	0.0000	141.6274	141.6274	0.0101	0.0000	141.8794
Worker	0.0775	0.0634	0.6805	1.7000e-003	0.1600	1.3000e-003	0.1613	0.0425	1.2000e-003	0.0437	0.0000	153.4549	153.4549	5.2400e-003	0.0000	153.5858
Total	**0.1021**	**0.7644**	**0.8611**	**3.1700e-003**	**0.1957**	**6.3500e-003**	**0.2021**	**0.0528**	**6.0300e-003**	**0.0588**	**0.0000**	**295.0823**	**295.0823**	**0.0153**	**0.0000**	**295.4652**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2682	2.8926	1.3323	2.9000e-003		0.1359	0.1359		0.1270	0.1270	0.0000	259.8605	259.8605	0.0703	0.0000	261.6169
Total	**0.2682**	**2.8926**	**1.3323**	**2.9000e-003**		**0.1359**	**0.1359**		**0.1270**	**0.1270**	**0.0000**	**259.8605**	**259.8605**	**0.0703**	**0.0000**	**261.6169**

3.4 Building Construction - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0246	0.7010	0.1806	1.4700e-003	0.0357	5.0500e-003	0.0408	0.0103	4.8300e-003	0.0152	0.0000	141.6274	141.6274	0.0101	0.0000	141.8794
Worker	0.0775	0.0634	0.6805	1.7000e-003	0.1600	1.3000e-003	0.1613	0.0425	1.2000e-003	0.0437	0.0000	153.4549	153.4549	5.2400e-003	0.0000	153.5858
Total	**0.1021**	**0.7644**	**0.8611**	**3.1700e-003**	**0.1957**	**6.3500e-003**	**0.2021**	**0.0528**	**6.0300e-003**	**0.0588**	**0.0000**	**295.0823**	**295.0823**	**0.0153**	**0.0000**	**295.4652**

3.4 Building Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1731	1.8846	0.9094	2.0400e-003		0.0863	0.0863		0.0806	0.0806	0.0000	180.4461	180.4461	0.0490	0.0000	181.6702
Total	**0.1731**	**1.8846**	**0.9094**	**2.0400e-003**		**0.0863**	**0.0863**		**0.0806**	**0.0806**	**0.0000**	**180.4461**	**180.4461**	**0.0490**	**0.0000**	**181.6702**

3.4 Building Construction - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0157	0.4652	0.1167	1.0200e-003	0.0252	3.0400e-003	0.0282	7.2600e-003	2.9100e-003	0.0102	0.0000	98.7808	98.7808	6.8400e-003	0.0000	98.9517
Worker	0.0496	0.0394	0.4278	1.1600e-003	0.1126	8.9000e-004	0.1135	0.0299	8.2000e-004	0.0307	0.0000	104.5794	104.5794	3.2700e-003	0.0000	104.6611
Total	**0.0652**	**0.5046**	**0.5444**	**2.1800e-003**	**0.1377**	**3.9300e-003**	**0.1417**	**0.0372**	**3.7300e-003**	**0.0409**	**0.0000**	**203.3602**	**203.3602**	**0.0101**	**0.0000**	**203.6128**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1731	1.8846	0.9094	2.0400e-003		0.0863	0.0863		0.0806	0.0806	0.0000	180.4459	180.4459	0.0490	0.0000	181.6700
Total	**0.1731**	**1.8846**	**0.9094**	**2.0400e-003**		**0.0863**	**0.0863**		**0.0806**	**0.0806**	**0.0000**	**180.4459**	**180.4459**	**0.0490**	**0.0000**	**181.6700**

3.4 Building Construction - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0157	0.4652	0.1167	1.0200e-003	0.0252	3.0400e-003	0.0282	7.2600e-003	2.9100e-003	0.0102	0.0000	98.7808	98.7808	6.8400e-003	0.0000	98.9517
Worker	0.0496	0.0394	0.4278	1.1600e-003	0.1126	8.9000e-004	0.1135	0.0299	8.2000e-004	0.0307	0.0000	104.5794	104.5794	3.2700e-003	0.0000	104.6611
Total	**0.0652**	**0.5046**	**0.5444**	**2.1800e-003**	**0.1377**	**3.9300e-003**	**0.1417**	**0.0372**	**3.7300e-003**	**0.0409**	**0.0000**	**203.3602**	**203.3602**	**0.0101**	**0.0000**	**203.6128**

3.5 Paving - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0145	0.1524	0.1467	2.3000e-004		8.2500e-003	8.2500e-003		7.5900e-003	7.5900e-003	0.0000	20.4752	20.4752	6.4800e-003	0.0000	20.6371
Paving	7.6000e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0221**	**0.1524**	**0.1467**	**2.3000e-004**		**8.2500e-003**	**8.2500e-003**		**7.5900e-003**	**7.5900e-003**	**0.0000**	**20.4752**	**20.4752**	**6.4800e-003**	**0.0000**	**20.6371**

3.5 Paving - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.2000e-004	5.8000e-004	6.2500e-003	2.0000e-005	1.6500e-003	1.0000e-005	1.6600e-003	4.4000e-004	1.0000e-005	4.5000e-004	0.0000	1.5289	1.5289	5.0000e-005	0.0000	1.5301
Total	**7.2000e-004**	**5.8000e-004**	**6.2500e-003**	**2.0000e-005**	**1.6500e-003**	**1.0000e-005**	**1.6600e-003**	**4.4000e-004**	**1.0000e-005**	**4.5000e-004**	**0.0000**	**1.5289**	**1.5289**	**5.0000e-005**	**0.0000**	**1.5301**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0145	0.1524	0.1467	2.3000e-004		8.2500e-003	8.2500e-003		7.5900e-003	7.5900e-003	0.0000	20.4752	20.4752	6.4800e-003	0.0000	20.6371
Paving	7.6000e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0221**	**0.1524**	**0.1467**	**2.3000e-004**		**8.2500e-003**	**8.2500e-003**		**7.5900e-003**	**7.5900e-003**	**0.0000**	**20.4752**	**20.4752**	**6.4800e-003**	**0.0000**	**20.6371**

3.5 Paving - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.2000e-004	5.8000e-004	6.2500e-003	2.0000e-005	1.6500e-003	1.0000e-005	1.6600e-003	4.4000e-004	1.0000e-005	4.5000e-004	0.0000	1.5289	1.5289	5.0000e-005	0.0000	1.5301
Total	**7.2000e-004**	**5.8000e-004**	**6.2500e-003**	**2.0000e-005**	**1.6500e-003**	**1.0000e-005**	**1.6600e-003**	**4.4000e-004**	**1.0000e-005**	**4.5000e-004**	**0.0000**	**1.5289**	**1.5289**	**5.0000e-005**	**0.0000**	**1.5301**

3.6 Architectural Coating - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.6257					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.5500e-003	0.0245	0.0246	4.0000e-005		1.7200e-003	1.7200e-003		1.7200e-003	1.7200e-003	0.0000	3.4043	3.4043	2.9000e-004	0.0000	3.4115
Total	**0.6292**	**0.0245**	**0.0246**	**4.0000e-005**		**1.7200e-003**	**1.7200e-003**		**1.7200e-003**	**1.7200e-003**	**0.0000**	**3.4043**	**3.4043**	**2.9000e-004**	**0.0000**	**3.4115**

3.6 Architectural Coating - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.0800e-003	1.6500e-003	0.0179	5.0000e-005	4.7200e-003	4.0000e-005	4.7600e-003	1.2500e-003	3.0000e-005	1.2900e-003	0.0000	4.3830	4.3830	1.4000e-004	0.0000	4.3864
Total	**2.0800e-003**	**1.6500e-003**	**0.0179**	**5.0000e-005**	**4.7200e-003**	**4.0000e-005**	**4.7600e-003**	**1.2500e-003**	**3.0000e-005**	**1.2900e-003**	**0.0000**	**4.3830**	**4.3830**	**1.4000e-004**	**0.0000**	**4.3864**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.6257					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.5500e-003	0.0245	0.0246	4.0000e-005		1.7200e-003	1.7200e-003		1.7200e-003	1.7200e-003	0.0000	3.4043	3.4043	2.9000e-004	0.0000	3.4115
Total	**0.6292**	**0.0245**	**0.0246**	**4.0000e-005**		**1.7200e-003**	**1.7200e-003**		**1.7200e-003**	**1.7200e-003**	**0.0000**	**3.4043**	**3.4043**	**2.9000e-004**	**0.0000**	**3.4115**

3.6 Architectural Coating - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.0800e-003	1.6500e-003	0.0179	5.0000e-005	4.7200e-003	4.0000e-005	4.7600e-003	1.2500e-003	3.0000e-005	1.2900e-003	0.0000	4.3830	4.3830	1.4000e-004	0.0000	4.3864
Total	**2.0800e-003**	**1.6500e-003**	**0.0179**	**5.0000e-005**	**4.7200e-003**	**4.0000e-005**	**4.7600e-003**	**1.2500e-003**	**3.0000e-005**	**1.2900e-003**	**0.0000**	**4.3830**	**4.3830**	**1.4000e-004**	**0.0000**	**4.3864**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Parking Lot	0.00	0.00	0.00		
Unrefrigerated Warehouse-No Rail	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Parking Lot	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0
Unrefrigerated Warehouse-No Rail	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Parking Lot	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Unrefrigerated Warehouse-No Rail	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	1.0903	6.0000e-005	6.6400e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0128	0.0128	3.0000e-005	0.0000	0.0136
Unmitigated	1.0903	6.0000e-005	6.6400e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0128	0.0128	3.0000e-005	0.0000	0.0136

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.1251					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.9645					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	6.3000e-004	6.0000e-005	6.6400e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0128	0.0128	3.0000e-005	0.0000	0.0136
Total	**1.0903**	**6.0000e-005**	**6.6400e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0128**	**0.0128**	**3.0000e-005**	**0.0000**	**0.0136**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.1251					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.9645					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	6.3000e-004	6.0000e-005	6.6400e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0128	0.0128	3.0000e-005	0.0000	0.0136
Total	**1.0903**	**6.0000e-005**	**6.6400e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0128**	**0.0128**	**3.0000e-005**	**0.0000**	**0.0136**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Brodiaea Warehouse (Operations - Trucks)

South Coast AQMD Air District, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Unrefrigerated Warehouse-No Rail	262.40	1000sqft	6.02	262,400.00	0
Parking Lot	252.46	1000sqft	5.80	252,460.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	10			**Operational Year**	2019
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Operations (Truck) Run Only.

Off-road Equipment - Operations (Truck) Run Only.

Trips and VMT - Operations (Truck) Run Only.

Architectural Coating -

Vehicle Trips - Operations (Passenger Car) Run Only. Trip Rates based on ITE 9th Edition.

Fleet Mix - Operations (Truck) Run Only.

Energy Use -

Water And Wastewater -

Solid Waste -

Operational Off-Road Equipment - Operational equipment provided by the Client.

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	10.00	1.00
tblConstructionPhase	PhaseEndDate	5/14/2018	5/1/2018
tblFleetMix	HHD	0.03	0.60
tblFleetMix	LDA	0.55	0.00
tblFleetMix	LDT1	0.04	0.00
tblFleetMix	LDT2	0.20	0.00
tblFleetMix	LHD1	0.02	0.22
tblFleetMix	LHD2	5.8700e-003	0.00
tblFleetMix	MCY	4.7240e-003	0.00
tblFleetMix	MDV	0.12	0.00
tblFleetMix	MH	9.9100e-004	0.00
tblFleetMix	MHD	0.02	0.18
tblFleetMix	OBUS	1.9990e-003	0.00

tblFleetMix	SBUS	7.0400e-004	0.00
tblFleetMix	UBUS	2.0270e-003	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOperationalOffRoadEquipment	OperHoursPerDay	8.00	4.00
tblOperationalOffRoadEquipment	OperHoursPerDay	8.00	4.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00
tblVehicleTrips	CNW_TTP	41.00	0.00
tblVehicleTrips	CW_TL	16.60	61.00
tblVehicleTrips	CW_TTP	59.00	100.00
tblVehicleTrips	DV_TP	5.00	0.00
tblVehicleTrips	PB_TP	3.00	0.00
tblVehicleTrips	PR_TP	92.00	100.00
tblVehicleTrips	ST_TR	1.68	0.64
tblVehicleTrips	SU_TR	1.68	0.64
tblVehicleTrips	WD_TR	1.68	0.64

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2018	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2018	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
		Highest		

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1.0903	6.0000e-005	6.6400e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0128	0.0128	3.0000e-005	0.0000	0.0136
Energy	2.8700e-003	0.0261	0.0219	1.6000e-004		1.9800e-003	1.9800e-003		1.9800e-003	1.9800e-003	0.0000	253.8899	253.8899	9.8500e-003	2.4500e-003	254.8654
Mobile	0.5765	16.4150	4.3947	0.0532	1.6264	0.1204	1.7468	0.4574	0.1152	0.5726	0.0000	5,150.1761	5,150.1761	0.2461	0.0000	5,156.3288
Offroad	0.0255	0.2448	0.2273	3.0000e-004		0.0173	0.0173		0.0160	0.0160	0.0000	27.0577	27.0577	8.5600e-003	0.0000	27.2718
Waste						0.0000	0.0000		0.0000	0.0000	50.0698	0.0000	50.0698	2.9590	0.0000	124.0457
Water						0.0000	0.0000		0.0000	0.0000	19.2510	251.7473	270.9983	1.9877	0.0488	335.2432
Total	**1.6952**	**16.6859**	**4.6506**	**0.0536**	**1.6264**	**0.1397**	**1.7661**	**0.4574**	**0.1331**	**0.5905**	**69.3207**	**5,682.8838**	**5,752.2046**	**5.2112**	**0.0513**	**5,897.7685**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1.0903	6.0000e-005	6.6400e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0128	0.0128	3.0000e-005	0.0000	0.0136
Energy	2.8700e-003	0.0261	0.0219	1.6000e-004		1.9800e-003	1.9800e-003		1.9800e-003	1.9800e-003	0.0000	253.8899	253.8899	9.8500e-003	2.4500e-003	254.8654
Mobile	0.5765	16.4150	4.3947	0.0532	1.6264	0.1204	1.7468	0.4574	0.1152	0.5726	0.0000	5,150.1761	5,150.1761	0.2461	0.0000	5,156.3288
Offroad	0.0255	0.2448	0.2273	3.0000e-004		0.0173	0.0173		0.0160	0.0160	0.0000	27.0577	27.0577	8.5600e-003	0.0000	27.2718
Waste						0.0000	0.0000		0.0000	0.0000	50.0698	0.0000	50.0698	2.9590	0.0000	124.0457
Water						0.0000	0.0000		0.0000	0.0000	19.2510	251.7473	270.9983	1.9877	0.0488	335.2432
Total	**1.6952**	**16.6859**	**4.6506**	**0.0536**	**1.6264**	**0.1397**	**1.7661**	**0.4574**	**0.1331**	**0.5905**	**69.3207**	**5,682.8838**	**5,752.2046**	**5.2112**	**0.0513**	**5,897.7685**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	5/1/2018	5/1/2018	5	1	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 5.8

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Site Preparation	Rubber Tired Dozers	0	8.00	247	0.40

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	0	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Site Preparation - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.2 Site Preparation - 2018

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.5765	16.4150	4.3947	0.0532	1.6264	0.1204	1.7468	0.4574	0.1152	0.5726	0.0000	5,150.1761	5,150.1761	0.2461	0.0000	5,156.3288
Unmitigated	0.5765	16.4150	4.3947	0.0532	1.6264	0.1204	1.7468	0.4574	0.1152	0.5726	0.0000	5,150.1761	5,150.1761	0.2461	0.0000	5,156.3288

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Parking Lot	0.00	0.00	0.00		
Unrefrigerated Warehouse-No Rail	167.94	167.94	167.94	3,728,851	3,728,851
Total	167.94	167.94	167.94	3,728,851	3,728,851

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Unrefrigerated Warehouse-No	61.00	8.40	6.90	100.00	0.00	0.00	100	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Parking Lot	0.546418	0.044132	0.199182	0.124467	0.017484	0.005870	0.020172	0.031831	0.001999	0.002027	0.004724	0.000704	0.000991
Unrefrigerated Warehouse-No Rail	0.000000	0.000000	0.000000	0.000000	0.220000	0.000000	0.180000	0.600000	0.000000	0.000000	0.000000	0.000000	0.000000

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	225.4645	225.4645	9.3100e-003	1.9300e-003	226.2711
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	225.4645	225.4645	9.3100e-003	1.9300e-003	226.2711
NaturalGas Mitigated	2.8700e-003	0.0261	0.0219	1.6000e-004		1.9800e-003	1.9800e-003		1.9800e-003	1.9800e-003	0.0000	28.4254	28.4254	5.4000e-004	5.2000e-004	28.5943
NaturalGas Unmitigated	2.8700e-003	0.0261	0.0219	1.6000e-004		1.9800e-003	1.9800e-003		1.9800e-003	1.9800e-003	0.0000	28.4254	28.4254	5.4000e-004	5.2000e-004	28.5943

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	532672	2.8700e-003	0.0261	0.0219	1.6000e-004		1.9800e-003	1.9800e-003		1.9800e-003	1.9800e-003	0.0000	28.4254	28.4254	5.4000e-004	5.2000e-004	28.5943
Total		**2.8700e-003**	**0.0261**	**0.0219**	**1.6000e-004**		**1.9800e-003**	**1.9800e-003**		**1.9800e-003**	**1.9800e-003**	**0.0000**	**28.4254**	**28.4254**	**5.4000e-004**	**5.2000e-004**	**28.5943**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	532672	2.8700e-003	0.0261	0.0219	1.6000e-004		1.9800e-003	1.9800e-003		1.9800e-003	1.9800e-003	0.0000	28.4254	28.4254	5.4000e-004	5.2000e-004	28.5943
Total		**2.8700e-003**	**0.0261**	**0.0219**	**1.6000e-004**		**1.9800e-003**	**1.9800e-003**		**1.9800e-003**	**1.9800e-003**	**0.0000**	**28.4254**	**28.4254**	**5.4000e-004**	**5.2000e-004**	**28.5943**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Parking Lot	88361	28.1537	1.1600e-003	2.4000e-004	28.2544
Unrefrigerated Warehouse-No Rail	619264	197.3108	8.1500e-003	1.6900e-003	198.0167
Total		**225.4645**	**9.3100e-003**	**1.9300e-003**	**226.2711**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Parking Lot	88361	28.1537	1.1600e-003	2.4000e-004	28.2544
Unrefrigerated Warehouse-No Rail	619264	197.3108	8.1500e-003	1.6900e-003	198.0167
Total		**225.4645**	**9.3100e-003**	**1.9300e-003**	**226.2711**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	1.0903	6.0000e-005	6.6400e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0128	0.0128	3.0000e-005	0.0000	0.0136
Unmitigated	1.0903	6.0000e-005	6.6400e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0128	0.0128	3.0000e-005	0.0000	0.0136

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.1251					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.9645					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	6.3000e-004	6.0000e-005	6.6400e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0128	0.0128	3.0000e-005	0.0000	0.0136
Total	**1.0903**	**6.0000e-005**	**6.6400e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0128**	**0.0128**	**3.0000e-005**	**0.0000**	**0.0136**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.1251					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.9645					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	6.3000e-004	6.0000e-005	6.6400e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0128	0.0128	3.0000e-005	0.0000	0.0136
Total	**1.0903**	**6.0000e-005**	**6.6400e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0128**	**0.0128**	**3.0000e-005**	**0.0000**	**0.0136**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	270.9983	1.9877	0.0488	335.2432
Unmitigated	270.9983	1.9877	0.0488	335.2432

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	60.68 / 0	270.9983	1.9877	0.0488	335.2432
Total		**270.9983**	**1.9877**	**0.0488**	**335.2432**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	60.68 / 0	270.9983	1.9877	0.0488	335.2432
Total		**270.9983**	**1.9877**	**0.0488**	**335.2432**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	50.0698	2.9590	0.0000	124.0457
Unmitigated	50.0698	2.9590	0.0000	124.0457

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	246.66	50.0698	2.9590	0.0000	124.0457
Total		**50.0698**	**2.9590**	**0.0000**	**124.0457**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	246.66	50.0698	2.9590	0.0000	124.0457
Total		**50.0698**	**2.9590**	**0.0000**	**124.0457**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
Forklifts	1	4.00	260	89	0.20	Diesel
Tractors/Loaders/Backhoes	1	4.00	260	97	0.37	Diesel

UnMitigated/Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Equipment Type	tons/yr										MT/yr					
Forklifts	0.0104	0.0928	0.0776	1.0000e-004		7.1900e-003	7.1900e-003		6.6200e-003	6.6200e-003	0.0000	8.9229	8.9229	2.8200e-003	0.0000	8.9935
Tractors/Loaders/Backhoes	0.0151	0.1519	0.1497	2.0000e-004		0.0101	0.0101		9.3300e-003	9.3300e-003	0.0000	18.1348	18.1348	5.7400e-003	0.0000	18.2783
Total	**0.0255**	**0.2448**	**0.2273**	**3.0000e-004**		**0.0173**	**0.0173**		**0.0160**	**0.0160**	**0.0000**	**27.0577**	**27.0577**	**8.5600e-003**	**0.0000**	**27.2718**

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

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APPENDIX 3.2:

CALEEMOD OPERATIONAL EMISSIONS MODEL OUTPUTS (PASSENGER CARS)

Brodiaea Warehouse (Operations - Passenger Cars)

South Coast AQMD Air District, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Unrefrigerated Warehouse-No Rail	262.40	1000sqft	6.02	262,400.00	0
Parking Lot	252.46	1000sqft	5.80	252,460.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	10			**Operational Year**	2019
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Operations (Passenger Car) Run Only.

Off-road Equipment - Operations (Passenger Car) Run Only.

Trips and VMT - Operations (Passenger Car) Run Only.

Architectural Coating -

Vehicle Trips - Operations (Passenger Car) Run Only. Trip Rates based on ITE 9th Edition.

Fleet Mix - Operations (Passenger Car) Run Only.

Energy Use -

Water And Wastewater -

Solid Waste -

Operational Off-Road Equipment - Operational equipment provided by the Client.

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	10.00	1.00
tblConstructionPhase	PhaseEndDate	6/11/2018	5/1/2018
tblConstructionPhase	PhaseStartDate	5/29/2018	5/1/2018
tblFleetMix	HHD	0.03	0.00
tblFleetMix	HHD	0.03	0.00
tblFleetMix	LDA	0.55	1.00
tblFleetMix	LDA	0.55	1.00
tblFleetMix	LDT1	0.04	0.00
tblFleetMix	LDT1	0.04	0.00
tblFleetMix	LDT2	0.20	0.00
tblFleetMix	LDT2	0.20	0.00
tblFleetMix	LHD1	0.02	0.00
tblFleetMix	LHD1	0.02	0.00

tblFleetMix	LHD2	5.8700e-003	0.00
tblFleetMix	LHD2	5.8700e-003	0.00
tblFleetMix	MCY	4.7240e-003	0.00
tblFleetMix	MCY	4.7240e-003	0.00
tblFleetMix	MDV	0.12	0.00
tblFleetMix	MDV	0.12	0.00
tblFleetMix	MH	9.9100e-004	0.00
tblFleetMix	MH	9.9100e-004	0.00
tblFleetMix	MHD	0.02	0.00
tblFleetMix	MHD	0.02	0.00
tblFleetMix	OBUS	1.9990e-003	0.00
tblFleetMix	OBUS	1.9990e-003	0.00
tblFleetMix	SBUS	7.0400e-004	0.00
tblFleetMix	SBUS	7.0400e-004	0.00
tblFleetMix	UBUS	2.0270e-003	0.00
tblFleetMix	UBUS	2.0270e-003	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOperationalOffRoadEquipment	OperHoursPerDay	8.00	4.00
tblOperationalOffRoadEquipment	OperHoursPerDay	8.00	4.00
tblOperationalOffRoadEquipment	OperLoadFactor	0.20	0.20
tblOperationalOffRoadEquipment	OperLoadFactor	0.37	0.37
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00
tblVehicleTrips	CNW_TTP	41.00	0.00
tblVehicleTrips	CW_TTP	59.00	100.00
tblVehicleTrips	DV_TP	5.00	0.00

tblVehicleTrips	PB_TP	3.00	0.00
tblVehicleTrips	PR_TP	92.00	100.00
tblVehicleTrips	ST_TR	1.68	1.04
tblVehicleTrips	SU_TR	1.68	1.04
tblVehicleTrips	WD_TR	1.68	1.04

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2018	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2018	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
		Highest		

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1.0903	6.0000e-005	6.6400e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0128	0.0128	3.0000e-005	0.0000	0.0136
Energy	2.8700e-003	0.0261	0.0219	1.6000e-004		1.9800e-003	1.9800e-003		1.9800e-003	1.9800e-003	0.0000	253.8899	253.8899	9.8500e-003	2.4500e-003	254.8654
Mobile	0.0703	0.1316	1.5544	5.4700e-003	0.6148	4.1300e-003	0.6189	0.1632	3.8100e-003	0.1670	0.0000	495.2369	495.2369	0.0114	0.0000	495.5225
Offroad	0.0255	0.2446	0.2271	3.0000e-004		0.0173	0.0173		0.0159	0.0159	0.0000	27.0288	27.0288	8.5500e-003	0.0000	27.2426
Waste						0.0000	0.0000		0.0000	0.0000	50.0698	0.0000	50.0698	2.9590	0.0000	124.0457
Water						0.0000	0.0000		0.0000	0.0000	19.2510	251.7473	270.9983	1.9877	0.0488	335.2432
Total	**1.1890**	**0.4024**	**1.8101**	**5.9300e-003**	**0.6148**	**0.0235**	**0.6383**	**0.1632**	**0.0218**	**0.1850**	**69.3207**	**1,027.9158**	**1,097.2365**	**4.9766**	**0.0513**	**1,236.9332**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1.0903	6.0000e-005	6.6400e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0128	0.0128	3.0000e-005	0.0000	0.0136
Energy	2.8700e-003	0.0261	0.0219	1.6000e-004		1.9800e-003	1.9800e-003		1.9800e-003	1.9800e-003	0.0000	253.8899	253.8899	9.8500e-003	2.4500e-003	254.8654
Mobile	0.0703	0.1316	1.5544	5.4700e-003	0.6148	4.1300e-003	0.6189	0.1632	3.8100e-003	0.1670	0.0000	495.2369	495.2369	0.0114	0.0000	495.5225
Offroad	0.0255	0.2446	0.2271	3.0000e-004		0.0173	0.0173		0.0159	0.0159	0.0000	27.0288	27.0288	8.5500e-003	0.0000	27.2426
Waste						0.0000	0.0000		0.0000	0.0000	50.0698	0.0000	50.0698	2.9590	0.0000	124.0457
Water						0.0000	0.0000		0.0000	0.0000	19.2510	251.7473	270.9983	1.9877	0.0488	335.2432
Total	**1.1890**	**0.4024**	**1.8101**	**5.9300e-003**	**0.6148**	**0.0235**	**0.6383**	**0.1632**	**0.0218**	**0.1850**	**69.3207**	**1,027.9158**	**1,097.2365**	**4.9766**	**0.0513**	**1,236.9332**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	5/1/2018	5/1/2018	5	1	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 5.8

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Site Preparation	Rubber Tired Dozers	0	8.00	247	0.40

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	0	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Site Preparation - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.2 Site Preparation - 2018

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0703	0.1316	1.5544	5.4700e-003	0.6148	4.1300e-003	0.6189	0.1632	3.8100e-003	0.1670	0.0000	495.2369	495.2369	0.0114	0.0000	495.5225
Unmitigated	0.0703	0.1316	1.5544	5.4700e-003	0.6148	4.1300e-003	0.6189	0.1632	3.8100e-003	0.1670	0.0000	495.2369	495.2369	0.0114	0.0000	495.5225

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Parking Lot	0.00	0.00	0.00		
Unrefrigerated Warehouse-No Rail	272.90	272.90	272.90	1,648,947	1,648,947
Total	272.90	272.90	272.90	1,648,947	1,648,947

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Unrefrigerated Warehouse-No	16.60	8.40	6.90	100.00	0.00	0.00	100	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Parking Lot	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Unrefrigerated Warehouse-No Rail	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	225.4645	225.4645	9.3100e-003	1.9300e-003	226.2711
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	225.4645	225.4645	9.3100e-003	1.9300e-003	226.2711
NaturalGas Mitigated	2.8700e-003	0.0261	0.0219	1.6000e-004		1.9800e-003	1.9800e-003		1.9800e-003	1.9800e-003	0.0000	28.4254	28.4254	5.4000e-004	5.2000e-004	28.5943
NaturalGas Unmitigated	2.8700e-003	0.0261	0.0219	1.6000e-004		1.9800e-003	1.9800e-003		1.9800e-003	1.9800e-003	0.0000	28.4254	28.4254	5.4000e-004	5.2000e-004	28.5943

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	532672	2.8700e-003	0.0261	0.0219	1.6000e-004		1.9800e-003	1.9800e-003		1.9800e-003	1.9800e-003	0.0000	28.4254	28.4254	5.4000e-004	5.2000e-004	28.5943
Total		**2.8700e-003**	**0.0261**	**0.0219**	**1.6000e-004**		**1.9800e-003**	**1.9800e-003**		**1.9800e-003**	**1.9800e-003**	**0.0000**	**28.4254**	**28.4254**	**5.4000e-004**	**5.2000e-004**	**28.5943**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	532672	2.8700e-003	0.0261	0.0219	1.6000e-004		1.9800e-003	1.9800e-003		1.9800e-003	1.9800e-003	0.0000	28.4254	28.4254	5.4000e-004	5.2000e-004	28.5943
Total		**2.8700e-003**	**0.0261**	**0.0219**	**1.6000e-004**		**1.9800e-003**	**1.9800e-003**		**1.9800e-003**	**1.9800e-003**	**0.0000**	**28.4254**	**28.4254**	**5.4000e-004**	**5.2000e-004**	**28.5943**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Parking Lot	88361	28.1537	1.1600e-003	2.4000e-004	28.2544
Unrefrigerated Warehouse-No Rail	619264	197.3108	8.1500e-003	1.6900e-003	198.0167
Total		**225.4645**	**9.3100e-003**	**1.9300e-003**	**226.2711**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Parking Lot	88361	28.1537	1.1600e-003	2.4000e-004	28.2544
Unrefrigerated Warehouse-No Rail	619264	197.3108	8.1500e-003	1.6900e-003	198.0167
Total		**225.4645**	**9.3100e-003**	**1.9300e-003**	**226.2711**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	1.0903	6.0000e-005	6.6400e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0128	0.0128	3.0000e-005	0.0000	0.0136
Unmitigated	1.0903	6.0000e-005	6.6400e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0128	0.0128	3.0000e-005	0.0000	0.0136

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.1251					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.9645					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	6.3000e-004	6.0000e-005	6.6400e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0128	0.0128	3.0000e-005	0.0000	0.0136
Total	**1.0903**	**6.0000e-005**	**6.6400e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0128**	**0.0128**	**3.0000e-005**	**0.0000**	**0.0136**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.1251					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.9645					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	6.3000e-004	6.0000e-005	6.6400e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0128	0.0128	3.0000e-005	0.0000	0.0136
Total	**1.0903**	**6.0000e-005**	**6.6400e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0128**	**0.0128**	**3.0000e-005**	**0.0000**	**0.0136**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	270.9983	1.9877	0.0488	335.2432
Unmitigated	270.9983	1.9877	0.0488	335.2432

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	60.68 / 0	270.9983	1.9877	0.0488	335.2432
Total		**270.9983**	**1.9877**	**0.0488**	**335.2432**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	60.68 / 0	270.9983	1.9877	0.0488	335.2432
Total		**270.9983**	**1.9877**	**0.0488**	**335.2432**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	50.0698	2.9590	0.0000	124.0457
Unmitigated	50.0698	2.9590	0.0000	124.0457

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	246.66	50.0698	2.9590	0.0000	124.0457
Total		**50.0698**	**2.9590**	**0.0000**	**124.0457**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	246.66	50.0698	2.9590	0.0000	124.0457
Total		**50.0698**	**2.9590**	**0.0000**	**124.0457**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
Forklifts	1	4.00	260	89	0.20	Diesel
Tractors/Loaders/Backhoes	1	4.00	260	97	0.37	Diesel

UnMitigated/Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Equipment Type	tons/yr										MT/yr					
Forklifts	0.0105	0.0933	0.0780	1.0000e-004		7.2300e-003	7.2300e-003		6.6500e-003	6.6500e-003	0.0000	8.9675	8.9675	2.8400e-003	0.0000	9.0385
Tractors/Loaders/Backhoes	0.0151	0.1513	0.1491	2.0000e-004		0.0101	0.0101		9.2900e-003	9.2900e-003	0.0000	18.0613	18.0613	5.7100e-003	0.0000	18.2042
Total	**0.0255**	**0.2446**	**0.2271**	**3.0000e-004**		**0.0173**	**0.0173**		**0.0159**	**0.0159**	**0.0000**	**27.0288**	**27.0288**	**8.5500e-003**	**0.0000**	**27.2426**

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

PHASE I ENVIRONMENTAL SITE ASSESSMENT
16.37-ACRES OF UNDEVELOPED LAND
SOUTHWEST CORNER OF ALESSANDRO BOULEVARD AND HEACOCK STREET
MORENO VALLEY, CALIFORNIA 92553
ASSESSOR'S PARCEL NUMBERS: 297-170-036 AND -038

Prepared for:

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August 31, 2017
File No. 01217215.00

This Phase I Environmental Site Assessment Report for 16.37 acres of undeveloped land located at the southwestern corner of Alessandro Boulevard and Heacock Street, Moreno Valley, California, dated August 31, 2017, was prepared by Justin Rauzon and reviewed by Kevin Green.

We declare that, to the best of our professional knowledge and belief, we meet the definition of Environmental Professional as defined in §312.10 of 40 CFR 312. The resumes for the individuals below are included in **Appendix F**. We have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. We have developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.

Justin Rauzon, R.E.P.A.
Project Manager
SCS ENGINEERS

Kevin W. Green, P.G.
Project Director
SCS ENGINEERS

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EXECUTIVE SUMMARY

SCS Engineers (SCS) was retained by Alere Property Group LLC to prepare a Phase I Environmental Site Assessment (Phase I ESA) of 16.37 acres of undeveloped land located at the southwestern corner of Alessandro Boulevard and Heacock Street, Moreno Valley, California (the "Property"). This assessment was performed in conformance with 40 CFR 312, Standards for Conducting All Appropriate Inquiries, and in general conformance with ASTM E1527-13.

With the exception of limited use as agricultural farmland since the 1980s (and perhaps earlier), the Property has never been developed. Historical records showed no past presence of structures on the Property. Based on the available information, it is unlikely that contamination is present on the Property.

During the site inspection, SCS observed placards that signified the presence of petroleum, natural gas, and high-pressure water pipelines to the west of the Property and a natural gas pipeline along the southern edge of the Property. SCS identified no information about releases from pipelines in the vicinity of the Property. Based on the available information, no negative environmental affects to the Property are anticipated from these pipelines.

Regulatory database information identified few known and suspected contamination sites in the area surrounding the Property. Based on the available information, it is unlikely that any of these sites have negatively affected the environmental condition of the Property.

Conclusions

In summary, SCS performed a Phase I Environmental Site Assessment o of 16.37 acres of undeveloped land located at the southwestern corner of Alessandro Boulevard and Heacock Street, Moreno Valley, California, in conformance with the scope and limitations of 40 CFR 312 and ASTM E1527-13. Any exceptions to, or deletions from, this practice are described in Section 5 of this report.

In the opinion of the Environmental Professional, this assessment has revealed no evidence of conditions indicative of releases or threatened releases of hazardous substances. Further investigation is not recommended.

Data Gaps

No site contacts, owners, or past operators were available to be interviewed as part of this Phase I ESA. Given the other information gathered during this assessment, SCS does not consider this to be a significant data gap.

1 INTRODUCTION

SCS Engineers (SCS) was retained by Alere Property Group LLC (the "User") to prepare a Phase I Environmental Site Assessment (Phase I ESA) of 16.37 acres of undeveloped land located at the southwestern corner of Alessandro Boulevard and Heacock Street, Moreno Valley, California (the "Property"). A location map for the Property is presented as **Figure 1** in **Appendix A**. This assessment was performed in conformance with 40 CFR 312, Standards for Conducting All Appropriate Inquiries, and in general conformance with ASTM E1527-13.

2 PURPOSE

This Phase I ESA is intended to constitute appropriate inquiry into the previous ownership and uses of the property, as required to support the assertion of the innocent landowner, contiguous property owner, and/or bona fide prospective purchaser defenses to liability (collectively the landowner liability protections, or LLPs) under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA a.k.a. Superfund), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and the Small Business Liability Relief and Brownfields Revitalization Act of 2002.

The purpose of this investigation was to identify conditions indicative of releases or threatened releases of hazardous substances as defined in CERCLA Section 101, and petroleum products, on, at, in, or to the Property.

If known or suspected contamination is identified, Users seeking to maintain LLPs have responsibilities in addition to completion of an AAI-compliant Phase I ESA. These "continuing obligations" include taking "appropriate care" and "reasonable steps" with respect to known or suspected releases of hazardous substances during the term of property ownership. In addition to these requirements under federal law, there are different requirements under state law with respect to liability protections. On request, SCS can provide support for clients with continuing obligations, as appropriate.

3 SCOPE OF SERVICES

This Phase I ESA is based on:

- Interviews with past and/or present owners, operators, and/or occupants of the Property.
- Reviews of federal, tribal, state, and local government records.
- Visual inspections of the Property and adjoining properties performed on July 31, 2017.
- Review of historical Property use information (topographic maps, aerial photographs, fire insurance maps, existing reports, etc.).
- Commonly known or reasonably ascertainable information about the Property (e.g., interviews with appropriate regulatory agency personnel and review of agency files review of available documents, interviews with other knowledgeable persons).
- Degree of obviousness of the presence or likely presence of contamination at the Property, and the ability to detect the contamination by appropriate investigation.

- Information provided as a result of the additional inquiries conducted by the User.

4 SPECIAL TERMS AND CONDITIONS

This Phase I ESA for 16.37 acres of undeveloped land located at the southwestern corner of Alessandro Boulevard and Heacock Street, Moreno Valley, California has been prepared specifically for Alere Property Group LLC. The report has been prepared in accordance with the care and skill generally exercised by reputable professionals, under similar circumstances, in this or similar localities. No other warranty, express or implied, is made as to the professional opinions presented herein.

No other party, known or unknown to SCS, is intended as a beneficiary of this work product, its content, or information embedded therein. Third parties use this report at their own risk. Third party reliance letters may be issued on request to SCS subject to approval of Alere Property Group and payment to SCS of a fee for such letters.

5 LIMITATIONS AND ASSUMPTIONS

The investigation focused on releases and threatened releases of hazardous substances or petroleum products that could be considered a recognized environmental condition (REC) and/or a liability due to their possible presence in significant concentrations (e.g., above acceptable limits set by the Federal or state government) or due to the potential for contaminant migration through exposure pathways (e.g., soil vapor inhalation or groundwater ingestion). Materials that may contain substances which are not currently deemed hazardous by the federal or state of California EPA were not considered as part of this study.

Unless specifically included in our scope of services, formal surveys for asbestos-containing materials, lead-based paints, fire safety, vapor intrusion, indoor air quality, mold, and similar matters were not part of this assessment. The Property was not evaluated for compliance with land use, zoning, wetlands, or similar laws. This report is not intended to be an environmental compliance audit.

Hazardous substances naturally occurring in plants, soils, and rocks (e.g., heavy metals, naturally occurring asbestos, or radon) are not typically considered in these investigations. Similarly, construction debris (e.g., discarded concrete, asphalt) is not considered to be of concern unless observations suggest that hazardous substances are likely to be present in significant concentrations.

Unless otherwise noted, sampling and laboratory analyses of soil, water, air, building materials, or other media, were not performed as part of this investigation. Positive identification of hazardous substances can only be accomplished through sampling and appropriate laboratory analysis.

SCS Engineers assumes no responsibility for the accuracy of information obtained from, compiled by, or provided by third-party sources, such as regulatory agency listings. Unless obviously inaccurate or if information exists to the contrary, SCS Engineers assumes that information collected during this environmental site assessment is accurate and correct. Unless warranted, information collected has not been independently validated as part of this assessment.

The following information is the responsibility of the User (40 CFR 312.22) and is not included in this Phase I ESA:

- Specialized knowledge or experience of the User.
- The relationship of the purchase price to the fair market value of the Property. The purchaser of a Property is required to consider whether any differential between the purchase price and the fair market value of the Property is due to the presence of releases or potential releases of hazardous substances at the Property.

Certain other limitations could affect the accuracy and completeness of this report, as follows:

- Site Access Limitations – None.
- Physical Obstructions to Observations – None.
- Outstanding Information Requests – None.
- Historical Data Sources Failure – None.
- Other Limitations – No site contacts, owners, or past operators were available to be interviewed as part of this Phase I ESA. Given the other information gathered during this assessment and knowledge that the Property was not previously developed, SCS does not consider this to be a significant data gap.

6 GENERAL SITE CHARACTERISTICS

SITE LOCATION

The Property is located at the southwestern corner of Alessandro Boulevard and Heacock Street. It has been assigned Riverside County Tax Assessor's parcel numbers (APNs) 297-170-036 and -038. An APN map is provided as **Figure 2** in **Appendix A**.

GENERAL SITE DESCRIPTION

The Property comprises 16.37 acres of undeveloped land.

ADJOINING PROPERTY USE

- North – Alessandro Boulevard adjoins the Property immediately to the north. The Moreno Valley Commerce Center and Albertaco's Mexican Restaurant (23880 Alessandro Boulevard) are located across the street to the north. Tenants in the Moreno Valley Commerce Center include a staffing agency, a beauty salon, an Asian grocery store, a Filipino restaurant, a DirecTV retailer, a barber shop, a Boost Mobile store, a massage retailer, and a payday loan center (23962 Alessandro Boulevard). No service stations or dry cleaners are currently located in the shopping center.
- East – A concrete-lined stormwater drainage channel and Heacock Street adjoin the Property immediately to the east. A Dairy Queen restaurant (24021 Alessandro

Boulevard), the Southpointe Shopping Center (24021 Alessandro Boulevard), and single-family residences (14083 to 14245 Travers Drive) are located across the street to the east. Tenants in the shopping center include restaurants, a learning center, a tax service business, etc. No service stations or dry cleaners are currently located in the shopping center.

- South – Brodiaea Avenue borders the Property immediately to the south. Undeveloped land, including a flood control basin, is located across the street to the south of the Property.
- West – Undeveloped land adjoins the Property to the west. Signs present on this adjacent site indicated that a nine-foot diameter high pressure Santa Ana Valley Pipeline waterline diagonally crosses the site to the west. Signs indicating that an Arco petroleum pipeline and a Questar Southern Trails gas pipeline cross the site to the west were also noted during the site inspection.

7 PHYSICAL SETTING

PHYSIOGRAPHIC SETTING

According to the U.S. Geological Survey (USGS), Sunnymead, California 7.5-minute topographic maps, the Property is located in Moreno Valley at an elevation of approximately 1,560 feet above mean sea level. Local topography slopes to the south.

GEOLOGY AND SOILS

The Property is situated within the Peninsular Range geopmorphic province of Southern California, which is primarily characterized by northwest trending mountain ranges. Surficial sediments in the Property area have been mapped as alluvial/fluvial deposits consisting of sand, silt, and clay (Santa Ana Watershed Project Authority).

GROUNDWATER

The Property is located within the Perris North Subbasin of the Santa Ana River Basin. No site-specific groundwater depth information was available for review. According to a review of information on the State Water Resources Control Board (SWRCB) GeoTracker website for the Mobil #18-A3E site (GeoTracker ID No. T0606599291), located approximately 2,500 feet east of the Property, the depth to groundwater was measured to be between 34 and 38 feet below ground surface (bgs). Based on its similar elevation, the depth to first groundwater beneath the Property is anticipated at a similar depth. Regional groundwater flow is to the south and southwest.

RADON

According to the California Department of Public Health's February 2016 Radon Program report, screening in the area of the Property (92553 zip code) found no locations (out of 13) where buildings had radon levels greater than or equal to 4 picocuries per liter (pCi/L), the EPA action level. The maximum radon result for the Property's zip code was 2.1 pCi/L. The alluvial

geology of the Property area is not normally associated with elevated radon levels. Based on the available information, elevated radon gas is not expected in the area of the Property.

8 SITE INSPECTION

Justin Rauzon of SCS conducted an inspection of the Property and surrounding area on July 31, 2017. A sketch map and photographs of the Property are provided in **Appendix B**.

The Property was undeveloped and partially covered with dry vegetation. The vegetation on portions of the Property had been cleared, leaving four rectangular patches of brush. SCS observed a sign that identified a natural gas pipeline along the southern edge of the Property, along the northern side of Brodiaea Avenue.

HAZARDOUS SUBSTANCES

No hazardous materials or evidence of past use, storage, or disposal of hazardous materials were observed on the Property.

NATURAL DRAINAGE

Natural waterways are not currently located on the Property. Runoff from the Property drains internally to the surrounding streets.

DISTURBED AREAS

No obvious disturbed areas were noted. Small amounts of windblown trash were observed across the Property, but no evidence of landfilled waste or indiscriminate disposal.

ELEVATORS AND OTHER HYDRAULIC EQUIPMENT

No elevators or other hydraulic equipment was observed on the Property.

WELLS

No wells or evidence of soil borings was observed on the Property.

ELECTRICAL EQUIPMENT

No electrical equipment was observed on the Property.

WASTEWATER

No industrial or sanitary wastewater is generated on the Property.

DRINKING WATER

Drinking water is not currently supplied to the Property.

STORAGE TANKS

No evidence (fill ports, vent lines, or dispensers) of underground storage tanks (USTs) was observed on the Property. No aboveground storage tanks (ASTs) were observed on the Property.

VISUAL INSPECTION OF ADJOINING SITES

No RECs or obvious indications of environmental issues that would likely affect the environmental condition of the Property were noted on the adjoining sites during the inspection. Underground pipelines transporting hazardous substances are also sometimes a source of environmental concern. Based on the visual inspection and database records reviewed, SCS did not identify any indications of releases from the pipelines in the vicinity of the Property.

9 INTERVIEWS

No site contacts, owners, or past operators were available to be interviewed as part of this Phase I ESA. Given the other information gathered during this assessment and knowledge that the Property was not previously developed, SCS does not consider this to be a significant data gap.

10 SITE HISTORY

Site history was evaluated from the following sources:

- Historical USGS topographic maps provided by Environmental Data Resources (EDR) (July 24, 2017).
- Historical aerial photographs provided by EDR (July 26, 2017).
- A City Directory review report provided by EDR (July 26, 2017).
- A search was made of EDR-Sanborn collection and no maps of the Property were found (July 24, 2017).

Copies of the topographic maps, aerial photos, City Directory report, and a Certified Sanborn Map Report from EDR stating that a search of the Sanborn Library collection revealed no maps covering the Property are included in **Appendix C**.

Year	Description	Source
1938	The Property was undeveloped land. Dirt roads were present to the north and east of the Property. The surrounding land was also undeveloped. A small creek originating to the northeast of the Property extended southward along the eastern boundary.	Aerial photo
1942	The Property and immediately surrounding sites were undeveloped.	Topographic map
1943	No significant changes from the 1942 topographic map were noted on the Property or surrounding sites.	Topographic map

Year	Description	Source
1949	No significant changes from the 1938 aerial photo were noted on the Property or adjoining sites. The presence of what appears to be furrows on the Property and vicinity may have been associated with agriculture use.	Aerial photo
1953	No significant changes from the 1943 topographic map or 1949 aerial photo were noted on the Property or surrounding sites.	Aerial photo and Topographic map
1967	No significant changes from the 1953 topographic map or aerial photo were noted on the Property or surrounding sites.	Aerial photo and Topographic map
1973	No significant changes from the 1967 topographic map were noted on the Property or surrounding sites.	Topographic map
1978	No significant changes from the 1967 aerial photo were noted on the Property or adjoining sites.	Aerial photo
1980	No significant changes from the 1973 topographic map were noted on the Property. A pipeline was depicted to the west and southwest of the Property, corresponding to the pathway of the nine-foot diameter high pressure Santa Ana Valley Pipeline waterline.	Topographic map
1985	No significant changes from the 1978 aerial photo were noted on the Property. Graded areas to the west and southwest of the Property showed the pipeline right-of-way. Shopping center buildings were constructed across the street to the north and single-family residences were developed across the street to the east.	Aerial photo
1989	Portions of the Property appeared to be cultivated farmland. An area at the southern end of the Property was cleared of vegetation. The Albertaco's restaurant was developed across the street to the north.	Aerial photo
1990	Shopping center tenants were listed at 23962 Alessandro Boulevard, across the street to the north of the Property. Star Brite Cleaners was listed as one of the tenants.	City directories

Year	Description	Source
1992	Taco Bell was listed at 23880 Alessandro Boulevard, to the north of the Property. Shopping center tenants were listed at 23962 and 24021 Alessandro Boulevard to the north and east of the Property. Star Brite Cleaners was again listed in the shopping center to the north.	City directories
1994	The Property remained undeveloped land. The western side of the Property was cleared of vegetation. Green vegetation was depicted along the eastern edge of the Property. A concrete-lined stormwater channel was developed immediately to the east of the Property. The restaurants and shopping centers across the street to the east were developed.	Aerial photo
1995	City directories listings for the shopping centers to the north and east were similar to those indicated in 1992.	City directories
1999	City directories listings included numerous tenants at the shopping centers to the north and east. None of the tenant names suggested the presence of a dry cleaners.	City directories
2003	City directories listings included numerous tenants at the shopping centers to the north and east. None of the tenant names suggested the presence of a cleaners.	City directories
2005	No significant changes from the 1994 aerial photo were noted on the Property or adjoining sites.	Aerial photo
2006	No significant changes from the 2005 aerial photo were noted on the Property or adjoining sites.	Aerial photo
2008	City directories listings included numerous tenants at the shopping centers to the north and east. None of the tenant names suggested the presence of a cleaners.	City directories
2009	No significant changes from the 2006 aerial photo were noted on the Property or adjoining sites.	Aerial photo
2010	No significant changes from the 2009 aerial photo were noted on the Property or adjoining sites.	Aerial photo
2012	No significant changes from the 2010 aerial photo were noted on the Property or adjoining sites. The topographic map contained no relevant site-specific details.	Aerial photo and Topographic map

Year	Description	Source
2013	City directories listings included numerous tenants at the shopping centers to the north and east. None of the tenant names suggested the presence of a dry cleaners.	City directories

HISTORICAL USE SUMMARY

With the exception of limited use as agricultural farmland since the 1980s, the Property has never been developed. Historical records showed no past presence of structures on the Property.

The existence of past agricultural activities on the Property and in adjacent areas indicates a potential for pesticide and/or heavy metal (associated with dusting powders) contamination. In SCS's experience, it is not uncommon to find trace levels of pesticides in soils at former agricultural areas in Southern California. However, these trace concentrations are rarely cause for environmental concern. It is our opinion that, without specific evidence of pesticide storage or mismanagement on the Property, collection and analysis of soil samples for pesticides is unwarranted.

HISTORICAL USE OF ADJOINING SITES

The area surrounding the Property was also undeveloped from at least 1938 through 1978. A pipeline was installed to the west and southwest of the Property in the late 1970s. This pipeline likely corresponds to the nine-foot diameter high pressure waterline presently observed to the west and southwest of the Property. The shopping center buildings to the north and the single-family residences to the east of the Property were developed in the early 1980s. A restaurant was constructed across the street to the north around 1989. Star Brite Cleaners was listed as a tenant across the street to the north of the Property between 1990 and 1992. The shopping center across the street to the east of the northern portion of the Property was developed in the early 1990s. The stormwater drainage located immediately to the east of the Property was channelized with concrete in the early 1990s.

Dry cleaning operations are commonly associated with releases of hazardous substances to the environment. As discussed in Section 12, historical database information contains no indications of releases at the former Star Brite Cleaners site historically located at the shopping center across the street to the north. Based on the distance of the shopping center buildings to the Property boundary (approximately 185 feet), SCS considers it unlikely that a release of dry cleaning chemicals from this historical cleaner has affected the Property.

11 COMMONLY KNOWN OR REASONABLY ASCERTAINABLE INFORMATION

In order to identify commonly known or reasonably ascertainable information about the Property, SCS reviewed previous environmental reports and various regulatory agency files and interviewed regulatory agency personnel. The following information was identified.

PREVIOUS ENVIRONMENTAL REPORTS

No previous environmental reports were provided to SCS for review.

REGULATORY AGENCY RECORDS

Local regulatory agencies and other sources were contacted in an effort to identify any known or suspected contamination sites or incidents of hazardous waste storage or disposal which might have resulted in soil or groundwater contamination within a one-mile radius of the Property. Within the City of Moreno Valley, the Riverside County Department of Environmental Health (RCDEH) generally acts as the lead enforcement agency for underground storage tank compliance. If a tank has leaked and groundwater contamination is suspected, the Santa Ana Regional Water Quality Control Board (SARWQCB) generally becomes the lead agency in supervising contaminant characterization and cleanup. Since the Property has no historical operations and no assigned address, SCS did not submit a request to review RCDEH files.

California Environmental Protection Agency Files

No businesses associated with the Property area appear in the California Environmental Protection Agency (CalEPA) Site Portal website.

Santa Ana Regional Water Quality Control Board Files

The Property does not appear in the SWRCB's GeoTracker website.

Department of Toxic Substances Control Files

The Property does not appear in the California Department of Toxic Substances Control (DTSC) EnviroStor website.

12 REVIEW OF FEDERAL, STATE, TRIBAL, AND LOCAL GOVERNMENT DATABASES

A database search for sites listed on various federal, state, tribal, and local databases in the area around the Property was obtained from EDR (July 24, 2017). A description of each of the databases searched is included in the report, which is attached as **Appendix D**. Among the databases included in the EDR report are NPL (federal, tribal, and state-equivalent), proposed and delisted NPL, CORRACTS (RCRA facilities subject to corrective actions), hazardous waste sites identified for investigation or remediation (SEMS [Superfund Enterprise Management System, formerly known as CERCLIS], State CERCLIS, VCP, Brownfields Calsites, etc.), LUST, sites with engineering controls, former CERCLIS (NFRAP), RCRA and state hazardous waste generators, ERNS, SWLF, USTs, and Toxic Pits.

Review of these records satisfies all requirements as set forth in 40 CFR Section 312.26 (b) and (c) with regard to the review of federal, tribal, and state government records of databases of such government records and local government records and databases of such records pertaining to

both the Property and the nearby or adjoining properties. Further, the search distances for each particular database are as specified in 40 CFR 312.26 and ASTM E1527-13.

Any known or suspected contaminated sites included on these lists within 0.25 miles of the Property are discussed in the following text. As a general rule, sites beyond 0.25 miles are not anticipated to impact a site significantly. Any sites beyond 0.25 miles with a high potential to impact the Property are also discussed. (Please note: the distances and directions listed in this report have been field verified and might not always match those in the EDR report.)

Sites such as TSD facilities, hazardous waste generators, HAZNET, FINDS, SQGs, LQGs, USTs, HIST UST, RCRA violations, and TRIS facilities with toxic chemical releases (generally in accordance with permitting requirements - into the air, water, or land as reported under SARA Title III) use or store hazardous materials and thus may pose a potential problem in the event of a spill or leak. However, unless these sites also appear in an agency list of contaminated sites, there is no evidence of any problems at this time. Therefore, sites on these lists will not be discussed unless on or in close proximity to the Property.

Please refer to **Appendix D** for further information on these sites.

PROPERTY LISTINGS

No historical operations conducted on the Property were identified in any of the databases searched by EDR. However, EDR indicates that the Property is situated at the furthest northeastern corner of the historical Department of Defense (DOD) March Air Force Base. The March Air Force Base appears in the NPL, SEMS, RCRA-LQG, US ENG CONTROLS, US INST CONTROLS, ROD, DOD, and PRP databases. Based on a review of online information about this Superfund site, the operable units where contamination has been identified and where remediation work is ongoing are all located to the south of Cactus Avenue, at least 0.75 miles to the south and southwest (downgradient) of the Property (AECOM, September 29, 2014). Given that no historical base operations were conducted at the Property, a review of the current status of contamination at the base, and its relatively downgradient location, it is unlikely that the March Air Force Base site has negatively affected the environmental condition of the Property.

ADJACENT SITE LISTINGS

The following adjacent sites were listed in one or more databases searched by EDR:

Star Bright Cleaners (RCRA-SQG, FINDS, and ECHO), 23962 Alessandro Boulevard (adjacent to the north) – This cleaners site was listed as a small quantity generator of hazardous waste in 1996. It was previously listed as a large quantity hazardous waste generator in 1987. As noted in Section 10, the shopping center to the north was first constructed in the early 1980s and this cleaners was first listed in city directories in 1990. The database information contains no indications of violations or chemical releases. While dry cleaning operations are commonly associated with releases of hazardous substances to the environment, based on the distance of the shopping center buildings to the Property boundary (approximately 185 feet), SCS considers it unlikely that a release of dry cleaning chemicals from this historical cleaner has affected the Property.

OTHER DATABASE SITES

The EDR report provides a summary table of regulatory database sites within specified distances of the Property, including: 1. standard environmental records, 2. additional environmental records, and 3. high risk historical records. This summary table is provided beginning on Page 4 of the EDR report (**Appendix D**). In addition to the Property and adjacent sites listings discussed above, SCS identified the following sites of concern within 0.25 miles of the Property:

- Menos No. 2 Auto Repair (RCRA-SQG and FINDS), 23952 Alessandro Boulevard, Unit B (approximately 365 feet north of the Property – upgradient).
- Moreno Valley Trans (RCRA-SQG, FINDS, and ECHO), 23920 Alessandro Unit F (approximately 615 feet north of the Property – upgradient).

According to the database report, Meno No. 2 Auto Repair and Moreno Valley Trans reported generating tetrachloroethylene waste. No violations were noted in the report. Based on the type of listing and distance, these sites are not anticipated to negatively affect the environmental condition of the Property.

Other sites within 0.25 miles do not have known releases such as EDR Hist Auto, EDR Hist Cleaner, RCRA-SQG, FINDS, ECHO, DRYCLEANERS, and HAZNET sites. None are known to have any contamination at this time; therefore, none are anticipated to have affected the environmental condition of the Property. Similarly, none of the sites situated beyond 0.25 miles, including the March Air Force Base, are anticipated to have impacted the Property.

Unmappable or Orphan Sites

Eight unmappable sites were identified in the EDR report. Unmappable sites cannot be plotted due to inaccurate or incomplete addresses. Based on review of the provided data, including the estimated locations of the unmappable sites in relation to the Property, it appears unlikely that the unmappable sites have adversely affected the environmental condition of the Property.

LANDFILLS

According to the EDR-provided review of the California Department of Resources Recycling and Recovery (CalRecycle) Solid Waste Information System, no active or inactive landfills were identified within 0.5 miles of the Property. Based on the available information, it is unlikely that landfills have adversely affected the environmental condition of the Property.

OIL AND GAS WELLS

Available oil and gas well maps from the California Department of Conservation, Division of Oil, Gas and Geothermal Resources (DOGGR) were reviewed to identify oil and gas wells on the Property or in the nearby area. According to the DOGGR Well Finder online database, the property is not located within the boundaries of a delineated oil and gas field.

A map showing the location of the Property relative to nearby oil and gas wells is provided in **Appendix E**. No oil and gas wells are located on the Property or within one mile of the

Property. Based on the available information, no significant environmental impacts to the Property are anticipated from oil and gas wells.

NATIONAL PIPELINE MAPPING SYSTEM

SCS reviewed the National Pipeline Mapping System (NPMS) website for the Property and surrounding area to identify any hazardous materials pipelines. The NPMS is a geographic information system (GIS) created by the U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration (PHMSA), and Office of Pipeline Safety (OPS) in cooperation with other federal and state governmental agencies and the pipeline industry. The NPMS consists of geospatial data, attribute data, public contact information, and metadata pertaining to the interstate and intrastate hazardous liquid trunklines and hazardous liquid low-stress lines as well as gas transmission pipelines, liquefied natural gas (LNG) plants, and hazardous liquid breakout tanks (tanks that receive and store liquids transported by pipeline) jurisdictional to PHMSA. The nominal accuracy of geospatial data in the NPMS is +/-500 feet. The NPMS does not contain information on interconnects, pump and compressor stations, valves, direction of flow, capacity, throughput, or operating pressure. In addition, distribution and gathering pipelines are not included in the NPMS.

The NPMS is built from data submitted by pipeline, LNG plant, and breakout tank facility operators. Since 2002, transmission pipeline and LNG plant facility operators are required to submit mapping information to the NPMS and to update their submissions annually. Breakout tank operators are able to submit data to the NPMS on a voluntary basis.

Based on review of the NPMS website, a natural gas pipeline is situated along the southern edge of the Property. The NPMS website does not show the Questar or Arco pipelines for which SCS observed placards identifying their presence to the west of the Property during the site inspection. The NPMS website does not contain any information about releases from pipelines in the vicinity of the Property. Based on the available information, no negative environmental affects to the Property are anticipated from these pipelines.

13 USER PROVIDED INFORMATION

A User Questionnaire was not returned to SCS for inclusion in the report. Alere provided no information beyond what is discussed above.

TITLE RECORDS

No title report was provided to SCS for review.

ENVIRONMENTAL LIENS OR ACTIVITY AND USE LIMITATIONS

No information regarding environmental liens or activity and use limitations was provided to SCS. No environmental liens or activity/use limitations were identified by SCS during the course of this assessment.

SPECIALIZED KNOWLEDGE

No specialized knowledge regarding the Property was provided to SCS by the User.

VALUATION REDUCTION FOR ENVIRONMENTAL ISSUES

No property valuation information was provided to SCS.

14 DEGREE OF OBVIOUSNESS OF THE PRESENCE/LIKELY PRESENCE OF CONTAMINATION ON THE PROPERTY

As discussed above, with the exception of limited use as agricultural farmland since the 1980s (and perhaps earlier), the Property has never been developed. Historical records showed no past presence of structures on the Property. Based on the available information, it is unlikely that contamination is present on the Property.

15 DATA GAPS

A data gap represents an inability on the part of the environmental professional to obtain information required by the standards and practices of 40 CFR 312 to fully identify conditions indicative of releases or threatened releases of hazardous substances on, at, in, or to the Property.

The following data gaps were identified:

No site contacts, owners, or past operators were available to be interviewed as part of this Phase I ESA. Given the other information gathered during this assessment and knowledge that the Property was not previously developed, SCS does not consider this to be a significant data gap.

16 FINDINGS AND OPINIONS

Based on the scope of work performed, SCS finds the following:

With the exception of limited use as agricultural farmland since the 1980s, the Property has never been developed. Historical records showed no past presence of structures on the Property.

During the site inspection, SCS observed signs for petroleum, natural gas, and high-pressure water pipelines to the west of the Property and a natural gas pipeline along the southern edge of the Property. SCS identified no information about releases from pipelines in the vicinity of the Property. Based on the available information, no negative environmental affects to the Property are anticipated from these pipelines.

Regulatory database information identified few known and suspected contamination sites in the area surrounding the Property. Based on the available information, it is unlikely that any of these sites have negatively affected the environmental condition of the Property.

In summary, SCS performed a Phase I Environmental Site Assessment o of 16.37 acres of undeveloped land located at the southwestern corner of Alessandro Boulevard and Heacock Street, Moreno Valley, California, in conformance with the scope and limitations of 40 CFR 312 and ASTM E1527-13. Any exceptions to, or deletions from, this practice are described in Section 5 of this report.

In the opinion of the Environmental Professional, this assessment has revealed no evidence of conditions indicative of releases or threatened releases of hazardous substances. Further investigation is not recommended.

17 REFERENCES

AECOM Technical Services, Inc. (AECOM), September 29, 2014. *Final Third Five-Year Review Report: Performance-Based Remediation at March Air Reserve Base and Former March Air Force Base, California*.

ASTM International, November 1, 2013. Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process, Designation: E1527-13.

California Department of Conservation, Division of Oil, Gas, and Geothermal Resources (DOGGR) Website: http://www.conservation.ca.gov/dog/Pages/Index.aspx.

California Department of Health Services (CDHS), Updated February 2016. *California Indoor Radon Test Results*: https://archive.cdph.ca.gov/HealthInfo/environhealth/Documents/Radon/RnReport02262016.pdf.

California Department of Toxic Substance Control (DTSC) EnviroStor Website: https://www.envirostor.dtsc.ca.gov/public/.

California Environmental Protection Agency (CalEPA), Site Portal Website: https://siteportal.calepa.ca.gov/nsite/.

California Environmental Protection Agency, State Water Resources Control Board (SWRCB), GeoTracker Website: http://geotracker.waterboards.ca.gov/.

Environmental Data Resources, Inc. (EDR), www.edrnet.com, (800) 352-0050.

Federal Register, The Daily Journal of the United States Government, November 1, 2005. Part III, Environmental Protection Agency, 40 CFR Part 312, Standards and Practices for All Appropriate Inquiry. Volume 70, No. 210. Amended December 30, 2013, Volume 78, No. 250.

National Pipeline Mapping System (NPMS) Website: https://www.npms.phmsa.dot.gov/PublicViewer/.

Santa Ana Regional Water Quality Control Board (SARWQCB). 3737 Main Street, Suite 500, Riverside, California 92501, (951) 782-4130.

Santa Ana Watershed Project Authority. http://www.sawpa.org.

South Coast Air Quality Management District (AQMD), Facility INformation Detail (FIND) website: http://www3.aqmd.gov/webappl/fim/prog/search.aspx.

18 GLOSSARY/DEFINITIONS

AAI -- All Appropriate Inquiry
AUL -- Activity and Use Limitations
BTEX -- benzene, toluene, ethylbenzene, and total xylenes
CERCLA -- Comprehensive, Environmental Response, Compensation, and Liability Act
CERCLIS -- Comprehensive Environmental Response, Compensation, and Liability Information System
CFR -- Code of Federal Regulations
CORRACTS -- Corrective Action Against Responsible Parties at a RCRA site
CREC -- A recognized environmental condition resulting from a past release of hazardous substances or petroleum products that has been addressed to the satisfaction of the applicable regulatory authority (for example, as evidenced by the issuance of a no further action letter or equivalent, or meeting risk-based criteria established by regulatory authority), with hazardous substances or petroleum products allowed to remain in place subject to the implementation of required controls (e.g., property use restrictions, AULs, or institutional or engineering controls).
DOGGR -- Department of Oil, Gas, and Geothermal Resources
De Minimis Condition -- A condition that generally does not present a threat to human health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies. Conditions determined to be *de minimis conditions* are not RECs or CRECs.
DTSC -- California EPA Department of Toxic Substances Control
EDR -- Environmental Data Resources, Inc.
EPA -- Environmental Protection Agency
ERNS -- Emergency Response Notification System
ESA -- Environmental Site Assessment
FINDS -- Facility Index System
HAZNET -- California EPA Hazardous Waste Facility and Manifest Data
HREC -- Historical Recognized Environmental Condition: A past release of any hazardous substances or petroleum products that has occurred in connection with the property and has been addressed to the satisfaction of the applicable regulatory authority or meeting unrestricted use criteria established by a regulatory authority, without subjecting the property to any required controls
LQG -- Large Quantity Hazardous Waste Generator
LUST -- Leaking Underground Storage Tank
MCL -- Maximum contaminant level
MTBE -- Methyl-tert-butyl-ether
NFA -- No Further Action determination
NFRAP -- No Further Remedial Action Planned
NPL -- National Priority List (Superfund)
PAHs -- Polynuclear aromatic hydrocarbons
PCBs -- Polychlorinated biphenyls
PRGs -- Preliminary Remediation Goals
RCRA -- Resource Conservation and Recovery Act
RCRIS -- Resource Conservation and Recovery Information System

RECs -- R*ecognized environmental conditions* is defined by ASTM E 1527-13 as: "The presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment. *De minimis conditions* are not *recognized environmental conditions*."

ROD -- Record of Decision

RBSLs -- Risk-based Screening Levels

RWQCB -- Regional Water Quality Control Board

SARA -- Superfund Amendments and Reauthorization Act

SLIC -- Spills, Leaks, Investigations, and Cleanups database

SQG -- Small Quantity Hazardous Waste Generator

SWIS -- Solid Waste Information System

SWLF -- Solid Waste Facility/Landfills

TPH -- Total Petroleum Hydrocarbons

TRIS -- Toxic Release Inventory System

TSD -- Treatment, Storage, and/or Disposal Facility

User -- The person or persons seeking to establish the innocent landowner defense, bona fide prospective purchaser liability protection, and/or contiguous property owner liability protection pursuant to CERCLA sections 101 and 107.

USGS -- United States Geologic Survey

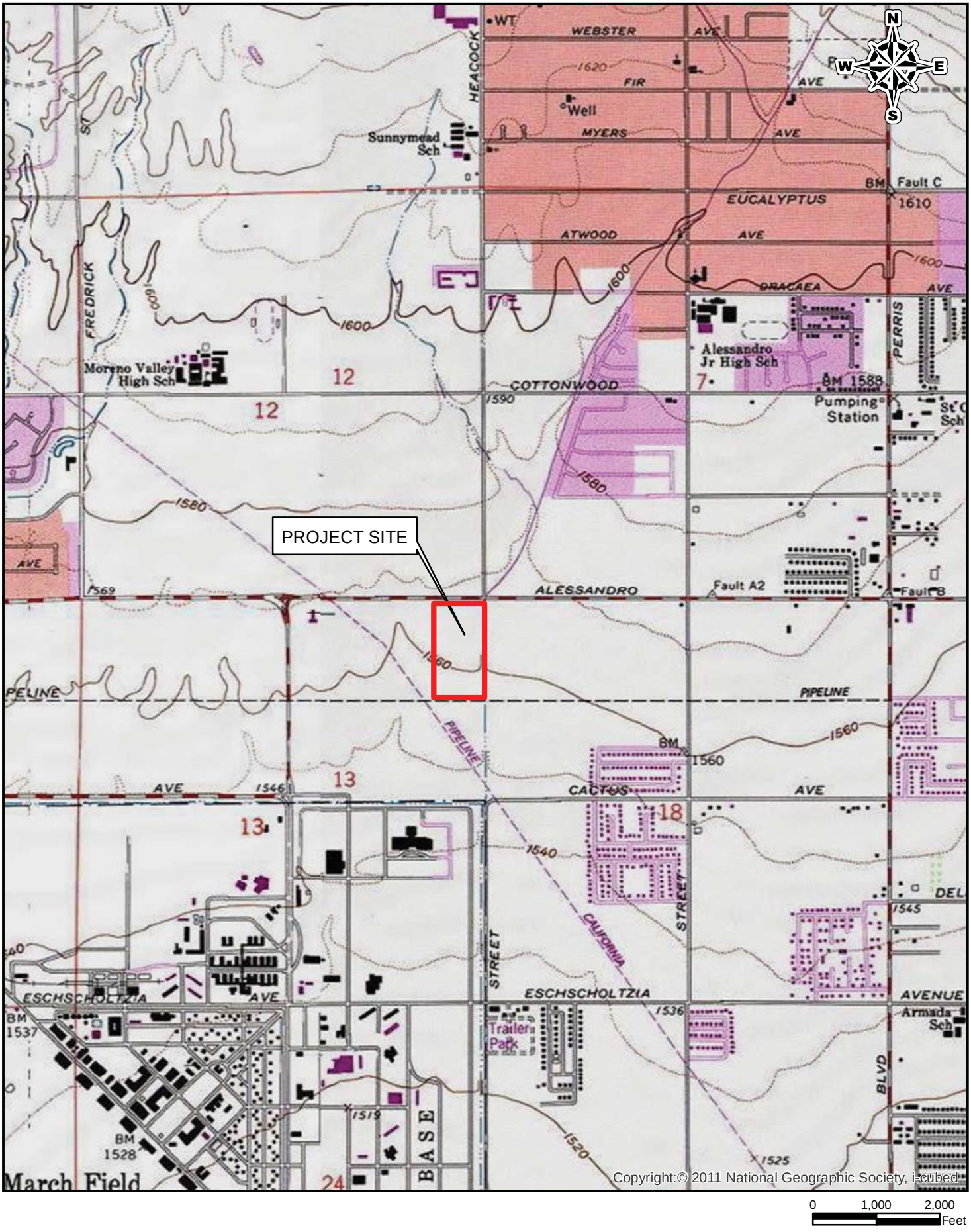
UST -- Underground Storage Tank

VCP -- Voluntary Cleanup Program

VOCs -- Volatile organic compounds

APPENDIX A

FIGURES 1 AND 2



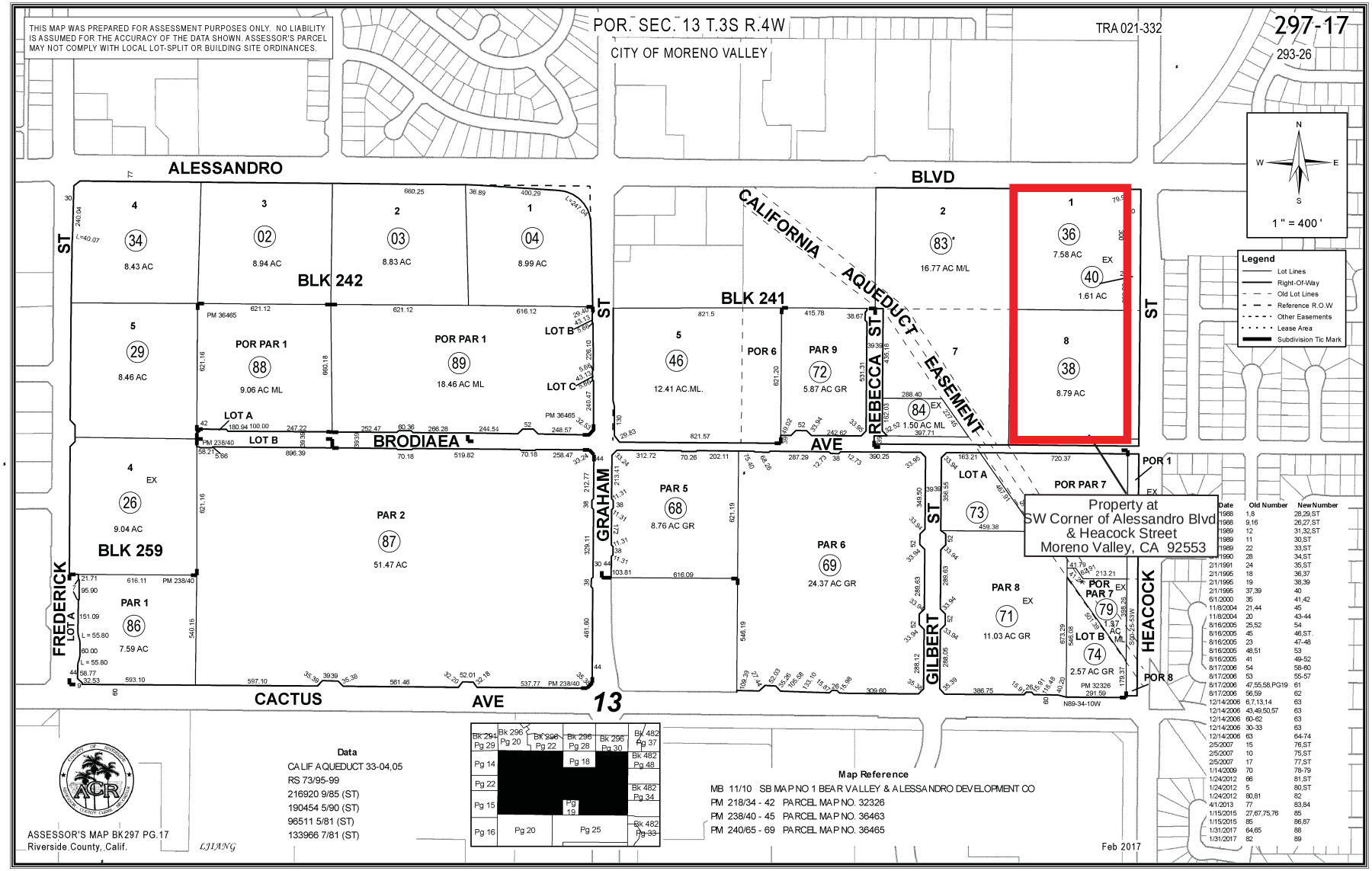
SCS ENGINEERS
3900 KILROY AIRPORT WAY, STE 100
LONG BEACH, CALIFORNIA 90806-6816

SITE:
SW Corner of Alessandro Blvd. & Heacock Street
Moreno Valley, California 92553

Job No.: 01217215.00

Title: SITE LOCATION MAP

FIGURE
1



Date	Old Number	New Number
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1988	9,16	26,27,ST
1989	12	31,32,ST
1989	11	30,ST
1989	22	33,ST
1990	28	34,ST
2/1/1991	24	35,ST
2/1/1995	18	36,37
2/1/1995	19	38,39
2/1/1995	37,39	40
6/1/2000	35	41,42
11/8/2004	21,44	45
11/8/2004	20	43-44
8/16/2005	25,52	54
8/16/2005	45	46,ST
8/16/2005	23	47-48
8/16/2005	48,51	53
8/16/2005	41	49-52
8/17/2006	54	58-60
8/17/2006	53	55-57
8/17/2006	47,55,58,PG19	61
8/17/2006	56,59	62
12/14/2006	6,7,13,14	63
12/14/2006	43,49,50,57	63
12/14/2006	60-62	63
12/14/2006	30-33	63
12/14/2006	63	64-74
2/5/2007	15	76,ST
2/5/2007	10	75,ST
2/5/2007	17	77,ST
1/14/2009	70	78-79
1/24/2012	66	81,ST
1/24/2012	5	80,ST
1/24/2012	80,81	82
4/1/2013	77	83,84
1/15/2015	27,67,75,76	85
1/15/2015	85	86,87
1/31/2017	64,65	88
1/31/2017	82	89

SCS ENGINEERS

Figure 2. Assessor's Parcel Map (APNs: 297-170-036 & 038)

APPENDIX B

AERIAL IMAGE AND SITE PHOTOGRAPHS

SCS ENGINEERS
ENVIRONMENTAL CONSULTANTS
3900 KILROY AIRPORT WAY, SUITE 100
LONG BEACH, CA 90806
PH. (562) 426-9544 FAX. (562) 427-0805

PROJ. NO.: 01217215.00
DWN. BY: J. RAUZON
APR. BY: K. GREEN

CLIENT: ALERE PROPERTY GROUP LLC
100 BAYVIEW CIRCLE, SUITE 310
NEWPORT BEACH, CALIFORNIA 92660

SHEET TITLE: GOOGLE EARTH AERIAL IMAGE SHOWING PHOTO LOCATIONS

PROJECT TITLE: 16.37-ACRES OF UNDEVELOPED LAND
SOUTHWEST CORNER OF ALESSANDRO BOULEVARD AND HEACOCK STREET
MORENO VALLEY, CALIFORNIA 92553

DATE: AUGUST 2017
SCALE: SEE FIGURE
FIGURE NO.: AERIAL

Photo 1 – View from the southwestern corner of Alessandro Boulevard and Heacock Street looking towards the southwest.

Photo 2 – View from the northeastern corner of the Property looking southward.

Photo 3 – View across Alessandro Boulevard to the north of the Property.

Photo 4 – View across Heacock Street to the east of the northern portion of the Property.

Photo 5 – Concrete stormwater channel along the eastern edge of the Property.

Photo 6 – View to the west across the northern portion of the Property.

Photo 7 – View to the west across the center of the Property.

Photo 8 – View to the south of the Property.

Photo 9 – View to the west along the southern edge of the Property. Note the sign for the natural gas pipeline.

Photo 10 – View to the north from the southeastern corner of the Property.

Photo 11 – View to the north from the south-central edge of the Property.

Photo 12 – View to the north from the southwestern corner of the Property.

Photo 13 – A sign for a high pressure waterline on the site adjoining the Property to the west.

Photo 14 – Dry vegetation on the southwestern portion of the Property.

Photo 15 – View to the west of the Property.

Photo 16 – Petroleum pipeline sign offsite to the west of the Property.

Photo 17 – View to the southeast across the Property.

Photo 18 – View from the center of the Property towards the northeast.

Photo 19 – Dry vegetation on the northern portion of the Property.

Photo 20 – Questar pipeline sign offsite to the west of the northwestern corner of the Property.

Photo 21 – View to the south-southeast from the northwestern corner of the Property

APPENDIX C

HISTORICAL SITE USE INFORMATION

SW Corner of Alessandro Blvd. & Heacock Street

SW Corner of Alessandro Blvd. & Heacock Street

Moreno Valley, CA 92553

Inquiry Number: 5001710.9

July 26, 2017

The EDR Aerial Photo Decade Package

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Aerial Photo Decade Package

07/26/17

Site Name:

SW Corner of Alessandro Blvd.
SW Corner of Alessandro Blvd.
Moreno Valley, CA 92553
EDR Inquiry # 5001710.9

Client Name:

SCS Engineers
3900 Kilroy Airport Way
Long Beach, CA 90806
Contact: Kim Braun

Environmental Data Resources, Inc. (EDR) Aerial Photo Decade Package is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's professional researchers provide digitally reproduced historical aerial photographs, and when available, provide one photo per decade.

Search Results:

Year	Scale	Details	Source
2012	1"=500'	Flight Year: 2012	USDA/NAIP
2010	1"=500'	Flight Year: 2010	USDA/NAIP
2009	1"=500'	Flight Year: 2009	USDA/NAIP
2006	1"=500'	Flight Year: 2006	USDA/NAIP
2005	1"=500'	Flight Year: 2005	USDA/NAIP
1994	1"=500'	Acquisition Date: June 01, 1994	USGS/DOQQ
1989	1"=500'	Flight Date: August 15, 1989	USDA
1985	1"=500'	Flight Date: July 28, 1985	USDA
1978	1"=500'	Flight Date: September 20, 1978	USDA
1967	1"=500'	Flight Date: May 15, 1967	USDA
1953	1"=500'	Flight Date: August 28, 1953	USDA
1949	1"=500'	Flight Date: May 08, 1949	USDA
1938	1"=500'	Flight Date: June 14, 1938	USDA

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INQUIRY #: 5001710.9

YEAR: 2012

= 500'

N

EDR

INQUIRY #: 5001710.9
YEAR: 2010
= 500'
N
EDR

INQUIRY #: 5001710.9
YEAR: 2009
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N
EDR

INQUIRY #: 5001710.9
YEAR: 2006
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EDR

INQUIRY #: 5001710.9
YEAR: 2005
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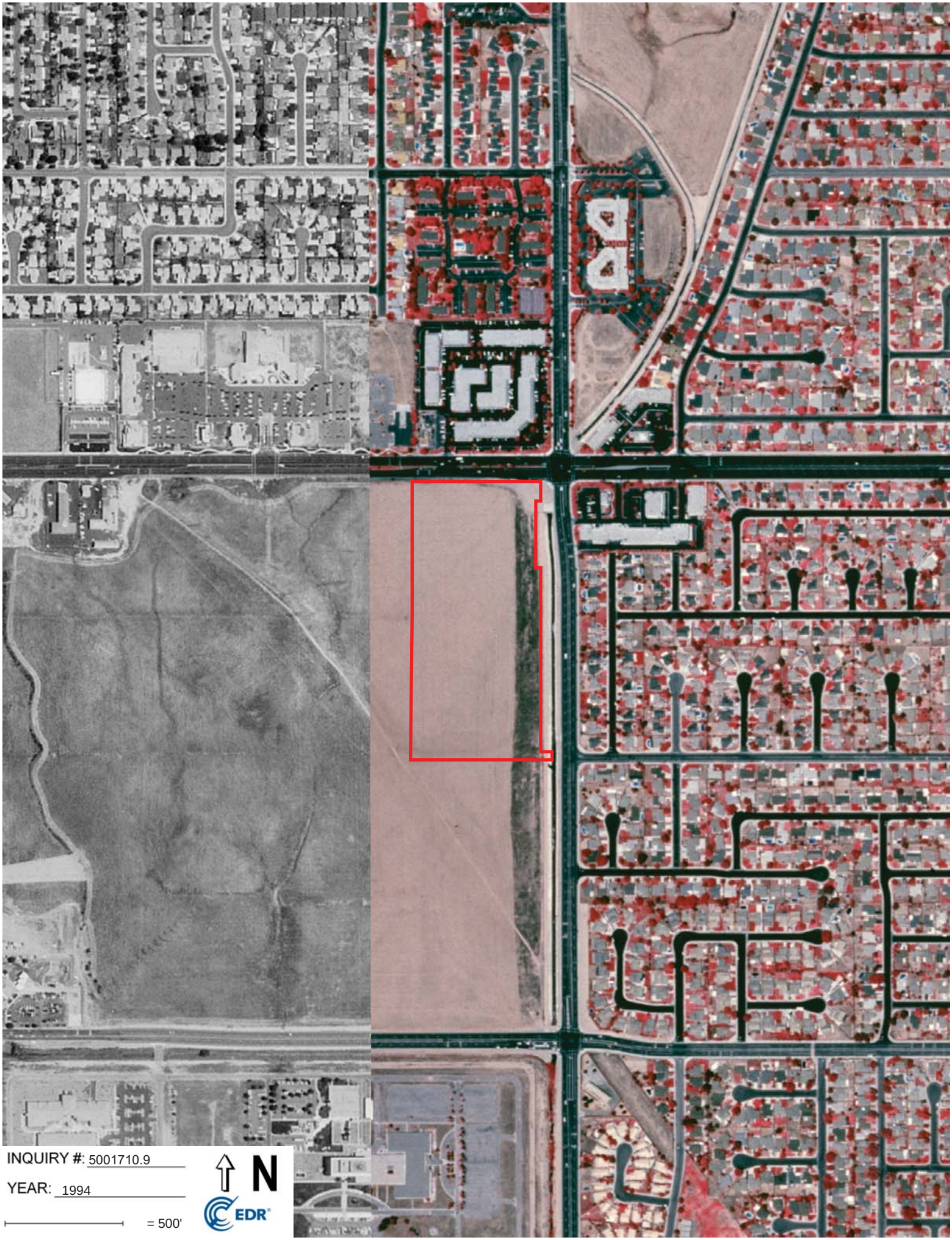
EDR



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N

EDR

INQUIRY #: 5001710.9

YEAR: 1989

= 500'

N

EDR

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YEAR: 1985
= 500'
N
EDR

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YEAR: 1978
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EDR

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EDR

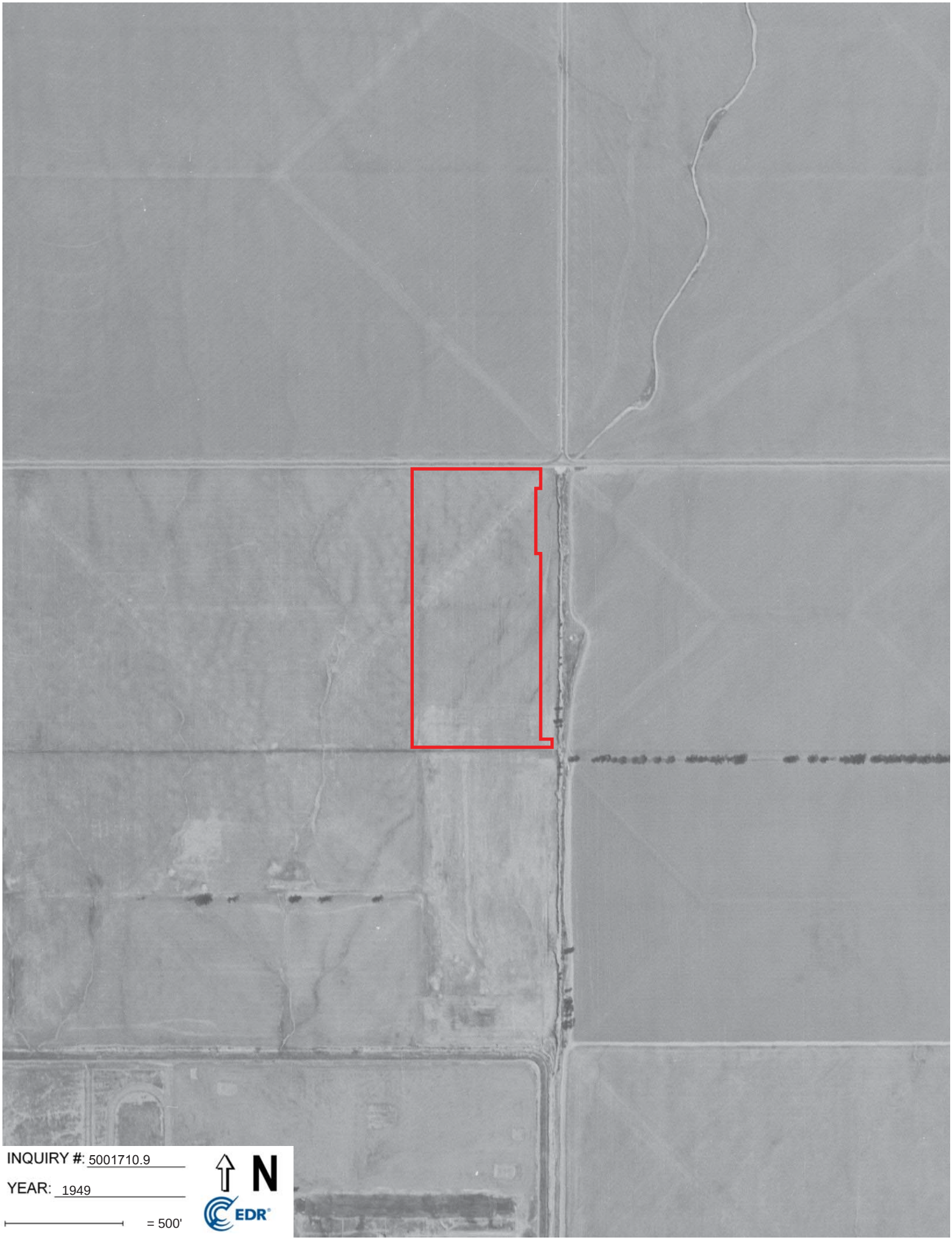
INQUIRY #: 5001710.9

YEAR: 1953

= 500'

N

EDR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EDR

INQUIRY #: 5001710.9
YEAR: 1938
= 500'
N
EDR

SW Corner of Alessandro Blvd. & Heacock Street

SW Corner of Alessandro Blvd. & Heacock Street
Moreno Valley, CA 92553

Inquiry Number: 5001710.5
July 26, 2017

The EDR-City Directory Image Report

Environmental Data Resources Inc

6 Armstrong Road
Shelton, CT 06484
800.352.0050
www.edrnet.com

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SECTION

Executive Summary

Findings

City Directory Images

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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EXECUTIVE SUMMARY

DESCRIPTION

Environmental Data Resources, Inc.'s (EDR) City Directory Report is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's City Directory Report includes a search of available city directory data at 5 year intervals.

RESEARCH SUMMARY

The following research sources were consulted in the preparation of this report. A check mark indicates where information was identified in the source and provided in this report.

Year	*Target Street*	*Cross Street*	*Source*
2013	☑	☐	Cole Information Services
2008	☑	☐	Cole Information Services
2003	☑	☐	Cole Information Services
1999	☑	☐	Cole Information Services
1995	☑	☐	Cole Information Services
1992	☑	☐	Cole Information Services
1990	☑	☐	Haines Criss-Cross Directory
1985	☑	☐	Haines Criss-Cross Directory
1980	☑	☐	Haines Criss-Cross Directory
1975	☑	☐	Haines Criss-Cross Directory

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FINDINGS

TARGET PROPERTY STREET

SW Corner of Alessandro Blvd. & Heacock Street
Moreno Valley, CA 92553

Year	*CD Image*	*Source*
ALESSANDRO BLVD		
2013	pg A2	Cole Information Services
2008	pg A13	Cole Information Services
2003	pg A27	Cole Information Services
1999	pg A38	Cole Information Services
1995	pg A50	Cole Information Services
1992	pg A60	Cole Information Services
1990	pg A68	Haines Criss-Cross Directory
1985	pg A71	Haines Criss-Cross Directory
1980	pg A73	Haines Criss-Cross Directory
1975	pg A75	Haines Criss-Cross Directory
HEACOCK ST		
2013	pg A5	Cole Information Services
2008	pg A17	Cole Information Services
2003	pg A30	Cole Information Services
1999	pg A41	Cole Information Services
1995	pg A53	Cole Information Services
1992	pg A63	Cole Information Services
1990	pg A69	Haines Criss-Cross Directory
1990	pg A70	Haines Criss-Cross Directory
1985	pg A72	Haines Criss-Cross Directory
1980	pg A74	Haines Criss-Cross Directory
1975	pg A76	Haines Criss-Cross Directory
1975	pg A77	Haines Criss-Cross Directory

FINDINGS

CROSS STREETS

No Cross Streets Identified

City Directory Images

Target Street	Cross Street	Source
✓	-	Cole Information Services

ALESSANDRO BLVD 2013

22990	TMSO INC
23020	TOMS NO 1 WORLD FAMOUS CHILIBURGER
23080	99+ FOOD MART
	CLINICA DENTAL FAMILIAR
	DEANZA OB GYN
	DEMOLA ANGEL MD
	HENRY NGUYEN OPTOMETRY
	LVRX
	MORENO VALLEY CLINICS MEDICA FAMILIA
	MORENO VALLEY WASH HOUSE
	UNITED STATES GOVERNMENT
23100	EBONY HAIR
	EXHILARATE FITNESS STUDIO
	GO GO CHINA
	M & M CLEANERS 2
	PLAZA HAND CAR WASH
23501	TABASSI CO LLC
23580	UNITED STATES GOVERNMENT
23581	MOTEL 7
23615	ALESSANDRO AUTO SPA INC
	CHASE AUTO TECH
	SPEEDY MOBILE LUB
23750	24 HOUR FITNESS
	BEVERAGES 4 LESS LIQUOR
	CITRUS BELT TAX SERVICE
	EXCEL PREP CHARTER SCHOOL
	FANCY TAN
	GOLDEN LANES
	GUS JR RESTAURANT
	HAPPY BUFFET
	KIANI DARIUSH LAW OFFICE OF
	LOS CANTARITOS MEXICAN RESTAURANT
	MENDYK CHIROPRACTIC INC
	MUSCLE HOUSE LLC
	OASIS COMMUNITY CHURCH
	RICK T KIM DDS
	RIVER KWAI THAI CUISINE
	WHITES BIKES
	WIENERSCHNITZEL
23880	ALBERTACOS
23890	ALCOHOLICS ANONYMOUS
	APEX AUTO BROKER
	ATLAS EXPRESS PADALA INC
	CALIF SCHOOL EMPLOYEES
	DUTALE
	EUGENES DENTAL
	FAIR HOUSING COUNCIL OF RIVERSIDE CO
	FAMILY HOSPICE CARE
	MORENO VALLEY LOCK & SAFE
23900	JESSIES JUMPERS

Target Street	Cross Street	Source
✓	-	Cole Information Services

ALESSANDRO BLVD 2013 (Cont'd)

23900	MARTIN MENDOZA
	UNLIMITED QUEST INC
23910	CLEAN AIR SMOG
	FANCY STITCHIN
	JUST BRAIDS
	MOLLY MAID
	MORENO VALLEY LIONS CLUB
23920	AMERICAN AUTOMOTIVE
	BRADYS AUTOMOTIVE
	CERTIFIED TIRE & SERVICE CENTERS
	XPERT AUTOMOTIVE
23932	ALESSANDRO ANIMAL HOSPITAL
	AMB DRIVING SCHOOL
	DIRECT CARPET & FLOORING
	MAGANA AUTO UPHOLSTERY
	NATIONAL INSTITUTE LEGAL
	PLUMMERS ELEVATORS SERVICE
	VALDES AUTO GLASS
	VALDEZ AUTO GLASS & WINDOW TINT
	VICTORY TEMPLE
23942	LUIS ESPINOSA
	PARTS PLUS
	PULIDOS WHEELS & TIRES
	WEST COAST CABLE
23952	BEST VALLEY SMOG & AUTO
23962	ACA GROUP SERVICE CORPORTAION
	ALEJANDRA ORTEZ
	AMERICAN QUICK PRINTING
	AZTEC INSURANCE SERVICES INC
	BANIG RESTAURANT FILIPINO & ORIENTAL
	BEST IMPRESSION
	CALIFORNIA BUDGET FINANCE
	DESASI SANDIP J DR DDS
	ERNESTO CERVANTES
	L B C COURIER CO
	MARIA BUENO
	PHILAM ENTERPRISES
	RED RIBBON BAKE SHOP
	SKYROCKET MOBILE
	SONORA GRILL
	STADIUM FASHION
	SUPER V 2
	SUPER V BEAUTY SALON & GIFT STORE
	THE INK GALLERY
	XCLUSIVE CUTZ
24021	AARONS
	ACADEMIA TAX SERVICES
	AMYS BARBER SHOP
	CHUYITAS MEXICAN RESTAURANT
	CYNTHIAS HAIR CARE

Target Street	Cross Street	Source
✓	-	Cole Information Services

ALESSANDRO BLVD 2013 (Cont'd)

24021	DESIGNER NAILS
	I DO WEDDINGS
	LOIS LAUER REALTY
	OREILLY AUTO PARTS
	PIZZA HUT
	SUNGADAN STUDIOS
	ZAPANTA DDS CRISTINA
24050	AV NAILS & SPA
	CIGARETTE KING
	DIAZ GROUP INC THE
	ESPINO LA PALMA
	TANMAKERS TANNING SALON
24100	DALIAS PIZZA EXPRESS
	KINGS DONUTS
24150	FLAVA SALON
	INKSMITH TATTOO
	LEADING EDGE LEARNING CENTER
	QWICK PICK
24430	ALLESANDRO COIN LAUNDRY
	AZTEC INSURANCE SERVICES
	BEAUTY SPOT
	OVERHEAD MORENO VALLEY GARAGE DOOR S
	PHYSICIANS FAMILY PRACTICE
	RANCHO DENTAL GROUP
	RED PERSIMMON NAILS & SPA
	TENAS SALON
	WIN WIN FASHION
24440	A1 LOCKSMITHS INC
	CHURCHS CHICKEN
	FOOD 4 LESS
	MCDONALDS
	MONEYTREE
	TONYS MOBIL
24481	APPLIANCE DISOUNTERS
	BEAUTY TRENDZ
24491	A B C FOOD STORE
24515	MVP BEAUTY PLUS
24525	ANIMAL ELEGANCE
	CONTINENTAL CURRENCY SERVICES
	VALLEY JEWELRY
24541	MORENO FAMILY DONUTS
24545	SUPER 99 CENTS UNIVERSE PLUS STORE
24553	APPLE FLORIST

Target Street	Cross Street	Source
✓	-	Cole Information Services

HEACOCK ST 2013

10271	MORENO VALLEY UNITED METHODIST CHURC
11401	NORTH HEACOCK DENTAL
	NORTH HEACOCK DENTAL GROUP
	REAGAN DAVID L DDS
	RYNEARSON R DAVID DDS MS
	SMITH ROBERT DDS
11441	HEALTHCARE IMAGINGMORENO VALLEY
	KIM DONG S MD
	LAGUNA VISTA PHARMACY
	LOMA LINDA UNIV HLTH CARE
	LOMA LINDA UNIVERSITY PEDIATRIC MEDI
	ONE ACUPUNCTURE
	PRIROMPRINTR VISITH MD
	RACINE HAROLD V MD
11481	BETHANY HOME CARE
	FARMERS INSURANCE GROUP
	KENT RONALD N MD PHD
	YAP ADWEN P DDS
11692	CHRISTINE STEYN
11696	ROBERT KOONTZ
11698	GILBERTO MEZA
12065	GOODWIN PAT BOOKKEEPING & TAX SERVIC
12075	RALEIGH BILL CLU
	STATE FARM INSURANCE
12085	DE LA CRUZ MICHAEL DMD
12095	OCCUPANT UNKNOWN
12097	ERICA EDGERSON
12107	OCCUPANT UNKNOWN
12109	PAUL CRAFTS
12123	ROBERT MARSHALL
12151	CLAUDIA PORTER
	DAN VACA
	LUIGI CANALE
	PORTER LUGO
12183	LUIS CORTES
	LUIS DENTAL LAB
12199	THERAPEUTIC HEALING CENTERI
	WATSON TAX & FINANCIAL SERVICES
12214	TOMLINSON LOIS CPA
12218	MINCO COMPUTERS
12222	FARMERS INSURANCE GROUP
12235	FURNITURE HELPERS
	MORENO MEAT MARKET
	PORKYS PIZZA
	PRO NAIL & HAIR
12238	XPOSUER HAIR STUDIO
12246	MORENO VALLEY REALTY
12255	MZP FOOD & GAS
	SAMMYS FOOD STORE
12275	RAMONAFIRESTONE TIRE CENTERS

Target Street	Cross Street	Source
✓	-	Cole Information Services

HEACOCK ST 2013 (Cont'd)

12300	JIFFY LUBE
12301	CAR ENTERPRISES
12431	CHEVRON
12451	JACKS JUNIOR
12460	PROVIDENT BANK
12477	JACK IN THE BOX
12540	GREAT DEAL INSURANCE SVCS INC
12576	KING AUTO REPAIR
12578	PIZZO BROS TOWING
12591	PAMS DONUTS
12595	AA
	PC CLINICS
12640	STEVES BURGERS
12712	ALL BRITE DENTAL CARE
	BONIADI R DR & ASSOCIATES
	CHENG ROGER MD
	MOVA ALI MOVAFAGH MD
	QUEST DIAGNOSTICS
12730	CHILDNET YOUTH & HOME
	DANIELS PHARMACY
	LABWEST INC
12800	GENTLE DENTAL
	PARK WEST REALTY
12810	ARMANDO FRANCO
	CARDIOVASCULAR CONSULTANTS OF THE IN
	FRANCO ARMANDO MD
	FRIENDLY OBGYN MEDICAL
	HEARX
	MORENO VALLEY OPTOMETRY
	SILVOLA ROBERT T DDS
12815	KAISER PERMANENTE
12818	BLACKMON LAWRENCE B DDS
	MEDICAL PLAZA PHARMACY
	MORENO VALLEY IMAGING
	NEW HOPE CHRISTIAN COUNSELING CENTER
12820	SHAHRBANOO NOROUZICHALLOU
12834	GISELA ZARATCE
12846	AGUSTIN FLORES
12875	MORENO VALLEY UNIFIED SCHOOL DISTRIC
	SUNNYMEAD ELEMENTARY
12880	CENTRO CHRISTIANO SINAI ASAMBLEA DE
12900	ALFREDO LOZANO
12920	CAHUE BALTAZAR
13050	DEO MARTINEZ
13060	S MURENO
13110	MARIA HERNANDEZ
13120	JUANITA TENORIO
13125	MOUNTAIN VIEW APARTMENTS
13135	ALFRED DRIVER
	ANDRE COSME

Target Street	Cross Street	Source
✔	-	Cole Information Services

HEACOCK ST 2013 (Cont'd)

13135	ANDRE MELANSON
	ANGELA BUTTS
	ANGELA KIRKINDOFF
	ANGELA WHITE
	ARDENCE MARTINEZ
	BEN MENDIOLA
	BERNADETTE SAPALO
	BIANCA HUTTON
	BRENDA ALCALA
	BRITTANY BOOKER
	CALVIN NORWOOD
	CANDICE JONES
	CAROLYN SWEARINGEN
	CARRIE DAUGHERTY
	CHARLES LANE
	CHERYL SMITH
	COURTNEY WALKER
	CRYSTAL ANDERSON
	D SMALL
	DALENISHA CRABTREE
	DAMON WARD
	DHOMANA DEVOE
	EBONY COCKERHAM
	ELMER RIVERA
	ELYSE OWENS
	GABRIELA LOBERA
	GABRIELLE YOUNG
	GARY SMITH
	GILBERTO ZERMENO
	GIOVANNI TAMPLIN
	HELEN WHITNEY
	IVONN AGUILAR
	JANEL MARQUEZ
	JASON BURGE
	JEANETTE MARTINEZ
	JESSICA LANGSTON
	JESUS LARIOS
	JORDAN DAVIS
	JOREATHA ABRAHAMS
	JOSE GARCIA
	JOSE LOPEZ
	JOSE PINEDA
	KELLY DAVIS
	KEYWANA HARRIS
	L MCNEAIL
	LAURA GARCIA
	LAURA GUZMAN
	LAURA VIALDORES
	LAWANDA ROSE
	LISA WILLIAMS

Target Street	Cross Street	Source
✓	-	Cole Information Services

HEACOCK ST 2013 (Cont'd)

13135	LOUBETH BRIZUELA
	LOUISE PRICE
	LUPE VILLEGAS
	LYNETTE MARTINEZ
	M AGUON
	MALCOM SILVA
	MARIA VILLAGRAN
	MARNETTE BROWN
	MELISSA DAVISON
	MICHAEL MABRY
	MONICA HOLDEN
	MOUNTAIN VIEW
	NARCIS ASTRAIL
	ODESSA LEWIS
	PEDRO MONJE
	PETER GRIFFIN
	REBECCA SEGOVRA
	REGENA MCCREIGHT
	RHONDA PERALTA
	RITA BALDERAS
	ROBERT BIBBS
	ROBERT FELIS
	ROBERT RAINEY
	ROGELIO LARA
	ROMEO ALMAZAN
	RON GRAYDON
	ROSHUN ELSTER
	RUCHEEDA BARNETTE
	SAPE KILO
	SHERRIE HILL
	SHONTE KELLY
	SUSAN LAMELA
	T LANGSTON
	TAMIKA STEWART
	TERESITA OPENA
	TERI JOHNSON
	THEODORE CUBBAGE
	TIFFINI JACKSON-THOMAS
	VALARIE MCGINNIS
	VERBEDA DAWSON
	VERONICA ALBARRAN
	WILLIAM HOLLOWAY
	YOLANDA GREENE
13260	ARGELIA DUMAS
	BILLY DUNCAN
	DOROTHY DAINES
	ELIAS CARDENAS
	EUGENE SKELTON
	FERNANDO FLORES
	GUADALUPE BAUTISTA

Target Street	Cross Street	Source
✓	-	Cole Information Services

HEACOCK ST 2013 (Cont'd)

13260	JOHN BROWN
	JUAN GARCIA
	MICHELLE GUITON
	MIGUEL GARCIA
	RICHARD LOPEZ
13266	DANIEL RAMOS
13270	CHARLOTTE ROSE
	D BEACHEM
	LEON MARTIN
	SAMPSON BROWN
	SHAUNTEE CHALKUS
13280	ALEJANDRO LEDEZMA
	DIXIE BE
	KATEY MOSLEY
	LAURA SANCHEZ
	PALOS VERDES APARTMENTS
	PEARL GARCIA
	SAMUEL EDWARD
	SANDRA BARRADAS
	TAMEEKA BROWN
13290	ANTHONY BOST
	BEN HENDERSON
	GRACIELA SANTIAGO
	HUGO GUDIEL
	JENNIFER JEFFERSON
13325	A MUNOZ
	ALMA RODRIGUEZ
	ANA RUIZ
	ANGEL GUADARRAMA
	ANGELICA LOPEZ
	ANTHONY MENDOZA
	ARACELI ZAVALA
	ASHLEY AUTMON
	ASHLEY HARRISON
	BERNADENE CONTRERAS
	BIANCA CHAVEZ
	BRYAN PADILLA
	CAREY ROBERTS
	CARLA MARTINEZ
	CATALINA CASTILLO
	CHEL MANALILI
	D BLAKE
	DAVID WASHINGTON
	DAVONA SAUNDERS
	DENNY ANTONINO
	EMMANUEL GODINEZ
	ENVANGELIN NAVARRO
	FRANCISCO LARA
	FRANCISCO PIZANA
	G CORDERO

HEACOCK ST 2013 (Cont'd)

13325	GLORIA GUTIERREZ
	HEACOCK PARK APARTMENTS
	HERSHEY DELROSARIO
	JACQUELINE WALKER
	JEREMY ALLGIER
	JESUS GONZALEZ
	JESUS RUBIO
	JOSE URIAS
	JOSE VARAJAS
	JULIO MARTINEZ
	LAKISA KENNEDY
	LEES LEARNING CENTER
	LICO GOMEZ
	LUIS AGUILAR
	LUIS FRANCO
	MAC COATS
	MARIA MALDONADO
	MARIA NAREZ
	MARIA RIVERA
	MARIO ANGULO
	MARLAYA CEJA
	MAYRA WURTHAN
	MERRILAN HOOVER
	MICHELLE CRUSE
	MIGUEL TORRES
	MILENE HUGHES
	MOIZ RIZVI
	RAYMOND HINTON
	ROBERTO BASTIDA
	ROLANDO DHEMING
	SANTHA WILLIAMS
	SELENE FLOREZ
	SERGIO ARRIAGA
	STEPHANIE RUSSAL
	SUSANA BAUTISTA
	SUSANA CARRILLO
	TRACY THOMPSON
	UNIQE DANODY
	XAVIER CARRIER
	YANIRA RODRIGUEZ
	YESENIA HERNANDEZ
13335	EVONDRA OWENS
13563	MORENO VALLEY UNIFIED SCHOOL DISTRIC
13799	ERMA FULCHER
	FULCHER ERMA INSURNCE
13800	2020 GOODYEAR MEDIA SOLUTIONS
	ACTIVE THERAPY CENTER
	AKINTIMOYE DAVID LAW OFFICE
	ALLEGIS GROUP
	AMANICA REAL ESTATE

Target Street	Cross Street	Source
✓	-	Cole Information Services

HEACOCK ST 2013 (Cont'd)

13800	CENTRAL OCCUPATIONAL MEDICINE
	CHRIS BURNS
	CIRCLE OF SUCCESS
	CRITTENTON FAMILY CENTER
	GARCIA RICHARD
	GATEWAY FINANCIAL SERVICES GROUP
	HEACOCK CHIROPRACTIC CENTER
	HEISSER INSURANCE AGENCY
	HORRIGANCOLE ENTERPRISE INC
	HUGHESNET
	IN HOUSE LENDER
	INFINITE WAY
	JENNISON JAMES H PHD
	KELLER WILLIAMS REALTY
	LEGAL DOCUMENTS PREPARATION
	LINKU SYSTEMS INC
	LMK LEGAL DOCUMENTS
	MTG EXPERTS
	NOWLINGMANOR LIMITED LLC DBA NOWLING
	NUEVA ERA LATINA
	PAYNE WINFIELD S III & ASSOCIATES
	REALTY EXECUTIVES INTERNATIONL
	THE TRAVIS LAW FIRM
	VECTOR MARKETING
	ZYMEDA PROVIDOR SOLUTIONS INC
15040	ADELA DIAZ
	ADRIANA GARCIA
	ALEXANDRA ALVAREZ
	ALICIA CONTRERAS
	ALMA PRECIADO
	ANGELICA MADRILES
	CHAD BISHOP
	CHAVEZ TRIANA
	DONNA CONTI
	ERIKA ESQUIVEL
	ESMERALDA DELACRUZ
	ESPERANZA ARVIZO
	FRANCISCO ALONSO
	GELEN STAMEY
	GLORIA GUTIEREZ
	GUSTAVO CARRILLO
	J F K MOBILE HOME PARK
	JAIME GARCIA
	JAMES EARLY
	JOEL CERVANTES
	JORGE BELTRAN
	JOSE BERBER
	JOSE MURO
	KARINA CHAVEZ
	MARIA CARRAMAN

Target Street	Cross Street	Source
✓	-	Cole Information Services

HEACOCK ST 2013 (Cont'd)

15040	MARIA CERMENO
	MARIA MIRANDA
	MARIA TORRES
	MARINA HERRERA
	MAYRA CARDENAS
	MICHAEL SUHY
	NIGDIA JIMENEZ
	NORMA REDE
	ORLANDO NARCISO
	PATRICK THOMES
	R ORTEGA
	RAFAEL CAZARES
	RAMIRO RODRIGUES
	RICHARD ZERECERO
	ROBERT DICKERSON
	ROBERT SCHWARTZ
	ROGELIO RENDON
	SALVADOR LOPEZ
	SARA ROMERO
	VERONICA CUADROS
	VIOLETA HERNANDEZ
	YVONNE CANDELARIA
16875	RYDER
17101	AMRO FABRICATING CORPORATION
	FREEMAN HOLDINGS OF RIVERSID

Target Street	Cross Street	Source
✓	-	Cole Information Services

ALESSANDRO BLVD 2008

23020	TOMS WORLD FAMOUS CHILIBRGR
23060	HOLLYWOOD STYLE
	PH WOODS RESTAURANT
	ROSE GARLIC INC
23080	99 FOOD MART
	CLINICA MEDICAL FAMILIAR
	DEMOLA ANGEL MD
	DR DEZAS DENTAL OFFICE
	FRONTIER MORTGAGE SOLUTIONS
	HANANLELAS JAVA HUT & DELI
	HENRY NGUYEN OPTOMETRY
	MORENO VALLEY DRY CLEANERS ZURE GA
	MORENO VALLEY PHYSICIANS ASSOCIATES
	NEXT FRONTIER HOME LOANS INC
	SOUTHERN CA CUSTOM WINDOWS & DOORS
	SUPERIOR GLASS & GLAZING CONTRACTOR
23100	DON JOSE MEXICAN RESTAURANT
	EBONY HAIR
	GO GO CHINA
	HOUSE OF SISTER SISTAH
	M & M CLEANERS
	MAGICAL DAY
	PLAZA HAND CAR WASH
23501	TABASSI INC
23580	MARIE ASCENCIO
23581	MOTEL 7
23615	909 EXTREME MONITORING INC
	OCCUPANT UNKNOWN
23750	24 HOURS FITNESS
	99 CLEANERS
	ABC BOWL
	ARACELY SARMIENTO
	BAY CLEANERS
	CITRUS BELT TAX SERVICE
	CLASSY B LIQUOR DELI
	COLOSSEUM REALTY
	DARIUSH KIANI
	FANCY TAN
	FOR GOOD TATTOO STUDIO
	GOLDEN OX BURGERS
	JUAN SALDANA
	LOS EQUIPALES MEXICAN GRILL
	MORENO DENTAL CARE
	MORENO VALLEY FUN BOWL INC
	OASIS COMMUNITY CHURCH
	POWERHOUSE DANCE CENTER
	PREHISTORIC TIMES REPTILES
	ROBERT RAYNE HEALTH & JUICE
	RUNNING CLEANERS
	SHEAR CUTS

ALESSANDRO BLVD 2008 (Cont'd)

23750	STEPPING STONES LEARNING ACADEMY
	SUPERIOR NAILS
	WHITES BIKES
	WIENERSCHNITZEL RESTAURANT INC
23890	AP MORENO VALLEY LLC
	APEX AUTO BROKERS
	APFEL FURNITURE SALE
	ATLAS EXPRESS PADALA INC
	CA SCHOOL EMPLOYEES ASSN MORENO VALL
	DYNASTRY GROUP HOME INC
	FAIR HOUSING COUNCIL OF RIVERSIDE CO
	FAIRCHILD CHIROPRACTIC CLINIC
	NEW BEGINNINGS HOME LOANS
	PERFORMANCE TEAM THE
23900	CERTIFIED TIRE & SERVICE CENTERS
	FIRST SOURCE AWARDS INC
	GOLDENS ELECTRONIC REPAIR
	UNLIMITED QUEST INC
	VICKYNO AUTO WINDOW TINT
23910	FANCY STITCHIN
	GBM MACHINE SHOP
	JAVIER JIMENEZ
	MOLLY MAID OF REDLANDS
	MORENO VALLEY COMMUNITY EDUCATION CE
23920	1ST PLACE AUTOMOTIVE
	ACME TUNE & SMOG
	BRADYS AUTOMOTIVE
	CERTIFED TIRE & SERVICE CENTER
	D & C AUTO REPAIR
	MORENO VALLEY TRANSMISSIONS
23932	AMMA MEDICAL SUPPLY
	M MD S WEST
	MAGANA AUTO UPHOLSTERY
	MOBILE PROS
	MULTI TELECOM INC
	PLUMMERS ELEVATORS SERVICE
	RANDHAWA H S DVM
	TRUE FOUNDATION CHRISTIAN
	VICTORY TEMPLE
23942	AMB DRIVING SCHOOL
	PARTS PLUS
	PULIDOS WHEELS & TIRES
23952	BEST VALLEY SMOG & AUTO REPAIR
23962	ABBEY
	ACE TV RENTALS
	AMERICAN QUICK PRINTING
	ATLAS SHIPPERS MORENO VALLEY
	BANIG FILIPINO & ORIENTAL RESTAURANT
	BUENO MARIA SALVE A DDS
	DANCEL FLORENDO

ALESSANDRO BLVD 2008 (Cont'd)

23962	DSOUZA LORRAINE REALTY EXECUTOR
	ERMA FULCHER
	FULCHER ERMA
	FUN 4 ALL PARTYS
	HEISSER INSURANCE AGENCY
	LAW OFFICES OF EDWARD LLOYS & ASSOCI
	MARIA BUENO
	NEW IMPRESSIONS TILE INC
	PARADISE VALLEY HOLDINGS INC
	PHIL AM ENTERPRISES
	PICOZZI & LLOYD
	RED RIBBON BAKE SHOP
	RITA HARB
	SANDIP DESAI DDS
	SUPER V BEAUTY SALON
	SUPER V BEAUTY SALON & GIFT STORE
	T L C NUTRITION CENTER
	VIDEO TIME
	VINCENT DANIEL P LAW OFFICES
24021	AMYS BARBER SHOP
	CENTURY 21
	CHUYITAS
	CSK AUTO INC
	DEL SOL FURNITURE 2
	DESIGNER HAIR & NAILS
	I DO WEDDINGS
	JPMORGAN CHASE BANK NATIONAL ASSOCIA
	LOIS LAUER REALTY
	MAMA CHUYS
	NUEVO TORITOS MEAT MARKET
	OUBEIDS SOUTHPOINTE DENTAL PRACTICE
	P N B REMITTANCE CONTRACTORS INC
	PHILIPPINE NATIONAL BANK REMITTANCE
	PIZZA HUT
	SUNGADAN
24050	ALBIERTOS MEXICAN RESTAURANT
	CIGARETTE KING
	DIAZ GROUP INC
	INSTANT CASH
	MARISCOS MELGOZA
	MEGA CELLULAR
	PATTAYA PLACE
24100	DALIAS PIZZA NO 12
24150	AGUA FINA
	APPLE FLORIST
	FADES UNLIMITED
	INK AHOLICS TATTOO STUDIO
	INKAHOLICS
	KARENS GROOMING SHOPPE
	PACIFIC LABOR SOURCE INC

ALESSANDRO BLVD 2008 (Cont'd)

24150	QWICK PICK
24400	CHECKING CHECK CASHING CENTERS
	SERVICE ANNEX LLC
24430	ASTEC
	AZTEC INSURANCE SERVICES
	COMMUNITY RECRUITMENT STAFFING
	POSTAL EXPRESS
	RANCHO DENTAL GROUP
	RANCHO MEDICAL CLINIC
	VINCENTEOS MEXICAN FOOD
	YOUR WIRELESS RETAILER
24440	CHURCHS CHICKEN
	FOOD 4 LESS
	LA S LOW COST AUTO INSURANCE
	MCDONALDS
	MCMANGA FOODS
	TONYS MOBIL
24481	APPLIANCE DISCOUNTERS SALES & SERVIC
24515	FREDERICK L HOFFER DDS
	MVP BEAUTY PLUS
	SUNNYMEAD VILLAGE DENTAL
24525	ANIMAL ELEGANCE
	CURVES FOR WOMEN SOUTH
	PAYLESS SHOESOURCE
	RIVERSIDE CURRENCY SERVICES
24541	MORENO FAMILY DONUTS
24549	MORENO VALLEY COMMUNITY SCHOOL
24551	PC WIRELESS
24553	BOUTIQUE

Target Street	Cross Street	Source
✓	-	Cole Information Services

HEACOCK ST 2008

10271	MORENO VALLEY UNITED METHODIST CHURC
11401	FACULTY PHYSICIANS & SURGEONS LLCMC
	LOMA LINDA UNIV PEDIATRIC MEDICAL GR
	NORTH HEACOCK DENTAL
	R RYNEARSON
	REAGAN DAVID L DDS
	RYNEARSON R DAVID DDS MS
11441	BRYAN FANDRICH MD
	DONG S KIM MD
	EAST WAY ACUPUNCTURE
	EDUARDO A GARCIA
	EDUARDO GARCIA
	HIGHLANDER REALTY
	LAGUNA VISTA PHARMACY
	LOMA LNDA UNIV RADIOLOGY MEDICAL GRO
	MORENO VALLEY PHYSICAL THERAPY
	NEW START WELL BEING CLINIC
	VALLEY VIEW FINANCIAL SERVICES
	VISITH PRIN MD PC
11481	ADWEN YAP DDS
	BETHANY HOME HEALTH CARE
	CHRISTLEY BEVERLY A INS AGENCY
	FAMILY DENTISTRY
	RONALD KENT MD PHD
11692	EUGENIA SANVICENTE
11696	DANIEL WESCOTT
11698	GILBERTO MEZA
12065	GOODWIN PAT BOOKKEEPING & TAX SERVIC
	JACQUELINE ASHE INVESTMENTS
	XIAO WONG
12075	RALEIGH BILL CLU
	STATE FARM INSURANCE
12085	MICHAEL DE LA CRUZ JR DDS
	MICHAEL DELACRUZ
12095	JOSE HERNANDEZ
	OCCUPANT UNKNOWN
12107	OCCUPANT UNKNOWN
12109	MARGARET LONG
12119	MORENO VALLEY RESOURCE CENTER
12123	ROBERT MARSHALL
12151	LUIGI CANALE
12183	LUIS CORTES
	LUIS DENTAL LAB
12199	KAPUR HARISH INSURANCE AGENCY
	MG MEDICAL SUPPLIES
	SKIN ESSENCE SKIN CARE CLINIC
12214	LOIS TOMLINSON CPA
12222	M & M CLEANERS
12234	CONSUMER CREDIT & LAW CENTER
	GOLDEN INSURANCE SERVICES

Target Street	Cross Street	Source
✓	-	Cole Information Services

HEACOCK ST 2008 (Cont'd)

12235	CAR QUEST
	COCINA RESTAURANT MORENO
	EXPRESS DONUTS
	LAVIT CHECK CASHING
	MORENO MEAT MARKET
	PORKYS PIZZA
	PRO NAIL & HAIR
	VISTA HERMOSA BAKERY
12238	XPOSUER HAIR STUDIO
12246	MORENO VALLEY REALTY
	MZP FOOD & GAS
12255	CIRCLE K STORES INC
	M D P
	MORENO VALLEY INVESTMENTS
	MZP FOOD & GAS
	SAMMYS FOOD STORE
12275	RAMONA AUTO SERVICES INC
12280	KENTUCKY FRIED CHICKEN
	KFC
12300	JIFFY LUBE
12301	C & J COX CORP
12370	ROBINSON ANITA REALTOR
12428	ARCO
	PRESTIEGE STATIONS INC
12431	CHEVRON STATIONS INC 1419
12450	REBECAS TRAVEL
12460	PROVIDENT BANK
12477	JACK IN THE BOX INC
12540	ANATOMICAL ART LLC
	CATHOLIC CHARITIES
	CELLULAR PLUS
	GLADIATONS SERVICE
	INTERGRATED BUISNESS MARKETING LLC
	NETWORK REAL ESTATE SERVICES
	TRIED & TRUE
12576	KING AUTO REPAIR
	UNLEASHED MOTOR SPORTS
12591	PAMS DONUTS
12640	STEVES BURGERS
12712	ALI M MOVAFAGH
	ALL BRITE DENTAL CARE
	CARSTENS HERMAN A MD INC
	CHILDNET YOUTH & HOME
	CHRISTOPHER OTIKO DPM
	DEANZA OB GYN
	FOSTER FAMILY NETWORK
	INJURY CARE MANAGEMENT
	MOVAFAGH MEDICAL GROUP
	PATANKAR KAUSTUBH V MD FACC
	RIVERSIDE REGIONAL PEDIATRIC MEDICAL

Target Street	Cross Street	Source
✓	-	Cole Information Services

HEACOCK ST 2008 (Cont'd)

12712	ROBERT F BONIADI DDS
	ROGER CHENG
	ROGER T CHENG MD
	TRI CITY MEDICAL TRANSPORT
12730	COVENANT ADVANTAGE INC
	DANIELS PHARMACY
	LOGIHEALTH MEDISPA & WELLNESS
12800	ALL AMERICAN REALTY
	PACIFIC DENTAL SERVICES
	PARKWEST LEASING CO
	SALVADOR GALLARDO
	VILLANUEVA AUGUSTINE REAL ESTATE
12810	ANTHONY FENISON
	ARMANDO FRANCO
	ARMANDO L FRANCO MD
	GEORGE PONCE
	LABCORP
	ROBERT T SILVOLA DDS
12815	KAISER FOUNDATION HOSPITALS
	KAISER PERMANENTE
	KAISER PERMANENTE MEDICAL GROUP
12818	DR LAWRENCE BLACKMON DDS
	DR LAWRENCE BLACKMON DENTAL OFFICE
	NEW HOPE CHRISTIAN CENTER INC
12820	OCCUPANT UNKNOWN
12834	OCCUPANT UNKNOWN
12846	AGUSTIN FLORES
12875	MORENO VALLEY UNIFIED SCHOOL DST
	SUNNYMEAD ELEMENTARY SCHOOL
12880	CENTRO CHRISTIANO SINAI ASAMBLEA
12900	ALFREDO LOZANO
13050	DEO MARTINEZ PC
	FIRST CARE
	ISMAEL SILVA JR MD
	LINDER JOHN DPM INC
13060	CYNTHIA CROPPER
13110	MARIA HERNANDEZ
13120	JUANITA TENORIO
13125	MOUNTAIN VIEW APARTMENTS
13135	AB SALES
	ADRIAN JOHNSON
	ALFREDIA BUFORD
	ALICE MCCOULLUM
	ANA RODRIGUEZ
	ANGELA DEVITA
	ANTHONY SPENCER
	APRIL BBUSH
	ATIYA ABNER
	AUTUMN ANDREWS
	BETTE MOORE

Target Street	Cross Street	Source
✓	-	Cole Information Services

HEACOCK ST 2008 (Cont'd)

13135	BOBBIE CEATON
	BRUCE LAWSON
	C STRONG
	CARRIE DAUGHERTY
	CHARLES GARLAND
	CHERRY COOPER
	CHERYL SMITH
	CLIFF PERKINS
	CLINT DOMINECK
	DAIHSY GOMEZ
	DAMON WARD
	DANIELLE WHEELER
	DEBRA COLEMAN
	DELIA MACIAS
	DETRA NASH
	DHOMANA HERNANDEZ
	ELMER RIVERA
	EMITH RIOS
	ERICKA KEMP
	FRANCISCO HERNANDEZ
	FRANK DENNIS
	GABE RAMIREZ
	GABRIELLA LOBERA
	GARFIELD BECKFORD
	GERALDINE LYONS
	GILBERTO VILCHEZ
	HELEN ALEXANDER
	HILDA PACHECO
	JAIME ACEVEDO
	JANICE JONES
	JASMINE CORTEZ
	JENNY HOLDEN
	JESSICA POLANCO
	JOANN BROWN
	JOREATHA ABRAHA
	JOREATHA ABRAHAMS
	JOSE LECHUGA
	JOSE PINEDA
	JOSEFINA ZARAGOZA
	JUAN CAMPOS
	JUAN CANALES
	JULIE SANGTASANESOUK
	KATHLEEN RIVERA
	KEITH PORTREY
	KENNETH DONALDSON
	KENNETH LEWIS
	KYLA THOMAS
	LASONYA YOUNG
	LINDA BONDS
	LISA CHATMAN

Target Street	Cross Street	Source
✓	-	Cole Information Services

HEACOCK ST 2008 (Cont'd)

13135	LOUISE PRICE
	MA MERAZ
	MARIA MACIAS
	MARIA SANCHEZ
	MAYRA CHAVARRIA
	MELISSA MURATALLA
	MERAZ ARECHIGA
	MICHAEL MCCOLLUM
	MICHAL FLORES
	MICHELE BUSTOS
	MICHELLE BEGGS
	MIKI MCGILL
	MONICA LACOUR
	NANETTE CALDWELL
	PAMELA SMITH
	PAMMY SANDOVAL
	PATTI DEWEY
	PEDRO LOZA
	PEDRO MONJE
	PEDRO SAUCEDO
	PENNY GARDENER
	RASHIDA NAVARRE
	REMEDIOS SAPALO
	RENE GREEN
	RICARDO GARCIA
	RONALD GRAYDON
	RONNELL LAWSON
	ROSA PIMENTEL
	RUBEN PEREZ
	S ASENA
	SAMMY MAYA
	SARAH SHANAHAN
	SENGTHIEN SERNA
	SERVANDA ESTRADA
	STAMFIELD APRIL
	SUHEILI SIERRA
	THERESA GARCIA
	THERESA LOWE
	THY TRAN
	VIRGINIA COLLINS
	YVONNE WATTS
13260	ANITA DENNIS
	E SKELTON
	GABRIEL ORDUNO
	JOSE GARCIA
	KELLY DAVIS
	MIGUEL BOLANOS
	TALIA OVANDO
13266	DANIEL RAMOS
13270	CHIKE EIEMERE

Target Street	Cross Street	Source
✓	-	Cole Information Services

HEACOCK ST 2008 (Cont'd)

13270	JUNLIAN ZHANG
	RAQUEL CAMACHO
	SHELBIE SANDERS
	STEVEN MARTINEZ
	VALLEY IMPORT SHIPPING
13280	DELORES WAKEFIELD
	ERIC BATTS
	HECTOR MALDONADO
	JUST VALUES DOT COM
	MARISELA PEREZ
	OTIS PORTER
	PALOS VERDES APARTMENTS
	RIVERSIDE WASTE & DISPOSAL
	SANDRA MANSO
	SARA ESTRADA
	WALKER TERRACE
13290	BEN HENDERSON
	FELISHA ANDERSON
	J THIERRY
	LARRY YANDERS
	TERESO GARCIA
	THERESA ROBINSON
	TRACY CARLBERG
	YVONNE ALARCON
13323	ALEJANDRO FLORES
13325	ALEXANDER STEELE
	ALICE OREJEL
	ALICIA LOPEZ
	ANA CORDERO
	ANA GALVAN
	ANA MADRIGAL
	ANGEL PEREZ
	ANTHONY THOME
	ANTONIA VELASQUEZ
	ARTURO SANCHEZ
	B BOOKER
	BERNADENE CONTRERAS
	BRIAN CARTER
	BRIANNE MCARTHUR
	BRYAN PADILLA
	CARMEN PARRA
	CLAUDIA GOINS
	CLIFFORD BROWN
	CONPCECION CARRION
	CRISTINA NUNEZ
	CRYSTAL MARDOCK
	DAVID BRAXTON
	DEMETRIO ANTONANIO
	DOROTHY AUSTIN
	EDNA CORDOVA

Target Street	Cross Street	Source
✓	-	Cole Information Services

HEACOCK ST 2008 (Cont'd)

13325	ENRIQUE MENDOZA
	ENVANGELIN NAVARRO
	FERNANDO AYALA
	FILOMENO DOMINGUEZ
	FLORENTINA AVILA
	FRANCISCO LARA
	FRANCISCO PIZANA
	GLORIA RODRIGUEZ
	GUADALUPE ISLAS
	HEACOCK PARK APARTMENTS
	ISSAC HIGH
	IZRALE DUARTE
	J PALMER
	JAMES LEARY
	JEREMY ALLGIER
	JESSICA ROCHA
	JESUS GONZALEZ
	JOE MORENO
	JOEL PARRA
	JOHN HODGE
	JORGE COLIN
	JOSE DIAZ
	JOSE VARAJAS
	JULIO ENCISO
	KAYLA THORNE
	KENNETH MARTIN
	KEONTA SCRUGGS
	KIMBERLY KNIGHT
	KYLENE BOND
	L GARNICA
	LARRY AVILA
	LAURA OCHOA
	LEE CARRIER
	LILIANA CAPARELLI
	M DADOUB
	MAC COATS
	MARIO ANGULO
	MARTHA MACIAS
	MARTIN AVALOS
	MAUREEN RUSH
	MELISSA NUCKLES
	MIKE GARCIA
	NICOLE MILLER
	NOELIA GOMEZ
	NORMA GOMEZ
	PATRICIA ESPINOZA
	PEDRO MARTINEZ
	PONCE OLMEDO
	PRICILLA HAYWARD
	RAMIRO VALLE

HEACOCK ST 2008 (Cont'd)

13325	RAYMOND HINTON
	REINA DOMINGUEZ
	ROBERT BARNEKOW
	ROBERT RICHARDSON
	ROBIN DOMKE
	RODRIGO HERNANDEZ
	ROGELIO MONTEJANO
	ROLANDO DHEMING
	ROSARIO LUGO
	RUDY DELROSARIO
	SORAYA PADILLA
	VALERIE THOMAS
	VANESSA MARTINEZ
	W CHOI
13563	CREEKSIDE ELEMENTARY SCHOOL
	MORENO VALLEY UNIFIED SCHOOL DST
	RIVERSIDE OF YMCA OF CREEKSIDE
13800	ABBYS ADOLESCENT DEVELOPMENT CENTER
	ACTIVE THERAPY CENTER
	AMERICAN MORTGAGE
	ANN PULTZ KRAMER
	B & F INVESTMENTS & TAX SERVICES
	CDS INC
	CONSTRUCTION DEFECT SOLUTIONS INC
	EMERALD MANAGEMENT RESOURCES
	FIRST MORTGAGE
	GREATER INLAND VALLEYS MLS INC
	GREATER VALLEY MORTGAGE
	GREEN GLYNISS MPT OCS
	HAGLER AUTO GROUP
	HAGLER ENTERPRISES INC
	HANGER INC
	HORRIGAN COLE ENTERPRISES INC
	JENNISON JAMES H PHD
	KOZIKOVE GROUP HOMES INC CORPORATE O
	LINKU SYSTEMS INC
	LUEANNAS CREOLE KITCHEN & BAR INC
	M & M REAL ESTATE INVESTMENT
	MARIANNE STMARIE
	MERIT MORTGAGE SERVICES
	NA NATIONWIDE MORTGAGE
	NATIONAL MENTOR INC
	NUTRITIONAL MERCHANDISE
	OPTIMA HOME HEALTH SERVICES INC
	PACIFIC EXECUTIVES INC
	PAMELA COLEMAN
	PRICE ISAAC CPA
	RANCHO PHYSICAL THERAPY
	T G A DEVELOPMENT & ENGINEERING INC
	THELMA GERALDINE MCDONALD

Target Street	Cross Street	Source
✓	-	Cole Information Services

HEACOCK ST 2008 (Cont'd)

13800	UNLIMITED FINANCIAL SOLUTIONS
15040	ABEL DENIZ
	ADELA DIAZ
	ALFREDO ZAMBRANO
	ALICIA CONTRERAS
	ALMA PRECIADO
	ANTONIO AVINA
	BERTHA MATOS
	BRIJIDO LEON
	BRYAN BISHOP
	CHAVEZ TRIANA
	CIRILO HERNANDEZ
	CRAIG SMARKER
	DANIEL GARCIA
	ENRIQUE BERROSTE
	ERIKA ESQUIVEL
	ERNESTO GUTIERREZ
	ESPERANZA ARVIZO
	FABIAN GONZALEZ
	FELIPE REYES
	FERNANDO ROJAS
	FRANCISCO ALONSO
	FRANCISCO MARTINEZ
	GELEN STAMEY
	GEORGE MACCRONE
	GREGORY KATSELES
	IGNACIO PANTOJA
	JESUS ZAMUDIO
	JOEL CERVANTES
	JORGE BELTRAN
	JORGE TORRES
	JOSE BERBER
	JOSE MURO
	JOSE RAMOS
	JOSEFINA LOZANO
	KAREN JUSTICE
	KATHLEEN GEORGE
	LUIS RAMOS
	LUPE ARENAS
	MANUEL HARO
	MARIA GUILLEN
	MARIA MORA
	MARIA PADILLA
	MARIA RODRIGUEZ
	MARIA TORRES
	MARTIN GARCIA
	MARY RADE
	MICHAEL SUHY
	MIGUEL FLORES
	MIGUEL ORTIZ

Target Street	Cross Street	Source
✓	-	Cole Information Services

HEACOCK ST 2008 (Cont'd)

15040	MIGUEL PEREZ
	NIGDIA JIMENEZ
	PATRICK THOMES
	R CASARES
	RAMIRO RODRIGUES
	RAMON LOPEZ
	RAUL LARA
	RAYMOND SAUCEDO
	REYNA DIAZ
	RICHARD ZERECERO
	RICHARDO CASTRO
	ROBERT DICKERSON
	ROBERT MORRIS
	ROBERT SCHWARTZ
	ROY HUFF
	S HOOPER
	SAMANTHA SMARKER
	SHUSILA SAMI
	SILVIA AMEZQUITA
	THOMAS SUTTON
	VERNON HELLESVIG
	VIVIAN IANNICCARI
	YENDIS BATTLE
	YOLANDA ZAMBRANO
	YVONNE CANDELARIA

Target Street	Cross Street	Source
✓	-	Cole Information Services

ALESSANDRO BLVD 2003

23060	PH WOODS RESTAURANT & BREWERY
23080	DEMOLA ANGEL MD
	DR DEZAS DENTAL OFFICE
	FRIENDSHIP CHRISTIAN BOOKS
	FRIENDSHIP CHRSTN FLWSHP CHRCH
	PLAZA MARKET & DELI
23100	A 1 CLEANERS
	CHINA GOGO
	DON JOSE MEXICAN RESTAURANT
	EBONY HAIR
	GOGO CHINA
23501	TABASSI CO
23580	LEIGH HICKS
23581	JIN KOO
23615	ALESSANDRO ENTERPRISES INC
	ALESSANDRO HAND CAR WASH
	MAGIC LUBE
	PEDROS FOOD
23750	BENS BEAUTY SALON
	CADILLAC BOWL
	CLASSY BS LIQUOR
	DEAN & ASSOCS
	FANCYTAN INC
	GINGER TAYLOR
	GINGER TAYLOR
	GOLDEN OX
	HAIRCUTS PLUS
	HEAR EASY HEARING AIDS
	INSPIRATIONS PRFRMNG ART CTR
	MAX MUSCLE
	MORENO VALLEY FUN BOWL INC
	MORENO VALLEY HEARING AIDS
	OASIS COMMUNITY CHURCH
	RAY CHAKMAKCHI
	ROBERT RYNNG HLTH & JUICE BAR
	RUSTIC
	SHEAR CUTS
	STEPPING STONES LEARNING ACDMY
	TAN FANCY
	THE RITE PLACE
	TWENTYFOUR HOUR FITNESS
	WED OF CANDLES
23880	TACO BELL NO
23890	CLINICAL MASSAGE THERAPY GROUP
	FAIR HOUSING COUNCIL OF RVRSD
	FAIRCHILD CHIROPRACTIC CLINIC
	LUIS DENTAL LAB
	MIRCH MASALA CORNER
23900	CERTIFIED TIRE & SERVICE
23910	ANGEL GARCIA

Target Street	Cross Street	Source
✔	-	Cole Information Services

ALESSANDRO BLVD 2003 (Cont'd)

23910	COLE FINANCIAL INC
	FANCY STITCHIN
	GBM MACHINE SHOP
	LJR ROOFING
	SSS ALARM CO
23920	1ST PLACE AUTOMOTIVE
	D & C AUTO REPAIR
23932	H RANDHAWA
	MAGANA AUTO UPHOLSTERY
	MELVIN MARTE
	PLUMMERS ELEVATORS SERVICE
	TRUE FOUNDATION CHRISTIAN
23942	ABBEY CO
	ANGELINE TANCREDI
	AP MORENO VALLEY LLC
	CLAUDIAS FASHION
	DYNO DUDES
	RANDY DARGITZ
23962	A PLUS COMPUTER SERVICES
	ACE TV RENTALS
	ATLAS BUILDERS
	BANIG RESTAURANT FLPN & ORNTL
	DEBORAH HEISSER
	DEBORAH HEISSER
	ERMA FULCHER
	FULCHER ERMA INSURANCE
	FUN 4 ALL PARTYS
	GROUND ZERO AUTO SALON
	LAW OFFICES OF MARC VINCENT
	MARC VINCENT
	MARC VINCENT & ASSOCS
	SUNBRIGHT TILE MARBLE
	SUPER V 2
	VINCENT DANIEL P LAW OFFICES
24021	CHELIS BEAUTY SALON
	DAIRY QUEEN
	DEL SOL FURNITURE
	EMYS BARBER SHOP
	KRAGEN AUTO PARTS MORENO VLY
	LUNA SUPER STORE
	MAMA CHUYS
	NUEVO TORITOS MEAT MARKET
	PIZZA HUT
	Q TEAZ FASHION
	SOUTH POINTE CTR LTD
24050	ALBERTOS MEXICAN FOOD
	FLASH PHOTO STUDIO
	INSTANT CASH
	KING CIGARETTE
	MEGA CELLULAR

Target Street	Cross Street	Source
✓	-	Cole Information Services

ALESSANDRO BLVD 2003 (Cont'd)

24050	PERFECT TOUCH BEAUTY SALON
	RAMADA FLOORING
	S STYLIST
	STYLIST VI SMITH
24100	DALIAS PIZZA NO
	KINGS DONUTS
24150	APPLE FLORIST
	CHRISTINE CRENSHAW
	CHRISTINE CRENSHAW
	GABBYS LIQUOR
	KARENS GROOMING SHOPPE
	NRTHMD PRSCHL & CHILD CARE CTR
	QWICK PICK
	WINGS N THINGS
	WINGS N THINGS II
24400	SERVICE ANNEX LLC
24440	TONYS MOBIL
24481	APPLIANCE DISCOUNTERS
24491	ABC FOOD STORE
	KWANG LEE
24525	ANIMAL ELEGANCE
	CALIFORNIA BANK & TRUST
	OCCUPANT UNKNOWN
	PAYLESS SHOESOURCE
	RIVERSIDE CURRENCY SERVICES
24545	99 CENT WORLD
	OCCUPANT UNKNOWN
24551	HANI KARAM
	WIRELESS PRO

Target Street	Cross Street	Source
✓	-	Cole Information Services

HEACOCK ST 2003

11401	NORTH HEACOCK DENTAL GROU
	REAGAN DAVID L DDS
	ROBERT SMITH
11441	BOWDRY IRENE LAW OFFICE
	DONG KIM
	HEAD INJURY RHBLTTN SRVC
	KIM DONG S MD
	LAW OFFICES OF IRENE BOWDRY
	LAWSON TERRY
	LOMA LNDA UNIV RDLGY MD GROUP
	PARKVIEW OCCUPATIONAL
	VALLEY VIEW FINANCIAL SERVICES
11481	ADWEN YAP DDS
	CHRISTLEY BEVERLY A INS AGENCY
	DELTA FAMILY DENTISTRY
	DIANE OLSON INSURANCE AGENCY
	RONALD N KENT MD
11636	GILBERT ARIAS
11692	FRANK JABLONSKI
11696	DANIEL WESCOTT
11698	BRITTON WATER TRUCKS
	FRANK BRITTON
12065	GOODWIN PAT BKPNG & TAX SRVC
	PAT GOODWIN
12075	MARK RALEIGH
	RALEIGH BILL CLU
12085	OCCUPANT UNKNOWN
12097	L CALHOUN
12107	MARINA HARRISON
12123	ROBERT MARSHALL
12151	DAN VACA
12183	OCCUPANT UNKNOWN
12199	CRUZ DELA
	DELA CRUZ MICHAEL DMD
	TILTON WILLIAM LAW OFFICES
12218	OCCUPANT UNKNOWN
12222	OCCUPANT UNKNOWN
12234	NEW YORK FLAVOR
	OCCUPANT UNKNOWN
12235	AZUL SERVICES
	MORENO MEAT MARKET
	PORKYS PIZZA
	PRO NAIL & HAIR
	SUKHDEV CHAHAL
	UNCLE CHENS
12238	OCCUPANT UNKNOWN
	SO UNIQUE BARBER & BTY SALON
12246	CHARLES ZUPPARDO
12255	CIRCLE K FOOD STORES
	SAMMYS BEER & WINE MARKET

HEACOCK ST 2003 (Cont'd)

12275	RAMONA FIRESTONE TIRE CNTR
	RAMONA TIRE INC
12280	KENTUCKY FRIED CHICKEN
12300	JIFFY LUBE
	OCCUPANT UNKNOWN
12301	C & J COX CORP
12428	SMOGPROS
	SMOGPROS TEST ONLY
12431	CHEVRON
12451	JACKS JR HAMBURGER
	JUNIOR JACKS
12460	OCCUPANT UNKNOWN
	PROVIDENT SAVINGS BANK
12477	JACK IN THE BOX
12540	CATHOLIC CHARITIES
	CURL FACTORY
	REBECAS TRAVEL
	TWISTIT UP BRAIDERY
12576	CUSTOM FIT
	KUSTOM FIT TRUCK & AUTO CTR
	MAGIC AUTO GLASS
	OCCUPANT UNKNOWN
	OUTCAST MOTORSPORTS
12578	PIZZO BROTHERS TOWING
12591	PAMS DONUTS
12593	ECONOMY DRIVING SCHOOL
12595	ALAN ELSON
	KWIK KEY LOCK & SAFE
12640	STEVES BURGERS
12712	ALI MOVAFAGH
	ALL BRITE DENTAL CARE
	CARLOS MARTINEZ
	CHENG ROGER T Y MD
	DR ROBERT BONIADI
	MOVA MEDICAL GROUP
	PATANKAR KAUSTUBH V MD FACC
12800	A SMITH
	JOSE KIYAN
	PERIN RUSSEL DDS
	RICHARD DNARVARTE
	SALVADOR GALLARDO
	SMITH A PHD
12810	ANTHONY FENISON
	CLINTON WONG
	FRANCO ARMANDO MD
	GEORGE PONCE
	LABCORP
	LYNN DIAZ
	MARCKS KURT DDS
	MORENO VALLEY ENDODONTICS

Target Street	Cross Street	Source
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HEACOCK ST 2003 (Cont'd)

12810	MORENO VALLEY OPTOMETRY
	PONCE GEORGE MD
	SILVOLA DDS ROBERT
	STEPHEN KALLAOSS
	WONG CLINTON K OD
12812	NEW HOPE CHRISTIAN CTR INC
12815	KAISER FOUNDATION HOSPITALS
	KAISER PRMNNT MDCL CARE PRGRM
12818	BLACKMON LAWRENCE B DDS
	LAWRENCE BLACKMON
	MEDICAL PLAZA PHARMACY
12820	TIMOTHY STCROIX
12834	OCCUPANT UNKNOWN
12846	AGUSTIN FLORES
12875	OCCUPANT UNKNOWN
	SUNNYMEAD ELEMENTARY SCHOOL
	SUNNYMEAD MIDDLE SCHOOL
12880	CENTRO CHRSTN SINAI ASMBL DE
	CRISTIANO CENTRO
12900	OCCUPANT UNKNOWN
12920	OCCUPANT UNKNOWN
	SIMPLE MATHEMATICS
13050	DEO MARTINEZ
	LINDER JOHN DPM INC
	MARTINEZ DEO MD
	RAI BALDEV S MD
	SAMI IGBAL M MD
13060	OCCUPANT UNKNOWN
13110	MARIA HERNANDEZ
13120	OCCUPANT UNKNOWN
13135	AGUSTIN CASTANEDA
	ALICE MCCOULLUM
	ANGELICA MAMARIL
	ANN LOCKETT
	B CARLOS
	BALWANT SINGH
	BOBBIE SEATON
	C THOMAS
	CAROL SHINE
	CHARLES CRUZ
	CHARLOTTE KIRKPATRICK
	CHERYL SMITH
	DAMON WARD
	DANETT HALE
	DELSINA LOPEZ
	DENISE TURRUBIATE
	DETRA NASH
	DEVIN BARNES
	DWAYNE KOVERLY
	EDGAR ROJAS

HEACOCK ST 2003 (Cont'd)

13135	EDWARD HEYES
	ELLEN FIELDS
	ELSA BRIZUELA
	ERNESTINA PIKOP
	EVELYN PARULAN
	FLOYD ROSS
	FRANCISCO AMEZQUITA
	FRANK DENNIS
	GISELLE HALL
	GLENDA CAMPBELL
	HELEN WOODS
	IRENE QUINN
	JAMILA GALLIEN
	JENNY HOLDEN
	JOANNE HAINES
	JOHN SCHMIERER
	JONATHAN JONES
	JULIE SANGTASANESOUK
	KAREN KANG
	KLEMENS HUYNH
	KRISTI PINCHBACK
	LAKISHA MOORE
	LORRAINE DAVIS
	MANUEL PLACENCIA
	MARIANELLA CESAR
	MARIBEL OCHOA
	MARY LONG
	MICHAEL CARTER
	MICHAEL GONZALES
	MICHAEL SEARLE
	MICHAL FLORES
	MICHELLE BEGGS
	MOUNTAIN VIEW APARTMENTS
	NAOMI PERRY
	OSCAR ROSSO
	RAYMOND SAUCEDO
	RONNIE SANDERS
	S FONTENOT
	SEAN LICHTWALD
	SERENA MULLIKIN
	SEUNG SIN
	SHANICE HIGHTOWER
	SHERI BUTLER
	SHIRLEY LEE
	SIEK MEAN
	SOMCHAY SANPASANESOUK
	T WILSON
	TAMMY SANDOVAL
	TARSHA HARPER
	THERESA LOWE

Target Street	Cross Street	Source
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HEACOCK ST 2003 (Cont'd)

13135	TROUBLE FREE FINANCIAL
	VINCENT RUIZ
	VIVIAN BULACAN
	WILLIAM NORWOOD
	YVONNE WATTS
	ZINA MUNOZ
13260	CYNTHIA GRAHAM
	DEANDRE MCCOY
	HUSSEIN ALHYARI
	JAVIER RAMERIZ
	LOURDES REYES
	MARIA MENDOZA
	MARIBEL MUNOZ
	ROBERT JOHNSON
13270	CHARLES HOWARD
	DIONTE SMITH
	EVA CHEUNG
	FLORITA SAUSAU
	JIRAPORD OWENS
	MEI SHEPHERD
	ORLANDO MALDONADO
	RAQUEL CAMACHO
	RUBEN MURILLO
13280	DANIEL CARDENAS
	FIRST CIRCUIT TECHNOLOGIES INC
	JAMES MOCK
	JESSICA WEBB
	OTIS PORTER
	PALOS VERDES APARTMENTS
	PEDRO ARIAS
	ROGELIA PENA
	SARA WILSON
13290	DANIEL DELORENZO
	KAREN FLORES
	LUTRICIA BREEDLOVE
	MAUREEN RUSH
	REBECCA FRANCO
	ROBERT QUINTANA
	STEVEN WARNER
	VICTOR FIGUEROA
	VIJAY MALI
13323	ALEJANDRO FLORES
13325	A PEREZ
	ALDO HERNANDEZ
	ALVIN PRESLEY
	AMY CONCHOLA
	ANTONIO DUVALL
	BARBARA CALDERON
	BERYL BROCKING
	BILL TOWNSEND

Target Street	Cross Street	Source
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HEACOCK ST 2003 (Cont'd)

13325	BRUCE LAWSON
	CARLOS MARTINEZ
	CAROL PRUITT
	CLAUDIA FIERRO
	CURTIS PAYTON
	DANIEL MEDINA
	DAVID ROMINE
	DAVID ZAZUETA
	DOLLY HOPKINS
	ENRIQUE MENDOZA
	ERNESTO VALENTINES
	EUGENIA COOK
	EVERARDO DELGADO
	FERNANDO HEACOCK
	GRACE CLARK
	HELIODORO TRUJILLO
	IGNACIO LOPEZ
	JAMES LEARY
	JOSE PARRAL
	K CROW
	K NUNEZ
	K SERNA
	KEONTA SCRUGGS
	LAKISA KENNEDY
	LAVENA TURNER
	LE FEVER MATTSON PRPRTY MNGMNT
	LINDA MAIDLOW
	LUPE ELBIALI
	M SMITH
	MAC COATES
	MARIE CHRISTOPHER
	MARTIN PEREZ
	MARY JOHNSON
	MATTIE SPEIGHT
	MERRILAN HOOVER
	MIGUEL MONTES
	MOHAMMAD HOSSAIN
	MONICA CHANEY
	MOSES LUEVANOS
	NANCY VALDIVIA
	NOVA HEACOCK PARK APARTMENTS
	P RANKINS
	PATRICK RICHARDSON
	PAUL IVIE
	PERLA GERARDO
	REBECCA SECHRIST
	ROSEL URSUA
	RUDY DELROSARIO
	SANDRA LOPEZ
	SONYA IRVINE

Target Street	Cross Street	Source
✔	-	Cole Information Services

HEACOCK ST 2003 (Cont'd)

13325	TELISA PARKER
	TERI HENDRIX
	VALERIE THOMAS
	WIILIAM SANTOSCOY
	WILLIAM ESTES
13563	YMCA OF MORENO VALLEY CRKSD
13800	ABBYS ADOLESCENT DVLPMNT CTR
	CDS INC
	COMONT EVICTION
	DAHUT & RASH LAW OFFICES
	DENTAL MANAGEMENT DECISION
	DIANE ARONOV
	EURASIA AM INC
	FIL CASTANEDA
	GOLDEN MERCHANT SERVICES
	INDUSTRIAL EMPLOYMENT SPCLST
	KAPUR HARISH INSURANCE
	MANN ARTHUR INSURANCE
	NETWORK MERCHANT SERVICES
	NUTRITIONAL MERCHANDISE
	PRICE ISAAC CPA
	RANCHO PHYSICAL THERAPY
	RUPP HENRY P III ATTY
	VLY RESRC CTR FOR THE RETARDED
15040	ALBERTO ARCE
	ARTHUR BOHRINGER
	BABU PATEL
	BERTHA MATOS
	CLARITA BATTLE
	CLAUDE BECKMAN
	CRAIG SMARKER
	DELORES WIMER
	DONALD MARTIN
	FABIAN GONZALEZ
	GELEN STAMEY
	GREGORY KATSELES
	JAIME LOYA
	JAMES BAILEY
	JESUS ZAMUDIO
	JFK MOBILE VILLAGE
	JOSE RAMOS
	JUAN JIMENEZK
	KATHLEEN GEORGE
	MICHAEL SUHY
	MIGUEL OLVERA
	MIGUEL PEREZ
	PATRICK THOMES
	PETRA TRUJILLO
	RAYMOND BOMAR
	RAYMOND SAUCEDO

Target Street	Cross Street	Source
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HEACOCK ST 2003 (Cont'd)

15040	RICARDO CASTRO
	RICHARD ZERECERO
	ROBERT MORRIS
	ROBERT MORRISON
	ROBERT SCHWARTZ
	SALVADO GODINEZ
	SHUSILA SAMI
	SPARKLE JUMPERS
	TINA SUTTON
	VATSANA NALY
	VICTORIA CAMARGO

Target Street	Cross Street	Source
✓	-	Cole Information Services

ALESSANDRO BLVD 1999

23080	FRIENDSHIP CHRISTIAN FELLOWSHIP CHURCH
	PLAZA MARKET & DELI
23100	A 1 CLEANERS
	BOTTOM GUN CAFE
	DON JOSE MEXICAN RESTAURANT
	EBONY HAIR
	PLAZA DEL SOL HAND CAR WASH
	STUDIO B
23580	POSTAL SERVICE
23581	MOTEL 7
23615	ALESSANDRO HAND CAR WASH
	EZ LUBE
	JAMAL SADIK
	MAGIC LUBE
	MAGIC TUNE
23750	24 HOUR FITNESS
	99 CLEANERS
	B KING
	BEN TURPIN HEARING AIDS
	CADILLAC BOWL
	CLUB CADILLAC
	COST CUTTERS
	FANCY TAN
	GOLDEN OX BURGERS
	HOT SPRINGS PORTABLE SPAS
	IN & OUT MARKET & LIQUOR
	INLAND EMPIRE HOT SPRING SPAS
	INSPIRATIONS PERFORMING ARTS CENTER
	L & M BOWLING EQUIPMENT
	MENDYK CHIROPRACTIC
	MORENO VALLEY HEARING AIDS
	NUTRI SYSTEM WEIGHT LOSS CENTER
	RIVER KWAI THAI CUISINE
	SHEAR CUTS
	SISLO ROSE MARIE
	SIZZLER RESTAURANTS
	SUN VALLEY REAL ESTATE
	SUPERIOR NAILS BY KIM
	SURF CITY SQUEEZE
	TUTOR TIME CHILD CARE LEARNING CENTER
	VALLEY CHIROPRACTIC
	WIENERSCHNITZEL NO 561
23880	TACO BELL NO 2858
23890	DIZZY DANIS CLEANING SERVICE
	EXPERT TIRE AND SERVICE CENTERS INCORPORATED
	FAIRCHILD CHIROPRACTIC CLINIC
	HOLY SPIRIT DURABLE MEDICAL EQUIPMENT
	MORENO VALLEY COMMERCE CENTER
	THE KOLL COMPANY
	TOTAL SECURITY SYSTEMS

ALESSANDRO BLVD 1999 (Cont'd)

23900	UNLIMITED QUEST INCORPORATED
23910	C & W TV
	FANCY STITCHIN
	JAVIER JIMENEZ
	LEONARDS CARPET
23920	D & C AUTO REPAIR
	EXPERT TIRE AND SERVICE CENTERS INCORPORATED
	GOODYEAR TIRE DLRS EXPERT TIRE AND SERVICE CENTERS INCORPORA
	JAPANESE CARS UNLIMITED
	LEES AUTO REPAIR
	MORENO VALLEY TRANSMISSIONS
	SUPERSTORES
	TIRE WHEEL & BRAKE SUPERSTORES
23932	ALESSANDRO ANIMAL HOSPITAL
	MAGANA AUTO UPHOLSTERY
	MULTI TELECOM INCORPORATED
23942	B & F AUTO REPAIR
	B & F MOBIL AUTO REPAIR
	PRAISE CHAPEL CHRISTIAN FELLOWSHIP
23952	AUTO SERVICE CLUB
	CLUB AUTO SALES
23962	AMERICAN QUICK PRINTING
	BANIG RESTAURANT FILIPINO & ORIENTAL
	CLASSY BS LIQUOR DELI
	ERMA FULCHER
	FUN 4 ALL PARTYS
	MARIA BUENO
	PHIL AM ENTERPRISES
	PIZZA ITALIA & SUBS
	SUPER V 2
	VIDEO TIME
24021	BRIAN HOMES
	DESIGNER NAILS
	G & M BEAUTY SUPPLY & SALON
	HIGH 9
	HOT SHOTS BILLIARDS & SPORTS BAR
	I DO WEDDINGS
	KRAGEN AUTO PARTS
	MR ANTHONYS
	MR ANTHONYS BEAUTY SALON
	OLD WEST MERCANTILE COMPANY
	PIZZA HUT
	SOUTH POINTE CENTER LIMITED
	US TROPHY
24050	GAME SPOT
	INSTANT CASH
	KHALED NOOR
	PATTAYA PALACE
	PERFECT TOUCH BEAUTY SALON
	STYLIST VI SMITH

Target Street	Cross Street	Source
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ALESSANDRO BLVD 1999 (Cont'd)

24050	TANMAKERS TANNING SALON
24100	LITTLE CAESARS PIZZA NO 5
	MUFFIN & DOUGHNUT
24150	A & S MARKET
	APPLE FLORIST
	EL CHALAN PERUVIAN RESTAURANT
	INK AHOLICS TATTOO STUDIO
	KARENS GROOMING SHOPPE
	PRECISION TAX & ACCOUNTING SERVICES
	T S SINFUL PRODUCTIONS
24440	MCDONALDS RESTAURANTS
	MOBIL OIL
	RALPHS GROCERY COMPANY
	TONYS MOBIL
24481	CHIEF AUTO PARTS
24491	A B C FOOD STORE
24515	DR JOE FIKTARZ CHILDRENS DENTISTRY
	HOME SAVINGS & LOAN ASSOCIATE
	HOUSEHOLD BANK F S B
	SUNNYMEAD VILLAGE DENTAL GROUP
	VANDYKE TRISH DDS
24525	ANIMAL ELEGANCE
	BOYLAN RICHARD N RIVERSIDE MEDICAL CLINIC
	FIRST PACIFIC NATIONAL BANK
	HAMOUI TAHA RIVERSIDE MEDICAL CLINIC
	PAYLESS SHOESOURCE
	VIDEO LAND MV
24541	MORENO FAMILY DONUTS
24545	99 CENT WORLD
24551	A TRAVEL TEAM
24553	BOUTIQUE THE

Target Street	Cross Street	Source
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HEACOCK ST 1999

11401	BONO SONNY CONGRESSMAN 44TH DISTRICT
	HEACOCK DENTAL GROUP
	NORTH HEACOCK DENTAL
	R RYNEARSON
	RYNEARSON R DAVID DDS MS
	SMITH ROBERT DDS
11441	BETHANY HOME HEALTH CARE
	EDUARDO GARCIA
	FANDRICH BRYAN MD
	GERMANIA CONSTRUCTION
	HARDESTY ROBERT MD
	KOSLOW ALAN R MD
	LOMA LINDA UNIVERSITY FACULTY MEDICAL GROUP
	LOMA LINDA UNIVERSITY PEDIATRIC MEDICAL GROUP INCORPORATED
	MORENO VALLEY PHYSICAL THERAPY
	NELSON JEWELL GENERAL CONTRACTOR
	PARKER GIGLIA MD
	PATHWAYS TO RECOVERY
	RACINE HAROLD V MD
	SMITH JAMES MD
	SMITHKLINE BEECHAM CLINIC LABORATORIES MORENO VALLEY
	SMITHKLINE BEECHAM CLINICAL LABORATORIES
	VALLEY VIEW FINANCIAL SERVICES
11481	ADWEN YAP
	CHRISTLEY BEVERLY A INS AGENCY
	DELTA FAMILY DENTISTRY
	DIANE OLSON FARMERS INS
	FARMERS INSURANCE GROUP AGENTS
11636	OCCUPANT UNKNOWN
11692	SHANNON JABLONSKI
11696	DANIEL WESCOTT
11698	GILBERTO MEZA
12065	GOODWIN PAT BOOKKEEPING & TAX SERVICE
	OCCUPANT UNKNOWN
	XIAO WONG
12075	OCCUPANT UNKNOWN
	RALEIGH BILL INS
	STAT FRM INS COMPANIES MORENO VALLEY AGENTS
12085	MICHAEL DELACRUZ
12095	JOSE HERNANDEZ
	M MARTINEZ
12097	LATOYA CALHOUN
	LOUIS EDGERSON
12109	MARGARET LONG
12151	LUIGI CANALE
12183	LUIS CORTES
12199	HALLBERG P & R INCORPORATED
	HEACOCK FAMILY DENTISTRY
	HEACOCK WEST MEDICAL GROUP
	SHAKLEE AUTHORIZED DISTRIBUTORS HALLBERG P & R INCORPORATED

HEACOCK ST 1999 (Cont'd)

12199	TC FA
	TC VANBUREN
	TOP THIS HAIR STUDIO
12214	ADVENTURE TRAVEL OF MORENO VALLEY
12218	SUMMERS APPLIANCE
12222	M & M CLEANERS
12230	BLUE RIBBON CONSTRUCTION
	MORENO VALLEY CONSTRUCTION
	OCCUPANT UNKNOWN
12235	AUTO SUPPLY CLUB WAREHOUSE MORENO VALLEY
	CYNTHIAS HAIR CARE
	EXPRESS DONUTS
	MORENO MEAT MARKET
	PORKYS PIZZA
	PRO NAIL & HAIR
	TIEMTO REALTY
12238	HER CUTS
	SO UNIQUE BARBER & BEAUTY SALON
12246	MORENO VALLEY REALTY
12255	CIRCLE K FOOD STORES
12275	RAMONA FIRESTONE TIRE CENTERS
12280	KENTUCKY FRIED CHICKEN
12300	JIFFY LUBE
12301	C & J COX CORPORATION
12431	CHEVRON USA NO 7568
12460	PROVIDENT SAVINGS BANK MORENO VALLEY
12477	JACK IN THE BOX
12540	CURL FACTORY
	CURL FACTORY THE
	CURLS
	FULCHER ERMA INS
	HUMANISTIC FOSTER FAMILY AGENCY
	NICELAND PROPERTIES INCORPORATED
12576	KUSTOM FIT TRUCK N AUTO CENTER
	MAGIC AUTO GLASS
12578	MORENO VALLEY AUTO REPAIR
	PIZZO BROTHERS TOWING
12591	PAMS DONUTS
12595	V C R REPAIR
12640	GOLDEN STATE OUTDOOR ADVERTISING COMPANY
	STEVES BURGERS
12712	AIM HI THERAPY CENTER
	CARDIOLOGY SPECIALIST MEDICAL GROUP INCORPORATED
	COMMUNITY PROFESSIONAL BUILDING
	DAMON REFERENCE
	LAKESIDE MEDICAL CLINIC NO 2
	MARTINEZ CARLOS DDS
	NORTH PERRIS FAMILY MEDICAL CENTER
	ROGER CHENG
12800	CALIFORNIA DENTAL OFFICE

HEACOCK ST 1999 (Cont'd)

12800	PARKWEST LEASING COMPANY
12810	ANTHONY FENISON
	ARMANDO FRANCO
	GEORGE PONCE
	MORENO VALLEY OPTOMETRY
	PERRY & ASSOCIATES
	SILVOLA ROBERT T DDS PARKWEST CENTER
	WONG CLINTON K OD
12815	CYN CREST MEDICAL OFFICES MORENO VALLEY MEDICAL OFFICES
	KAISER PERMANENTE MEDICAL CARE PROGRAM MORENO VALLEY MEDC
12818	NEW HOPE CHRISTIAN CENTER INCORPORATED
12820	AGUSTIN CASTRO
12846	AGUSTIN FLORES
12875	SUNNYMEAD ELEMENTARY SCHOOL
12900	ALFREDO LOZANO
	ROSE OF SHARON EVANGELISTIC C O G I C
13050	LINDER JOHN DPM INCORPORATED
	MARTINEZ DEO MD
	SMITHKLINE BEECHAM CLINIC LABORATORIES MORENO VALLEY
13060	CYNTHIA CROPPER
13110	MARIA HERNANDEZ
13120	JUANITA TENORIO
	OCCUPANT UNKNOWN
13125	MOUNTAIN VIEW APARTMENTS
13135	ALFREDA DRIVER
	ALFREDIA BUFORD
	ALICE MCCOULLUM
	ANA RODRIGUEZ
	ANGELA DEVITA
	ANGELICA MURILLO
	ANN LOCKETT
	ANTHONY SPENCER
	APRIL BUSH
	ATIYA ABNER
	AUTUMN ANDREWS
	BARIN BUTLER
	BILLY GRANT
	BOBBIE SEATON
	BRENDA ALCALA
	BRENDA DICKENS
	CATHY RATCLIFFE
	CHERRY COOPER
	CHERYL SMITH
	COURTNEY WALKER
	DAMON WARD
	DANIELLE WHEELER
	DAVID DOMINGUEZ
	DENNIS MARTIN
	DETRA NASH
	ELMER RIVERA

HEACOCK ST 1999 (Cont'd)

13135 EMILIO COBO
EVA ERVIN
FRANCISCO HERNANDEZ
GABRIELLA LOBERA
GARY SMITH
GERALDINE LYONS
GILBERTO VILCHEZ
HELEN ALEXANDER
JANET YOUNG
JANICE JONES
JATHA LEE
JEFFREY MARTIN
JENNY HOLDEN
JESUS LARIOS
JOANN BROWN
JOHN FERNANDO
JOSE PINEDA
JOSEFINA ZARAGOZA
JUAN CANALES
JULIE SANGTASANESOUK
KAMONIE DAVIS
KATHLEEN HOLLOWAY
KATHLEEN RIVERA
KENNETH ELLSWORTH
KENNETH LEWIS
KYLA THOMAS
L MCNEAIL
LAKISHA MOORE
LAMONZO COLEMAN
LILLY JOHNSON
LINDA BONDS
LOUBETH BRIZUELA
LOUISE PRICE
LUZ NORIEGA
LYNDA CHARLES
MARIA AGUIRRE
MARIA VILLAGRAN
MARY WILLIAMS
MAYNOR TREJO
MAYRA CHAVARRIA
MELISSA DAVISON
MERAZ ARECHIGA
NANETTE CALDWELL
NATASHA HAMPTON
NATAYCHA WATERS
PEDRO MONJE
PEDRO SAUCEDO
PENNY GARDENER
PENNY SALAZER
PERRIN ANDERSON

HEACOCK ST 1999 (Cont'd)

13135	RECORD EUGENE
	ROGELIO LARA
	RUBEN MENDEZ
	RUKHSANA BEGUM
	S ANDERSON
	SARAH SHANAHAN
	SENGTHIEN SERNA
	SHANTA PERKINS
	SHAUNDA GREEN
	SOPHIA HENDERSON
	SUHEILI SIERRA
	TAWAE BLACK
	VICKIE CROSS
	VIRGINIA COLLINS
	VIRGINIA RAMOS
	YOLANDA GREENE
	YURI ESPINO
	YVONNE WATTS
13260	ANITA DENNIS
	BILLY DUNCAN
	D PEREZ
	DAMIAN HERNANDEZ-SR
	E SKELTON
	GABRIEL ORDUNO
	JOSE GARCIA
	KELLY DAVIS
	LATRENDA PHILLIPS
	MICHELE BUSTOS
	MIGUEL GARCIA
	NADINE HARPER
	PHILIP DECOUD
	RACHEL HORTON
	SHELLEY VILLARREAL
	WILLIE FRANK
13266	DANIEL RAMOS
13270	ANNA PRECIADO
	CHARLOTTE ROSE
	DESSIE HAMMOND
	JUAN GARCIA
	JUNLIAN ZHANG
	LAREISHA ROLLAND
	PRECIDADO ANA
	RAQUEL CAMACHO
13280	ERIC BATTS
	KIFHAN SINGH
	PALOS VERDES APARTMENTS
	SAMUEL EDWARD
	STEPHANIE ORR
13290	BEN HENDERSON
	DONALD MANN

HEACOCK ST 1999 (Cont'd)

13290	FELISHA ANDERSON
	J THIERRY
	LARRY YANDERS
	TERESO GARCIA
	TRACY CARLBERG
13323	ALEJANDRO FLORES
13325	ALICE OREJEL
	ANA GALVAN
	ANGEL PEREZ
	ANGELICA LOPEZ
	ANTHONY MENDOZA
	ANTHONY THOME
	ATARAH SYKES
	B BOOKER
	BERNADENE CONTRERAS
	BREANNA WHITE
	BRIAN CARTER
	BRIANNE MCARTHUR
	BRYAN PADILLA
	CATALINO PASCUAL
	CECILY ROBINSON
	CLAUDIA FIERRO
	CONPCECION CARRION
	DAVONA SAUNDERS
	DENNY ANTONINO
	DOROTHY AUSTIN
	EDGAR SANDOVAL
	EDNA CORDOVA
	ENRIQUE MENDOZA
	ESPINOZA ZAVALA
	EULALIO REYES
	FILOMENO DOMINGUEZ
	FLORENTINA AVILA
	FRANCISCO LARA
	FRANCISCO PIZANA
	G ORDUNO
	GLORIA RODRIGUEZ
	HEACOCK ASSOCIATES
	ISSAC HIGH
	IZRALE DUARTE
	JAMES LEARY
	JEREMY ALLGIER
	JESSICA ROCHA
	JESUS GONZALEZ
	JESUS RUBIO
	JESUS URIAS
	JOE MORENO
	JOEL PARRA
	JOSE VARAJAS
	JULIO ENCISO

HEACOCK ST 1999 (Cont'd)

13325	K MARSHALL
	KAMARRI WOODS
	KAYLA THORNE
	KEONTA SCRUGGS
	KYLENE BOND
	LANETTE WALTER
	LARA OURDIKIAN
	LEE CARRIER
	LICO GOMEZ
	LILIANA CAPARELLI
	LILIANA SANDOVAL
	LIZBETH GUADARRAMA
	MAC COATS
	MARGARITA RODRIGUEZ
	MARIA VELASQUEZ
	MARIO ANGULO
	MARK GULLEY
	MARVIN PERNELL
	MAUREEN RUSH
	MELISSA PAYAN
	NELSON ALVARADO
	NICOLE MILLER
	NOELIA GOMEZ
	PONCE OLMEDO
	RAMIRO VALLE
	RAYMOND HINTON
	REINA DOMINGUEZ
	ROBERT BARNEKOW
	ROBERTO BASTIDA
	ROBIN DOMKE
	RODRIGO HERNANDEZ
	ROGELIO MONTEJANO
	ROLANDO DHEMING
	ROSARIO LUGO
	ROSENDO MAYA
	RUDY DELROSARIO
	SELENE FLOREZ
	SHAWNTAY HENRY
	SUSANA GUTIERREZ
	VALERIE POLK
	VICTOR ESTRELLA
	W CHOI
13563	CREEKSIDE ELEMENTARY SCHOOL
	CREEKSIDE YMCA
	MORENO VALLEY UNIFIED SCHOOL DISTRICT SCHOOLS
13800	BLUE CROSS OF CALIF AUTHORIZED AGENT MARVIN REECE
	CARDIOVASCULAR CONSULTANTS OF THE INLAND VALLEY
	CASTANEDA FIL REAL ESTATE
	FARMERS INSURANCE DISTRICT OFFICE
	FARMERS INSURANCE MARVIN REECE

HEACOCK ST 1999 (Cont'd)

13800	GOLDEN EAGLE MANAGEMENT
	GREATER INLAND VALLEYS MULTIPLE LISTING SERVICE
	HIRST & BAUGHMAN ATTORNEYS AT LAW
	I T C ESCROW DIVISION
	INVESTORS TITLE COMPANY ESCROW DIVISION
	KOZELKA RAY INSURANCE
	MERIT MORTGAGE SERVICES
	NOVA CARE ORTHOTICS & PROSTHETICS
	OASIS SURGICAL ASSOCIATES ORTHOPAEDIC MEDICAL GROUP
	PERRIS COMMUNITY HEALTH CENTER
	PIONEER REAL ESTATE
	PONCE GEORGE MD
	PRICE ISAAC CPA
	QUALITY CARE HOME HEALTH GROUP
	QUALITY HOME HEALTH TRANSPORTATION
	RANCHO PHYSICAL THERAPY
	REALTY EXECUTIVES
	REECE MARVIN INSURANCE
	RIVERSIDE COUNTY OF CONSOLIDATED COURTS
	SIMON FOUNDATION THE
	THOMPSON KEITH INS AGENCY
	WARREN KEITH DISTRICT MANAGER
	WEST VALLEY ORTHOPEDIC & SPORTS PHYSICAL THERAPY
15040	ABEL DENIZ
	ADELA DIAZ
	AGUSTIN RODRIGUEZ
	ALFREDO ZAMBRANO
	ALICIA CONTRERAS
	ALMA PRECIADO
	ANGEL ROSALES
	ANTONIO AVINA
	BRYAN BISHOP
	CHAVEZ TRIANA
	CIRILO HERNANDEZ
	DANIEL GARCIA
	ENRIQUE BERROSTE
	ERIKA ESQUIVEL
	ERNESTO GUTIERREZ
	ESPERANZA ARVIZO
	ESTELA PEREZ
	FABIAN GONZALEZ
	FELIPE REYES
	FERNANDO ROJAS
	FRANCISCO ALONSO
	FRANCISCO SANDOVAL
	GABRIEL ZAMBRANO
	GELEN STAMEY
	IGNACIO PANTOJA
	J F K MOBILE VILLAGE
	JESUS ZAMUDIO

Target Street	Cross Street	Source
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HEACOCK ST 1999 (Cont'd)

15040	JOEL CERVANTES
	JORGE BELTRAN
	JOSE BERBER
	JOSE MURO
	JOSE RAMOS
	JOSE TORRES
	JOSEFINA LOZANO
	JUAN ORTEGA
	KATHLEEN GEORGE
	MANUEL HARO
	MARIA GUILLEN
	MARIA MIRANDA
	MARIA MORA
	MARIA PADILLA
	MARIA TORRES
	MARTIN GARCIA
	MICHAEL SUHY
	MIGUEL FLORES
	MIGUEL ORTIZ
	NIGDIA JIMENEZ
	PATRICK THOMES
	R CASARES
	RAFAEL CAZARES
	RAFAEL ORTEGA
	RAMIRO RODRIGUES
	RAMON LOPEZ
	RAUL LARA
	REYNA DIAZ
	RICHARD ZERECERO
	RICHARDO CASTRO
	ROBERT DICKERSON
	ROBERT SCHWARTZ
	SALES MANUEL
	SARA ROMERO
	SHUSILA SAMI
	SILVIA AMEZQUITA
	THOMAS SUTTON
	VERONICA CUADROS
	VIVIAN IANNICCARI
	YENDIS BATTLE
	YOLANDA ZAMBRANO
	YVONNE CANDELARIA

Target Street	Cross Street	Source
✓	-	Cole Information Services

ALESSANDRO BLVD 1995

23040	DON JOSE MEXICAN RESTAURANT
23080	ANTONIO A TAN MD
	MORENO VALLEY OBSTETRICS & GYN
	PLAZA MARKET & DELI
	TAN, ANTONIO A
23100	A 1 CLEANERS
	BOTTOM GUN CAFE
	GOGO CHINA
	PLAZA HAND CAR WASH
23580	US POST OFFICE
23615	ALESSANDRO HAND CAR WASH
	EZ LUBE
23750	ALESSANDRO PLAZA
	ANDERSON, LORI J
	CADILLAC BAR & RESTAURANT
	CANYON PRESS
	COST CUTTERS FAMILY HAIR CARE
	FAMILY FITNESS CTR
	FANCY TAN
	HAPPYS WHOLESALE AUTO ACCES
	IN & OUT MARKET & LIQUOR
	INSPIRATIONS PERFORMING ARTS
	KRIS CRONAUER
	LACEY & ASSOC INSURANCE
	MAHARAJAH INDIA CUISINE
	NUTRI SYSTEM WEIGHT LOSS CTR
	OSCAR
	PINKYS BOWL WEST
	SIZZLER
	WIENERSCHNITZEL
23888	TACO BELL
23890	FAIRCHILD CHIROPRACTIC CLINIC
	STATE FARM INSURANCE
	STEWART, CHARLES L
	SUNNYMEAD ANSWERING SVC
23910	AUTO FINE TRIM
	C & W TV
	FANCY STITCHIN
	MORENO VLY HOUSE SPORTS
	OCCUPANT UNKNOWNN
23920	ACME TUNE & SMOG
	ALEXANDERS TOWING
	MORENO VALLEY TRANSMISSIONS
23932	ALESSANDRI ANIMAL HOSPITAL
	ALESSANDRO ANIMAL HOSPITAL
	GENE BRIGHAMS MARTIAL ARTS
	MAGANAS UPHOLSTERY
	RANDHAWA, H S
	STRAIGHTEDGE INC
23942	CHARLES ESTEY DELIVERY AGENT

Target Street	Cross Street	Source
✓	-	Cole Information Services

ALESSANDRO BLVD 1995 (Cont'd)

23942	RONS RADIATOR REPAIR
23952	AUTO SERVICE CLUB
23962	AMERICAN SPEEDY PRINTING CTR
	ARJAY COMMUNICATION
	BANIG RESTAURANT FILIPINO
	BUENO, MARIA S
	CLASSY BS LIQUOR DELI
	FUN IN THE SUN QUAD RENTAL INC
	KIM, JANG
	MARIA S BUENO DDS
	MAXWELL STREET PIZZA
	PHIL AM ENTERPRISES
	PRIMELAND CORP
	STAR BRITE CLEANERS
	SUPER V2
	SUPER, V II
	VIDEO TIME
	WEIGHT CONTROL
	YESTERYEAR COMICS
24021	DESIGNER NAILS
	MR ANTHONYS BEAUTY SALON
	PIZZA HUT
	SHAGNASTYS BILLIARDS & BAR
	VIDEO SYNDROME
24050	KAYS HAIRSTYLING
	PATTAYA PLACE
	PERFECT TOUCH BEAUTY SALON
	TANMAKERS TANNING SALON
24100	MUFFIN & DOUGHNUT
24150	BUFORDS BARBEQUE
	GORDYS MARKET
	KIN FOLK BARBEQUE
	SINGH, H
24375	FLOWERS & MORE
24400	GOLDEN SWIRL FORZEN YOGURT
24440	MC DONALDS
	MOBIL OIL CORP
	SMITHS FOOD & DRUG CTR
24481	CHIEF AUTO PARTS
24515	DONALD R HODSON DDS
	HOUSEHOLD BANK FSB
	HOWARD STAPLETON DDS
	JOE FIKTARZ DDS
	LOUIS HERZFELD DDS
	MERLIN J LARSON DDS
	ROBERT A MILNER DDS
	RUSSELL I WEBB DDS
	SUNNYMEAD VILLAGE DENTAL GROUP
24525	PAYLESS SHOE SOURCE
	VIDEO LAND MV

Target Street	Cross Street	Source
✓	-	Cole Information Services

ALESSANDRO BLVD 1995 (Cont'd)

24541	FOSTERS DONUTS
24545	DOUGANS DOUG HOUSE
24551	A TRAVEL TEAM
24553	ISAAC E PRICE
	PRICE, ISAAC E

Target Street	Cross Street	Source
✓	-	Cole Information Services

HEACOCK ST 1995

1504	GONZALEZ, FABIAN
11401	CAVIN, THERESA
	DAVID REAGAN DDS
	MILES J YAMAGUCHI MD
	NORTH HEACOCK DENTAL GROUP
	R DAVID RYNEARSON DDS
	ROBERT SMITH DDS
	STANLEY H SCHWARTZ MD
11441	BRYAN KONAKIS INSURANCE
	FARMERS INSURANCE GROUP
	GERMANIA CONSTRUCTION
	JEWELL NELSON GENERAL CONTR
	KATHY MARKOS INSURANCE
	LAWSON, TERRY
	LOMA LINDA MEDICAL CARE CTR
	LOMA LINDA UNIVERSITY MEDICAL
	MORENO VALLEY PHYSICAL THERAPY
	NEW HOPE CHRISTIAN CTR INC
	V K MATHUR
	VISITH PRIROMPRINTR MD
11481	BENSON, JOHN
	BEVERLY A CHRISTLEY INSURANCE
	DIANE, OLSON
	FARMERS INSURANCE GROUP
	JIM, PECK
	JOHN BENSON MD
	KENT, RONALD M
	LEE, PATRICK S
	PATRICK S LEE DDS
	RONALD N KENT PHD
11636	DAVIS, PAUL
11680	OCCUPANT UNKNOWNN
11692	JABLONSKI, FRANK T
11696	WOOD, ALAN E
11698	BRITTON, FRANK
12065	GOODWIN, WAYNE
	PAT GOODWIN INCOME TAX SVC
12075	RALEIGH, BILL
	STATE FARM INSURANCE
12085	BARTON, J T
12095	VELASCO, C
12107	SHARP, PROVI I
12123	MARSHALL, ELLEN
12135	CLARK, SANDY
12151	SOPER, GEORGE E
12183	BOYDEN, C M
12199	BARTON, ROBERT
	FELICIA & CO
	HEACOCK FAMILY DENTISTRY
	MICHAEL F CRUZ JR DDS

Target Street	Cross Street	Source
✔	-	Cole Information Services

HEACOCK ST 1995 (Cont'd)

12199	RCL MEDICAL & INDUSTRIAL
12214	ADVENTURE TRAVEL INC
12218	SUMMERS APPLIANCE
12222	A TOUCH OF CLASS FLORIST SHOP
12230	ZUPPARDO, JAY
12234	AMERICAN PET GROOMING MORENO
12235	CYNTHIAS HAIR CARE
	EXPRESS DONUTS
	HEACOCK AUTO SUPPLY
	MORENO MEAT MARKET
	PORKYS PIZZA
	PRO NAIL & HAIR
12238	HARRIS, TAMRA
	HER CUTS BEAUTY SALON
12246	MORENO VALLEY REALTY
12255	CIRCLE K FOOD STORE
12275	RAMONA TIRE & AUTOMOTIVE
12280	KFC
12428	SMOG PROS
12431	CHEVRON USA INC
12441	SHELL OIL CO
12477	JACK IN THE BOX
12540	CURL FACTORY
	CURLS
	KOKO, JERRY
	KWON, BEN
	LANDS R US REALTY
	NANCYS PSYCHIC READINGS
12576	MORENO VALLEY STEREO WAREHOUSE
12578	ENGINE EXCHANGE
	PIZZO BROTHERS TOWING
12591	PAMS DONUTS
12595	RICE LOCK & KEY
12640	GOLDEN STATE OUTDOOR ADVG CO
	STEVES BURGERS
12712	COMMUNITY PROFESSIONAL BLDG
	COMPUTERIZED DIAGNOSTIC CTR
	DAMON REFERENCE
	DEGASTON, ALEXIS
	DONALD MASSE MD
	GILBERT H ZIMMERMAN MD
	KELRAN INC
	MORENO VALLEY MEDICAL ASSOC
	NORMAN E SNYDER MD
	RAKESH CHOPRA MD
	RAYMOND P SAKOVER MD
	RAYMOND V HUSSEY MD
	RICHARD G SLADE MD
	RICHARD J ZAUNER MD
	ROGER T Y CHENG MD

HEACOCK ST 1995 (Cont'd)

12712	RONALD J OTTO MD
	ROSEMARIE TWEED DO
	S STEVE MERA MD
	WILLIAM DUGE MD
12730	ALLERGY CENTER
	CHRIS THANOS DDS
	FAYE BOMER MD
	GEORGE H GRAUE DDS
	KENNETH G JAHNG MD
	MORENO VALLEY CHILDRENS
	WOMENS CARE OF MORENO VALLEY
12800	CALIFORNIA DENTAL GROUP
	TMC ESCROW
12810	L & L REALTORS
	MORENO VALLEY OPTOMETRY
	ROBERT J WEST INC
	ROBERT T SILVOLA DDS
	SYLVIA LOPEZ
	WILLDAN ASSOCIATES
	WILLIAM GORAL MD
12818	GARY SCHNEIDER
	KEVIN N GAMAGE MD
	ROBERT KOPITZKE
	THOMAS J WHITAKER DDS
	WEST VALLEY ORTHOPEDIC THERAPY
12875	SUNNYMEAD ELEMENTARY SCHOOL
12880	MORENO VALLEY PARENT PRESCHOOL
	NEW HOPE COMMUNITY CHURCH
	OPEN BIBLE COMMUNITY CHURCH
13050	BALDEV S RAI MD
	JOHN LINDER DPM
	M P S ARORA MD
	SMITH KLINE BEECHAM CLINICAL
	WASEEM IBRAHIM MD
13110	OCCUPANT UNKNOWNN
13125	DUNN, ROBERT W
	JOURDON, CLETTON
	MAESTAS, B
	MOUNTAIN VIEW APARTMENTS
13135	ADCOCK, NATHAN L
	AHUMADA, F
	ANDERSON, WENDA S
	BAKER, JAMES
	BALTIERRA, OSCAR
	BARROZO, STEVEN
	BEAHAN, TONY
	BETHEA, MICHAEL A
	BOYD, L
	BROWN, C
	BUCCI, TRACY

HEACOCK ST 1995 (Cont'd)

13135	CABRERA, LETICIA I
	CALDWELL, LASHONE
	CAPPERINO, MARK C
	CARPENTER, L K
	COSTANZO, A
	DOONG, SHING
	EBERHARDT, CHRISTI
	FORD, TAMMY
	FOSTER, A
	GILLESPIE, LEONARD
	GRANT, ESTHER
	GREER, NOAH
	HAMBRICK, JOANNE
	HARDIN, ALAN
	HOLLAND, LINDA D
	HUNT, J
	JACKSON, C
	JOHNSTON, DEBBIE
	JONES, JOANNE
	KOCHER, CHERISH
	LACOUR, MONICA
	LANGSTON, JOHN
	LARA, DEBRA
	LAWSON, MICHAEL
	LOUIS, WILLIE
	MADAMBA, FELIPE
	MADRIL, RICHARD
	MCBRIDE, ERICA
	MEJIA, RUBEN
	MOBRIGGS, COLLINS
	MOORE, ANITA
	MOSER, BILLY R
	MUNOZ, CLEOTIL
	NEBEKER, KAREN K
	NUNEZ, DOLORES
	OLIPHANT, RAY
	REESE, BRODIUS
	RESSE, REGINA
	REYNOLDS, CAROL A
	ROBERTS, YVONNE
	ROPER, D
	SCROGGINS, BRENT
	SIDER, M
	STOCKHAM, T
	TIONG, CONRADO
	TYLER, ROBERT
	WASHINGTON, HELLEN
	WILTSHIRE, D C
	WIN, K
	WOODS, NICOLE

HEACOCK ST 1995 (Cont'd)

13155	ROWLETT, C
13260	TAYLOR, DEBORAH
13280	BREWSTER, WM
13325	ABRAHAM, NORMA
	BAGWELL, CAMILLE
	BAILEY, DENITA
	BAZILE, EUGENE
	BEAN, MICHAEL
	BUCHANNON, EDDIE
	BUSH, RODRICK
	CARSON, DAVE
	CLINKSALE, L
	DILLON, ROBERT JR
	ELLISON, AARON
	FOX, RANDALL L
	GROOMER, ROBERT
	HALL, ROBERTA A
	HEACOCK ASSOCIATES
	HOOPER, TRACIE
	KINKEAD, DIANE
	LIPSCOMB, DEL
	LUMPKIN, SAMUEL
	MARKS, T
	MEYERS, DEXTAUR
	MICHAEL, ROBT
	MILLER, ROBIN
	MOORE, SARAH
	MORRIS, MONICA
	NANCE, TRACY A
	NOVOA, LETICIA M
	OROSCO, GERALDO
	OSORIO, AMMI
	OVERTON, ANTHONY
	OWEN, BUTCH
	PARADA, MARIA
	PICKENS, DWIGHT
	PURIFOY, ALZADIA
	REYES, CAROLYN
	SMITH, CURLEY
	TRICK, E
	ULLOA, CAMACHO B
	VERGARA, SERGIO
	WILLIAMS, M
	WOODS, MICHELE
13335	HANLEY, RICHARD
13563	CREEKSIDE ELEMENTARY SCHOOL
	CREEKSIDE YMCA
13800	BARBARA THOMPSON INSURANCE
	DENTON REAL ESTATE
	DEOBRAH, HEISSER

Target Street	Cross Street	Source
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HEACOCK ST 1995 (Cont'd)

13800	ELLIS & OCONNELL
	FARMERS INSURANCE GROUP
	FRANCO, ARMANDO
	GLORIA, DENTON
	H & R FINANCIAL
	HEANEY REALTY
	HENRY P RUPP III
	JOHN C BERINGER ACCOUNTANT
	JOHN C BERINGER CPA
	KEITH, SUSAN L
	KIMBROUGH, MICHAEL M
	LEGAL HELP CLINIC
	LITE LIFE DOCTORS HOSPITAL
	MEDICAL CLINIC
	MORENO VALLEY INSURANCE
	PIONEER PROPERTY MANAGEMENT
	PIONEER REAL ESTATE
	REALTY EXECUTIVES
	RUPP, HENRY P III
	SIMCOR INC
	THOMPSON & KIMBROUGH LAW OFCS
	THOMPSON, KEITH B
15040	AVELLANOZA, DILIA
	AYALA, MARIA E
	CAIN, VERN L
	CANALE, TAD
	CUEVAS, F
	DAHARSH, WILLIAM A
	ELLIOTT, JOHN
	ESHOM, BOB
	GEORGE, K
	GEORGE, KITTY
	GOODWIN, SUSIE
	JAMISON, MAUREEN
	JFK MOBILE VILLAGE
	KOEHNKEN, C
	LAYER, MICHAEL
	MACK, SOMBATI
	MATRAY, ROBERT
	MERLOS, JUAN
	PAZ, RICARDO
	SAMI, RAM K
	SAMI, V
	SARNGIAMSOOK, PRASART
	SCARLETT, D
	SEAY, JAMES
	STINCHFIELD, PETER
	TAVARES, TAMMY
	TRUJILLO, PETRA
	VALENZUELA, M

Target Street	Cross Street	Source
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HEACOCK ST 1995 (Cont'd)

15040 WHEELER, FRANK
WOOLSEY, MARIA
YANEZ, NOEMI G

Target Street	Cross Street	Source
✔	-	Cole Information Services

ALESSANDRO BLVD 1992

22990	THRIFTY OIL CO
23100	DON JOSE MEXCN REST
	GARLIC ROSE RSTRNT
	PLAZA HAND CAR WASH
	Y E S YOUR EMP SLTN
23580	US POSTAL SERV
23581	MOTEL 6
23615	ALESSANDRO 100 WASH
	EZ LUBE
23750	ABSOLUTELY NAILS
	BLUEPORT ENTPRS
	BOX OFFICE MEMORY
	CADILLAC SPORT BAR
	CANYON PRESS
	COST CUTTERS
	FAMILY FITNESS CNTR
	FANCY TAN
	HAPPYS WHLSL AUTO
	KEYBOARD MASTERS
	LACEY&ASC INS AGCY
	MEAT N EAT DELI
	SPORT MED CONNECTN
	T SHIRTS PLUS
23880	TACO BELL
23890	CARNES BUSNS&TAX
	D F C TRANSPRTN
	FAIRCHILD CHIRO
	STEWART CHAS L
	STEWART, CHARLES L
	STRAIGHTEDGE INC
	WESTRN UNTD FNCL
23900	FLOWER BOX MOR VLY
	SC STOP EDUC SPLY
23910	C&W T V
	FANCY STITCHIN
	GREAT AMER WINDOW
	HOUSE OF SPORTS
	LEONARDS CARPET
23920	ACME TUNE&SMOG
	ALEXANDERS TOWING
	BRAKE TECH
	GOODYEAR TIRE&SV CT
	MORENO VLY TRNSMSNS
	MY MECHANIC
23932	EDWARDS GLASS
	HUBER BARTON C DVM
	MAGANA AUTO UPHOL
	MERRY MAIDS
	PAPILLON
	SHORIN KUNG FU

Target Street	Cross Street	Source
✔	-	Cole Information Services

ALESSANDRO BLVD 1992 (Cont'd)

23942	ESTEY C DLVRY AGENT
	NEW DIRECTIONS INC
	RONS RADIATOR RPR
23952	FIVE STAR AUTOMTV
23962	2 DAY SIGNS
	A A T HM MED EQUIP
	AMER SPEEDY PRNTG
	ARJAY COMMUNICATION
	BANIG REST FILIPINO
	CLASSY BS LQR DELI
	FUN SUN QUAD RENTAL
	MAXWELL ST PIZZA
	PHIL AM ENTERPRISES
	STAR BRITE CLNRS
	SUPER V 2
	TARBELL REALTORS
	VIDEO TIME
	WEIGHT CONTROL
	YESTERYEAR COMICS
24021	A&W RESTAURANTS
	DESIGNER NAILS
	HEACOCK MARKET
	MR ANTHONYS
	PIZZA HUT
	ROCKETS&POCKETS
	VIDEO SYNDROME
24050	BARRETO ILIANA
	KUTTS AUTO PARTS
	PATTAYA PALACE
	PERFECT TOUCH BTY
	STONE CHIROPRACTIC
	TANMAKERS TANNG SLN
24100	LITTLE CAESARS PZA
	MUFFINS DUFFINS
24150	GORDYS MARKET
	KIN FOLK BARBEQUE
24400	SMITHS FOOD&DRUG CT
24440	MCDONALDS RSTRNTS
	MOBIL OIL
24481	CHIEF AUTO PARTS
24491	SEVEN 11 FOOD 20402
24515	HODSON DONALD R DDS
	HOUSEHOLD BANK FSB
24525	CAL WEST NATL BANK
	PAYLESS SHOESOURCE
24541	FOSTERS DONUTS
24545	DOUGANS DOG HOUSE
24549	CAL WEST NATL BANK
24551	A TRAVEL TEAM
24553	PRICE ISAAC E CPA

Target Street	Cross Street	Source
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ALESSANDRO BLVD 1992 (Cont'd)

24553 PRICE, ISAAC E

Target Street	Cross Street	Source
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HEACOCK ST 1992

11401	AMER VLY PDTRY GRP
	CAVIN, THERESA
	NORTH HEACOCK DENTL
	RYNEARSON R DDS MS
	SCHWARTZ S H MD
11441	BROWNE, BLAIR P
	COMBS, HENRY
	DEBORAH, HEISSER
	DIANE, OLSON
	FARMERS INS ADMIN
	GERMANIA CONSTR
	HEISSER DEBORAH
	INLAND EMPR CLINICL
	KAN MEDICAL GROUP
	LAWSON TERRY RPT
	LAWSON, TERRY
	LINCOLN CLB RVRSDE
	LLU PEDIATRIC MDCL
	LOMA LND ORTHOPEDIC
	NELSON JEWELL PAVNG
	OLSON D FARMERS INS
	PRIN VISITH MD
	REID, GENE
	SHAPIRO, DEAN H
	STILLINGS DONALD DC
	THOMPSON B INS AGCY
	THOMPSON, BARBARA
11481	CHRISTLEY B INS AG
	HAYNES RAYMOND ATTY
	JIM, PECK
	KENT RONALD MD PHD
	LEE PATRICK S
	LEE, PATRICK S
	LINDORA MDCL CLINIC
	MORENO VLY INS
11636	NEW HOPE CMNTY CH
11696	WOOD, ALAN E
11698	BRITTON, FRANK
12065	GOODWIN P INCOME TX
	GOODWIN, WAYNE
12075	RALEIGH, BILL
	STATE FARM INS AGNT
12085	BARTON, J T
12095	CARPENTER, JACK
	ENLOW, EDWARD
12199	DANCING IMAGES
	FELICIA&CO
	NEW WAY CELLULAR
	SPA CLUB
12214	ADVENTURE TRAVEL

Target Street	Cross Street	Source
✔	-	Cole Information Services

HEACOCK ST 1992 (Cont'd)

12218	SUMMERS APPLIANCE
12222	A TOUCH CLASS FLRST
12226	BALANCING ACT THE
12234	R&B INTERIORS
12235	COCINA, MORENO
	EXPRESS DONUTS
	HEACOCK AUTO SUPPLY
	MORENO MEAT MKT
	PORKYS PIZZA
	PRO NAIL&HAIR
	TWO DREAMERS
12238	YOLANDAS BTY SALON
12246	MORENO VLY REALTY
12255	CIRCLE K FOOD 312
12275	GOSLIN TIRE SERVICE
12280	KENTUCKY FRIED CHKN
12428	SMOG PROS
12431	CHEVRON USA 7568
12441	SHELL OIL CO
12451	JACKS JR
12460	PROVIDENT FDRL BANK
12477	JACK IN THE BOX
12540	BROWN MAXINE REALTY
	CURL FACTORY THE
	KOKO, JERRY
	KWON, BEN
	NICELAND PROPERTIES
	PIONEER RE PROPERTY
12576	MORENO VLY STERO
12578	MORENO VLY ENGINE
	PIZZO BROS TOWING
12591	PAMS DONUTS
12593	SPORTS CAR DUGOUT
12595	RICE LOCK&KEY
12640	GOLDEN ST OTDR ADVR
	STEVES BURGERS
12712	AIM HI THERAPY CTR
	BRIDGES, ROBERT L
	CHENG ROGER T MD
	CHOPRA RAKESH MD
	COMNTY PRFSNL BLDG
	DAMON REFERENCE
	HALBRIDGE, NEIL J
	INLAND CARDIOVASCLR
	KANEL HARRIS H MD
	MORENO VLY MDCL ASC
	OPSAHL SONJA MD
	SLADE RICHARD MD
	ZAUNER RICHARD J
12730	GRAUE GEO H DDS INC

Target Street	Cross Street	Source
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HEACOCK ST 1992 (Cont'd)

12730	JAHNG KENNETH G MD
	KAISER MED APPNTMNT
	MORENO VLY ALLERGY
12800	T M C ESCROW
12810	A WEST DERMATOLOGY
	ENGINEERING SV CORP
	GORAL WILLIAM MD
	L&L REALTORS
	NELSON, GLORIA A
	SILVOLA ROBERT DDS
	WEST J ROBT MD INC
	WONG CLINTON K OD
12818	GAMAGE KEVIN N MD
	PRO CMNTY ACTN LGE
	WEST VLY THERAPY
	WHITAKER THOS J DDS
12875	MORENO VLY SUNNYMD
12920	CALVARY CHAPEL
13050	BALA SUSHEELA MD
	LINDER JOHN DPM INC
	MARTINEZ DEO MD
	ROBERTSON JOHN A MD
	SMITHKLINE BEECHAM
	TAN, ANTONIO A
13120	SANDERS, ROBERT
13125	MOUNTAIN VW APTS
13135	BRADLEY, LISA
	BROWN, C
	CAMACHO, SERGIO
	CAMMARANO, JOSEPH
	CARROLL, DIANA
	DEBACKER, B
	EHRET, BARBARA
	GILMORE, EDWIN
	HOWARD, FRANCES
	HUALDE, TERESA
	JACKSON, C
	JOHNSON, RHONDA K
	KERSEY, MYLES W
	LEACH, EDITH
	MACKIE, JAMES J
	MADAMBA, FELIPE
	MANLEY, BRYAN
	MARTINEZ, JOSE
	MCNEES, KATHRYN L
	MEJIA, RUBEN
	MIKESELL, T
	MORRIS, MICHAEL
	MUNOZ, CLEOTIL
	NUNEZ, DOLORES

HEACOCK ST 1992 (Cont'd)

13135	PALMER, LYNELL
	PORCHIA, VINCENT
	ROBERTS, YVONNE
	ROLLOCK, SUBRE
	SIDER, M
	SOLANO, G
	TAYLOR, JIMMY
	TIONG, CONRADO
	WILLIAMS, J
	WILTSHIRE, D C
13270	SCOTT, ANTHONY
13280	AVULA, CYNTHIA
13325	ANDERSON, ERIC
	BAZILE, E
	BEAN, MICHAEL
	BELL, LISA
	CADAVID, CARLOS J
	CANNON, ROGER
	CARTER, J S
	CHA, ROBERT
	CLINKSALE, L
	DILLON, ROBERT JR
	FOX, RANDALL L
	GROOMER, ROBERT
	HEACOCK ASSOCIATES
	HILL, BRIAN
	HOOPER, TRACIE
	JONES, BOB J
	KINKEAD, DIANE
	LIPSCOMB, DEL
	MALLOY, RICHARD
	MCCLENDON, B J
	MENKE, RICHARD
	MILLER, R
	NELSON, AREVIA
	OSORIO, AMMI
	OVERTON, ANTHONY
	PALMER, MICHAEL
	PARADA, MARIA
	RACHLIN, MARK
	ROZVADOVSKY, PAEL
	SEELIG, STEFAN
	SNYDER, EDWARD M
	WEDGE, RANDY P
13563	CREEKSIDE YMCA
	MORENO VLY CREEKSDE
13800	FRANCO ARMANDO MD
	FRANCO, ARMANDO
	KIMBROUGH, MICHAEL M
	REALTY EXECUTIVES

Target Street	Cross Street	Source
✓	-	Cole Information Services

HEACOCK ST 1992 (Cont'd)

13949	TICKLE, F
15040	CAIN, VERN L
	CALDERON, GIL
	CANALE, TAD
	CASTRO, LETICIA
	CHAMBERS, KEN JR
	CHAMBERS, THOMAS
	CUEVAS, F
	DAHARSH, WILLIAM A
	HATZENBUEHLER, ANNA M
	J F K MOBILE VLG
	KLINNOO, ANNA
	KOEHNKEN, C
	LAYER, MICHAEL
	MACK, SOMBATI
	MERLOS, JUAN
	MORRISON, ROBERT
	SAMI, V
	SARNGIAMSOOK, PRASART
	STINCHFIELD, PETER
	TRUJILLO, PETRA
	WHEELER, FRANK
	WHETSTONE, EBBIE A
	WOOLSEY, MARIA

Target Street	Cross Street	Source
✓	-	Haines Criss-Cross Directory

ALESSANDRO BLVD 1990

	ALESSANDRO BLVD	92388 CONT	
23900	★BUDGET ELECTRONICS	653-1663	7
	CAPPETTA Michael S	00	4
	★FLOWER BOX MOR VLY	653-3171	9
	★SC STOP EDCTNL SPLY	653-4446	+0
	★SOUTHLAND CABLEVISN	653-2151	9
23910	★AUTO FINE TRIM	242-8746	7
	CULLEN Noel J	00	4
	★MORENO VLY HS SPRTS	653-2688	9
	★MORENO VLY YLLW CAB	653-3333	9
	B ★C&W T V	653-2988	6
23920	★BRAKE TECH	653-1105	7
	★FUN IN SUN QUD RNTL	653-6117	
	★FUN IN SUN WD RNTL	653-6117	9
	★GOODYEAR TIRE&SV CT	656-8204	9
	★MARCH GOODYEAR	656-8204	
	★MARCH TIRE&SERV CTR	656-8204	9
	SIMMS John E	00	4
	★VOLKSWEIMERS VW	656-1776	7
23932	★ACE HI MOVING&STRG	653-3151	9
	★ALESSANDRO ANML HSP	656-4455	9
	★ALESSANDRO GRMNG	656-4455	
	ALEXANDER Anna M	00	4
	★BHULLAR K S DVM	656-4455	9
	★DELGADILLO RIC DVM	656-4455	9
	★DENNIS MC CLELLANS	653-4991	7
	★DIAL ONE WINDW TNTG	656-6655	9
	★GREAT AMER WNDW TNT	656-6655	+0
	★GYM THE	653-4991	9
	HOLSTEIN Curt E	00	+0
	★HUBER BARTON C DVM	656-4455	9
	★JAZZERCISE	653-4991	9
	★KUNG FU SAN	653-4991	7
	★MAGANA AUTO UPHOL	656-7436	9
	MAGANA Francisco	00	5
	★MERRY MAIDS	653-3161	9
	★R&R TOY WAREHOUSE	656-2526	7
	★THE GYM	653-4991	7
	★TYKE TOYS	656-2526	+0
23942	★ESTEY C DLVRY AGENT	656-0136	+0
	FLORIN Mirko B	00	4
	★LUCERNE PACIFIC	653-3181	+0
	★NEW DIRECTIONS INC	656-3669	+0
	★RONS RADIATOR RPR	653-1151	7
	★TECH MOVIL	653-1821	9
23952	★FIVE STAR TOWING	653-8425	7
	★FIVE STAR TOWING	653-0204	9
	★5 STAR AUTOMOTIVE	653-8441	7
23955	★DESERT ROAD ADVNTR	773-3187	+0
23962	BUILDING		
	★AMERICANA POOL&SPA	653-0898	7
	★CLASSY BS LQR DELI	656-7912	7
	★FLASH POINT BICYCLS	653-6022	9
	★KINDER MFG FACTORY	653-2161	9
	★MAGRUM&SCOTT JWLRS	653-3340	9
	★MAXWELL ST PIZZA	656-4481	7
	★RENTAL CITY	656-3444	7
	★STAR BRITE CLNRS	656-1512	7
	★TARBELL REALTORS	653-1550	+0
	★TREASURE MINE BTQ	656-5250	6
	★VIDEO TIME	653-6162	7
	★3 DAY BLINDS	653-9553	9
23962			
24050	★BARRETO ILIANA	242-1601	7
	BRIGHAM Eugene A	00	+0
	★PATTAYA PALACE	242-3189	9
	★PERFECT TOUCH BTY	924-2831	7
	★PERFECT TOUCH PAULA	242-1601	7
	SHORIN Kung Fu	924-8715	+0
	★STONE CHIROPRACTIC	924-8785	9
	★TANMAKERS TANNG SLN	924-2625	9
	★VIDEO SYNDROME	242-1797	7
24100	★LITTLE CAESARS PZA	924-4469	9
	★MUFFINS DUFFINS	924-3559	9
24150	★A R O HOBBIES	924-3240	9
	★ALFREDOS BARBER SHP	924-4541	9
	★GORDYS MARKET	247-2603	9
	★KIN FOLK BARBEQUE	924-9085	9
	★MORENO VLY FISH MKT	247-5103	9
	★STITCHES N STUFF	247-7367	+0
24481	★CHIEF AUTO PARTS	242-8439	4
24491	★SEVEN 11 FOOD 20402	242-3032	6
24515	★BRANDT WAYNE DDS	242-4777	6
	★FIKTARZ JOE DR	242-4777	6
	GAUM Sanford DDS	242-4777	+0
	★HERZFELD LOUIS DDS	242-4777	
	★HODSON DONALD R DDS	242-4777	
	★HOUSEHOLD BANK FSB	242-6614	+0
	NASH Guy R DDS	242-4777	+0
	★SUNNYMEAD VLG DENTL	242-4777	6

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HEACOCK ST 1990

13325	HEACOCK PARK APTS		L
	ALBEE Troy	653-4803 +0	
	ALBERT Drew	656-4726 9	
	ANSTED Katherine	656-6411 5	
	ANZILOTTI Edila	653-4803 +0	
	AOGSTO Carrie	656-1607 +0	
	AUSTIN Roger	653-6201 9	
	★B&G CARPET CLNG	653-2768 7	
	BATTLE Kevin	656-1105 +0	2
	BAZILE E	653-7635	
	BECKHAM Cheryl	656-2758 +0	
	BRUCE Desi	656-5408 +0	
	BRZOSTOWSKI Kurt	653-6010 +0	
	CARTER Michael K	00 4	
	CHICCO Rose	656-6962 5	2
	COOK Kevin	656-3842 +0	
	DAVIS Keith J	00 4	
	DEBNAM Frederick A	00 4	
	EVANS Stephen	653-3224 +0	
	FALCON Jacinto	656-3331 +0	
	GALARZ Marcela	653-1345 +0	
	GOODHUE Johathan	656-2641 +0	
	GROOMER Robt	653-3752	
	GUTIERREZ Rogaciano	656-5021 +0	
	HALL Blaine J	00 +0	
	★HEACOCK PARK APTS	653-9330 3	
	HINTON Ann	00 1	
	HOCKIN Bonnie J	00 4	
	HOOPER Tracie	656-1717 +0	
	JACKSON B	656-3124 4	
	JARAMILLO Richard	00 7	
	JONES Ken A	00 5	
	KELLOGG Carl W	00 +0	
	KUCERA Gayelyn	653-6000 9	
	LAFLAMME Lawrence J	00 +0	
	LEBRON Marion E	00 4	
	LINDAUER Paul K	656-7324 6	
	LIPSCOMP Del	653-1868 2	
	MARTIN Chas	653-4331 7	
	MORRIS Jonathan K	00 +0	
	NEAL Walter	656-2375 +0	
	ONEILL Donald W	653-0547 +0	
	PAGDONSOLAN Michael	656-2527 +0	
	PHELPS D	653-3016 +0	
	RAINES Stephen	656-2709 9	
	RICKENBACK Dawn L	653-3605 +0	
	RODGERS B	653-6102	

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HEACOCK ST 1990

	HEACOCK		92388	
0		RODGERS E	653-	+0
0		SAIN Ricnard	00	4
0		SCOTT Melinda C	00	+0
9		SEARCY Elma	653-	+0
4		SEDGEWICK Dorothy	653-	+0
9		SEDGEWICK John	653-	+0
0		SMITH Al	656-	+0
4		SMITH C	656-	7
0		SNYDER Edw M	653-	+0
0		SPARKS Michael	656-	5
0		SPENCE Lanita F	00	+0
4		STILES Ven O	656-	4
0		SWANSON Richard A	00	+0
0		TENA Luis A	00	+0
0		VANSICKLER Supannee	656-	6
9		VITTERS Craig	656-	7
0		WALKER Ed C	653-	+0
9		WALTER Karen	656-	+0
4		WYCHE Kaaren T	00	+0
0		YAKEL Margaret P	00	+0
4		YATES James M Jr	00	4
4		ZAPP James S	00	4
9	13325			
4	13563	★CREEKSIDE SCHOOL	656-8266	9
0	15040	J F K MOBILE VLG		
9		BARRON Jesus A	00	7
0		BROWN Linda	247-2129	9
0		BROWN Terry	247-6409	+0
4		CAIN Vern L	242-8168	7
0		CALDERON Gil	924-4485	7
5		CAMP Albert Jr	00	4
9		CANALE Tad	242-2815	2
0		COLLINS James	00	5
4		CONLEY Susan	00	+0
0		DAHARSH Frances	242-6977	
0		DAHARSH Wm A	242-6977	
0		DIBLE Kimberly	924-0617	+0
0		DOVE Jalern	00	5
4		FIERRO Valerie	924-5541	6
9		FISHER Eva	247-3677	+0
4		GARCIA Jesusita P	00	7
0		GUILLEMETTE R C	00	4
4		HATZENBUEHLER Anna	247-6924	+0
9		HERNANDEZ Frankie	00	4
0		HERRERA T	242-5360	9
0		HOLMAN Michelle L	00	4
0		★J F K MOBILE VLG	242-5437	9
5		JOHNSON Danny D	00	4
0		KASEMSAMRITPHOL Kas	00	+0
0		KATSELES Greg G	00	+0
0		KOEHNKEN Clarence H	00	6
0		LAYBOURNE Denise M	00	4
0		LENCI Joann S	00	+0
9		LOPEZ Rogelio	00	4
		LOUCKS Gail A	00	4
0		LOWER L	247-3481	9
0		LOWER S	247-3481	
0		MABLEY Timothy M	00	+0
4		MACK Ray C	00	4
4		MAPES Charles B	00	4
9		MARTIN Donald	247-3071	9
0		MCARTHUR Anita A	00	4
0		MCCAUMBERS Waldo	247-9840	+0
0		MEYER Guy	242-9444	5
0		MILLER David E	00	9
0		MINER Charles	00	5
4		MORRISON Iowana	242-8131	6
0		MORRISON Robt	242-8131	
0		NEAL J L	242-7266	6
9		OCONNER David L	00	4
0		OLSON Larry D	924-6595	6
0		OSWOOD Gwendolyn	924-9862	7
4		REYNA Petra	00	4
0		SAMI V	924-2705	5
0		SCHATZ Allen	00	+0
0		SCHNEIDER Mark	242-9006	+0
9		SMACKER Craig	247-1733	9
0		SOBOLESKE Maria A	00	4
0		STAMEY Gene E	00	4
0		STROUP Edw	242-0111	6
5		THOMSON Curtis	00	+0
		TRUJILLO Petra	242-2533	7
4		VALASQUEZ Joe M	00	+0
0		WHETSTONE Ebbie A	242-7693	6
0		WHITE Carol A	00	5
7		WILLIAMSON Cindy D	00	+0
4		WIMER Dolly	924-4719	9
5		WIZIKOWSKI Ronald F	00	4
9		WOOLSEY Maria	924-2707	9
	15040			
	15049	CHAMBERS Yvonne	247-1696	+0
4	16630	XXXX	00	
	★	140 BUS 269 RES	189 NEW	
9				

Target Street	Cross Street	Source
✓	-	Haines Criss-Cross Directory

ALESSANDRO BLVD 1985

23580	XXXX	00	
23581	MOTEL 6	653-2131	7

ZIP CODE 92388
SUNNYMEAD

24481	CHIEF AUTO PARTS	653-8439	4
24491	SEVEN ELEVEN 20402	653-3032	2
24515	HOUSEHOLD BANK FSB	656-6614	+5
	SUNNYMEAD VLG DNTL	656-4477	4

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HEACOCK ST 1985

13280
13290 APARTMENTS
BLAKE TAMMY 656-1836 +5
HIGGINSON PAUL 656-4608 +5
KILBURG DONALD A 656-6315 +5
LOEBEL WALTER H 656-4525 +5
MERGENTHAL SUSAN 656-5762 +5
13290
13325 HEACOCK PARK APTS
ANSTED KATHERINE 656-6411 +5
78 BAZILE E 653-7635 7
BESAW SHERRY 656-1272 +5
BOHRINGER JUANITA 656-1007 +5
BUTLER MARK 656-5095 +5
CALIMLIM LITO 656-1637 +5
CARROLL TIMOTHY P 656-4133 +5
CARUTHERS A 656-7955 +5
CHICCO ROSE 656-6962 +5
ERICKSON DONALD JR 653-5119 +5
FINLEY NORMAN 656-7715 4
GROOMER EDWARD 653-3752 0
GUTIERREZ BEN 656-4729 +5
HALL ROBT 653-1607 4
HANSEN MARK 653-7924 +5
HEACOCK PARK APTS 653-9330 3
HOLM JEAN 653-5131 +5
HOPKINS CRAIG G 656-5100 +5
HORNBACK ALLEN 653-1448 +5
HURD BRUCE 653-3320 +5
JACKSON B 656-3124 4
JOHNSON SYLVESTER 656-5165 +5
JOHNSON WM 653-3997 +5
JONES WARREN D 653-0546 +5
JORDAN JOHN 656-5845 +5
KERFIEN ROBT 656-4297 +5
KIM HYON 656-4642 +5
29 KOPCHA PETER 653-6278
KOTZIN JOHN 656-2000 +5
LACONICO CARL 653-7643 +5
LATTINEN JEANNINE 656-7173 +5
LIPSCOMP DEL 653-1868 5
LOWELL JACK 656-2925 +5
MAGEE CHAS 924-1239 +5
MANAHAN LEO 653-6740 +5
MANSWER AHMED A 656-6868 +5
MATHIS DAVID A 656-3086 +5
MILLER ERVIN 656-5806 +5
MOSLEY JOHN 653-0859 +5
NAGLE ERIC 653-5812 +5
NOBLES LEONARD 653-0952 +5
NORLUND TAMERA 656-1831 +5
NUNN TONGE 656-5913 +5
PUCCETTI DANTE 653-4489 4
RAMIREZ LARRY 656-5665 +5
SCHRAGER ALAN 656-3119 +5
SIPE SHARON 656-5505 +5
STEWARD APRIL 653-6484 +5
THOMAS ELIZABETH 653-1607 4
VALERIE ANITA 656-7242 +5
VICKERY JOHN 653-5292 +5
WARNER RAYMOND D 656-7143 +5
WEST THOS L JR 653-6781 +5
WILSON MIRIAM 653-5024 +5
YOUNGER JEFF 653-4365 +5
13325
13385 XXXX 00
14510 XXXX 00
15040 TOWN&COUNTRY MBL HM
ATTERBURY LES 653-3387 +5
39 CABLE JENNIE E 653-2764
CAIN VERN L 653-8168 0
CANALE TAD 653-2815 2
COKER JOHN 656-3826 3
DAHARSH WM A 656-6977 4
DEWEY KORSUM 924-1343 +5
DUNHAM JACK 653-5779 0
FIERRO DELLA 656-3108 2
GARCIA JESSIE 924-4439 +5
GEORGE DAN 656-7222 +5
GIDNEY LINDA 656-6975 +5
HELLESUIT C 656-2902 +5
HUNT CHAS L 656-1246 0
JACKSON TERRY 656-4755 +5
JANES LESTER 653-2201 4
JIMENEZ ANGEL 924-3123 +5
MEYER GUY 653-9444 +5
MILLER DAVID 653-8737 4
MORRISON HAROLD A 653-7407 1
MORRISON IOWANA 653-8131 0
NAIDU SHIU N 653-0504 +5
NEAL J L 653-7266 0
OELKERS JANE 924-2246 +5
PAK JONG WOO 653-7641 4
PERKINS CLARENCE 653-4907 3
SALDARRIAGA RICARDO 656-5154 +5
SAMI V 924-2705 +5
SEGURA RONALD 924-2271 +5
SMITH ALVIN 653-9766 1
SMOUSE WALTER 653-3363 4
TOWN&CNTRY MBL HM 653-5437
WARD RICHARD 653-8038 +5
52 WHETSTONE EBBIE A 653-7693 9
YOUNG K W 656-1524 4
YOUNG KAY W 656-1526 +5
15040
15050 XXXX 00
★ 45 BUS 138 RES 108 NEW
HEADLY RD 92370

Target Street	Cross Street	Source
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ALESSANDRO BLVD 1980

23580	XXXX	00	
23581*	MOTEL 6	653-2131	7

ZIP CODE 92388
SUNNYMEAD

24774	HARTER MARGIE F	653-1810	4	26
24786	RIDGE B J	653-2035	8	26
24798	XXXX	00		26

Target Street	Cross Street	Source
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HEACOCK ST 1980

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HEACOCK 92388 CONT

	WENSIER L	653-6027 +0
13290		
13325	COUNTRYPARK/AF APTS	
47	ALT MICHAEL	653-9253 9
60	BARNEY BOBBIE	653-7080 7
78	BAZILE E	653-7635 7
45	BEAMAN MICHAEL	653-2206 8
	BEGANY RUSSELL R SR	653-0258 9
95	BERGERON RONALD	653-3756 9
	BETTLE HAROLD	653-4353 +0
	BLISS KEVIN	653-0587 +0
42	BRUSELL HARRY E	653-6268 7
	CHIASSON DENNIS	653-1615 +0
	CHRISTIAN FRANK W	653-7046 +0
	CONSTANTINO CHARLES	653-8761 +0
	COOMBS MICHAEL	653-8995 +0
*	**COUNTRY PARK APTS**	**653-9330** 7
40	DELONG FLOYD	653-2507 7
31	DICK JEFF	653-8675 8
120	ELLEMAN MIKE	653-1925 9
73	ELLIS J	653-7212 9
	FERRIS NICHOLAS	653-9135 +0
	FITZGERALD RAYMOND	656-1239 +0
	GILLIS ROBERT	653-0769 +0
	GREENE ARTHUR L	653-5096 8
71	GREENHAGEN ELVIN	653-4415 9
	GROOMER EDWARD	653-3752 +0
	GROTHE MARK	653-7518 +0
	HARDEN EARL	653-8243 +0
	HAREU ANA	653-8154 +0
	HAREU ANA	653-0947 +0
	HEASTON KIM	653-5132 +0
	HENAGER DAVID	653-9334 +0
	HOERSCH EDW	653-0437 +0
90	HOWE CHESTER C	653-6989 9
	JOHNSON WM	653-5435 +0
29	KOPCHA PETER	653-6278 5
	LABOUNTY WM	653-5030 +0
	LLEWELLYN DANL	653-4236 +0
	LONG RICK A	653-4837 +0
	MALDONADO N	653-6215 +0
	MCKINNEY CHAS	653-0195 +0
	MCMULLEN TIMOTHY	653-0272 +0
	MEYER AL	653-5151 +0
92	MINER GEORGE JR	653-7158 9
	MUMMERT LORENE	656-1307 +0
27	NAKASHIMA K	653-4970 5
	NEWTON BRIAN	653-3313 +0
	OUTLAW HENRY	653-0113 +0
	PARKER DAVID	653-7515 +0
	PAVY MICHAEL E	653-0478 +0
	POORE KIEFFER	653-0142 +0
	PUCKETT WM ED	653-0918 +0
	PYLER B S	653-3585 +0
	QUERO RUBEN	653-9338 +0
	QUIRK JOHN	653-0932 +0
	RICHARDS DOUGLAS	656-1207 +0
	RIPPERDAN ORIN	653-2870 +0
	RUDESEAL ERNEST	653-7078 +0
	SANDERS DENNIS R	653-1572 +0
89	SANFILIPPO M I	653-5082 9
	SAYRE LEO V	653-0770 +0
108	SLADE DONALD	653-3514 6
	SMITH GORDON E	653-6566 +0
104	STALLINGS SHELIA	653-8719 9
56	STRAUSSER DAVID N	653-7054 7
57	SWIHART V J	653-0659 9
	TATUM DOROTHY	653-8597 +0
5	THOMAS GARY N	653-7180 8
	TURNER EARL	653-5435 +0
	TYSDAL GEO A	653-6984 +0
	WALKER CHAS A	653-4677 +0
	WALKER CHAS A CHLD	653-9414 +0
	WALLACE CHAS	653-4746 +0
	WALLS JOHN	653-4813 +0
	WALTEMATH R JR	653-9476 +0
	WEBB FRANK	653-5185 +0
	WEINFURTER RUSSELL	653-0432 +0
112	WEST ARTHUR	653-6970 6
	WHITEHEAD RONALD	653-0442 +0
	WINGENBACH MARK	653-9101 +0
13325		
13385	XXXX	00
15040	TOWN&COUNTRY MBL HM	
79	AMUSSEN CHARLES S	653-0222 9
	ANDREWS CHARLENE	653-8038 +0
	BOLIN JAS A	653-4010 +0
24	BYRD DAVID	653-4237 8
39	CABLE JENNIE E	653-2764
	CAIN THOS	656-1353 +0
	CAIN VERN L	653-8168 +0
60	CANALE TED	653-2815 8
90	COLLINS JAS	653-5572 8
	DEAN GLADYS	653-7935 +0
	DEBNAM ALLAN G	653-3315 9
	DEBNAM DEBBIE	653-5014 +0
	DUNHAM JACK	653-5779 +0
37	FIERRO ROBT	653-6259 8
	FILION DELBERT	653-9746 +0
	FITCH EARL RAY	653-9175 9
	GRAY SPENCER	653-0658 +0
	HARKEY WM B	653-0915 +0
74	HUDSON JOHN	653-7104 7
	HUNT CHAS L	656-1246 +0
	HUTHISON CYNTHIA	653-1329 +0
	JOHNSTON RAYMOND	653-6376 +0
50	KENNEN CHISE	653-7213 6
	KOEHNKEN CLARENCE	653-1640 +0
	MADISON OSCAR	653-1719
	MOFFETT RAYMOND JR	653-7851 +0
	MORRISON IOWANA	653-8131 +0
	NEAL J L	653-7266 +0
	PAPROCKI BETTY A	653-1667 +0
*	**PRESTON ALLEN CNCRT**	**653-9396** +0
	ROBINSON P D	653-9728 +0
	SALMOND MAHLON B	653-9301 +0
46	SMITH GREGORY A	653-0133 9
80	SMITH RYAN	653-1243 9
53	SMOUSE WALTER	653-3363 8
	STINSON KENNETH	653-6545 +0
	STRADLEY ROBT B	653-3679 +0
	TABER GLENN A	653-0374 +0
	TERRILL JOHN	653-2026 +0
	THOMAS JAS A	653-4114 +0
*	**TOWN&CNTRY MBL HM**	**653-5437**
	WEST A	653-3974 +0
52	WHETSTONE EBBIE A	653-7693 9
	WILLIAMSON C M	653-1648 +0
	YATES STEPHEN R	653-2064 +0
15040		
15050	XXXX	00

* 45 BUS 184 RES 129 NEW

Target Street	Cross Street	Source
✓	-	Haines Criss-Cross Directory

ALESSANDRO BLVD 1975

22990	STOKKE ROBT	653-8200+5
	*STOKKES GULF SERV	653-8200+5
23580	*MOTEL 6	653-2131

ZIP CODE 92388 SUNNYMEAD

24774	HARTER MARGIE F	653-1610 4
24798	XXXX	00
24810	WILSON F	653-6098+5
24822	RIDGE JAS D	653-5631 4

Target Street	Cross Street	Source
✓	-	Haines Criss-Cross Directory

HEACOCK ST 1975

13325...APARTMENTS

	ABDO DAVID	653-6480+5
	ALLEN DAVID	653-4817+5
	ALLEN FRANK	653-4223+5
	ARNOLD MIKE A	653-1382+5
	BARNEY BOBBIE	653-1030+5
	BASS KEITH A	653-6187+5
61	BAYHAM SANDRA L	653-5785 4
40	BAZILE EUGENE	653-7288 4
	BOHLKE B G	653-5463+5
	BOOTH PEGI	653-5790+5
65	BOWINS B J	653-5908 4
	BOWMAN CHAS R	653-7775+5
	BOX WM	653-4209+5
	BRADLEY CYNTHIA	653-2755+5
37	BUBB FRANK	653-5521 4
	CANTWELL KENNETH G	653-2761+5
	CARSON LELA K	653-4928+5
	COMBS BERTIE A	653-6700+5
	CORGAN MICHAEL	653-5867+5
	COULSTON GERALD	653-7321+5
	DELLAROSE AMEDEO	653-3936+5
	DICKSON RICHARD T	653-6991+5
	DINUNZIO MICHAEL J	653-6443+5
	DOWNEY FRED	653-6860+5
	EDWARDS E F	653-5077+5
	ERNST FOREST	653-5149+5
120	EVANOFF WM	653-2352 4
	FERRARI JOHN M	653-7078+5
	FILLINGIM KENNETH	653-6562+5
	FISHER ANNIE MAJ	653-6538+5
	FREEBORG LINDA K	653-7352+5
	FREEBORG PAUL S	653-7352+5
	GALLAVAN S C	653-5394+5
	GIBSON JEAN E	653-3352+5
	GOLDSMITH RICHARD	653-8250+5
	GUARDIANI ALLAN	653-6930+5
	HOPKINS JERRY	653-6445+5
	JANKI PHILIP	653-2507+5
	KARGE ANITA	653-6189+5
	KAY DAVID	653-7696+5
	KELIIPAAKAVA WM	653-6829+5
	KOENIG STEPHEN J	653-7335+5
	KOPCHA PETER	653-6278+5
	KRETHEOTIS LORI K	653-4928+5
93	LABBE YVETTE	653-8254 4
	LAMACCHIA ANTHONY	653-2602+5
	LINDEGARD RANDALL	653-6305+5
	LINNKRAM	653-5772+5
	LOGANJAS	653-6196+5
	LOWERY J T	653-5483+5
98	LUURU H A	653-7068 4
	MEIER JO E	653-4928+5
	MENDES MANUEL J	653-6224+5
	MENDES RENEE	653-6224+5
	MORGAN WM	653-6473+5
	MOUNT M	653-8297+5
	MOY HUGH A COL	653-2508+5
	NAKASHIMA K	653-4970+5
13	NELSON GENE	653-8141 4
101	NOGUCHI MINOURU	653-2328 4

Target Street	Cross Street	Source
✓	-	Haines Criss-Cross Directory

HEACOCK ST 1975

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..HEACOCK                    92388 CONT..
        NOVAK DAN A              653-4817+5
        OCONNER KEVIN            653-4160+5
        ODELL WILMER CMSGT       653-3408+5
        OGLES WM G JR            653-3548+5
        OLGUIN BERNIE JR         653-8232+5
        PICK S                   653-4691+5
        PLEASANT B E COL         653-6359+5
        PRUDE TOMMY T            653-7903+5
   72   RAINIS JOS J             653-1271 4
        RAMSEY BOBBY L JR        653-1439+5
        ROBERTS ROBT             653-4323+5
        ROGERS K M               653-6063+5
  118   SHEPHERD JOHN            653-7036 4
        SMITH RON                653-5677+5
        SNIDER DENNIS R          653-4923+5
   54   STEUART CONNIE           653-2261 4
        STEVENS JOS              653-6529+5
        SULLIVAN DANL M M        653-2421+5
        SVOBODA WM               653-4201+5
        TAFT IDA                 653-3614+5
        THIBEAU B J              653-2939+5
        TRAINOR STEVE            653-8151+5
        VALENTAS THOS E          653-6517+5
        WALLIS L J               653-2939+5
        YORK RICHARD C           653-5882+5
        ZYBER DAVID J            653-1304+5
 1332.......................
 1338 XXXX                       00
15040...TOWN&COUNTRY MBL HM
        ARNOLD JIM               653-7076+5
   39   CABLE JENNIE E           653-2764
   35   CAFFARELLO A A MSGT653-7073 4
        CARIOU ROBT P            653-2540+5
        CORTEZ JESUS             653-1744+5
        COX FOY D                653-7383+5
        CRAM GLENN L             653-5335+5
   12   DAHEDL GERDA             653-6789
        DAY CLIFTON L            653-2331+5
   90   FITCH EARL               653-8192 4
        GATES RICHARD            653-8182+5
        GIDNEY JACK              653-2314 4
       *GIDNEY MBL HM SV         653-2314+5
        GORIAN MICHAEL           653-2546+5
   62   GRANT DELORES            653-4042
   62   GRANT SAM                653-4042
        GRAY SPENCER             653-5723+5
        HARPER V M               653-4254+5
        HARRIS CHAS              653-3227+5
        HARTER WM                653-1075+5
        HESS BRIAN               653-7076+5
        HICKS TIMOTHY K          653-4944+5
        JACKSON TERRY            653-7076+5
        JOKINEN ARNOLD           653-6376+5
   80   JONES ROBT G             653-2085
        KENNEDY CRATON A JR653-6398+5
   13   LAWRENCE D               653-5571 4
   70   LOCKE RONALD             653-6891
   75   LUDVIGSON ORSON          653-2080
        LYONS J D                653-5526+5
   45   MADISON OSCAR            653-1719
   68   MARTEL WILFRED           653-6971
        MARTIN NATHAN            653-1234+5
   71   MCKEE LESLIE             653-7219
        MCNEESE JAS              653-3263+5
    4   NADDY WM                 653-3583 4
        NELSON MCKINLEY J        653-5916+5
    8   NORMAN PAUL              653-4523
        NYHUS DALE D             653-6682
        OLMSTEAD MICHAEL J       653-4487
        PORTER GEO               653-6061+5
        PUCKETT HENRY            653-4844+5
        RIVERA ERNEST J          653-4676+5
    3   ROWELL DONALD R          653-6428 4
    2   SALISBURY C G            653-1425
        SKONORD R H SR           653-4570+5
        STODDARD LARRY           653-7478+5
        STONE DARLENE J          653-6932+5
   57   SUKURS JOS               653-5224
        SYMON CHAS               653-7937+5
       *TOWN&CONTRY MBLE HMS653-5437
        WALKER BOBBY K           653-7957+5
   44   WATKINS ROGER            653-6867 4
   11   WEST MARGARET            653-2505 4
        WISNIEWSKI JOHN          653-4325+5
15040.......................
15050 XXXX                       00
      ** 19 BUS  171 RES  118 NEW
```

SW Corner of Alessandro Blvd. & Heacock Street

SW Corner of Alessandro Blvd. & Heacock Street

Moreno Valley, CA 92553

Inquiry Number: 5001710.4

July 24, 2017

EDR Historical Topo Map Report

with QuadMatch™

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Historical Topo Map Report

07/24/17

Site Name:	Client Name:
SW Corner of Alessandro Blvd.	SCS Engineers
SW Corner of Alessandro Blvd.	3900 Kilroy Airport Way
Moreno Valley, CA 92553	Long Beach, CA 90806
EDR Inquiry # 5001710.4	Contact: Kim Braun

EDR Topographic Map Library has been searched by EDR and maps covering the target property location as provided by SCS Engineers were identified for the years listed below. EDR's Historical Topo Map Report is designed to assist professionals in evaluating potential liability on a target property resulting from past activities. EDRs Historical Topo Map Report includes a search of a collection of public and private color historical topographic maps, dating back to the late 1800s.

Search Results:

P.O.# NA

Project: 01217215.00

Coordinates:

Latitude:	33.91547 33° 54' 56" North
Longitude:	-117.244983 -117° 14' 42" West
UTM Zone:	Zone 11 North
UTM X Meters:	477353.94
UTM Y Meters:	3752810.54
Elevation:	1565.00' above sea level

Maps Provided:

2012	1901
1980	
1973	
1967	
1953	
1947	
1943	
1942	

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Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

2012 Source Sheets

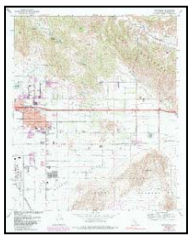
Riverside East

7.5-minute, 24000

Sunnymead

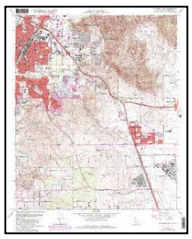
7.5-minute, 24000

1980 Source Sheets



Sunnymead

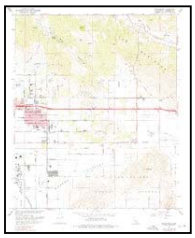
7.5-minute, 24000
Aerial Photo Revised 1978



Riverside East

7.5-minute, 24000
Aerial Photo Revised 1978

1973 Source Sheets



Sunnymead

7.5-minute, 24000
Aerial Photo Revised 1973

1967 Source Sheets

Riverside East

7.5-minute, 24000
Aerial Photo Revised 1966

Sunnymead

7.5-minute, 24000
Aerial Photo Revised 1966

Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

1953 Source Sheets

Sunnymead

7.5-minute, 24000
Aerial Photo Revised 1951

Riverside East

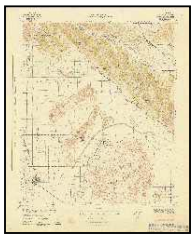
7.5-minute, 24000
Aerial Photo Revised 1951

1947 Source Sheets

RIVERSIDE

15-minute, 50000

1943 Source Sheets



PERRIS

15-minute, 62500

1942 Source Sheets

Perris

15-minute, 62500
Aerial Photo Revised 1939

Riverside

15-minute, 62500
Aerial Photo Revised 1939

Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

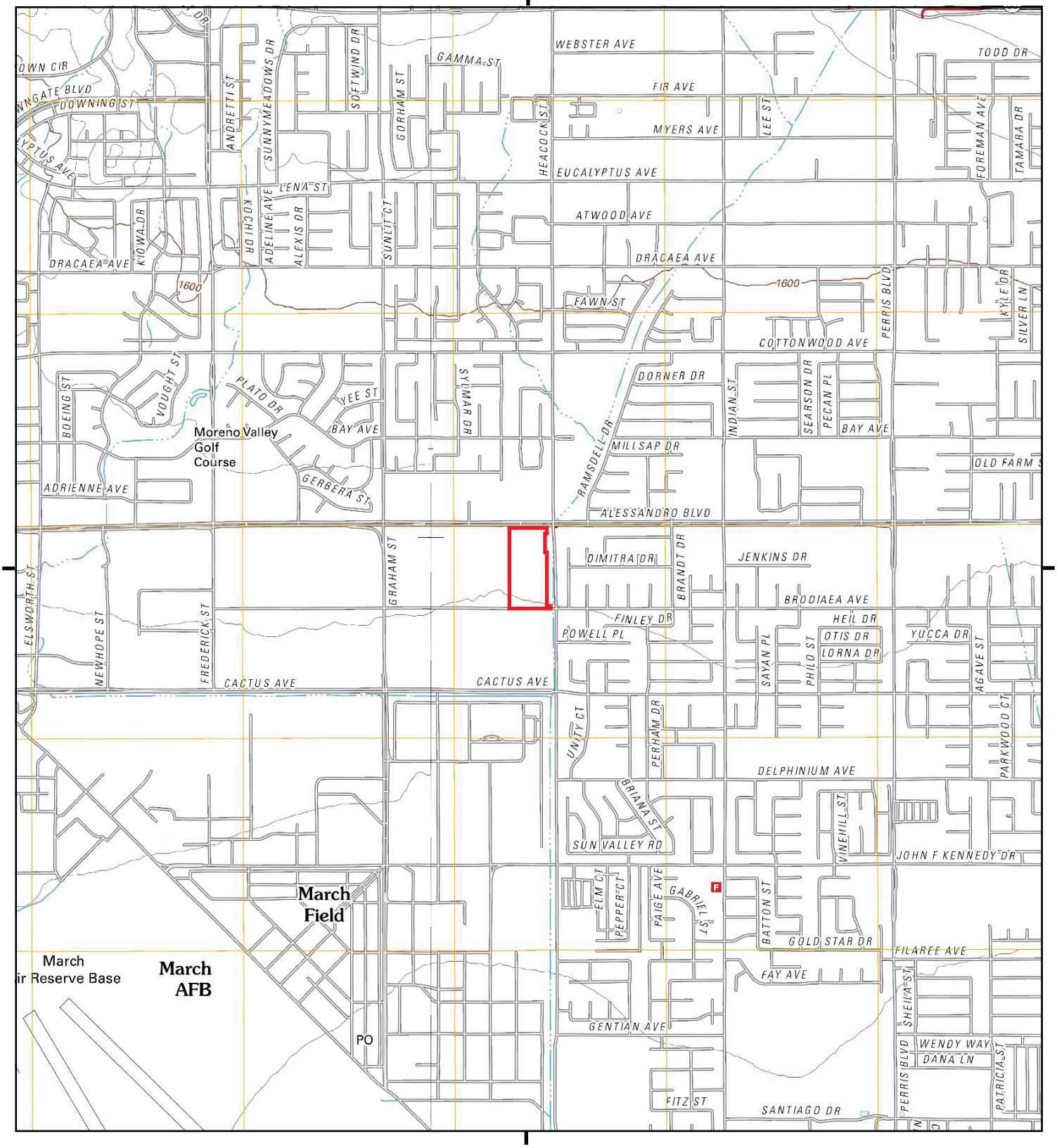
1901 Source Sheets

Riverside

15-minute, 62500

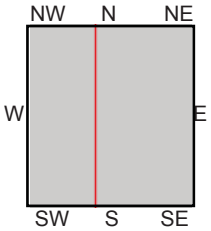
Historical Topo Map

2012



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5



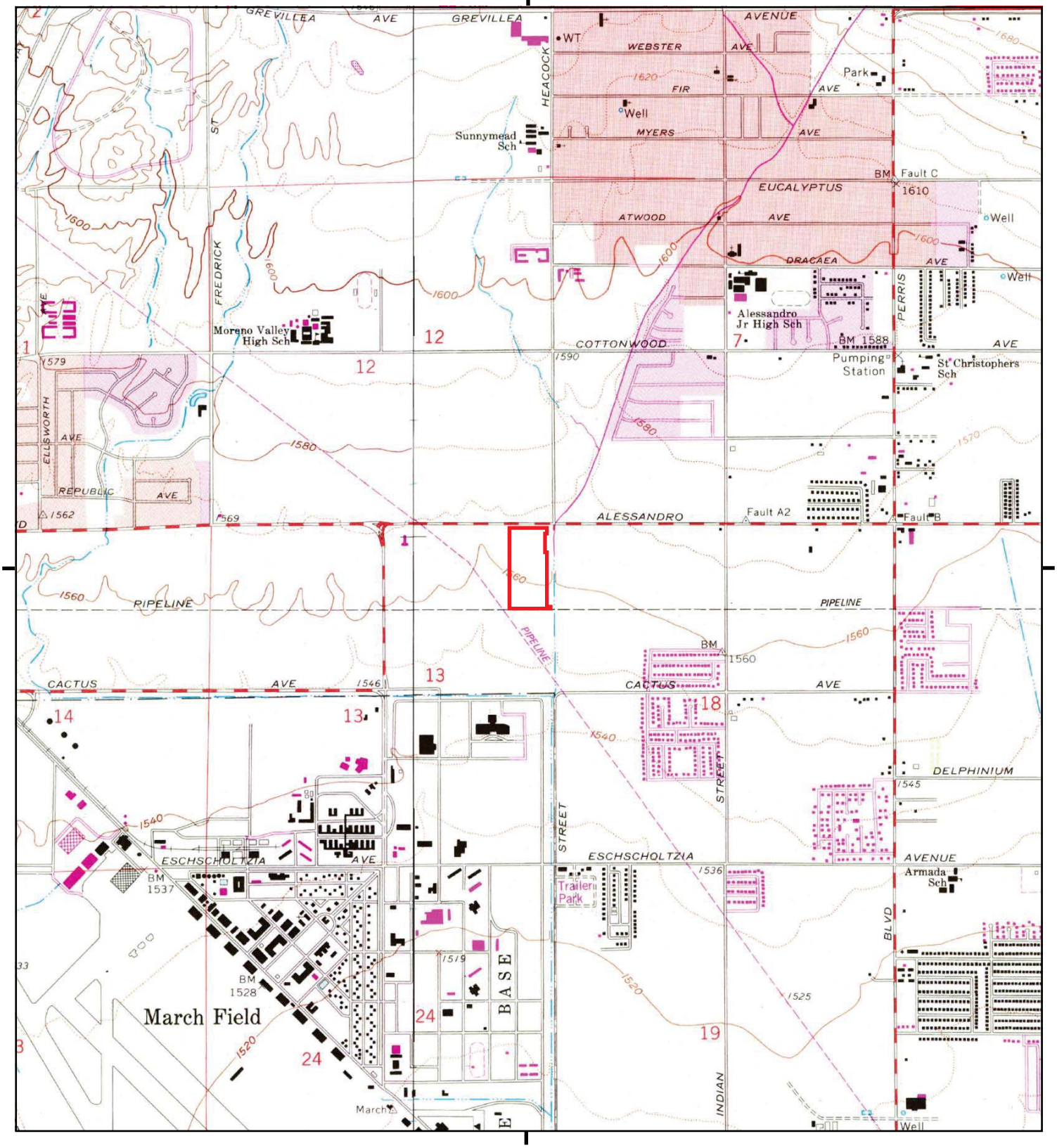
TP, Sunnymead, 2012, 7.5-minute
W, Riverside East, 2012, 7.5-minute

SITE NAME: SW Corner of Alessandro Blvd. & Heacoc
ADDRESS: SW Corner of Alessandro Blvd. & Heacoc
Moreno Valley, CA 92553
CLIENT: SCS Engineers

N

Historical Topo Map

1980



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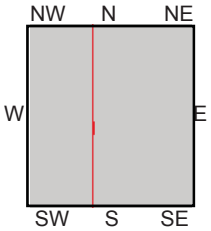
0 Miles 0.25 0.5 1 1.5



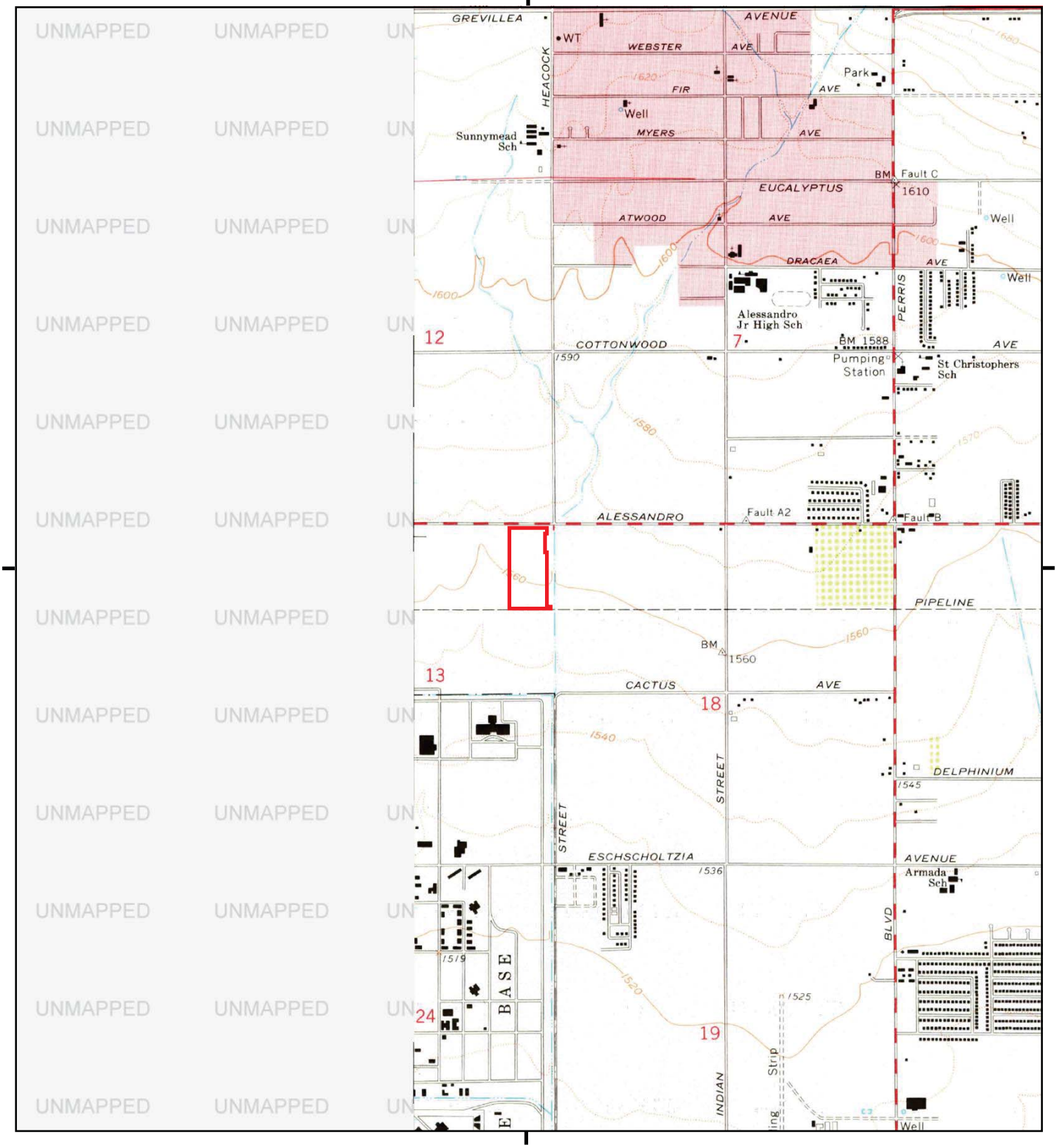
TP, Sunnymead, 1980, 7.5-minute
W, Riverside East, 1980, 7.5-minute

SITE NAME: SW Corner of Alessandro Blvd. & Heacoc
ADDRESS: SW Corner of Alessandro Blvd. & Heacoc
Moreno Valley, CA 92553
CLIENT: SCS Engineers

N

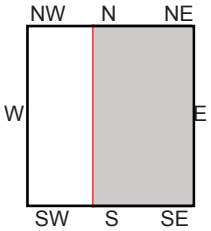
Historical Topo Map

1973



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5



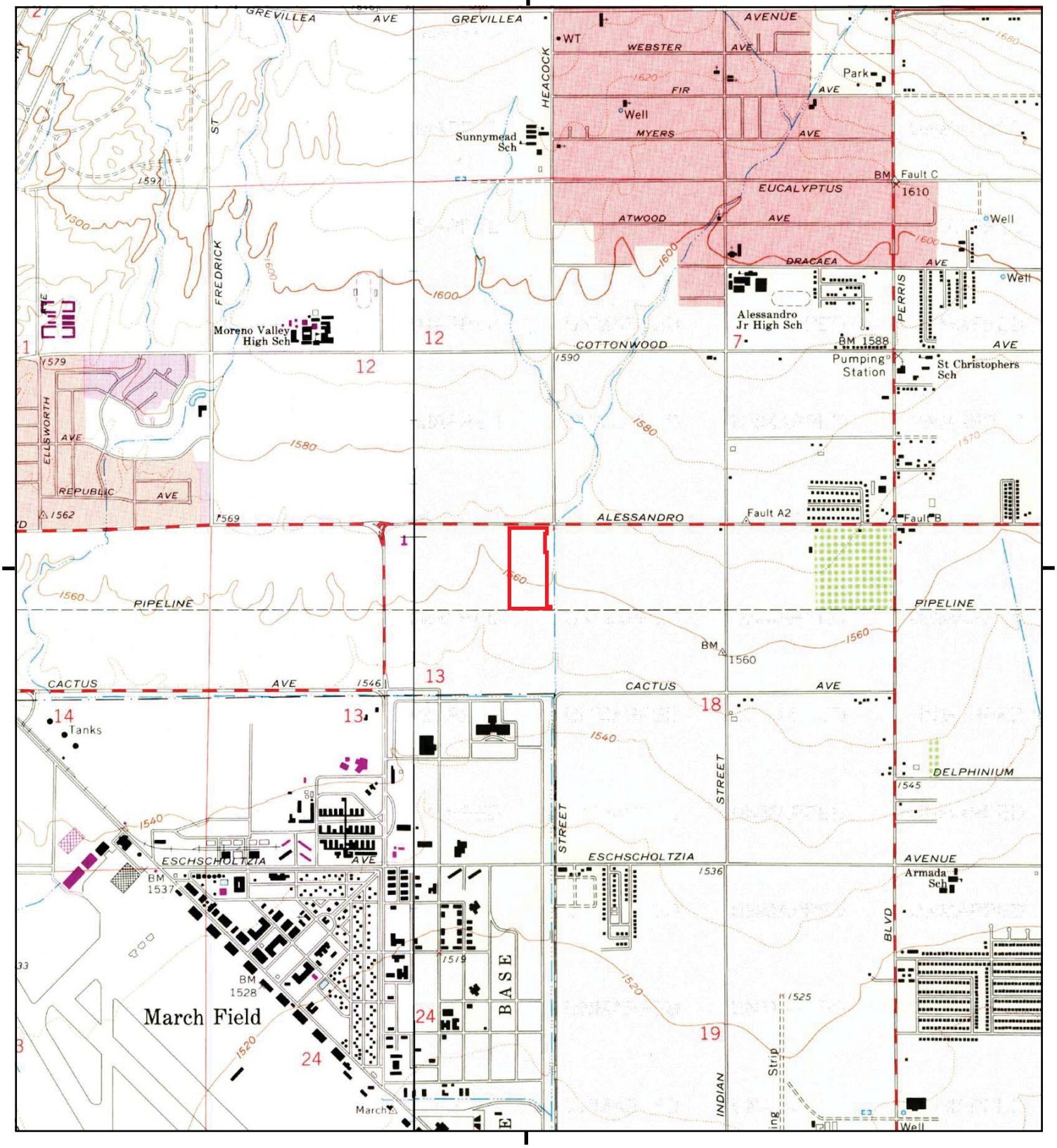
TP, Sunnymead, 1973, 7.5-minute

SITE NAME: SW Corner of Alessandro Blvd. & Heacoc
ADDRESS: SW Corner of Alessandro Blvd. & Heacoc
Moreno Valley, CA 92553
CLIENT: SCS Engineers

N

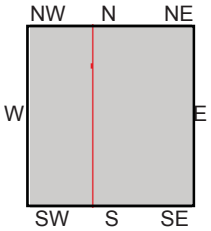
Historical Topo Map

1967



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5



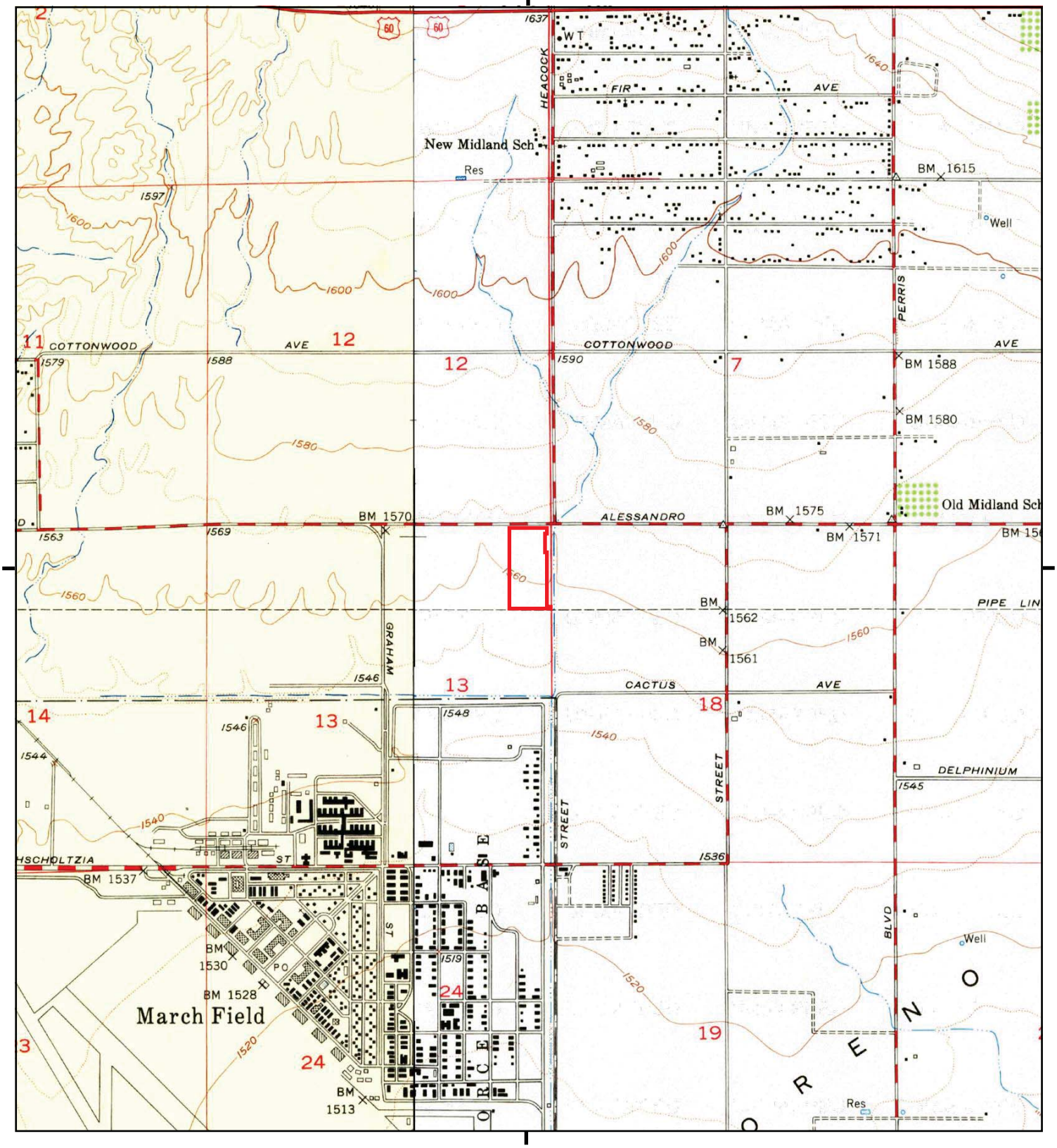
TP, Sunnymead, 1967, 7.5-minute
W, Riverside East, 1967, 7.5-minute

SITE NAME: SW Corner of Alessandro Blvd. & Heacoc
ADDRESS: SW Corner of Alessandro Blvd. & Heacoc
Moreno Valley, CA 92553
CLIENT: SCS Engineers

N

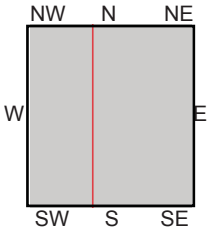
Historical Topo Map

1953



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5



TP, Sunnymead, 1953, 7.5-minute
W, Riverside East, 1953, 7.5-minute

SITE NAME: SW Corner of Alessandro Blvd. & Heacoc
ADDRESS: SW Corner of Alessandro Blvd. & Heacoc
Moreno Valley, CA 92553
CLIENT: SCS Engineers

N

Historical Topo Map

1947

This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

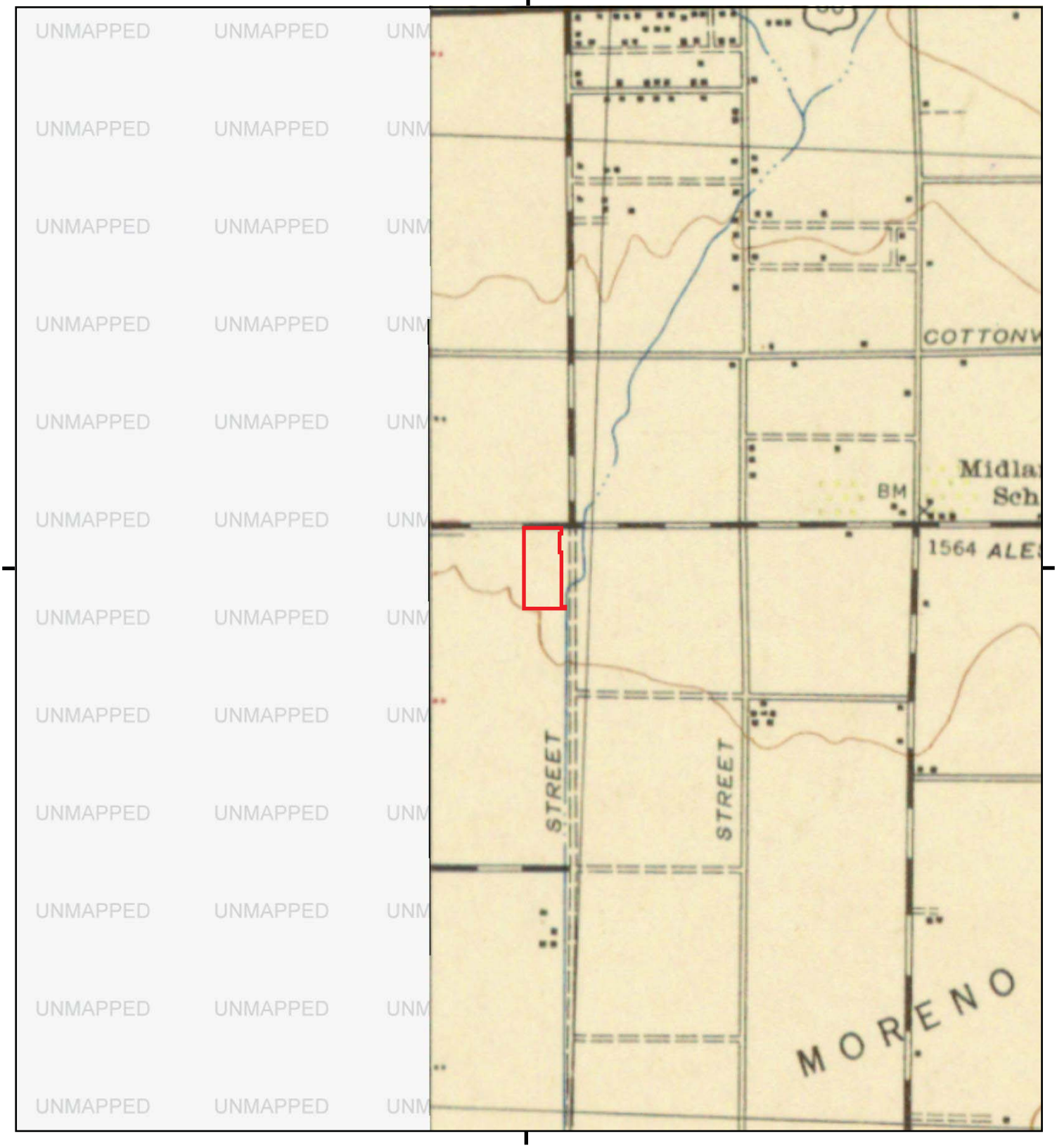
W, RIVERSIDE, 1947, 15-minute

SITE NAME: SW Corner of Alessandro Blvd. & Heacoc
ADDRESS: SW Corner of Alessandro Blvd. & Heacoc
Moreno Valley, CA 92553
CLIENT: SCS Engineers

N

Historical Topo Map

1943



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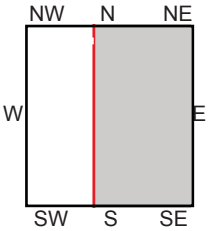
0 Miles 0.25 0.5 1 1.5



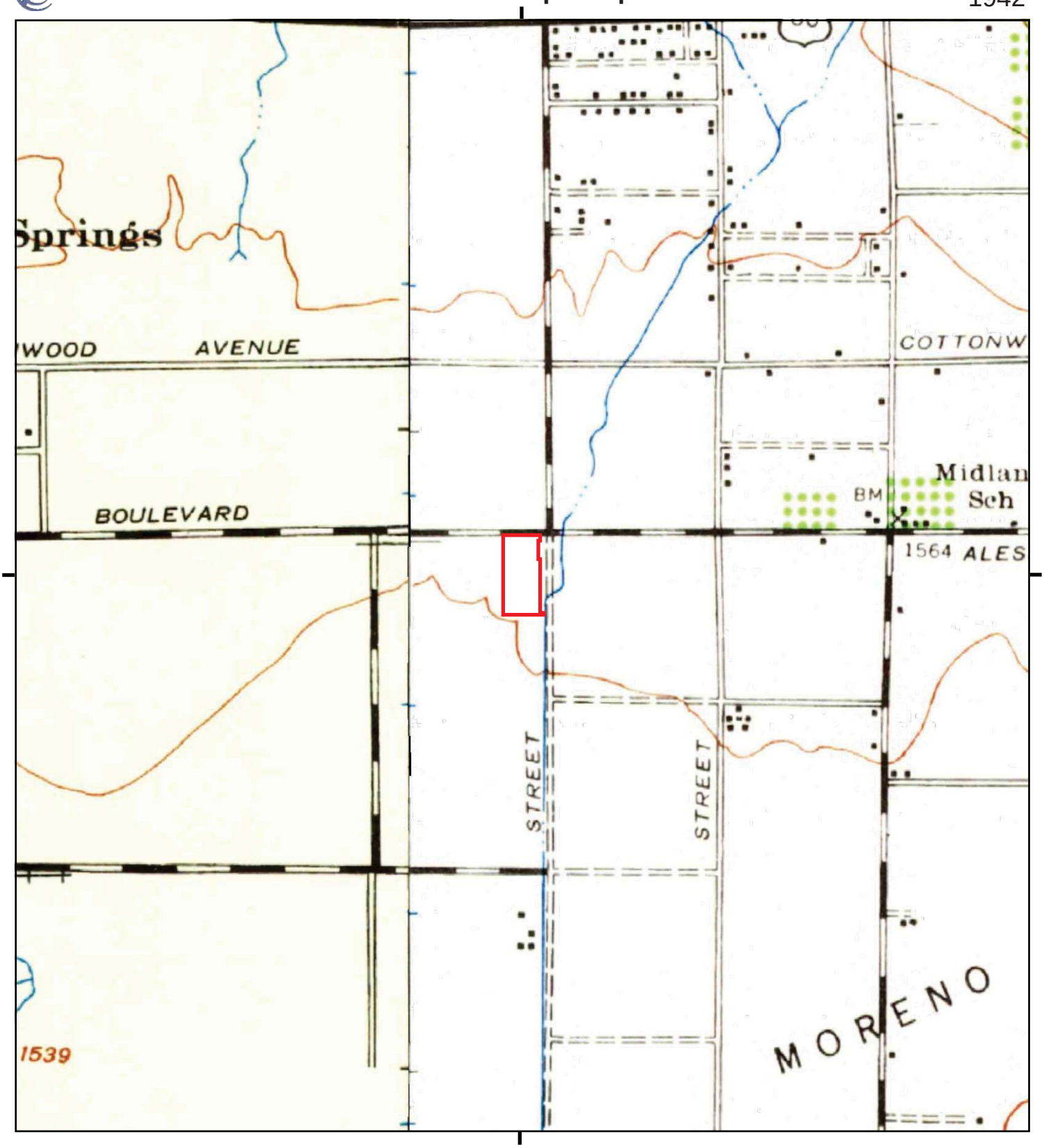
TP, PERRIS, 1943, 15-minute

SITE NAME: SW Corner of Alessandro Blvd. & Heacoc
ADDRESS: SW Corner of Alessandro Blvd. & Heacoc
Moreno Valley, CA 92553
CLIENT: SCS Engineers

N

Historical Topo Map

1942



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

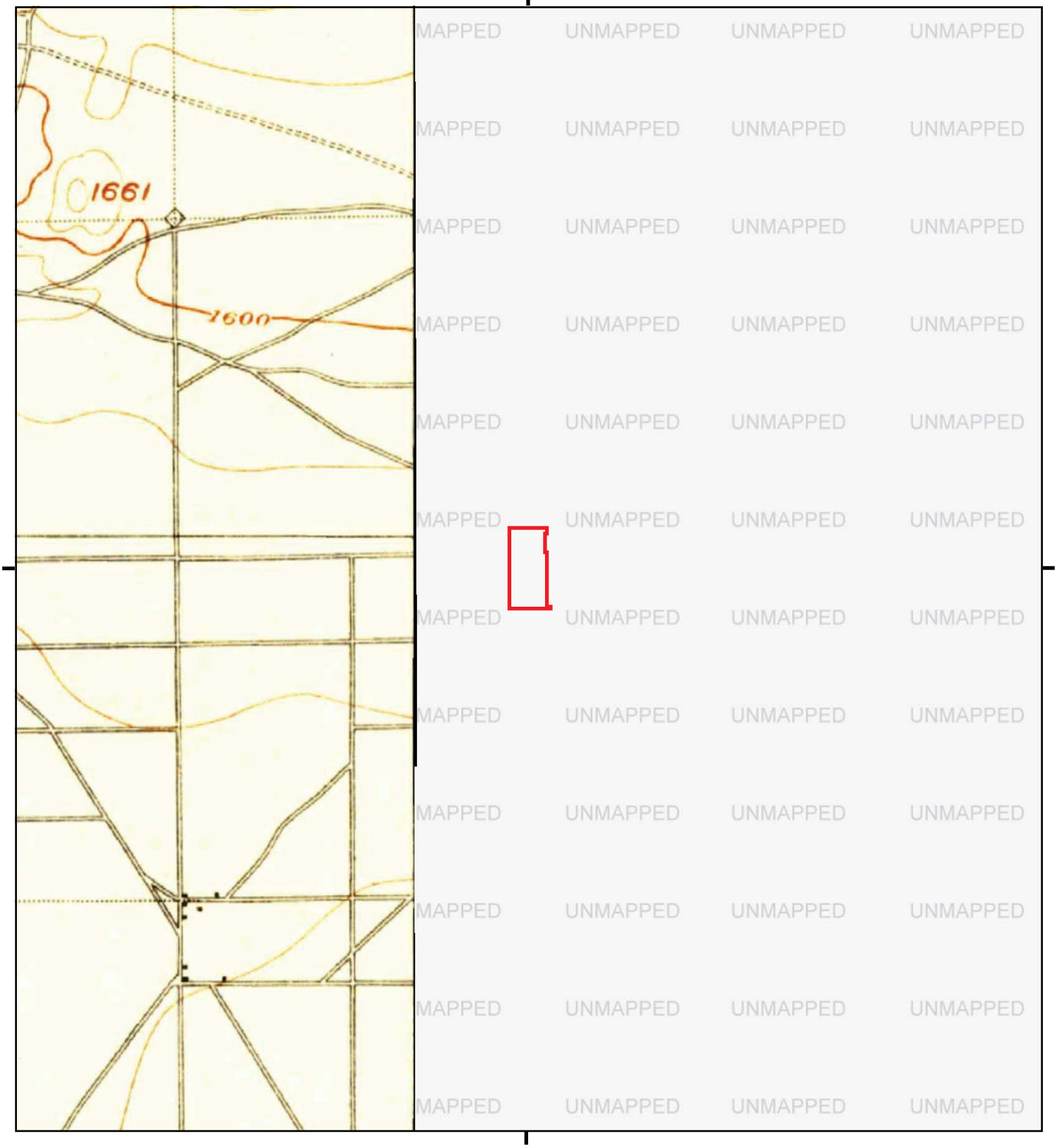
TP, Perris, 1942, 15-minute
W, Riverside, 1942, 15-minute

SITE NAME: SW Corner of Alessandro Blvd. & Heacoc
ADDRESS: SW Corner of Alessandro Blvd. & Heacoc
Moreno Valley, CA 92553
CLIENT: SCS Engineers

N

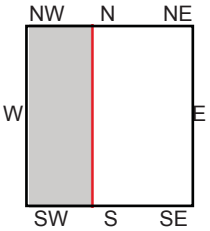
Historical Topo Map

1901



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5



W, Riverside, 1901, 15-minute

SITE NAME: SW Corner of Alessandro Blvd. & Heacoc
ADDRESS: SW Corner of Alessandro Blvd. & Heacoc
Moreno Valley, CA 92553
CLIENT: SCS Engineers

N

SW Corner of Alessandro Blvd. & Heacock Street

SW Corner of Alessandro Blvd. & Heacock Street

Moreno Valley, CA 92553

Inquiry Number: 5001710.3

July 24, 2017

Certified Sanborn® Map Report

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

Certified Sanborn® Map Report

07/24/17

Site Name:	Client Name:
SW Corner of Alessandro Blvd.	SCS Engineers
SW Corner of Alessandro Blvd.	3900 Kilroy Airport Way
Moreno Valley, CA 92553	Long Beach, CA 90806
EDR Inquiry # 5001710.3	Contact: Kim Braun

The Sanborn Library has been searched by EDR and maps covering the target property location as provided by SCS Engineers were identified for the years listed below. The Sanborn Library is the largest, most complete collection of fire insurance maps. The collection includes maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow, and others. Only Environmental Data Resources Inc. (EDR) is authorized to grant rights for commercial reproduction of maps by the Sanborn Library LLC, the copyright holder for the collection. Results can be authenticated by visiting www.edrnet.com/sanborn.

The Sanborn Library is continually enhanced with newly identified map archives. This report accesses all maps in the collection as of the day this report was generated.

Certified Sanborn Results:

Certification # 784E-42CB-878B

PO # NA

Project 01217215.00

UNMAPPED PROPERTY

This report certifies that the complete holdings of the Sanborn Library, LLC collection have been searched based on client supplied target property information, and fire insurance maps covering the target property were not found.

Sanborn® Library search results

Certification #: 784E-42CB-878B

The Sanborn Library includes more than 1.2 million fire insurance maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow and others which track historical property usage in approximately 12,000 American cities and towns. Collections searched:

- ✔ Library of Congress
- ✔ University Publications of America
- ✔ EDR Private Collection

The Sanborn Library LLC Since 1866™

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APPENDIX D

EDR DATABASE REPORT

SW Corner of Alessandro Blvd. & Heacock Street
SW Corner of Alessandro Blvd. & Heacock Street
Moreno Valley, CA 92553

Inquiry Number: 05001710.2r
July 24, 2017

The EDR Radius Map™ Report with GeoCheck®

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

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Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-13) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

SW CORNER OF ALESSANDRO BLVD. & HEACOCK STREET
MORENO VALLEY, CA 92553

COORDINATES

Latitude (North):	33.9154700 - 33˚ 54' 55.69''
Longitude (West):	117.2449830 - 117˚ 14' 41.93''
Universal Tranverse Mercator:	Zone 11
UTM X (Meters):	477353.4
UTM Y (Meters):	3752616.2
Elevation:	1565 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map:	5641326 SUNNYMEAD, CA
Version Date:	2012
West Map:	5641312 RIVERSIDE EAST, CA
Version Date:	2012

AERIAL PHOTOGRAPHY IN THIS REPORT

Portions of Photo from:	20140527, 20140603
Source:	USDA

MAPPED SITES SUMMARY

Target Property Address:
SW CORNER OF ALESSANDRO BLVD. & HEACOCK STREET
MORENO VALLEY, CA 92553

Click on Map ID to see full detail.

MAP ID	SITE NAME	ADDRESS	DATABASE ACRONYMS	RELATIVE ELEVATION	DIST (ft. & mi.) DIRECTION
Reg	MARCH AIR FORCE BASE		DOD	Same	1 ft.
Reg	MARCH AIR FORCE BASE	22 CSG/CC	NPL, SEMS, RCRA-LQG, US ENG CONTROLS, US INST...	Same	1252, 0.237, South
A1	BEST VALLEY SMOG & A	23952 ALSSNDRO BLVD	EDR Hist Auto	Higher	109, 0.021, NNW
A2	B & F AUTO REPAIR	23942 ALESSANDRO BLV	EDR Hist Auto	Higher	109, 0.021, NNW
A3	HOWIES CRPT CLG FLOO	23932 ALESSANDRO BLV	EDR Hist Cleaner	Higher	109, 0.021, NNW
A4	BRAKE TECH	23920 ALESSANDRO BLV	EDR Hist Auto	Higher	109, 0.021, NNW
A5	GBM CYLINDERS HEADS	23910 ALESSANDRO BLV	EDR Hist Auto	Higher	109, 0.021, NNW
A6	STAR BRIGHT CLEANERS	23962 ALESSANDRO	RCRA-SQG, FINDS, ECHO	Higher	113, 0.021, North
A7	MENOS NO 2 AUTO REP	23952 ALESSANDRO BLV	RCRA-SQG, FINDS	Higher	113, 0.021, North
A8	MARK C BLOOME CO	23920 ALESSANDRO BLV	RCRA-SQG, FINDS, ECHO	Higher	113, 0.021, North
A9	MORENO VALLEY TRANS	23920 ALESSANDRO UNI	RCRA-SQG, FINDS, ECHO	Higher	113, 0.021, North
A10	VICKYNO AUTO WINDOW	23900 ALESSANDRO BLV	EDR Hist Auto	Higher	114, 0.022, NNW
A11	MOBILE PROS TRAILER	23890 ALESSANDRO BLV	EDR Hist Auto	Higher	126, 0.024, NNW
12	CSK AUTO INC	24021 ALESSANDRO BLV	EDR Hist Auto	Higher	334, 0.063, NE
B13	99 CLEANERS	23750 ALESSANDRO BLV	RCRA-SQG, FINDS, ECHO, DRYCLEANERS, HAZNET	Higher	586, 0.111, NW
B14	99 CLEANERS	23750 ALESSANDRO LVD	DRYCLEANERS	Higher	586, 0.111, NW
B15	99 CLEANERS	23750 ALESSANDRO BLV	EDR Hist Cleaner	Higher	586, 0.111, NW
C16	ARCO AM/PM	23501 ALESSANDRO BLV	LUST, UST	Higher	1756, 0.333, WNW
C17	ARCO AM/PM MINI MARK	23501 ALESSANDRO BLV	SWEEPS UST, CA FID UST, HIST CORTESE	Higher	1756, 0.333, WNW
D18	MOBIL STATION 18-A3E	24440 ALESSANDRO BLV	LUST	Higher	2607, 0.494, ENE
D19	EXXON MOBIL OIL CORP	24440 ALESSANDRO BLV	RCRA-LQG, LUST, FINDS	Higher	2607, 0.494, ENE
20	RANCHO VERDE HIGH AD	17750 LA SALLE STREE	ENVIROSTOR, SCH	Higher	2728, 0.517, East
21	PROPOSED ALTERNATIVE	SEC CACTUS AVENUE AN	ENVIROSTOR, SCH	Lower	3299, 0.625, SE
22	ELEMENTARY SCHOOL NO	HEACOCK STREET/ATWOO	ENVIROSTOR, SCH	Higher	4323, 0.819, North
23	BAY AVENUE ELEMENTAR	24801 BAY AVENUE	ENVIROSTOR, SCH	Higher	4552, 0.862, ENE
24	RIVERSIDE COUNTY DEP	14310 FREDERICK STRE	ENVIROSTOR, HWT	Lower	4594, 0.870, West
25	BADGER SPRINGS MIDDL	24750 DELPHINIUM AVE	ENVIROSTOR, SCH	Lower	4737, 0.897, SE
26	MARCH FIELD SKEET RA		UXO	Lower	4878, 0.924, West
27	CHAPARRAL ELEMENTARY	24850 DELPHINIUM AVE	ENVIROSTOR, SCH	Lower	5131, 0.972, SE

EXECUTIVE SUMMARY

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

Proposed NPL..... Proposed National Priority List Sites
NPL LIENS..... Federal Superfund Liens

Federal Delisted NPL site list

Delisted NPL..... National Priority List Deletions

Federal CERCLIS list

FEDERAL FACILITY..... Federal Facility Site Information listing

Federal CERCLIS NFRAP site list

SEMS-ARCHIVE..... Superfund Enterprise Management System Archive

Federal RCRA CORRACTS facilities list

CORRACTS..... Corrective Action Report

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF..... RCRA - Treatment, Storage and Disposal

Federal RCRA generators list

RCRA-CESQG..... RCRA - Conditionally Exempt Small Quantity Generator

Federal institutional controls / engineering controls registries

LUCIS..... Land Use Control Information System

Federal ERNS list

ERNS..... Emergency Response Notification System

State- and tribal - equivalent NPL

RESPONSE..... State Response Sites

State and tribal landfill and/or solid waste disposal site lists

SWF/LF ..... Solid Waste Information System

State and tribal leaking storage tank lists

INDIAN LUST ..... Leaking Underground Storage Tanks on Indian Land
SLIC ..... Statewide SLIC Cases

State and tribal registered storage tank lists

FEMA UST ..... Underground Storage Tank Listing
UST ..... Active UST Facilities
AST ..... Aboveground Petroleum Storage Tank Facilities
INDIAN UST ..... Underground Storage Tanks on Indian Land

State and tribal voluntary cleanup sites

INDIAN VCP ..... Voluntary Cleanup Priority Listing
VCP ..... Voluntary Cleanup Program Properties

State and tribal Brownfields sites

BROWNFIELDS ..... Considered Brownfieds Sites Listing

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS ..... A Listing of Brownfields Sites

Local Lists of Landfill / Solid Waste Disposal Sites

WMUDS/SWAT ..... Waste Management Unit Database
SWRCY ..... Recycler Database
HAULERS ..... Registered Waste Tire Haulers Listing
INDIAN ODI ..... Report on the Status of Open Dumps on Indian Lands
DEBRIS REGION 9 ..... Torres Martinez Reservation Illegal Dump Site Locations
ODI ..... Open Dump Inventory
IHS OPEN DUMPS ..... Open Dumps on Indian Land

Local Lists of Hazardous waste / Contaminated Sites

US HIST CDL ..... Delisted National Clandestine Laboratory Register
HIST Cal-Sites ..... Historical Calsites Database
SCH ..... School Property Evaluation Program
CDL ..... Clandestine Drug Labs
Toxic Pits ..... Toxic Pits Cleanup Act Sites
US CDL ..... National Clandestine Laboratory Register

Local Lists of Registered Storage Tanks

SWEEPS UST ..... SWEEPS UST Listing

HIST UST	Hazardous Substance Storage Container Database
CA FID UST	Facility Inventory Database

Local Land Records

LIENS	Environmental Liens Listing
LIENS 2	CERCLA Lien Information
DEED	Deed Restriction Listing

Records of Emergency Release Reports

HMIRS	Hazardous Materials Information Reporting System
CHMIRS	California Hazardous Material Incident Report System
LDS	Land Disposal Sites Listing
MCS	Military Cleanup Sites Listing
SPILLS 90	SPILLS 90 data from FirstSearch

Other Ascertainable Records

RCRA NonGen / NLR	RCRA - Non Generators / No Longer Regulated
FUDS	Formerly Used Defense Sites
SCRD DRYCLEANERS	State Coalition for Remediation of Drycleaners Listing
US FIN ASSUR	Financial Assurance Information
EPA WATCH LIST	EPA WATCH LIST
2020 COR ACTION	2020 Corrective Action Program List
TSCA	Toxic Substances Control Act
TRIS	Toxic Chemical Release Inventory System
SSTS	Section 7 Tracking Systems
RMP	Risk Management Plans
RAATS	RCRA Administrative Action Tracking System
PRP	Potentially Responsible Parties
PADS	PCB Activity Database System
ICIS	Integrated Compliance Information System
FTTS	FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
MLTS	Material Licensing Tracking System
COAL ASH DOE	Steam-Electric Plant Operation Data
COAL ASH EPA	Coal Combustion Residues Surface Impoundments List
PCB TRANSFORMER	PCB Transformer Registration Database
RADINFO	Radiation Information Database
HIST FTTS	FIFRA/TSCA Tracking System Administrative Case Listing
DOT OPS	Incident and Accident Data
CONSENT	Superfund (CERCLA) Consent Decrees
INDIAN RESERV	Indian Reservations
FUSRAP	Formerly Utilized Sites Remedial Action Program
UMTRA	Uranium Mill Tailings Sites
LEAD SMELTERS	Lead Smelter Sites
US AIRS	Aerometric Information Retrieval System Facility Subsystem
US MINES	Mines Master Index File
ABANDONED MINES	Abandoned Mines
FINDS	Facility Index System/Facility Registry System
ECHO	Enforcement & Compliance History Information
DOCKET HWC	Hazardous Waste Compliance Docket Listing
FUELS PROGRAM	EPA Fuels Program Registered Listing
CA BOND EXP. PLAN	Bond Expenditure Plan

EXECUTIVE SUMMARY

Cortese	"Cortese" Hazardous Waste & Substances Sites List
CUPA Listings	CUPA Resources List
EMI	Emissions Inventory Data
ENF	Enforcement Action Listing
Financial Assurance	Financial Assurance Information Listing
HAZNET	Facility and Manifest Data
ICE	ICE
HWP	EnviroStor Permitted Facilities Listing
HWT	Registered Hazardous Waste Transporter Database
MINES	Mines Site Location Listing
MWMP	Medical Waste Management Program Listing
NPDES	NPDES Permits Listing
PEST LIC	Pesticide Regulation Licenses Listing
PROC	Certified Processors Database
Notify 65	Proposition 65 Records
UIC	UIC Listing
WASTEWATER PITS	Oil Wastewater Pits Listing
WDS	Waste Discharge System
WIP	Well Investigation Program Case List

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP	EDR Proprietary Manufactured Gas Plants

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA LF	Recovered Government Archive Solid Waste Facilities List
RGA LUST	Recovered Government Archive Leaking Underground Storage Tank

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified in the following databases.

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property.
Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL: Also known as Superfund, the National Priority List database is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund program. The source of this database is the U.S. EPA.

A review of the NPL list, as provided by EDR, and dated 04/05/2017 has revealed that there is 1 NPL site within approximately 1 mile of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
MARCH AIR FORCE BASE	*22 CSG/CC*	*S 1/8 - 1/4 (0.237 mi.)*	*0*	*8*

Federal CERCLIS list

SEMS: SEMS (Superfund Enterprise Management System) tracks hazardous waste sites, potentially hazardous waste sites, and remedial activities performed in support of EPA's Superfund Program across the United States. The list was formerly know as CERCLIS, renamed to SEMS by the EPA in 2015. The list contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This dataset also contains sites which are either proposed to or on the National Priorities List (NPL) and the sites which are in the screening and assessment phase for possible inclusion on the NPL.

A review of the SEMS list, as provided by EDR, and dated 02/07/2017 has revealed that there is 1 SEMS site within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
MARCH AIR FORCE BASE	*22 CSG/CC*	*S 1/8 - 1/4 (0.237 mi.)*	*0*	*8*

Federal RCRA generators list

RCRA-LQG: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

A review of the RCRA-LQG list, as provided by EDR, and dated 12/12/2016 has revealed that there is 1 RCRA-LQG site within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
MARCH AIR FORCE BASE	*22 CSG/CC*	*S 1/8 - 1/4 (0.237 mi.)*	*0*	*8*

RCRA-SQG: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

A review of the RCRA-SQG list, as provided by EDR, and dated 12/12/2016 has revealed that there are 5

RCRA-SQG sites within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
STAR BRIGHT CLEANERS	*23962 ALESSANDRO*	*N 0 - 1/8 (0.021 mi.)*	*A6*	*51*
MENOS NO 2 AUTO REP	*23952 ALESSANDRO BLV*	*N 0 - 1/8 (0.021 mi.)*	*A7*	*52*
MARK C BLOOME CO	*23920 ALESSANDRO BLV*	*N 0 - 1/8 (0.021 mi.)*	*A8*	*54*
MORENO VALLEY TRANS	*23920 ALESSANDRO UNI*	*N 0 - 1/8 (0.021 mi.)*	*A9*	*55*
99 CLEANERS	*23750 ALESSANDRO BLV*	*NW 0 - 1/8 (0.111 mi.)*	*B13*	*58*

Federal institutional controls / engineering controls registries

US ENG CONTROLS: A listing of sites with engineering controls in place.

A review of the US ENG CONTROLS list, as provided by EDR, and dated 02/13/2017 has revealed that there is 1 US ENG CONTROLS site within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
MARCH AIR FORCE BASE	*22 CSG/CC*	*S 1/8 - 1/4 (0.237 mi.)*	*0*	*8*

US INST CONTROL: A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

A review of the US INST CONTROL list, as provided by EDR, and dated 02/13/2017 has revealed that there is 1 US INST CONTROL site within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
MARCH AIR FORCE BASE	*22 CSG/CC*	*S 1/8 - 1/4 (0.237 mi.)*	*0*	*8*

State- and tribal - equivalent CERCLIS

ENVIROSTOR: The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifes sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.

A review of the ENVIROSTOR list, as provided by EDR, and dated 01/30/2017 has revealed that there are 7 ENVIROSTOR sites within approximately 1 mile of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
RANCHO VERDE HIGH AD	*17750 LA SALLE STREE*	*E 1/2 - 1 (0.517 mi.)*	*20*	*78*

Facility Id: 33820009 Status: No Action Required				
ELEMENTARY SCHOOL NO Facility Id: 36880002 Status: No Action Required	***HEACOCK STREET/ATWOO***	***N 1/2 - 1 (0.819 mi.)***	***22***	***83***
BAY AVENUE ELEMENTAR Facility Id: 33820010 Status: No Further Action	***24801 BAY AVENUE***	***ENE 1/2 - 1 (0.862 mi.)***	***23***	***85***

Lower Elevation	Address	Direction / Distance	Map ID	Page
PROPOSED ALTERNATIVE Facility Id: 60000563 Status: No Further Action	***SEC CACTUS AVENUE AN***	***SE 1/2 - 1 (0.625 mi.)***	***21***	***80***
RIVERSIDE COUNTY DEP Facility Id: 80000870 Status: Inactive - Action Required	***14310 FREDERICK STRE***	***W 1/2 - 1 (0.870 mi.)***	***24***	***88***
BADGER SPRINGS MIDDL Facility Id: 60000826 Status: No Further Action	***24750 DELPHINIUM AVE***	***SE 1/2 - 1 (0.897 mi.)***	***25***	***89***
CHAPARRAL ELEMENTARY Facility Id: 33010055 Status: No Action Required	***24850 DELPHINIUM AVE***	***SE 1/2 - 1 (0.972 mi.)***	***27***	***91***

State and tribal leaking storage tank lists

LUST: Leaking Underground Storage Tank (LUST) Sites included in GeoTracker. GeoTracker is the Water Boards data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

A review of the LUST list, as provided by EDR, has revealed that there are 3 LUST sites within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
ARCO AM/PM Database: RIVERSIDE CO. LUST, Date of Government Version: 04/18/2017 Database: LUST REG 8, Date of Government Version: 02/14/2005 Database: LUST, Date of Government Version: 03/13/2017 Status: Completed - Case Closed Facility Status: Case Closed Facility Id: 200016218 Global Id: T0606500632 Facility Status: 9 Global ID: T0606500632	***23501 ALESSANDRO BLV***	***WNW 1/4 - 1/2 (0.333 mi.)***	***C16***	***63***
MOBIL STATION 18-A3E Database: LUST REG 8, Date of Government Version: 02/14/2005 Facility Status: Leak being confirmed Global ID: T0606599291	24440 ALESSANDRO BLV	ENE 1/4 - 1/2 (0.494 mi.)	D18	67
EXXON MOBIL OIL CORP Database: RIVERSIDE CO. LUST, Date of Government Version: 04/18/2017 Database: LUST, Date of Government Version: 03/13/2017	***24440 ALESSANDRO BLV***	***ENE 1/4 - 1/2 (0.494 mi.)***	***D19***	***69***

Status: Open - Verification Monitoring
Facility Id: 200117362
Global Id: T0606599291
Facility Status: 5C

ADDITIONAL ENVIRONMENTAL RECORDS

Other Ascertainable Records

DOD: Consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

A review of the DOD list, as provided by EDR, and dated 12/31/2005 has revealed that there is 1 DOD site within approximately 1 mile of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
MARCH AIR FORCE BASE		0 - 1/8 (0.000 mi.)	0	8

ROD: Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid the cleanup.

A review of the ROD list, as provided by EDR, and dated 11/25/2013 has revealed that there is 1 ROD site within approximately 1 mile of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
MARCH AIR FORCE BASE	***22 CSG/CC***	***S 1/8 - 1/4 (0.237 mi.)***	***0***	***8***

UXO: A listing of unexploded ordnance site locations

A review of the UXO list, as provided by EDR, and dated 10/25/2015 has revealed that there is 1 UXO site within approximately 1 mile of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
MARCH FIELD SKEET RA		W 1/2 - 1 (0.924 mi.)	26	91

DRYCLEANERS: A list of drycleaner related facilities that have EPA ID numbers. These are facilities with certain SIC codes: power laundries, family and commercial; garment pressing and cleaners' agents; linen supply; coin-operated laundries and cleaning; drycleaning plants except rugs; carpet and upholster cleaning; industrial launderers; laundry and garment services.

A review of the DRYCLEANERS list, as provided by EDR, and dated 03/09/2017 has revealed that there are 2 DRYCLEANERS sites within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
99 CLEANERS	***23750 ALESSANDRO BLV***	***NW 0 - 1/8 (0.111 mi.)***	***B13***	***58***

EPA Id: CAL000265973 EPA Id: CAL000319087 EPA Id: CAD983656554				
99 CLEANERS EPA Id: CAL000116087	23750 ALESSANDRO LVD	NW 0 - 1/8 (0.111 mi.)	B14	62

HIST CORTESE: The sites for the list are designated by the State Water Resource Control Board [LUST], the Integrated Waste Board [SWF/LS], and the Department of Toxic Substances Control [CALSITES]. This listing is no longer updated by the state agency.

A review of the HIST CORTESE list, as provided by EDR, and dated 04/01/2001 has revealed that there is 1 HIST CORTESE site within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
ARCO AM/PM MINI MARK Reg Id: 083303648T	***23501 ALESSANDRO BLV***	***WNW 1/4 - 1/2 (0.333 mi.)***	***C17***	***66***

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR Hist Auto: EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

A review of the EDR Hist Auto list, as provided by EDR, has revealed that there are 7 EDR Hist Auto sites within approximately 0.125 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
BEST VALLEY SMOG & A	23952 ALSSNDRO BLVD	NNW 0 - 1/8 (0.021 mi.)	A1	48
B & F AUTO REPAIR	23942 ALESSANDRO BLV	NNW 0 - 1/8 (0.021 mi.)	A2	48
BRAKE TECH	23920 ALESSANDRO BLV	NNW 0 - 1/8 (0.021 mi.)	A4	49
GBM CYLINDERS HEADS	23910 ALESSANDRO BLV	NNW 0 - 1/8 (0.021 mi.)	A5	50
VICKYNO AUTO WINDOW	23900 ALESSANDRO BLV	NNW 0 - 1/8 (0.022 mi.)	A10	57
MOBILE PROS TRAILER	23890 ALESSANDRO BLV	NNW 0 - 1/8 (0.024 mi.)	A11	57
CSK AUTO INC	24021 ALESSANDRO BLV	NE 0 - 1/8 (0.063 mi.)	12	57

EXECUTIVE SUMMARY

EDR Hist Cleaner: EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

A review of the EDR Hist Cleaner list, as provided by EDR, has revealed that there are 2 EDR Hist Cleaner sites within approximately 0.125 miles of the target property.

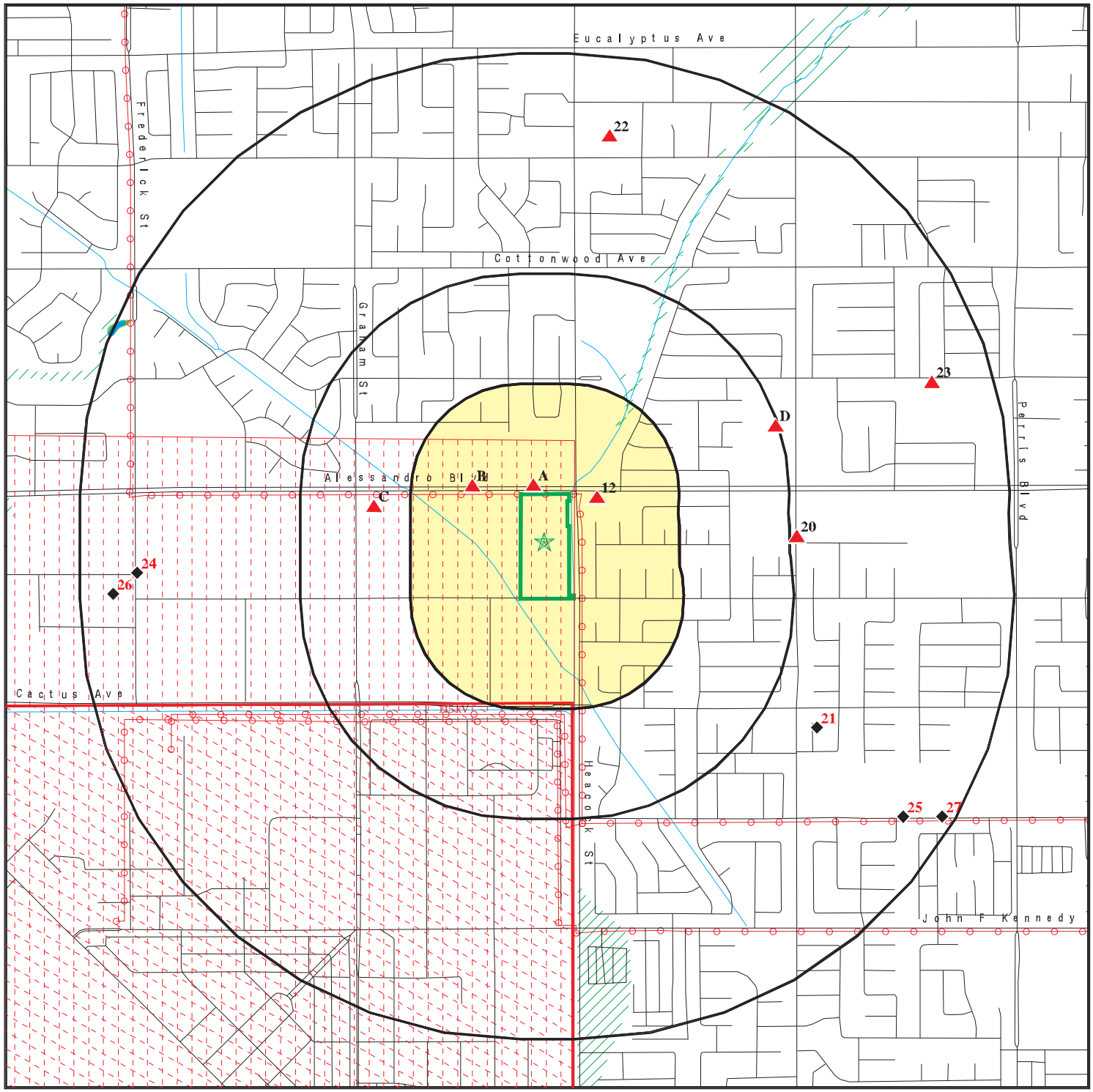
Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
HOWIES CRPT CLG FLOO	23932 ALESSANDRO BLV	NNW 0 - 1/8 (0.021 mi.)	A3	49
99 CLEANERS	23750 ALESSANDRO BLV	NW 0 - 1/8 (0.111 mi.)	B15	63

EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped. Count: 8 records.

Site Name	Database(s)
	CDL
	CDL
UCR - PARKING LOT 6	LUST
U.S. AIR FORCE - MARCH AFB (FORMER	SLIC
RIVERSIDE PLUME	SLIC
UCR (PESTICIDE PITS)	SLIC
PROPOSED ALESSANDRO ADMINISTRATION	ENVIROSTOR, SCH
INDIAN MIDDLE SCHOOL	ENVIROSTOR, SCH

OVERVIEW MAP - 05001710.2R



Target Property

Sites at elevations higher than or equal to the target property

Sites at elevations lower than the target property

Manufactured Gas Plants

National Priority List Sites

Dept. Defense Sites

0 1/4 1/2 1 Miles

Indian Reservations BIA

Power transmission lines

100-year flood zone

500-year flood zone

National Wetland Inventory

State Wetlands

Upgradient Area

Areas of Concern

N

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME:	SW Corner of Alessandro Blvd. & Heacock Street	CLIENT:	SCS Engineers
ADDRESS:	SW Corner of Alessandro Blvd. & Heacock Street Moreno Valley CA 92553	CONTACT:	Kim Braun
		INQUIRY #:	05001710.2r
LAT/LONG:	33.91547 / 117.244983	DATE:	July 24, 2017 1:17 pm

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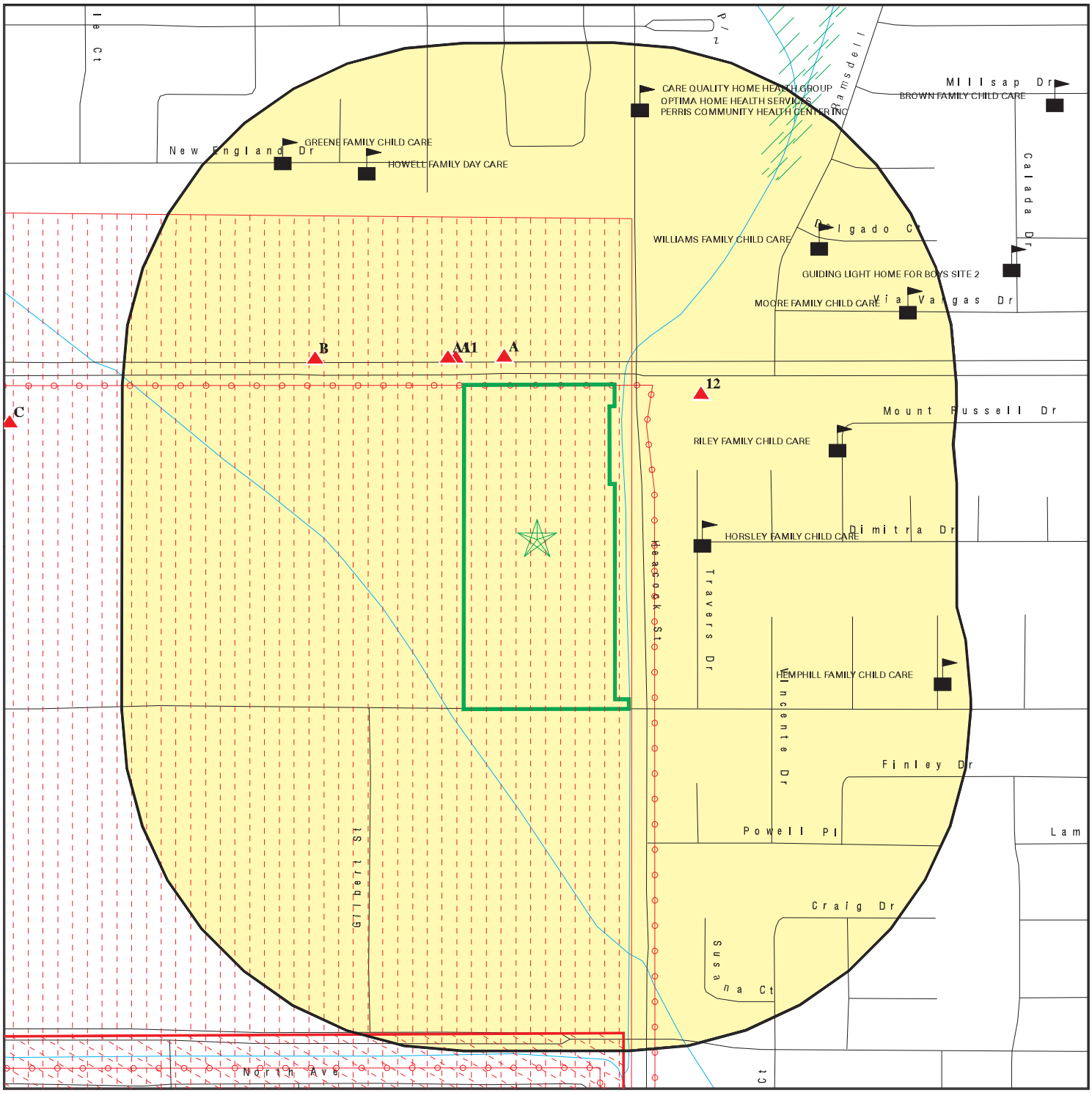
DETAIL MAP - 05001710.2R



0 1/16 1/8 1/4 Miles

- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- Sensitive Receptors
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Power transmission lines
- 100-year flood zone
- 500-year flood zone
- Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: SW Corner of Alessandro Blvd. & Heacock Street	CLIENT: SCS Engineers
ADDRESS: SW Corner of Alessandro Blvd. & Heacock Street Moreno Valley CA 92553	CONTACT: Kim Braun INQUIRY #: 05001710.2r
LAT/LONG: 33.91547 / 117.244983	DATE: July 24, 2017 1:18 pm

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MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
STANDARD ENVIRONMENTAL RECORDS								
Federal NPL site list								
NPL	1.000		0	1	0	0	NR	1
Proposed NPL	1.000		0	0	0	0	NR	0
NPL LIENS	0.001		0	NR	NR	NR	NR	0
Federal Delisted NPL site list								
Delisted NPL	1.000		0	0	0	0	NR	0
Federal CERCLIS list								
FEDERAL FACILITY	0.500		0	0	0	NR	NR	0
SEMS	0.500		0	1	0	NR	NR	1
Federal CERCLIS NFRAP site list								
SEMS-ARCHIVE	0.500		0	0	0	NR	NR	0
Federal RCRA CORRACTS facilities list								
CORRACTS	1.000		0	0	0	0	NR	0
Federal RCRA non-CORRACTS TSD facilities list								
RCRA-TSDF	0.500		0	0	0	NR	NR	0
Federal RCRA generators list								
RCRA-LQG	0.250		0	1	NR	NR	NR	1
RCRA-SQG	0.250		5	0	NR	NR	NR	5
RCRA-CESQG	0.250		0	0	NR	NR	NR	0
Federal institutional controls / engineering controls registries								
LUCIS	0.500		0	0	0	NR	NR	0
US ENG CONTROLS	0.500		0	1	0	NR	NR	1
US INST CONTROL	0.500		0	1	0	NR	NR	1
Federal ERNS list								
ERNS	0.001		0	NR	NR	NR	NR	0
State- and tribal - equivalent NPL								
RESPONSE	1.000		0	0	0	0	NR	0
State- and tribal - equivalent CERCLIS								
ENVIROSTOR	1.000		0	0	0	7	NR	7
State and tribal landfill and/or solid waste disposal site lists								
SWF/LF	0.500		0	0	0	NR	NR	0
State and tribal leaking storage tank lists								
LUST	0.500		0	0	3	NR	NR	3

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
INDIAN LUST	0.500		0	0	0	NR	NR	0
SLIC	0.500		0	0	0	NR	NR	0
State and tribal registered storage tank lists								
FEMA UST	0.250		0	0	NR	NR	NR	0
UST	0.250		0	0	NR	NR	NR	0
AST	0.250		0	0	NR	NR	NR	0
INDIAN UST	0.250		0	0	NR	NR	NR	0
State and tribal voluntary cleanup sites								
INDIAN VCP	0.500		0	0	0	NR	NR	0
VCP	0.500		0	0	0	NR	NR	0
State and tribal Brownfields sites								
BROWNFIELDS	0.500		0	0	0	NR	NR	0
ADDITIONAL ENVIRONMENTAL RECORDS								
Local Brownfield lists								
US BROWNFIELDS	0.500		0	0	0	NR	NR	0
Local Lists of Landfill / Solid Waste Disposal Sites								
WMUDS/SWAT	0.500		0	0	0	NR	NR	0
SWRCY	0.500		0	0	0	NR	NR	0
HAULERS	0.001		0	NR	NR	NR	NR	0
INDIAN ODI	0.500		0	0	0	NR	NR	0
DEBRIS REGION 9	0.500		0	0	0	NR	NR	0
ODI	0.500		0	0	0	NR	NR	0
IHS OPEN DUMPS	0.500		0	0	0	NR	NR	0
Local Lists of Hazardous waste / Contaminated Sites								
US HIST CDL	0.001		0	NR	NR	NR	NR	0
HIST Cal-Sites	1.000		0	0	0	0	NR	0
SCH	0.250		0	0	NR	NR	NR	0
CDL	0.001		0	NR	NR	NR	NR	0
Toxic Pits	1.000		0	0	0	0	NR	0
US CDL	0.001		0	NR	NR	NR	NR	0
Local Lists of Registered Storage Tanks								
SWEEPS UST	0.250		0	0	NR	NR	NR	0
HIST UST	0.250		0	0	NR	NR	NR	0
CA FID UST	0.250		0	0	NR	NR	NR	0
Local Land Records								
LIENS	0.001		0	NR	NR	NR	NR	0
LIENS 2	0.001		0	NR	NR	NR	NR	0
DEED	0.500		0	0	0	NR	NR	0
Records of Emergency Release Reports								
HMIRS	0.001		0	NR	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
CHMIRS	0.001		0	NR	NR	NR	NR	0
LDS	0.001		0	NR	NR	NR	NR	0
MCS	0.001		0	NR	NR	NR	NR	0
SPILLS 90	0.001		0	NR	NR	NR	NR	0
Other Ascertainable Records								
RCRA NonGen / NLR	0.250		0	0	NR	NR	NR	0
FUDS	1.000		0	0	0	0	NR	0
DOD	1.000		1	0	0	0	NR	1
SCRD DRYCLEANERS	0.500		0	0	0	NR	NR	0
US FIN ASSUR	0.001		0	NR	NR	NR	NR	0
EPA WATCH LIST	0.001		0	NR	NR	NR	NR	0
2020 COR ACTION	0.250		0	0	NR	NR	NR	0
TSCA	0.001		0	NR	NR	NR	NR	0
TRIS	0.001		0	NR	NR	NR	NR	0
SSTS	0.001		0	NR	NR	NR	NR	0
ROD	1.000		0	1	0	0	NR	1
RMP	0.001		0	NR	NR	NR	NR	0
RAATS	0.001		0	NR	NR	NR	NR	0
PRP	0.001		0	NR	NR	NR	NR	0
PADS	0.001		0	NR	NR	NR	NR	0
ICIS	0.001		0	NR	NR	NR	NR	0
FTTS	0.001		0	NR	NR	NR	NR	0
MLTS	0.001		0	NR	NR	NR	NR	0
COAL ASH DOE	0.001		0	NR	NR	NR	NR	0
COAL ASH EPA	0.500		0	0	0	NR	NR	0
PCB TRANSFORMER	0.001		0	NR	NR	NR	NR	0
RADINFO	0.001		0	NR	NR	NR	NR	0
HIST FTTS	0.001		0	NR	NR	NR	NR	0
DOT OPS	0.001		0	NR	NR	NR	NR	0
CONSENT	1.000		0	0	0	0	NR	0
INDIAN RESERV	0.001		0	NR	NR	NR	NR	0
FUSRAP	1.000		0	0	0	0	NR	0
UMTRA	0.500		0	0	0	NR	NR	0
LEAD SMELTERS	0.001		0	NR	NR	NR	NR	0
US AIRS	0.001		0	NR	NR	NR	NR	0
US MINES	0.250		0	0	NR	NR	NR	0
ABANDONED MINES	0.001		0	NR	NR	NR	NR	0
FINDS	0.001		0	NR	NR	NR	NR	0
UXO	1.000		0	0	0	1	NR	1
ECHO	0.001		0	NR	NR	NR	NR	0
DOCKET HWC	0.001		0	NR	NR	NR	NR	0
FUELS PROGRAM	0.250		0	0	NR	NR	NR	0
CA BOND EXP. PLAN	1.000		0	0	0	0	NR	0
Cortese	0.500		0	0	0	NR	NR	0
CUPA Listings	0.250		0	0	NR	NR	NR	0
DRYCLEANERS	0.250		2	0	NR	NR	NR	2
EMI	0.001		0	NR	NR	NR	NR	0
ENF	0.001		0	NR	NR	NR	NR	0
Financial Assurance	0.001		0	NR	NR	NR	NR	0
HAZNET	0.001		0	NR	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
ICE	0.001		0	NR	NR	NR	NR	0
HIST CORTESE	0.500		0	0	1	NR	NR	1
HWP	1.000		0	0	0	0	NR	0
HWT	0.250		0	0	NR	NR	NR	0
MINES	0.001		0	NR	NR	NR	NR	0
MWMP	0.250		0	0	NR	NR	NR	0
NPDES	0.001		0	NR	NR	NR	NR	0
PEST LIC	0.001		0	NR	NR	NR	NR	0
PROC	0.500		0	0	0	NR	NR	0
Notify 65	1.000		0	0	0	0	NR	0
UIC	0.001		0	NR	NR	NR	NR	0
WASTEWATER PITS	0.500		0	0	0	NR	NR	0
WDS	0.001		0	NR	NR	NR	NR	0
WIP	0.250		0	0	NR	NR	NR	0
EDR HIGH RISK HISTORICAL RECORDS								
EDR Exclusive Records								
EDR MGP	1.000		0	0	0	0	NR	0
EDR Hist Auto	0.125		7	NR	NR	NR	NR	7
EDR Hist Cleaner	0.125		2	NR	NR	NR	NR	2
EDR RECOVERED GOVERNMENT ARCHIVES								
Exclusive Recovered Govt. Archives								
RGA LF	0.001		0	NR	NR	NR	NR	0
RGA LUST	0.001		0	NR	NR	NR	NR	0
- Totals --		0	17	6	4	8	0	35

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

DOD **MARCH AIR FORCE BASE (CLOSED)** **DOD** **CUSA143538**
Region **N/A**
MARCH AIR FORCE BASE (CLO (County), CA
< 1/8
1 ft.

DOD:

Feature 1:	Air Force DOD
Feature 2:	Not reported
Feature 3:	Not reported
URL:	Not reported
Name 1:	March Air Force Base (Closed)
Name 2:	Not reported
Name 3:	Not reported
State:	CA
DOD Site:	Yes
Tile name:	CARIVERSIDE

NPL **MARCH AIR FORCE BASE** **NPL** **1000169261**
Region **22 CSG/CC** **SEMS** **CA4570024527**
South **RIVERSIDE, CA 92518** **RCRA-LQG**
1/8-1/4 **US ENG CONTROLS**
1252 ft. **US INST CONTROL**
ROD
PRP

NPL:

EPA ID:	CA4570024527
Cerclis ID:	902761
EPA Region:	9
Federal:	Y
Final Date:	1989-11-20 00:00:00
Site Score:	31.940000000000001
Latitude:	33.906379999999999
Longitude:	-117.2557

Category Details:

NPL Status:	Currently on the Final NPL
Category Description:	Depth To Aquifer-> 50 And <= 100 Feet
Category Value:	65
NPL Status:	Currently on the Final NPL
Category Description:	Distance To Nearest Population-> 0 And <= 1/4 Mile
Category Value:	10

Site Details:

Site Name:	MARCH AIR FORCE BASE
Site Status:	Final
Site Zip:	92518
Site City:	RIVERSIDE
Site State:	CA
Federal Site:	Yes
Site County:	RIVERSIDE
EPA Region:	09
Date Proposed:	07/14/89
Date Deleted:	Not reported
Date Finalized:	11/21/89

MARCH AIR FORCE BASE (Continued) **1000169261**

Substance Details:

NPL Status:	Currently on the Final NPL
Substance ID:	Not reported
Substance:	Not reported
CAS #:	Not reported
Pathway:	Not reported
Scoring:	Not reported

NPL Status:	Currently on the Final NPL
Substance ID:	A046
Substance:	POLYCHLORINATED BIPHENYLS
CAS #:	1336-36-3
Pathway:	GROUND WATER PATHWAY
Scoring:	3

NPL Status:	Currently on the Final NPL
Substance ID:	U210
Substance:	TETRACHLOROETHENE
CAS #:	127-18-4
Pathway:	GROUND WATER PATHWAY
Scoring:	2

NPL Status:	Currently on the Final NPL
Substance ID:	U228
Substance:	TRICHLOROETHYLENE (TCE)
CAS #:	79-01-6
Pathway:	GROUND WATER PATHWAY
Scoring:	2

Summary Details:

Conditions at proposal July 14, 1989): March Air Force Base MAFB) covers approximately 7,000 acres near Riverside in the Moreno Valley in Riverside County, California. MAFB is adjacent to light industrial, agricultural, and residential areas. Established in 1918 as the Alessandro Aviation Field, MAFB has served as a training base and refueling operations base. Industrial operations including aircraft maintenance and repair) involved use of solvents and disposal of solvent wastes. MAFB is participating in the Installation Restoration Program IRP), established in 1978. Under this program, the Department of Defense seeks to identify, investigate, and clean up contamination from ha ardous materials. As part ofIRP, the Air Force investigated 28 potentially contaminated disposal areas. MAFB Well No. 1 on-base was found to be contaminated with trichloroethylene, tetrachloroethylene, and cis-1,2-dichloroethylene at levels that exceed State drinking water standards. It was taken out of service. Soils on the base are contaminated with toluene and ben ene. An estimated 11,600 people obtain drinking water from municipal wells within 3 miles of ha ardous substances on MAFB. The Air Forceis conducting a remedial investigation/ feasibility study RI/FS) to determine the type and extent of contamination at the base and identify alternatives for remedial action. Status November 21, 1989): Field work continues on the RI/FS.

Site Status Details:

NPL Status:	Final
Proposed Date:	07/14/1989
Final Date:	11/21/1989
Deleted Date:	Not reported

MARCH AIR FORCE BASE (Continued) **1000169261**

Narratives Details:

NPL Name:	MARCH AIR FORCE BASE
City:	RIVERSIDE
State:	CA

SEMS:

Site ID:	902761
EPA ID:	CA4570024527
Federal Facility:	Y
NPL:	Currently on the Final NPL
Non NPL Status:	Not reported

Following information was gathered from the prior CERCLIS update completed in 10/2013:

Site ID:	0902761
EPA ID:	CA4570024527
Facility County:	RIVERSIDE
Short Name:	MARCH AIR FORCE BASE
Congressional District:	41
IFMS ID:	09N6
SMSA Number:	6780
USGC Hydro Unit:	18070202
Federal Facility:	Federal Facility
DMNSN Number:	7000.00000
Site Orphan Flag:	N
RCRA ID:	Not reported
USGS Quadrangle:	Not reported
Site Init By Prog:	Not reported
NFRAP Flag:	Not reported
Parent ID:	Not reported
RST Code:	Not reported
EPA Region:	09
Classification:	Federal Facility
Site Settings Code:	SU
NPL Status:	Currently on the Final NPL
DMNSN Unit Code:	ACRE
RBRAC Code:	Not reported
RResp Fed Agency Code:	USAF
Non NPL Status:	Not reported
Non NPL Status Date:	/ /
Site Fips Code:	06065
CC Concurrence Date:	/ /
CC Concurrence FY:	Not reported
Alias EPA ID:	Not reported
Site FUDS Flag:	Not reported

CERCLIS Site Contact Name(s):

Contact ID:	9000102.00000
Contact Name:	John Lucey
Contact Tel:	(415) 972-3145
Contact Title:	Remedial Project Manager (RPM)
Contact Email:	Not reported

Contact ID:	13003854.00000
Contact Name:	Leslie Ramirez
Contact Tel:	(415) 972-3978

MARCH AIR FORCE BASE (Continued) **1000169261**

Contact Title: Site Assessment Manager (SAM)
Contact Email: Not reported

Contact ID: 13003858.00000
Contact Name: Sharon Murray
Contact Tel: (415) 972-4250
Contact Title: Site Assessment Manager (SAM)
Contact Email: Not reported

Contact ID: 13004003.00000
Contact Name: Carl Brickner
Contact Tel: Not reported
Contact Title: Site Assessment Manager (SAM)
Contact Email: Not reported

CERCLIS Site Alias Name(s):
Alias ID: 101
Alias Name: MARCH AFB
Alias Address: Not reported
CA
Alias ID: 102
Alias Name: MARCH AIR FORCE BASE
Alias Address: 22 CSG/CC
MARCH AFB, CA 92518
Alias ID: 103
Alias Name: MARCH AIR FORCE BASE
Alias Address: 22 CSG/CC
RIVERSIDE, CA 92518
Alias ID: 9270150
Alias Name: MARCH USAF BASE
Alias Address: OLDB MARCH 3430 BUNDY AVENUE
MARCH AFB, CA 92311
Alias ID: 101
Alias Comments: PREVIOUS EPA ID# AZD 981 416 977
Site Description: March Air Force Base originally a 640 acres site called Alessandro Aviation Field, was officially opened March 1, 1918. The base was initially used to train "Jenny" pilots during World War I. The base was closed for about four years after the war and was then reopened in 1927. By 1938, the base was considered to be the central location for west coast bombing and gunnery training. In 1949, the Strategic Air Command took control of the base. Since that time, the base has hosted bombers, refuelers, and cargo aircraft. In June 1992, the base became an Air Mobility Command installation. Its primary mission is refueling, but reserve and guard units have cargo and fighter missions as well. In September 1993, March AFB was designated by Congress to realign its forces. The Base will be redesignated "March Air Reserve Base" and is xpected to decrease to about 1/3 of its present size. After realignment, property that is not retained by the base will be available for transfer.
The U.S. Air Force, due to its primary mission in national defense, has long been engaged in a wide variety of operations that involve the use, storage, and disposal of hazardous waste. In 1980, the Installation Restoration Program (IRP) was developed by the Department of Defense (DOD) to locate and cleanup hazardous waste sites. At March AFB, aircraft maintenance, fuel storage operations, fire-training exercises, and base operations have generated a variety of hazardous wastes. Consequently, several areas of soil and groundwater on-base have been contaminated. In September 1983 the IRP process began. The results were records indicating 30 potentially contaminated sites which required further investigation. A second study,

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completed in March 1987, indicated that 5 of the 30 sites required even further investigation to determine the type and extent of contamination in the soil and groundwater. In June 1987, further investigation was done, indicating that additional work was required to better define the extent of contamination and to research possible off-base migration of TCE in groundwater. In November 1989, March AFB was add to the National Priorities List (NPL) primarily due to the contamination of groundwater on-base. In September 1990, a Federal Facilities Agreement (FFA) was signed by the Air Force, U.S. Environmental Protection Agency (EPA), and the State of California. Three separate OUs were created based on geographic location of sites, similarity of contaminants, and location of groundwater contaminant plumes. The subject of this ROD (6/20/96) is OU-1, OU-1 includes Sites 4,5,7,9,10,13,14,15,16,18,29,31,34, and 38. Groundwater at Sites 4, 18,31,and the OU-1 Groundwater Plume, and soil at Sites 4,10,15,18,31, and 34 require remedial action. Sites 5,7,9,13,14,6,29, and 38 are considered no further action. Sites 21 and 23 are covered in OU-2 ROD. Site 33, the Panero Aircraft Fueling System is detailed in OU-3. The following are Sites that require Groundwater remediation: OU 1-Groundwater Plume - The OU-1 Groundwater Plume is the most widespread plume at the base, extending from Site 31 south and east through the area of Sites 34, 9, and 5, and extending to a maximum of approximately 1300 feet beyond the eastern boundary and 1500 feet south of Site 5 off-base. Numerous contaminants, including TCE, were detected. Site 4 Groundwater Plume - This plume is localized in the vicinity of Site 4 with the apparent source area near the southern end of Site 4. The contaminants with the highest concentration are TCE and PCE. Site 18 - Groundwater Plume - This plume is localized in the vicinity of Site 18 with the apparent source area west of the engine test cell in the center of Site 18. Fuel has been detected in four of the ten monitoring wells to date. Site 31 - Groundwater Plume - Concentrations of contaminants at Site 31, primarily TCE, are much higher than those in the rest of the OU-1 Plume, and these high concentrations are confined to a relatively small area. These conditions coupled with the history of Site 31 (reported solvent disposal) indicate that Site 31 is a likely source for much of the TCE found in OU-1 groundwater. Therefore, even though the Site 31 plume has the same contaminants and is continuous with the OU-1 plume, it is appropriate to treat Site 31 separately from the remainder of the OU-1 plume, in order to eliminate the source of contamination. Sites That Require Soil Remediation Include: Site 4 - Landfill No.6 - a landfill operating from 1955 to 1969, covering 8.5 acres, and located along the eastern boundary of the base, south of the East Gate. The landfill is up to 25 feet deep, containing primarily sanitary waste, construction rubble, and debris. Small amounts of medical wastes and empty fuel containers are also present. There are low levels of chlorinated solvents in the soil and soil gas, as well as elevated concentrations of trichloroethylene (TCE) and tetrachloroethylene (PCE) in the groundwater. Both TCE and PCE are found in solvents used to clean and degrease military equipment. Vinyl chloride, a breakdown product of TCE and PCE, has also been detected in Site 4 groundwater. The landfill is considered the source of contaminants detected in groundwater downgradient of the Site. Site 10 - Flightline Drainage Channel - This site, installed prior to 1940, is located southeast of the flightline aircraft maintenance areas. The channel is concrete lined (since the 1960s) up to the eastern boundary of the base where it discharges to the Perris Valley Storm Drain (PVSD). The PVSD flows east approximately 2 miles, where it joins another drainage and flows south approximately 6 miles to the San Jacinto River. The channel has reportedly received various waste oils, hydraulic fluids, diesel fuel, jet fuel, waste paints, paint strippers, paint thinners, battery acids and solvents, including TCE. Prior to 1974, wastes may have been discharged directly to the PVSD. Since 1974, the main oil/water separator has pretreated

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the runoff before its discharge off-base. Site 15 - Fire Protection Training Area No.3- This site is located southeast of the end of runway 12-30 and between Sites 5 and 7. The area was developed in 1978 and was reportedly constructed by placing an underdrain system and gravel over a clay liner. Firefighting water, solutions of Aqueous Film Forming Foam (AFFF), and residual fuel used during training exercises were drained to a formerly unlined water holding pond located adjacent to Site 15. Approximately 6,000 gallons per year of contaminated JP-4 have been burned in training exercises since the facility was constructed in 1978. This Site is no longer being used as a fire training area. Site 18 - Engine Test Cell - This site is located on the flightline, south of Taxiway No.2, and has been inactive for several years. The test cell was constructed in 1957 for the purpose of testing aircraft engines. An oil/water separator was installed in 1976, water from the seperator was discharged to the base wastewater treatment plant. The oil was collected by a contractor for off-base disposal. Prior to 1976, spills of oil, fuel, and solvents were drained to a nearby ditch. Potential sources of fuel include overflow of tanker trucks and fuel tanks on aircraft that have been parked nearby. Site 31 - Unconfirmed Solvent Disposal - Site 31 is located off Graeber Street on the east side of Building 1211. The practice of discharging solvents on the ground reportedly occurred from about the mid-1950s to the mid-1970s. In addition, floor drains from maintenance shops may have leaked solvents to the subsurface. Groundwater sampling at the site has indicated TCE concentrations which exceed State and Federal drinking water standards. Site 34 - Pritchard Aircraft Fueling System - Site 34 is located next to Building 1245, at the southeast end of Taxiway No, 1. In 1962, six 50,000 gallon tanks were moved to this site from the Pabero Fueling System. In 1990, this system was discontinued, and in 1991, the tanks and system were removed. During a geological investigation stained soils and fuel odors were observed. Sites With No Further Action Planned: Site 5 - Landfill No.3 - This Site covers approximately 5 acres and is located southeast of the present flightline. The landfill was reportedly operated from the late 1940s to approximately 1960. Landfill wastes consist primarily of sanitary waste and construction rubble. Site 7 - Fire Training Area No.2 - This Site is located on the eastern part of the base, north of the Alert Facility. Between 1954 and 1978, fire training exercises were conducted in unlined training pits. Three distinct burn pits were identified in historic aerial photographs of the base. A portion of this Site may have been used for crash rescue training. Wastes used in those exercises reportedly included contaminated fuel, waste solids, and spent solvents. Site 9 - Main Oil/Water Separator - Site 9 is located north of the Site 5 at the southeast end of the flightline apron. The facility was constructed in 1974 and serves the main storm, drainage system for the flightline apron and the flightline shops. The storm drains have reportedly received waste oils, hydraulic fluids, diesel fuel, waste paints, spent solvents, paint strippers, paint thinners, and battery acids. The oil/water separator is of earthen construction with a large baffle that divides the separator into two compartments. The separated oil is picked up by a skimmer and pumped to a holding tank for Off-base disposal. This facility drains into the flightline Drainage Channel (Site 10) and then to the Perris Valley Storm Drain Lateral A. Site 13 - Tank Truck Spill Site - Site 13 is located along the eastern perimeter road of the base, within the northern portion of Site 5. In 1973, approximately 5,000 gallons of JP-4 jet fuel spilled from a tank truck to the ground at this location. The accidental discharge resulted from a mechanical malfunction. There was no reported containment or cleanup activities. Site 14 - Liquid Fuel Pump Station Overflow - Site 14 is located southeast of the flightline apron and about 50 to100 feet west of the East March Sludge Drying Beds (Site 16). In 1973, approximately 1,000 gallons of JP-4 jet fuel spilled onto the ground. The spill occurred due to an overflow

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of the liquid fuel pump station at Building 1245. The spill was contained in the unpaved area south of the pump station and allowed to percolate into the ground. Site 16 - East March Sludge Drying Beds - Site 16 is located on the eastern part of the base, at the south end of the flight line parking apron, and near the former East March Wastewater Treatment Plant. The treatment plant was constructed in 1938 and provided secondary treatment for sanitary and industrial wasterwater. Primary and secondary sludges were digested anaerobically, dewatered on unlined sludge drying beds, and disposed of in an on-base landfill. The sludge may have contained heavy metals and organics resulting from discharges of industrial wastes to the sanitary sewer system. These drying beds ope3rated from 1938 to 1977, when the plant was destroyed in place. Site 29 - Fire Training Area No.1 - Site 29 is located at the eastern part of the base, north of Site 9. The area was used as a fire training pit prior to 1951. Suspected contaminants at the site include contaminated fuel, waste oil, and spent solvents Site 38 (PCB Contamination, Building 1311), Building 1311 is located at the southeast end of the taxiway, northwest of IRP Site 23. In 1984, soils from four areas contaminated with transformer oils were sampled. Soils from two of the areas (Buildings 317 and 1305) were determined to be PCB-contaminated. The soils were excavated and removed from the Base. Records to verify the cleanup have not been located. The RI/FS report and Proposed Plan for OU-1 were released to the public on April 28, 1994. These two documents were made available via the Administrative Record, the information repositories at the Moreno Valley and March AFB libraries, and at the Moreno Valley Chamber of Commerce. A fact sheet, condensed from the Proposed Plan, was sent to everyone on the March AFB mailing list, which includes Restoration Advisory Board (RAB) members. An OU-1 RI/FS subcommittee, formed by the RAB, provided oral comments to the RAB at its April 26, 1994 meeting. The Final RI/FS Report was published in July 1994. A public comment period was held from April 28 to May 28, 1994. In addition, a public meeting was held on May 12, 1994 at 7 p.m. at Best Western Image Suites in Moreno Valley. Representatives of the U.S. Air Force, EPA, Department of Toxic Substances Control, and California Regional Water Quality Control Board, Santa Ana, attended the public meeting to address any questions about the RI/FS and Proposed Plan. March Air Force Base (AFB) is located on 7,123 Acres in the northern end of the Perris Valley, east of the city of Riverside, in Riverside County, California, approximately 60 miles east of Los Angeles and 90 miles north of San Diego. The base lies in sections of Township 3 South, Range 4 West. The population of Riverside County is 1,700,413 and consists primarily of English and Spanish speaking citizens. The climate of the March AFB area is characterized as Mediterranean to semi-arid, varying according to elevation and distance from the Pacific Ocean. The weather generally consists of warm to hot, dry summers and mild winters. Current land use on March AFB is classified as residential and light industrial. Maintenance facilities, warehouses, and administrative centers support the mission. The land surrounding March AFB area includes areas of residences in all directions around the Site, light industry to the north, and agriculture to the east and south. With the exception of small surface water ponds that are used for agricultural purposes, there are two permanent surface water bodies within 3.5 miles of March AFB. Lake Perris, located 4 miles southeast of the base, provides approximately 130,000 acre feet of storage for State Project Water brought in by the California Aqueduct which runs north and east of the base. An east-west portion of the Colorado River Aqueduct is located approximately 3.5 miles south of the base. This aqueduct flows in to Lake Matthews, which is located about 10 miles west of March AFB. A very small recreation lake is located approximately 2 miles east of the base. It is maintained by the Moreno Valley Ranch homeowners association and is located just south of Iris Street and west of Lasselle Street in the City of Moreno Valley. A number of

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wetlands and riparian areas have been identified on and in the immediate area of the base, most are located on West March, outside OU-1. The U.S. Army Corps of Engineers determined that approximately 2.17 acres of jurisdictional wetlands exist in the Heacock Drain Channel, with .8 acres of wetlands adjacent to the Site 4 landfill. The wetlands are not continuous but are localized patches of wetland vegetation that change position each year due to high volume, high velocity storm water flow from the spring rains through these channels which causes scouring of the earthen bottom and sides. Manyindustrial, agricultural and domestic wells exist in the Perris Valley. Four on-base wells and two off-site wells southeast of the base were formerly used for the base water supply. One of these wells was shut down in February 1984 due to trichloroethylene (TCE) contamination, the other 3 on-base wells were shut down due to low yields. The two off-site wells are located southeast of the base in the center of Perris Valley. Although both of these wells are operable only one is occasionally used for emergency service, while the other is dormant. All base water is currently supplied by the Eastern Municipal Water District. OU-1 is made up of Sites 4,5,7,9,10,13,14,15,16,18,29,31,34, and 38. Sites 21 and 23 are included in the OU-2 ROD. Site 10 (Flightline Drainage Channel). This site is located southeast of the flightline aircraft maintenance areas. The drainage channel, which was installed prior to 1940, has reportedly received various waste oils, hydraulic fluids, diesel fuel, jet fuel, waste paints, paint strippers, paint thinners, battery acids and solvents (including TCE). The drainage channel is concrete lined (since the 1960s) up to the eastern boundary of the base where it discharges to the Penis Valley Storm Drain. The Penis Valley Storm Drain flows east approximately 2 miles, where joins another drainage and flows south approximately 6 miles to the San Jacinto River. Prior to 1974, waste disposed of in the drainage channel may have been discharged directly to the Penis Valley Storm Drain. Since 1974, the main oil/water separator (Site 9) has pretreated the runoff before its discharge off base. Primary contaminants of concern are polycyclic aromatic hydrocarbons (PAHs), which were detected in drainage ditch sediments. PAHs are a series of petroleum derivatives found in many fuel and asphalt compounds. Site 15 (Fire Protection Training Area Number 3). This site is located southeast of runway 12-30 and between Sites 5 and 7. The area was developed in 1978 and was reportedly constructed by placing an underdrain system and gravel over a clay liner. Firefighting water, solutions of Aqueous Film Forming Foam (AFFF), and residual fuel used during training exercises were drained to a formerly unlined water holding pond located adjacent to Site 15. Approximately 6,000 gallons per year of contaminated JP-4 have been burned in framing exercises since the facility was constructed in 1978. The site is no longer being used as a fire training area. The primary contaminant of concern is phenanthrene, a PAH. Selected Remedy (as described in the OU 1 ROD): For both Sites 10 and 15, the preferred method of cleanup of these soils is excavation and low-temperature thermal desorption. Need for Explanation of Significant Differences (ESD): The Record of Decision (ROD) selected remedy for soils at Sites 10 and 15 was excavation and low temperature thermal desorption. The soils were excavated and treated by bio-remediation and properly recycled to approved regulatory standards. This ESD will be entered in the Administrative Record maintained at March AFB. An Explanation of Significant Differences for Operable Unit 01 for the March Air Force Base Site was completed in August 2000. Sites that require soil remediation include Sites 4, 10, 15, 18, 31, 34. Sites that require groundwater remediation include OU1 and Sites 4,18, and 31 groundwater plumes. Sites with No Further Action Planned: Site 5,7,9,13,14,16,29,38.
OU 2: In 1980, the Installation Restoration Program (IRP) was developed by the Department of Defense as the mechanism for the CERCLA process, incorporating applicable Resource Conservation Recovery Act (RCRA) regulations

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as well as meeting requirements of the National Oil and Hazardous Substance Pollution Contingency Plan (NCP) (40 CFR. Part 300). The Air Force conducted a Phase I records search of 30 potentially contaminated IRP sites on the Base. There are now a total of 44 IRP sites at the former March AFB and current March ARB. The primary contaminants identified in the IRP include chlorinated solvents, fuels, polychlorinated biphenyls (PCBs), and polynuclear aromatic hydrocarbons (PAHs). Contamination by PAHs and PCBs appears to be restricted to surface and near-surface soils whereas fuel hydrocarbons and solvents tend to be predominant contaminants in subsurface soils and groundwater. The lead agency for cleanup of the closed portions of March AFB is the Air Force. The EPA, the California Department of Toxic Substances Control (DTSC), and the Santa Ana Regional Water Quality Control Board (RWQCB) are all support agencies for cleanup activities at the Base. The current land use and adjacent land use for most of the OU 2 Air Force Real Property Agency (AFRPA) sites is vacant land/open space with limited commercial and residential land use adjacent to some of the sites. Site 3 and the adjacent areas are undeveloped land. Site 6 contains an engineered waste cell. There is a residential area to the south and a golf course is to the east of Site 6. Site 12 was the former civil engineering yard with numerous structures. Site 12 is not currently utilized. Residential land use occurs to the east of Site 17. Air Force commercial facilities such as offices are located to the north and west of the Site 17. Site 19 is currently a part of the operating wastewater treatment plant. Structures relating to plant operations are located on-site and to the west and north. Site 20 and 26 and the adjacent areas are undeveloped land. A former water treatment plant is south of Site 26 and west of Site 20. This facility is no longer used. Site 23 is an active agricultural area, surrounded by currently vacant land to the north, south and east. Air Force land consisting of open space is west of Site 23. Site 25 and the adjacent areas is undeveloped land, with nearby residential development to the south. The three Site 35 subareas and Site 42 are former UST locations within landscaped areas adjacent to structures. The areas near Site 35a, 35b and Site 42 are still actively used as office and dormitory areas, but the Site 35c area is no longer used. Sites 30 and 40 are open space with some riparian vegetation. A residential area is located to the north and west of Site 40. The OU 2 sites are located on that portion of March AFB that may be converted to non-Air Force use. Site 23 is on private land. The anticipated land use for most of the OU 2 Air Force Real Property Agency (AFRPA) sites is commercial or industrial use. Alternative land uses have also been assessed and areas of West March could remain open space such as the Stephens' Kangaroo Rat (SKR) Conservation Area. March AFB is located in the North Perris Groundwater Basin. Currently, there are no potable groundwater resources extracted at the OU 2 AFRPA sites. The relatively thin water-bearing zone on West March is not anticipated to yield substantial quantities of water. Therefore, the potential for extraction and use of groundwater from the West March AFRPA sites is limited, both now and in the foreseeable future. Water-bearing zones producing sufficient groundwater for use may be present at AFRPA sites on the Main Base and Site 23, and should be considered a potential potable water source. Surface water is not currently used at the OU 2 AFRPA sites. Surface water areas such as at Site 6, 30 and 40 may remain as wetlands depending on future site development. OU2 consists of a number of sites. Each site is described below. Site 3 is a former 23-acre landfill located south of Cactus Avenue and west of Plummer Road. Riparian vegetation is found in the drainage areas. Site 3 is located in the 1,300-acre Stephens' Kangaroo Rat (SKR) reserve. The Site 3 landfill was used from 1954 through 1974. The landfill received household and dumpster waste, construction debris, and military waste from the Base. The military wastes included empty tanks, spent munitions, and miscellaneous wastes such as parachutes, medical waste, and fire hoses. Some of the contaminants found in the wastes included

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volatile organic compounds, pesticides, PCBs, PAHs, and munitions residues. The Air Force was concerned that the waste in the landfill might contaminate the soil and groundwater. After discussions with the regulatory agencies and the public, a decision was made to clean up the site by removing the landfilled waste. An interim removal action was completed in late 1995 and early 1996. Approximately 223,200 cubic yards of landfilled materials and soil were removed. Excavated materials from Site 3 to be transported to and disposed of in the engineered waste cells at Site 6 were tested for organic and inorganic constituents during the remedial investigation and monitored during the removal action according to approved work plans. Site 6 is located on West March, north of the Air Force Village West residential development, south of Van Buren Boulevard, east of Plummer Road, and west of Air Force Village West Drive. The landfill comprised three discrete areas: Site 6a (approximately 15 acres) the location of the main former landfill area; Site 6b Quarry (approximately 0.6 acre) the location of a former quarry; and Site 6b Pond (approximately 2.6 acres) the location of a pond. Site 6 was used by March AFB from the early 1950s to the early 1 980s for disposal of household waste and construction debris. Polynuclear aromatic hydrocarbons (PAHs), PCBs, pesticides, herbicides, and dioxins were found in samples of soil and water collected during the OU2 RI. An interim, removal action was conducted in 1995; approximately 63,000 cubic yards of waste were removed from Site 6a and temporarily stockpiled. Waste at Site 6a was removed from the vadose zone and beneath groundwater including soil contaminated with petroleum hydrocarbons. Waste was also removed from the pond, including debris and tar. Two engineered waste cells, over 12 acres in size, were constructed in the Site 6a area. No confirmation samples were taken of soils and bedrock under Site 6a because the bottom of the excavation was below the water table and sample results would not be meaningful. This site was treated as a closure in place rather than a clean closure. Stockpiled waste from Site 6a was landfilled back into the engineered waste cells over Site 6a. Excavated materials from Site 6a to be disposed of in the engineered waste cells at Site 6 were tested for organic and inorganic constituents during the remedial investigation and monitored during the removal action according to approved work plans. Site 12, the 20-acre Base Civil Engineering Yard, is located north of MacDill Street, between Lackland Avenue and Travis Avenue. The area is developed with numerous structures and is partially paved with asphalt. From the l950's to 1996, Site 12 was the civil engineering yard for general maintenance operations for March AFB. It included a carpentry shop, electrical shop, paint shop, pesticide shop, and storage areas for heavy equipment. These shops used and stored a variety of hazardous materials including paints and paint-related products, pesticides, solvents, acids, and drums labeled hazardous waste. During the OU2 RI, PAHs and hexavalent chromium were found in soil samples. The contaminant 1,1-dichloroethene (1, 1-DCE) was found in soil vapor samples in a small area in deeper soils near Building 2507. Groundwater beneath Site 12 has become impacted by trichloroethene (TCE) and tetrachloroethene (PCE). The groundwater contamination is in a small area and is only slightly above maximum contaminant levels (MCLs). Periodic monitoring of the groundwater to observe changes in contaminant concentrations is being conducted. After discussions with the regulatory agencies and the public, a limited interim removal action was taken in 1996 to ensure that the site could be used for industrial purposes by removing soils contaminated with PAHs and hexavalent chromium at the northwest portion of Site 12. Approximately 2,000 cubic yards of non-hazardous contaminated soil was excavated from a small area in the northwest portion of the site and placed in the engineered waste cells at Site 6. Excavated materials from Site 12 to be transported to and disposed of in the engineered waste cells at Site 6 were tested for organic and inorganic constituents during the remedial investigation and prior to excavation activities for the removal

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action according to approved work plans. Site 17 is a former Base swimming pool located on the Main Base on U Street between DeKay and K Streets. The area is vacant land, adjoining Base housing to the east and south. The former swimming pool at Site 17 was closed in the 1 970s. After it was closed, the pool was used as a disposal site and the wastes were covered with soil. After discussions with the regulatory agencies and the public, a decision was made to clean the site by removing the waste. The pool and its contents were removed during a 1994 interim removal action. The wastes were taken off the Base for disposal. After the interim removal action, low levels of PCBs were still detected in soils at least 8 feet beneath the ground surface. The pool excavation was filled with clean soil, leaving the PCBs in place. No PCB contamination has been found in the groundwater and the PCBs are not expected to migrate to groundwater. Confirmation sampling conducted after the interim removal action demonstrated that PCBs remain at the site at levels of concern to human health Site 19 is about 7 acres in size, located at the southern end of West March, east of the active wastewater treatment plant. The site is generally vacant land with four concrete lined drying beds in the western portion of the site. Site 19 contains the four active lined sludge-drying beds and three inactive, unlined sludge-drying beds associated with the wastewater treatment plant. The plant was constructed in 1941 and used to process the wastewater from Camp Haan and March AFB. A total of 10 sludge-drying beds have historically been used at the site. Three of these beds have been backfilled. In 1990 when the plant was upgraded, four lined drying beds were constructed at the location of previously unlined beds. In the past, wastewater treatment sludge was spread out in the unlined drying beds to dry. When dry, the sludge was removed from the drying beds. Recently, the dried sludge has been removed from the Base for disposal. Past disposal practices are unknown. PAHs, PCBs, hexavalent chromium, and thallium were found in soil samples in the area of the unlined sludge beds at levels above residential PRGs. Site 20 is located adjacent to the southwest portion of March AFB, on the property acquired by the Department of Veterans Affairs from the Air Force in the 1970s. Site 20 is a former landfill about 7 acres in size used between 1958 and 1965 as a disposal site for household waste and construction debris. Some of the chemicals found in the soils at Site 20 included PAHs, dieldrin, PCBs, and 1 ,4-dichlorobenzene. The Air Force was concerned the waste in the landfill could contaminate soil and groundwater. After discussions with the regulatory agencies and the public, a decision was made to clean up the site by removing the landfilled waste. The interim removal action at Site 20 was conducted in conjunction with the removal of dried sludge at Site 26a and 26b Dried sludge of Site 26b covered a portion of Site 20. Approximately 116,000 cubic yards of non-hazardous soil, debris, and dried sludge were removed from Sites 20 and 26 in 1996 and placed in the engineered waste cells at Site. Excavated materials from Site 20 to be transported to and disposed of in he engineered waste cells at Site 6 were tested for organic and inorganic constituents during the remedial investigation and monitored during the removal action according to approved work plans According to the As-Built Construction Report OU2, Site 6a, all materials from Site 20 placed in the Site 6 engineered waste cells met the requirements of CCR Title 23, Section 2523 (currently CCR Title 27, Section 20220) for a non-hazardous solid waste landfill. After the waste was removed from Site 20, confirmation samples from beneath the former landfill were tested. The results confirmed that the site had been cleaned to levels protective of human health and the environment. No restriction on future use of the land is required. Site 22 is a suspected former landfill east of and adjacent to Interstate 215. The original 7-acre area of Site 22 was expanded to 15 acres by extending the northern site boundary to ensure all potential areas of concern were investigated. The location of the landfill was based on limited evidence. Investigations could not locate any landfllled materials or debris.

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Geophysical surveys were used to fmd buried metal or disturbed soils. Soil gas sampling was also conducted at this site. Finally, soil and groundwater were sampled. No contaminants were found in any of the samples and the geophysical surveys found no buried waste. This evidence showed that a landfill did not exist in this area. This site was investigated during the OU2 remedial investigation and levels of contamination requiring remedial action were not identified. There was no risk assessment completed on Site 22 because no contaminants were found and the site poses no risk to human health or the environment. No restriction on future use of the land is required. Site 23 is located off-Base to the east, near the intersection of Nandina Avenue andHeacock Street in the City of Moreno Valley. Between 1938 and 1977, Site 23 was a 1-acre holding pond for wastewater that had been treated and used for irrigation of agricultural crops. In 1991, the pond was filled in, and it and the surrounding areas were leveled. The land is now used as a commercial sod farm and irrigated with reclaimed water from the Moreno Valley wastewater treatment plant. This site was investigated during the OU1 remedial investigation and no contamination requiring remedial action was identified. There was no risk assessment completed on Site 23 because no contaminants were found and the site poses no risk to human health or the environment. No restriction on future use of the land is required. Site 24 is a former 3-acre landfill, west of Site 19. Site 24 was reportedly used between 1941 and 1965 to dispose of household waste and military waste. A small amount of soil from bullet backstop berms may have been placed in the landfill as well as some ash from an incinerator. Some of the contaminants found in the waste included PAHs, PCBs, antimony, barium, and cadmium. The Air Force was concerned that the waste in the landfill could contaminate groundwater. After discussions with the regulatory agencies and the public, a decision was made to clean up the site by removing the landfilled waste. In December 1996, approximately 19,300 cubic yards of non-hazardous, landfilled waste was removed and placed in the engineered waste cells at Site 6. Excavated materials from Site 24 to be transported to and disposed of in the engineered waste cells at Site 6 were tested for organic and inorganic constituents during the remedial investigation and monitored during the removal action according to approved work plans. Site 25 covers approximately 33 acres and is located south of Cactus Avenue. Site 25 was used in the past for open air detonation and burning of munitions. Three areas with shallow trenches were used to bury munitions residue after destruction. Some of the contaminants found in the soils at this site included nickel, l,3,5-trinitrobenzene, nitroglycerin, benzo(a)pyrene, and RDX, all of which are munition residues. Additionally, 1,1 -dichloroethene was also found. The Air Force was concerned that the contaminants in soil would cause groundwater contamination. After discussions with the regulatory agencies and the public, a decision was made to clean up the site by removing the debris and contaminated soils. Approximately 3,000 cubic yards of non-hazardous waste from the trenches and contaminated soils were removed and disposed of in the engineered waste cells at Site 6. Excavated materials from Site 25 to be transported to and disposed of in the engineered waste cells at Site 6 were tested for organic and inorganic constituents at a rate of about 1 sample for every 200 cubic yards of excavated materials during the removal action. Testing was also performed as part of the remedial investigation. Site 26 covers approximately 3 acres and is located in the southwest portion of March AFB. Site 26 is subdivided into two areas, Site 26a and 26b. Site 26b is located over a portion of the Site 20 landfill. Site 26a is located on property controlled by the AFRPA and Site 26b is on the property of the Department of Veterans Affairs. Site 26 was used for disposal of lime sludge that was a waste from the treatment of drinking water for March AFB. From 1941 to 1984, the water treatment plant treated Colorado River water used to supplement the drinking water supply for the Base. Arsenic from the treated Colorado River

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water was found in the lime sludge at low levels. After discussions with the regulatory agencies and the public, a decision was made to clean up the site by removing the sludge. As mentioned in the description of the landfill at Site 20, approximately 116,000 cubic yards of non-hazardous soil and dried sludge were removed from Sites 20 and 26 in 1996 and disposed of in the engineered waste cells at Site 6. Excavated materials from Site 26 to be transported to and disposed of in the engineered waste cells at Site 6 were tested for organic and inorganic constituents during the remedial investigation and monitored during the removal action according to approved work plans. Site 30 covered approximately 40 acres, south of Alessandro Boulevard and west of Interstate 215. Site 30 is located in the 1,300 acre SKR reserve. There is no evidence that Site 30 ever operated as a March AFB-controlled landfill, but illegal dumping of domestic waste from the surrounding community has occurred and some minor amounts of construction debris were found. Soil and groundwater samples taken at the site did not detect contaminants at levels not protective of human health. After discussions with the regulators and the public, a decision was made to clean up the site by removing the domestic and construction debris. Domestic and construction debris was, removed from the site in April 1997 and disposed of off the Base. The Air Force has installed gates on access roads to prevent vehicular traffic to the site. Warning signs were placed in several areas, and gates remain padlocked to help prevent access by unauthorized persons. Site 35 consisted of three subareas (Sites 35a, 35b, and 35c) located in the former 15th Air Force Headquarter complex on West March. The subareas were locations of former underground storage tanks (USTs) associated with. Buildings 3409 (Site 35a), 3417/34 18 (Site 35b), and 3406 (Site 35c). Site 35a, a former 8,000-gallon fuel oil tank, was located west of Allen Avenue and south of 11th street, east of Building 3409. Site 35b, two former diesel tanks of 6,650-gallon and 3,500-gallon, was located between Building 3417 and 3418, west of Allen Avenue and Bundy Avenue. Site 35c, a former 1,000-gallon diesel tank, was located north of 5th Street and west of Dalla Avenue, east of Building 3406. All tanks have been removed and the locations closed without restrictions in accordance with state and county regulations. Fuel leaks have been associated with the tanks at Site 35. Sites 35a and 35b were investigated during the OU2 remedial investigation and other studies and levels of contamination requiring remedial action were not identified. After discussions with the regulatory agencies, the Air Force decided to clean up the soil by bioventing at Site 35c where fuel had leaked. Bioventing has reduced diesel fuel contamination to levels protective of human health and the environment at Site 35c. No restriction on future use of the land is required.
Site 40 covers approximately 49 acres on West March, north of Van Buren Boulevard and west of Plummer Road. The most prominent feature at the site is the abandoned quarry, containing a pond with riparian vegetation. The pond is replenished by groundwater and by surface flow from an intermittent stream channel entering the pond from the west. Site 40 is located in the 1,300 acre SKR reserve. Site 40 was used as a disposal location for drums, construction debris, battery casings, and motor vehicle parts. After discussions with the regulatory agencies, a decision was made to complete an expedited cleanup of the area exposed by the erosion and other debris at the site. The time-critical removal action completed in 1994 included removal of the drums, miscellaneous waste, and contaminated soil. Hazardous waste from the site was taken off the Base for proper disposal. Approximately 6,800 cubic, yards of non-hazardous materials were disposed of at the Site 6 engineered waste cells. Excavated materials from Site 40 to be transported to and disposed of in the engineered waste cells at Site 6 were tested for organic and inorganic constituents at a rate of about one sample for every 100 cubic yards of excavated materials during the removal action. Testing was also performed as part of the remedial investigation. Building 3404 is located on less than one acre near the

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intersections of 1 1th Street and Davis Avenue on West March. Transformers located in Building 3404 reportedly leaked oils containing PCBs onto the floor of the transformer room. These oils were also spilled onto the soil surrounding the building. After discussions with the regulatory agencies and the public, a decision was made to clean up the area outside of Building 3404 by removing the contaminated soil. In the interim removal action, the contaminated soils were excavated and taken offsite for proper disposal. A total of 330 tons of contaminated soils were removed from the site. The PCB concentrations were low enough to allow disposal of 292 tons of contaminated soils as non-hazardous waste. An additional 38 tons was disposed of off the Base as hazardous waste. Clean fill was placed in the excavation to grade and a gravel cover was placed on top of the previously excavated area. Confirmation sampling conducted after the interim removal action confirmed that the site had been cleaned to levels protective of human health and the environment. No restriction on future use of the land is required. Transformer oils may be present in the concrete floor of Building 3404. The Air Force attempted to remove the PCBs from the concrete. Minimal levels of PCBs were left and have been encapsulated. The concrete is not addressed in this AFRPA OU2 ROD because building interiors are not regulated under CERCLA. The current landowner, the County of Riverside, has entered into a land use covenant with the State that restricts use of the building to industrial activities and contains other measures to prevent exposure to residual contamination. The current land use and adjacent land use for most of the OU2 AFRPA sites is vacant land/open space with limited commercial and residential land use adjacent to some of the sites as discussed below. Site 3 and the adjacent areas are undeveloped land. Site 6 contains an engineered waste cell. There is a residential area to the south and a golf course is to the east of Site 6. Site 12 was the former civil engineering yard with numerous structures. Site 12 is not currently utilized. Residential land use occurs to the east of Site 17. Air Force commercial facilities such as offices are located to the north and west of the Site 17. Site 19 is currently a part of the operating wastewater treatment plant. Structures relating to plant operations are located on-site and to the west and north. Site 20 and 26 and the adjacent areas are undeveloped land. A former water treatment plant is south of Site 26 and west of Site 20. This facility is no longer used. Site 23 is an active agricultural area, surrounded by currently vacant land to the north, south and east. Air Force land consisting of open space is west of Site 23. Site 25 and the adjacent areas is undeveloped land, with nearby residential development to the south. The three Site 35 subareas and Site 42 are former UST locations within landscaped areas adjacent to structures. The areas near Site 35a, 35b and Site 42 are still actively used as office and dormitory areas, but the Site 35c area is no longer used. Sites 30 and 40 are open space with some riparian vegetation. A residential area is located to the north and west of Site 40. The OU2 sites other than site 23 discussed in this AFRPA OU2 ROD are located on that portion of March AFB that may be converted to non-Air Force use. Site 23 is on private land. The anticipated land use for most of the OU2 AFRPA sites is commercial or industrial use. Alternative land uses have also been assessed and areas of West March could remain open space such as the SKR Conservation Area. March AFB is located in the North Perris Groundwater Basin. Currently, there are no potable groundwater resources extracted at the OU2 AFRPA sites. The relatively thin water-bearing zone on West March is not anticipated to yield substantial quantities of water. Therefore, the potential for extraction and use of groundwater from the West March AFRPA sites is limited, both now and in the foreseeable future. Water-bearing zones producing sufficient groundwater for use may be present at AFRPA sites on the Main Base and Site 23, and should be considered a potential potable water source. Surface water is not currently used at the OU2 AFRPA sites. Surface water areas such as at Site 6, 30 and 40 may remain as wetlands depending on future site

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development. A Record of Decision (ROD) for OU2 was completed May 11, 2004. A ROD addressing OU2 was completed in September 2005. Operable Unit (OU) 4: A total of three IRP sites (IRP Sites 21, 41, and 44), three AOCs (Water Tower 3410, Water Tank 6601, and the former Base Hospital and Dental Clinic), and one RFA site (Site L) are addressed in this OU4. Site 21 is off base approximately 1.5 miles south of the southern extension of the active March ARB runway. Although never physically part of March AFB, the site is considered to be part of the former base for purposes of the IRP because treated wastewater produced on base was held in this off-base pond. John Cordures, property owner until his death, used the water for irrigation of surrounding agricultural land from 1941 to 1946 and again from 1955 to 1984. The estate was sold to Ross Department Stores in 2001. The site is near the intersection of Morgan Street and Webster Avenue, in the City of Perris. Site 21 encompasses 1.5 acres and is part of a landscaped berm and below-grade parking area for warehouse trucks associated with a Ross warehouse distribution facility. The general surface-water drainage in the area is to the east following the gently sloping terrain (surface gradient at the site is approximately 20 to 40 feet per mile). Bedrock was not encountered during the investigation phases at Site 21. Groundwater at Site 21 is at a depth of more than 150 feet below ground surface (bgs) and the general groundwater flow direction is to the south and southeast. Site 21 was used from 1941 to 1946, and again from 1955 to 1984, to hold treated wastewater from the base. Sanitary and industrial wastewater received primary and secondary treatment on the base prior to discharge into this holding pond. The treated effluent was held in the pond and used for irrigation of the surrounding agricultural land. The boundaries of the effluent pond were physically well defined by the pond's berm during the 1993 OU1 Remedial Investigation/Feasibility Study (RI/FS). At that time the site covered an area of approximately 2.2 acres and was being used by private parties as an illegal dump. In approximately 1998, the berm was removed, and the site was incorporated into the surrounding sod farm. In 2001, the land was sold and the former pond area now consists of a landscaped berm on the west side of the site and a truck parking area that lies approximately 8 feet below grade on the east side. Based on historic use, the primary contaminants of concern at Site 21 include metals, volatile organic compounds (VOCs), and pesticides. Site 21 is part of a Ross warehouse distribution facility in the city of Perris. Adjacent and surrounding land uses consist of commercial/industrial development, and some land is in agricultural production. Although much of the surrounding property is currently agriculture, other properties are zoned for light industrial/commercial. As development occurs, agriculture zoning will likely change to general industrial. Site 41 is approximately 1 mile south of State Highway 58 and 11 miles east of Kramer Junction (the intersection of U.S. Highway 395 and State Highway 58) in San Bernardino County, California. Structures currently remaining at the site include a concrete bunker no longer in use. The general surface water drainage is to the northeast following the very gently sloping terrain (surface gradient at the site is approximately 20 to 40 feet per mile). Depth to beneficial groundwater is approximately 300 feet bgs. However, perched zone water is found between 100 and 150 feet bgs at nearby sites. A regional hardpan soil, approximately 3 to 4 feet thick at a depth of approximately 34 feet bgs, is reported in the area. The Air Force obtained right of entry for an approximate 315-acre parcel from the Bureau of Land Management (BLM) in the late 1950s for construction and operation of a radio relay station for use by George AFB. The parcel was transferred to Edwards AFB in 1963 and to March AFB in February 1968. The Radio Relay Annex was declared excess and was scheduled for deactivation in October 1968. The station facilities included a septic system, storage tanks for water and petroleum products, 4 miles of runway, a radio tower, a water well, an aboveground bunker, and several support

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buildings. The Air Force closed the station in the mid-1980s. Investigations and cleanup actions were conducted between February 1995 and May 1996 and included identification and removal of asbestos-containing material and lead-based paint, destruction of the water-supply well, removal of underground storage tanks (USTs) (oil, water, and septic) and contaminated soil, and confirmation sampling. Small amounts of diesel fuel leaked from the USTs. Based on historic use, the primary contaminant of concern at the site is total petroleum hydrocarbons (TPH) diesel fuel. Site 41 is in a remote area of the Mojave Desert. The Hawes site extends across 315 acres of desert land. The site is in the process of being transferred from the DOD back to the BLM, and the site will likely remain vacant due to its remote location and reversion to BLM control. Site 44 is in the central portion of the March ARB, east of the intersection of Graeber Street and Meyer Drive. Site 44 includes a 110-foot-tall, 200,000-gallon water tower, two large water storage tanks, and several buildings used by March ARB water system maintenance personnel. The area is characterized by relatively flat topography. A concrete-lined drainage ditch, just north of the site, flows eastward to the Heacock Storm Drain that drains south along the eastern perimeter of the former base. Groundwater at Site 44 is estimated to be approximately 30 feet bgs. Groundwater flow direction in this area is generally to the south and southeast. The water tower at Site 44 utilized a valve controller with a 6-inch mercury pot for water flow control. Past spills from the mercury pot caused mercury contamination of soils beneath and surrounding the valve controller. The flow controller at the water tower was in a subsurface valve box, 12 feet below grade. During a construction project to place a concrete floor in the below-grade box, approximately 80 cubic feet of soil were removed and stockpiled south and east of the valve box. In November 1995, the Air Force contracted to characterize the valve box and surrounding area for elemental mercury contamination. Based on the results of initial investigations at Site 44, the Air Force initiated a removal action. Soil was excavated in several discrete areas around the water tower. The primary soil removal areas were the valve box and surface soils in areas adjacent to the borings that identified "hot spots" of contamination. The excavated soil was segregated and packaged for off-site disposal. Once excavation of the valve pit was completed, the site was restored by filling the excavated area with sand to approximately 3 feet below the valve. A 6-inch-thick concrete floor was installed in the bottom of the valve pit. Land uses on adjacent and surrounding properties are exclusively industrial and commercial. As Site 44 will remain Air Force property, Site 44 is expected to stay industrial/commercial in the foreseeable future. Water Tower 3410 is an aboveground water storage tank on Former March AFB at the intersection of Plummer Road and 11th Street. Water Tower 3410 is in an area characterized by relatively flat topography, with a gentle slope to the east/northeast. No surface water bodies or major surface water drainages are associated with the site. Groundwater levels underlying Water Tower 3410 are between approximately 33 and 48 feet bgs. The groundwater flow direction is to the east. Although Water Tower 3410 was not specifically included in the Basewide RI/FS Work Plan, due to the presence of mercury pot water flow controllers at other March water storage facilities and the similarity of Water Tower 3410 with Water Tower 407 (Site 44), it was suspected that Water Tower 3410 might also have mercury-contaminated soils. March ARB Department of Public Works was contacted to determine if a mercury vault ever existed at the site. Interviews with Department personnel indicated that the building never contained a mercury vault. The only mercury controls at Water Tower 3410 are those that control associated pumps. Four aboveground controls are attached to the water tower rather than in a vault and contain only small amounts of elemental mercury. Water Tower 3410 is in an area characterized by industrial/commercial land use intermixed with vacant parcels. Adjacent and

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surrounding land use is also a mix of industrial/commercial use and vacant parcels. March Joint Powers Authority (MJPA) plans for the area, including Water Tower 3410, are for an industrial/business park. Water Tank 6601 is an aboveground storage tank north of Van Buren Boulevard and west of Plummer Road, west of 1-215. Water Tank 6601 is at an elevation of approximately 1,660 feet above mean sea level. The site is characterized by highly dissected upland topography and consists of highly eroded gullies and exposures of weathered bedrock. The primary flow of surface water in the vicinity of Water Tank 6601 is to the east. One primary intermittent stream channel drains to the east near the facility. The site is underlain by shallow surface soils, with a maximum thickness of soil only tens of feet thick. Based on information presented by Tetra Tech in the OU2 RI/FS, just south of the water tank, groundwater is encountered in weathered bedrock at depths ranging from 10 to 40 feet bgs. Groundwater flow is generally to the east. Water Tank 6601 is an active, 200,000-gallon water tank constructed in approximately 1942, with valves, piping, and electronic controls inside a fenced area with a concrete floor and a metal roof. The enclosure was constructed in the mid 1980s, in response to repeated vandalism at the site. Each incidence of vandalism resulted in releases of elemental mercury at the site due to breakage of a reservoir or "mercury pot." Some of the elemental mercury was recovered after each incident; however, no formal cleanup actions were performed. A cage was constructed to protect the controls from additional vandalism. The mercury control was removed and replaced with controls without mercury prior to the OU4 RI/FS investigation. Water Tank 6601 is in an undeveloped area, which is fenced. Adjacent and surrounding land use is mixed industrial/ vacant. Water Tank 6601 is expected to remain industrial. MJPA plans for the adjacent and surrounding land are for industrial/commercial development. The former base Hospital and Dental Clinics are in the northeast corner of the former base, near the intersection of Cactus Avenue and Heacock Street. The main Hospital building is five stories and the Dental Clinic is a one-story structure. The surface topography in and around the site is relatively flat with a gentle slope (surface gradient at the site is approximately 20 to 30 feet per mile). Major drainage features lie north and east of the site and consist of intermittent drainage channels (Cactus Channel Storm Drain and Heacock Storm Drain). There are no major drainages across the site, and there are no perennial water bodies near the site. While groundwater was not part of the investigation, groundwater is reported to be 25 to 30 feet bgs in the area of the former hospital and dental clinic. Groundwater flow direction is to the south and east. Construction of the Hospital was completed in 1966 and modified in subsequent years. The latest addition was completed in 1974. The original construction of the Dental Clinic was completed in 1985. A sewer main extends from the Hospital/Dental Clinic complex, south along the eastern base boundary to the last manhole before the connection of the hospital lines with the "old trunk line" from western portions of the March ARB. The sewer line, which services both the Hospital and Dental Clinic, was first brought on line with completion of the original hospital building. Two primary lines collect effluent from the complex. The two lines ultimately empty into the old sewer main that flows directly south to the current lifting station, from which sewage is transferred around the south end of the active runway to the current wastewater treatment plant. The former base Hospital and Dental Clinic are in an area characterized by institutional (i.e., medical) land use. Adjacent and surrounding land use is a mix of residential, commercial, a small amount of vacant property and land in agricultural use, and a small corridor of public facilities to the east of the Hospital for an electrical transmission line easement. MJPA plans for the Hospital/Dental Clinic site are for similar reuse. Site L, formerly a swimming pool at the Non-Commissioned Officer (NCO) Club, is east of Riverside Drive and north of Meyer Drive. The site is

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outside the boundary of March ARB that was established as a result of the realignment of March AFB in May 1996. It is part of the land identified as available for transfer by the AFRPA. Site L is in an area characterized by relatively flat topography. No major drainages are associated with the site. Groundwater levels at the site are approximately 26 feet bgs. The groundwater flow direction is to the southeast. The swimming pool at Site L was reportedly constructed in 1953 along with the NCO Club. After decommissioning at an unspecified time, it was used as a repository for a variety of wastes, some potentially hazardous. The pool and wastes were covered with soil, and the area was allowed to become overgrown with grass and weeds. The facility was abandoned and a chain-link fence restricted access to the former pool. In 1993, the pool was identified as an AOC during a comprehensive RFA/Expanded Source Investigation (ESI), which concluded that the pool was filled with a variety of wastes, including waste soils, solvents, and PCBs. In 1994, as part of the RFA investigation, a soil gas survey was conducted to screen for the presence of VOCs. No VOCs were detected above the laboratory reporting limits. Site L is currently open space (parking lot) with no structures, and is bordered on the north by vacant land and on the south by a parking area adjacent to Meyer Drive. The NCO Club is to the east of Site L, and the U.S. Army Reserve Center, with associated landscaping and parking is to the west. Surrounding land uses include institutional/medical, commercial, public facilities/recreation, and vacant land. The MJPA plans for Site L and the surrounding land are commercial in nature. A portion of the parcel in which Site L is located is currently leased to a catering business. A Record of Decision addressing OU4 was completed in September of 2005.

CERCLIS Assessment History:

Action Code:	001
Action:	DISCOVERY
Date Started:	/ /
Date Completed:	02/01/85
Priority Level:	Not reported
Operable Unit:	SITEWIDE
Primary Responsibility:	Federal Facilities
Planning Status:	Not reported
Urgency Indicator:	Not reported
Action Anomaly:	Not reported

Action Code:	001
Action:	PRELIMINARY ASSESSMENT
Date Started:	/ /
Date Completed:	02/01/87
Priority Level:	Low priority for further assessment
Operable Unit:	SITEWIDE
Primary Responsibility:	Federal Facilities
Planning Status:	Not reported
Urgency Indicator:	Not reported
Action Anomaly:	Not reported

Action Code:	001
Action:	SITE INSPECTION
Date Started:	/ /
Date Completed:	06/01/87
Priority Level:	Low priority for further assessment
Operable Unit:	SITEWIDE

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Primary Responsibility: Federal Facilities
Planning Status: Not reported
Urgency Indicator: Not reported
Action Anomaly: Not reported

Action Code: 001
Action: HAZARD RANKING SYSTEM PACKAGE
Date Started: / /
Date Completed: 06/01/87
Priority Level: Not reported
Operable Unit: SITEWIDE
Primary Responsibility: EPA Fund-Financed
Planning Status: Not reported
Urgency Indicator: Not reported
Action Anomaly: Not reported

Action Code: 001
Action: PROPOSAL TO NATIONAL PRIORITIES LIST
Date Started: / /
Date Completed: 07/14/89
Priority Level: Not reported
Operable Unit: SITEWIDE
Primary Responsibility: EPA Fund-Financed
Planning Status: Not reported
Urgency Indicator: Not reported
Action Anomaly: Not reported

Action Code: 001
Action: FINAL LISTING ON NATIONAL PRIORITIES LIST
Date Started: / /
Date Completed: 11/21/89
Priority Level: Not reported
Operable Unit: SITEWIDE
Primary Responsibility: EPA Fund-Financed
Planning Status: Not reported
Urgency Indicator: Not reported
Action Anomaly: Not reported

Action Code: 001
Action: Notice Letters Issued
Date Started: / /
Date Completed: 02/07/90
Priority Level: Not reported
Operable Unit: SITEWIDE
Primary Responsibility: EPA Fund-Financed
Planning Status: Not reported
Urgency Indicator: Not reported
Action Anomaly: Not reported

Action Code: 001
Action: INTERAGENCY AGREEMENT NEGOTIATIONS
Date Started: 02/07/90

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Date Completed: 09/27/90
Priority Level: Not reported
Operable Unit: SITEWIDE
Primary Responsibility: Federal Enforcement
Planning Status: Alternate
Urgency Indicator: Not reported
Action Anomaly: Not reported

Action Code: 001
Action: FEDERAL INTERAGENCY AGREEMENT
Date Started: 09/27/90
Date Completed: 09/27/90
Priority Level: Not reported
Operable Unit: SITEWIDE
Primary Responsibility: Federal Enforcement
Planning Status: Primary
Urgency Indicator: Not reported
Action Anomaly: Not reported

Action Code: 004
Action: FEDERAL FACILITY REMEDIAL INVESTIGATION/FEASIBILITY STUDY
Date Started: 01/24/92
Date Completed: 04/30/95
Priority Level: Not reported
Operable Unit: WEST MARCH - SOILS/GW
Primary Responsibility: Federal Facilities
Planning Status: Primary
Urgency Indicator: Not reported
Action Anomaly: Not reported

Action Code: 001
Action: FEDERAL FACILITY REMEDIAL DESIGN
Date Started: 04/07/96
Date Completed: 04/18/96
Priority Level: Not reported
Operable Unit: EAST MARCH - SOILS/GW
Primary Responsibility: Federal Facilities
Planning Status: Primary
Urgency Indicator: Not reported
Action Anomaly: Not reported

Action Code: 001
Action: FEDERAL FACILITY REMEDIAL INVESTIGATION/FEASIBILITY STUDY
Date Started: 09/27/90
Date Completed: 06/20/96
Priority Level: Not reported
Operable Unit: EAST MARCH - SOILS/GW
Primary Responsibility: Federal Facilities
Planning Status: Primary
Urgency Indicator: Not reported
Action Anomaly: Not reported

Action Code: 001
Action: RECORD OF DECISION

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Date Started: / /
Date Completed: 06/20/96
Priority Level: Not reported
Operable Unit: EAST MARCH - SOILS/GW
Primary Responsibility: Federal Facilities
Planning Status: Primary
Urgency Indicator: Not reported
Action Anomaly: Not reported

Action Code: 001
Action: Explanation Of Significant Differences
Date Started: / /
Date Completed: 08/24/00
Priority Level: Not reported
Operable Unit: EAST MARCH - SOILS/GW
Primary Responsibility: Federal Facilities
Planning Status: Not reported
Urgency Indicator: Not reported
Action Anomaly: Not reported

Action Code: 001
Action: FEDERAL FACILITY FIVE YEAR REVIEW
Date Started: 09/30/03
Date Completed: 11/19/03
Priority Level: Not reported
Operable Unit: EAST MARCH - SOILS/GW
Primary Responsibility: Federal Facilities
Planning Status: Not reported
Urgency Indicator: Not reported
Action Anomaly: Not reported

Action Code: 004
Action: RECORD OF DECISION
Date Started: / /
Date Completed: 05/11/04
Priority Level: Not reported
Operable Unit: WEST MARCH - SOILS/GW
Primary Responsibility: Federal Facilities
Planning Status: Primary
Urgency Indicator: Not reported
Action Anomaly: Not reported

Action Code: 002
Action: FEDERAL FACILITY REMEDIAL INVESTIGATION/FEASIBILITY STUDY
Date Started: 09/27/90
Date Completed: 09/29/05
Priority Level: Not reported
Operable Unit: BASEWIDE
Primary Responsibility: Federal Facilities
Planning Status: Primary
Urgency Indicator: Not reported
Action Anomaly: Not reported

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Action Code:	003
Action:	RECORD OF DECISION
Date Started:	/ /
Date Completed:	09/29/05
Priority Level:	Not reported
Operable Unit:	BASEWIDE
Primary Responsibility:	Federal Facilities
Planning Status:	Primary
Urgency Indicator:	Not reported
Action Anomaly:	Not reported

Action Code:	005
Action:	RECORD OF DECISION
Date Started:	/ /
Date Completed:	09/30/05
Priority Level:	Not reported
Operable Unit:	WEST MARCH - SOILS/GW
Primary Responsibility:	Federal Facilities
Planning Status:	Not reported
Urgency Indicator:	Not reported
Action Anomaly:	Not reported

Action Code:	003
Action:	FEDERAL FACILITY FIVE YEAR REVIEW
Date Started:	/ /
Date Completed:	09/30/09
Priority Level:	Not reported
Operable Unit:	SITEWIDE
Primary Responsibility:	Federal Facilities
Planning Status:	Not reported
Urgency Indicator:	Not reported
Action Anomaly:	Not reported

Action Code:	001
Action:	Restoration Advisory Board
Date Started:	01/01/93
Date Completed:	/ /
Priority Level:	Not reported
Operable Unit:	SITEWIDE
Primary Responsibility:	Federal Facilities
Planning Status:	Not reported
Urgency Indicator:	Not reported
Action Anomaly:	Not reported

Action Code:	001
Action:	FEDERAL FACILITY REMEDIAL ACTION
Date Started:	03/05/96
Date Completed:	/ /
Priority Level:	Not reported
Operable Unit:	EAST MARCH - SOILS/GW
Primary Responsibility:	Federal Facilities
Planning Status:	Primary
Urgency Indicator:	Not reported

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Action Anomaly: Not reported

Action Code: 005
Action: FEDERAL FACILITY REMEDIAL INVESTIGATION/FEASIBILITY STUDY
Date Started: 10/30/05
Date Completed: / /
Priority Level: Not reported
Operable Unit: SITE 8 & 36
Primary Responsibility: Federal Facilities
Planning Status: Not reported
Urgency Indicator: Not reported
Action Anomaly: Not reported

Federal Register Details:
Fed Register Date: 11/21/89
Fed Register Volume: 54
Page Number: 48184

Fed Register Date: 07/14/89
Fed Register Volume: 54
Page Number: 29820

RCRA-LQG:
Date form received by agency: 02/29/2016
Facility name: MARCH AIR RESERVE BASE
Facility address: 610 MEYER DR
BLDG 2403
MARCH ARB, CA 92518
EPA ID: CA4570024527
Mailing address: MEYER DR
BLDG 2403
MARCH ARB, CA 92518
Contact: CRAIG HUNTER
Contact address: MEYER DR BLDG 2403
MARCH ARB, CA 92518
Contact country: US
Contact telephone: (951) 655-5082
Contact email: CRAIG.HUNTER.1@US.AF.MIL
EPA Region: 09
Land type: Federal
Classification: Large Quantity Generator
Description: Handler: generates 1,000 kg or more of hazardous waste during any calendar month; or generates more than 1 kg of acutely hazardous waste during any calendar month; or generates more than 100 kg of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month; or generates 1 kg or less of acutely hazardous waste during any calendar month, and accumulates more than 1 kg of acutely hazardous waste at any time; or generates 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulates more than 100 kg of that material at any time

MARCH AIR FORCE BASE (Continued) **1000169261**

Owner/Operator Summary:

Owner/operator name:	GEN. RUSSELL A. MUNCY
Owner/operator address:	Not reported
	Not reported
Owner/operator country:	Not reported
Owner/operator telephone:	Not reported
Legal status:	Federal
Owner/Operator Type:	Operator
Owner/Op start date:	11/01/2013
Owner/Op end date:	Not reported

Owner/operator name:	US AIR FORCE
Owner/operator address:	GRAEBER BLDG 470
	MARCH ARB, CA 92518
Owner/operator country:	US
Owner/operator telephone:	(951) 655-4665
Legal status:	Federal
Owner/Operator Type:	Owner
Owner/Op start date:	01/01/1945
Owner/Op end date:	Not reported

Handler Activities Summary:

U.S. importer of hazardous waste:	No
Mixed waste (haz. and radioactive):	No
Recycler of hazardous waste:	No
Transporter of hazardous waste:	No
Treater, storer or disposer of HW:	No
Underground injection activity:	No
On-site burner exemption:	No
Furnace exemption:	No
Used oil fuel burner:	No
Used oil processor:	No
User oil refiner:	No
Used oil fuel marketer to burner:	No
Used oil Specification marketer:	No
Used oil transfer facility:	No
Used oil transporter:	No

Universal Waste Summary:

Waste type:	Batteries
Accumulated waste on-site:	Yes
Generated waste on-site:	No

Waste type:	Lamps
Accumulated waste on-site:	Yes
Generated waste on-site:	No

Waste type:	Thermostats
Accumulated waste on-site:	Yes
Generated waste on-site:	No

. Waste code:	141
. Waste name:	141

. Waste code:	151
. Waste name:	151

MARCH AIR FORCE BASE (Continued) **1000169261**

. Waste code: 181
. Waste name: 181

. Waste code: 223
. Waste name: 223

. Waste code: 241
. Waste name: 241

. Waste code: 281
. Waste name: 281

. Waste code: 331
. Waste name: 331

. Waste code: 343
. Waste name: 343

. Waste code: 352
. Waste name: 352

. Waste code: 723
. Waste name: 723

. Waste code: 791
. Waste name: 791

. Waste code: D001
. Waste name: IGNITABLE WASTE

. Waste code: D002
. Waste name: CORROSIVE WASTE

. Waste code: D003
. Waste name: REACTIVE WASTE

. Waste code: D005
. Waste name: BARIUM

. Waste code: D006
. Waste name: CADMIUM

. Waste code: D007
. Waste name: CHROMIUM

. Waste code: D008
. Waste name: LEAD

. Waste code: D009
. Waste name: MERCURY

. Waste code: D011
. Waste name: SILVER

. Waste code: D018
. Waste name: BENZENE

MARCH AIR FORCE BASE (Continued) **1000169261**

. Waste code: D035
. Waste name: METHYL ETHYL KETONE

Historical Generators:
Date form received by agency: 10/22/2014
Site name: MARCH AIR RESERVE BASE
Classification: Large Quantity Generator

. Waste code: D001
. Waste name: IGNITABLE WASTE

. Waste code: D002
. Waste name: CORROSIVE WASTE

. Waste code: D005
. Waste name: BARIUM

. Waste code: D006
. Waste name: CADMIUM

. Waste code: D007
. Waste name: CHROMIUM

. Waste code: D008
. Waste name: LEAD

. Waste code: D011
. Waste name: SILVER

. Waste code: D018
. Waste name: BENZENE

. Waste code: D035
. Waste name: METHYL ETHYL KETONE

. Waste code: F002
. Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE, METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2, TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

. Waste code: F005
. Waste name: THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Date form received by agency: 03/20/2013
Site name: MARCH AIR RESERVE BASE

MARCH AIR FORCE BASE (Continued) **1000169261**

Classification: Large Quantity Generator

. Waste code: D001
. Waste name: IGNITABLE WASTE

. Waste code: D002
. Waste name: CORROSIVE WASTE

. Waste code: D006
. Waste name: CADMIUM

. Waste code: D007
. Waste name: CHROMIUM

. Waste code: D008
. Waste name: LEAD

. Waste code: D011
. Waste name: SILVER

. Waste code: D018
. Waste name: BENZENE

. Waste code: F002
. Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE, METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2, TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

. Waste code: F003
. Waste name: THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NONHALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS, AND A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

. Waste code: F005
. Waste name: THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Date form received by agency: 07/15/2010
Site name: MARCH AIR RESERVE BASE

MARCH AIR FORCE BASE (Continued) **1000169261**

Classification: Large Quantity Generator

. Waste code: 181
. Waste name: 181

. Waste code: 214
. Waste name: 214

. Waste code: 223
. Waste name: 223

. Waste code: 281
. Waste name: 281

. Waste code: 342
. Waste name: 342

. Waste code: 343
. Waste name: 343

. Waste code: 352
. Waste name: 352

. Waste code: 461
. Waste name: 461

. Waste code: 541
. Waste name: 541

. Waste code: 792
. Waste name: 792

. Waste code: D001
. Waste name: IGNITABLE WASTE

. Waste code: D002
. Waste name: CORROSIVE WASTE

. Waste code: D006
. Waste name: CADMIUM

. Waste code: D007
. Waste name: CHROMIUM

. Waste code: D008
. Waste name: LEAD

. Waste code: D011
. Waste name: SILVER

. Waste code: D018
. Waste name: BENZENE

. Waste code: F002
. Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE, METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE,

MARCH AIR FORCE BASE (Continued) **1000169261**

ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2, TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

. Waste code: F003
. Waste name: THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NONHALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS, AND A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

. Waste code: F005
. Waste name: THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Date form received by agency: 03/26/2008
Site name: MARCH AIR RESERVE BASE
Classification: Large Quantity Generator

. Waste code: D001
. Waste name: IGNITABLE WASTE

. Waste code: D002
. Waste name: CORROSIVE WASTE

. Waste code: D004
. Waste name: ARSENIC

. Waste code: D005
. Waste name: BARIUM

. Waste code: D006
. Waste name: CADMIUM

. Waste code: D007
. Waste name: CHROMIUM

. Waste code: D008
. Waste name: LEAD

. Waste code: D009
. Waste name: MERCURY

. Waste code: D011

MARCH AIR FORCE BASE (Continued) **1000169261**

. Waste name: SILVER

. Waste code: D018
. Waste name: BENZENE

. Waste code: D021
. Waste name: CHLOROBENZENE

. Waste code: D035
. Waste name: METHYL ETHYL KETONE

. Waste code: F002
. Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE, METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2, TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

. Waste code: F005
. Waste name: THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

. Waste code: U188
. Waste name: PHENOL

. Waste code: U227
. Waste name: 1,1,2-TRICHLOROETHANE (OR) ETHANE, 1,1,2-TRICHLORO-

Date form received by agency: 02/08/2006
Site name: MARCH AIR RESERVE BASE
Classification: Large Quantity Generator

. Waste code: D001
. Waste name: IGNITABLE WASTE

. Waste code: D002
. Waste name: CORROSIVE WASTE

. Waste code: D006
. Waste name: CADMIUM

. Waste code: D007
. Waste name: CHROMIUM

. Waste code: D008
. Waste name: LEAD

Date form received by agency: 02/25/2004

MARCH AIR FORCE BASE (Continued) **1000169261**

Site name: MARCH AIR RESERVE BASE
Classification: Large Quantity Generator

. Waste code: D001
. Waste name: IGNITABLE WASTE

. Waste code: D002
. Waste name: CORROSIVE WASTE

. Waste code: D004
. Waste name: ARSENIC

. Waste code: D005
. Waste name: BARIUM

. Waste code: D006
. Waste name: CADMIUM

. Waste code: D007
. Waste name: CHROMIUM

. Waste code: D011
. Waste name: SILVER

. Waste code: D018
. Waste name: BENZENE

Date form received by agency: 04/10/2002
Site name: MARCH AIR RESERVE BASE
Classification: Large Quantity Generator

. Waste code: D001
. Waste name: IGNITABLE WASTE

. Waste code: D002
. Waste name: CORROSIVE WASTE

. Waste code: D003
. Waste name: REACTIVE WASTE

. Waste code: D004
. Waste name: ARSENIC

. Waste code: D005
. Waste name: BARIUM

. Waste code: D006
. Waste name: CADMIUM

. Waste code: D007
. Waste name: CHROMIUM

. Waste code: D008
. Waste name: LEAD

. Waste code: D009
. Waste name: MERCURY

MARCH AIR FORCE BASE (Continued) **1000169261**

. Waste code: P098
. Waste name: POTASSIUM CYANIDE (OR) POTASSIUM CYANIDE K(CN)

Date form received by agency: 10/12/2000
Site name: MARCH ARB CA
Classification: Large Quantity Generator

Date form received by agency: 07/14/2000
Site name: MARCH AIR RESERVE BASE
Classification: Large Quantity Generator

. Waste code: D001
. Waste name: IGNITABLE WASTE

. Waste code: D002
. Waste name: CORROSIVE WASTE

. Waste code: D008
. Waste name: LEAD

. Waste code: D009
. Waste name: MERCURY

. Waste code: F001
. Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS USED IN DEGREASING: TETRACHLOROETHYLENE, TRICHLORETHYLENE, METHYLENE CHLORIDE, 1,1,1-TRICHLOROETHANE, CARBON TETRACHLORIDE AND CHLORINATED FLUOROCARBONS; ALL SPENT SOLVENT MIXTURES/BLENDS USED IN DEGREASING CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F002, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

. Waste code: F002
. Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE, METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2, TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

. Waste code: F003
. Waste name: THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NONHALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS, AND A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

. Waste code: F005

MARCH AIR FORCE BASE (Continued) **1000169261**

. Waste name: THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Date form received by agency: 03/04/1999
Site name: MARCH ARB, CA
Classification: Large Quantity Generator

Date form received by agency: 09/01/1996
Site name: MARCH AIR RESERVE BASE
Classification: Large Quantity Generator

Date form received by agency: 03/26/1996
Site name: MARCH AFB, CA
Classification: Large Quantity Generator

Date form received by agency: 03/31/1994
Site name: MARCH AIR FORCE BASE, CA
Classification: Large Quantity Generator

Date form received by agency: 03/30/1992
Site name: MARCH AIR FORCE BASE
Classification: Large Quantity Generator

Facility Has Received Notices of Violations:
Regulation violated: FR - 262.30-34.C
Area of violation: Generators - General
Date violation determined: 04/27/1995
Date achieved compliance: 04/27/2000
Violation lead agency: EPA
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 04/28/1995
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: EPA
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: FR - 262.10-12.A
Area of violation: Generators - General
Date violation determined: 03/05/1984
Date achieved compliance: 04/04/1995
Violation lead agency: EPA
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 05/18/1984
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: EPA
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

MARCH AIR FORCE BASE (Continued) **1000169261**

Evaluation Action Summary:

Evaluation date:	11/02/2006
Evaluation:	COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation:	Not reported
Date achieved compliance:	Not reported
Evaluation lead agency:	State

Evaluation date:	05/06/1996
Evaluation:	FOLLOW-UP INSPECTION
Area of violation:	Not reported
Date achieved compliance:	Not reported
Evaluation lead agency:	State

Evaluation date:	04/04/1995
Evaluation:	COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation:	Generators - General
Date achieved compliance:	04/27/2000
Evaluation lead agency:	EPA

Evaluation date:	03/05/1984
Evaluation:	COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation:	Generators - General
Date achieved compliance:	04/04/1995
Evaluation lead agency:	EPA

US ENG CONTROLS:

EPA ID:	CA4570024527
Site ID:	0902761
Name:	MARCH AIR FORCE BASE
Address:	22 CSG/CC RIVERSIDE, CA 92518
EPA Region:	09
County:	RIVERSIDE
Event Code:	Not reported
Actual Date:	09/30/2005
Contact Name:	Not reported
Contact Phone and Ext:	Not reported
Event Code Description:	Not reported

Action ID:	001
Action Name:	Explanation Of Significant Differences
Action Completion date:	08/24/2000
Operable Unit:	01
Contaminated Media :	Soil
Engineering Control:	Bioremediation (Ex-Situ)
Contact Name:	Not reported
Contact Phone and Ext:	Not reported
Event Code Description:	Not reported

Action ID:	001
Action Name:	RECORD OF DECISION
Action Completion date:	06/20/1996
Operable Unit:	01
Contaminated Media :	Groundwater
Engineering Control:	Discharge
Contact Name:	Not reported
Contact Phone and Ext:	Not reported

MARCH AIR FORCE BASE (Continued) **1000169261**

Event Code Description: Not reported

Action ID: 001
Action Name: RECORD OF DECISION
Action Completion date: 06/20/1996
Operable Unit: 01
Contaminated Media : Groundwater
Engineering Control: Extraction
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

Action ID: 001
Action Name: RECORD OF DECISION
Action Completion date: 06/20/1996
Operable Unit: 01
Contaminated Media : Groundwater
Engineering Control: Liquid Phase Carbon Adsorption
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

Action ID: 001
Action Name: RECORD OF DECISION
Action Completion date: 06/20/1996
Operable Unit: 01
Contaminated Media : Groundwater
Engineering Control: Monitoring
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

Action ID: 001
Action Name: RECORD OF DECISION
Action Completion date: 06/20/1996
Operable Unit: 01
Contaminated Media : Groundwater
Engineering Control: Other, (N.O.S.)
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

Action ID: 001
Action Name: RECORD OF DECISION
Action Completion date: 06/20/1996
Operable Unit: 01
Contaminated Media : Soil
Engineering Control: Cap
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

Action ID: 001
Action Name: RECORD OF DECISION
Action Completion date: 06/20/1996
Operable Unit: 01
Contaminated Media : Soil

MARCH AIR FORCE BASE (Continued) **1000169261**

Engineering Control: Disposal
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

Action ID: 001
Action Name: RECORD OF DECISION
Action Completion date: 06/20/1996
Operable Unit: 01
Contaminated Media : Soil
Engineering Control: Excavation
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

Action ID: 001
Action Name: RECORD OF DECISION
Action Completion date: 06/20/1996
Operable Unit: 01
Contaminated Media : Soil
Engineering Control: Impermeable Barrier
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

Action ID: 001
Action Name: RECORD OF DECISION
Action Completion date: 06/20/1996
Operable Unit: 01
Contaminated Media : Soil
Engineering Control: Low Temperature Thermal Desorption
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

Action ID: 001
Action Name: RECORD OF DECISION
Action Completion date: 06/20/1996
Operable Unit: 01
Contaminated Media : Soil
Engineering Control: Monitoring
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

Action ID: 001
Action Name: RECORD OF DECISION
Action Completion date: 06/20/1996
Operable Unit: 01
Contaminated Media : Soil
Engineering Control: Operations & Maintenance (O&M)
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

Action ID: 001
Action Name: RECORD OF DECISION

MARCH AIR FORCE BASE (Continued) **1000169261**

Action Completion date: 06/20/1996
Operable Unit: 01
Contaminated Media : Soil
Engineering Control: Recycling
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

Action ID: 001
Action Name: RECORD OF DECISION
Action Completion date: 06/20/1996
Operable Unit: 01
Contaminated Media : Soil
Engineering Control: Soil Vapor Extraction (in-situ)
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

Action ID: 003
Action Name: RECORD OF DECISION
Action Completion date: 09/29/2005
Operable Unit: 04
Contaminated Media : Groundwater
Engineering Control: No Action
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

Action ID: 003
Action Name: RECORD OF DECISION
Action Completion date: 09/29/2005
Operable Unit: 04
Contaminated Media : Soil
Engineering Control: Monitoring
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

Action ID: 003
Action Name: RECORD OF DECISION
Action Completion date: 09/29/2005
Operable Unit: 04
Contaminated Media : Soil
Engineering Control: No Action
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

Action ID: 005
Action Name: RECORD OF DECISION
Action Completion date: 09/30/2005
Operable Unit: 02
Contaminated Media : Groundwater
Engineering Control: No Action
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

MARCH AIR FORCE BASE (Continued) **1000169261**

Action ID: 005
Action Name: RECORD OF DECISION
Action Completion date: 09/30/2005
Operable Unit: 02
Contaminated Media : Soil
Engineering Control: No Action
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

US INST CONTROL:

EPA ID: CA4570024527
Site ID: 0902761
Name: MARCH AIR FORCE BASE
Action Name: RECORD OF DECISION
Address: 22 CSG/CC
RIVERSIDE, CA 92518
EPA Region: 09
County: RIVERSIDE
Event Code: Not reported
Inst. Control: Covenant
Actual Date: 09/30/2005
Complet. Date: 09/29/2005
Operable Unit: 04
Contaminated Media : Soil
Contact Name : Not reported
Contact Phone and Ext : Not reported
Event Code Description: Not reported

EPA ID: CA4570024527
Site ID: 0902761
Name: MARCH AIR FORCE BASE
Action Name: RECORD OF DECISION
Address: 22 CSG/CC
RIVERSIDE, CA 92518
EPA Region: 09
County: RIVERSIDE
Event Code: Not reported
Inst. Control: Deed Notices
Actual Date: 09/30/2005
Complet. Date: 09/29/2005
Operable Unit: 04
Contaminated Media : Soil
Contact Name : Not reported
Contact Phone and Ext : Not reported
Event Code Description: Not reported

EPA ID: CA4570024527
Site ID: 0902761
Name: MARCH AIR FORCE BASE
Action Name: RECORD OF DECISION
Address: 22 CSG/CC
RIVERSIDE, CA 92518
EPA Region: 09
County: RIVERSIDE
Event Code: Not reported

MARCH AIR FORCE BASE (Continued) **1000169261**

Inst. Control: Subdivision regulation
Actual Date: 09/30/2005
Complet. Date: 09/29/2005
Operable Unit: 04
Contaminated Media : Soil
Contact Name : Not reported
Contact Phone and Ext : Not reported
Event Code Description: Not reported

EPA ID: CA4570024527
Site ID: 0902761
Name: MARCH AIR FORCE BASE
Action Name: RECORD OF DECISION
Address: 22 CSG/CC
RIVERSIDE, CA 92518
EPA Region: 09
County: RIVERSIDE
Event Code: Not reported
Inst. Control: Zoning regulation
Actual Date: 09/30/2005
Complet. Date: 09/29/2005
Operable Unit: 04
Contaminated Media : Soil
Contact Name : Not reported
Contact Phone and Ext : Not reported
Event Code Description: Not reported

EPA ID: CA4570024527
Site ID: 0902761
Name: MARCH AIR FORCE BASE
Action Name: RECORD OF DECISION
Address: 22 CSG/CC
RIVERSIDE, CA 92518
EPA Region: 09
County: RIVERSIDE
Event Code: Not reported
Inst. Control: Covenant
Actual Date: 06/15/2004
Complet. Date: 05/11/2004
Operable Unit: 02
Contaminated Media : Groundwater
Contact Name : Not reported
Contact Phone and Ext : Not reported
Event Code Description: Not reported

EPA ID: CA4570024527
Site ID: 0902761
Name: MARCH AIR FORCE BASE
Action Name: RECORD OF DECISION
Address: 22 CSG/CC
RIVERSIDE, CA 92518
EPA Region: 09
County: RIVERSIDE
Event Code: Not reported
Inst. Control: Covenant
Actual Date: 06/15/2004
Complet. Date: 05/11/2004

MARCH AIR FORCE BASE (Continued) **1000169261**

Operable Unit: 02
Contaminated Media : Soil
Contact Name : Not reported
Contact Phone and Ext : Not reported
Event Code Description: Not reported

EPA ID: CA4570024527
Site ID: 0902761
Name: MARCH AIR FORCE BASE
Action Name: RECORD OF DECISION
Address: 22 CSG/CC
RIVERSIDE, CA 92518
EPA Region: 09
County: RIVERSIDE
Event Code: Not reported
Inst. Control: Base use plan change
Actual Date: 09/30/2005
Complet. Date: 09/30/2005
Operable Unit: 02
Contaminated Media : Soil
Contact Name : Not reported
Contact Phone and Ext : Not reported
Event Code Description: Not reported

EPA ID: CA4570024527
Site ID: 0902761
Name: MARCH AIR FORCE BASE
Action Name: RECORD OF DECISION
Address: 22 CSG/CC
RIVERSIDE, CA 92518
EPA Region: 09
County: RIVERSIDE
Event Code: Not reported
Inst. Control: Building, demolition, or excavation regulation
Actual Date: 09/30/2005
Complet. Date: 09/30/2005
Operable Unit: 02
Contaminated Media : Soil
Contact Name : Not reported
Contact Phone and Ext : Not reported
Event Code Description: Not reported

ROD:
Full-text of USEPA Record of Decision(s) is available from EDR.

PRP:
PRP name: STATE OF CALIFORNIA/DEPT. OF HEALTH SERVICES
STATE OF CALIFORNIA/DEPT. OF WATER QUALITY
U.S. AIR FORCE
U.S. AIR FORCE

A1 NNW < 1/8 0.021 mi. 109 ft. | **BEST VALLEY SMOG & AUTO REPAIR** | **EDR Hist Auto** | **1020196980**
23952 ALSSNDRO BLVD STE B | **N/A**
MORENO VALLEY, CA 92553

Site 1 of 11 in cluster A

Relative: Higher

Actual: 1572 ft.

EDR Hist Auto

Year:	Name:	Type:
1987	B C E ENTERPRISES INC	Gasoline Service Stations
1988	B C E ENTERPRISES INC	Gasoline Service Stations
1989	B C E ENTERPRISES INC	Gasoline Service Stations, NEC
1991	FIVE STAR AUTOMOTIVE REPAIR	General Automotive Repair Shops
1992	AUTO SERVICE CLUB	General Automotive Repair Shops
1992	FIVE STAR AUTOMOTIVE REPAIR	General Automotive Repair Shops
1993	AUTO SERVICE CLUB	General Automotive Repair Shops
1994	AUTO SERVICE CLUB	General Automotive Repair Shops
1995	AUTO SERVICE CLUB	General Automotive Repair Shops
1996	AUTO SERVICE CLUB	General Automotive Repair Shops
1997	AUTO SERVICE CLUB	General Automotive Repair Shops
1998	AUTO SERVICE CLUB	General Automotive Repair Shops
2005	BEST VALLEY SMOG & AUTO REPAIR	General Automotive Repair Shops
2006	BEST VALLEY SMOG & AUTO REPAIR	General Automotive Repair Shops
2007	BEST VALLEY SMOG & AUTO REPAIR	General Automotive Repair Shops
2008	BEST VALLEY SMOG & AUTO REPAIR	General Automotive Repair Shops

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A2 NNW < 1/8 0.021 mi. 109 ft. | **B & F AUTO REPAIR** | **EDR Hist Auto** | **1020851583**
23942 ALESSANDRO BLVD | **N/A**
MORENO VALLEY, CA 92553

Site 2 of 11 in cluster A

Relative: Higher

Actual: 1572 ft.

EDR Hist Auto

Year:	Name:	Type:
1988	RONS RADIATOR REPAIR	Automotive Repair Shops, NEC
1989	RONS RADIATOR REPAIR	Powertrain Components Repair Services
1990	RONS RADIATOR REPAIR	Powertrain Components Repair Services
1991	RONS RADIATOR REPAIR	Powertrain Components Repair Services
1991	TOTAL PERFORMANCE AUTOMOT	General Automotive Repair Shops
1992	RONS RADIATOR REPAIR	Powertrain Components Repair Services
1993	RONS RADIATOR REPAIR	Powertrain Components Repair Services
1996	B & F AUTO REPAIR	General Automotive Repair Shops
1997	B & F AUTO REPAIR	General Automotive Repair Shops
1998	B & F AUTO REPAIR	General Automotive Repair Shops
1999	B & F AUTO REPAIR	General Automotive Repair Shops
2001	B & F AUTO REPAIR	General Automotive Repair Shops
2002	B & F AUTO REPAIR	General Automotive Repair Shops
2003	B & F AUTO REPAIR	General Automotive Repair Shops
2004	RONS RADIATOR REPAIR	Powertrain Components Repair Services
2004	B & F AUTO REPAIR	General Automotive Repair Shops
2005	RONS RADIATOR REPAIR	Powertrain Components Repair Services
2005	B & F AUTO REPAIR	General Automotive Repair Shops
2006	B & F AUTO REPAIR	General Automotive Repair Shops
2006	RONS RADIATOR REPAIR	Powertrain Components Repair Services
2007	B & F AUTO REPAIR	General Automotive Repair Shops
2007	RONS RADIATOR REPAIR	Powertrain Components Repair Services
2008	RONS RADIATOR REPAIR	Powertrain Components Repair Services
2008	B & F AUTO REPAIR	General Automotive Repair Shops
2009	B & F AUTO REPAIR	General Automotive Repair Shops

B & F AUTO REPAIR (Continued) **1020851583**

2010	PULIDOS WHEELS & TIRES	Frame And Front End Repair Services
2010	B & F AUTO REPAIR	General Automotive Repair Shops
2011	PULIDOS WHEELS & TIRES	Frame And Front End Repair Services
2012	PULIDOS WHEELS & TIRES	Frame And Front End Repair Services
2013	PULIDOS WHEELS & TIRES	Frame And Front End Repair Services
2014	PULIDOS WHEELS & TIRES	Frame And Front End Repair Services

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A3 **HOWIES CRPT CLG FLOORCARE SVC** **EDR Hist Cleaner** **1018948519**
NNW **23932 ALESSANDRO BLVD** **N/A**
< 1/8 **MORENO VALLEY, CA 92553**
0.021 mi.
109 ft. **Site 3 of 11 in cluster A**

Relative:
Higher

EDR Hist Cleaner

Actual:
1572 ft.

Year:	Name:	Type:
1991	HOWIES CRPT CLG FLOORCARE SVC	Carpet And Upholstery Cleaning On Customer Premises
1992	HOWIES CRPT CLG FLOORCARE SVC	Carpet And Upholstery Cleaning On Customer Premises

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A4 **BRAKE TECH** **EDR Hist Auto** **1020506416**
NNW **23920 ALESSANDRO BLVD G** **N/A**
< 1/8 **MORENO VALLEY, CA 92388**
0.021 mi.
109 ft. **Site 4 of 11 in cluster A**

Relative:
Higher

EDR Hist Auto

Actual:
1572 ft.

Year:	Name:	Type:
1989	MY MECHANIC	General Automotive Repair Shops
1989	BRAKE TECH	General Automotive Repair Shops
1991	MORENO VALLEY TRANSMISSION	General Automotive Repair Shops
1991	MY MECHANIC	General Automotive Repair Shops
1991	BRAKE TECH	General Automotive Repair Shops
1992	ACME TUNE & SMOG	General Automotive Repair Shops
1992	MORENO VALLEY TRANSMISSION	Automotive Transmission Repair Shops
1992	L & M TIRE CO	General Automotive Repair Shops
1993	ACME TUNE & SMOG	General Automotive Repair Shops
1993	MORENO VALLEY TRANSMISSION	Automotive Transmission Repair Shops
1993	L & M TIRE CO	General Automotive Repair Shops
1994	MORENO VALLEY TRANSMISSION	Automotive Transmission Repair Shops
1995	JAPANESE CARS UNLIMITED	General Automotive Repair Shops
1995	MORENO VALLEY TRANSMISSION	Automotive Transmission Repair Shops
1995	L & M TIRE CO INC	General Automotive Repair Shops
1996	L & M TIRE CO INC	General Automotive Repair Shops
1996	MORENO VALLEY TRANSMISSION	Automotive Transmission Repair Shops
1996	JAPANESE CARS UNLIMITED	General Automotive Repair Shops
1997	JAPANESE CARS UNLIMITED	General Automotive Repair Shops
1997	MORENO VALLEY TRANSMISSION	Automotive Transmission Repair Shops
1998	JAPANESE CARS UNLIMITED	General Automotive Repair Shops
1998	MORENO VALLEY TRANSMISSION	Automotive Transmission Repair Shops
1999	MORENO VALLEY TRANSMISSION	Automotive Transmission Repair Shops
2000	MORENO VALLEY TRANSMISSION	Automotive Transmission Repair Shops
2000	PRECISION DIAGNOSTICS PLUS	Automotive Repair Shops, NEC
2000	BEST VLY SMOG & AUTO RPR	General Automotive Repair Shops
2000	LEES AUTO REPAIR	General Automotive Repair Shops
2000	D&C AUTO REPAIR	General Automotive Repair Shops

BRAKE TECH (Continued) **1020506416**

2001	MORENO VALLEY TRANSMISSION	Automotive Transmission Repair Shops
2001	D&C AUTO REPAIR	General Automotive Repair Shops
2001	PRECISION DIAGNOSTICS PLUS	Automotive Repair Shops, NEC
2001	BEST VALLEY SMOG & AUTO REPAIR	General Automotive Repair Shops
2001	LEES AUTO REPAIR	General Automotive Repair Shops
2002	1ST PLACE AUTOMOTIVE	Automotive Repair Shops, NEC
2002	PRECISION DIAGNOSTICS PLUS	Automotive Repair Shops, NEC
2002	MORENO VALLEY TRANSMISSION	Automotive Transmission Repair Shops
2002	D&C AUTO REPAIR	General Automotive Repair Shops
2002	LEES AUTO REPAIR	General Automotive Repair Shops
2002	BEST VALLEY SMOG & AUTO REPAIR	General Automotive Repair Shops
2003	MORENO VALLEY TRANSMISSION	Automotive Transmission Repair Shops
2003	PRECISION DIAGNOSTICS PLUS	Automotive Repair Shops, NEC
2003	1ST PLACE AUTOMOTIVE	General Automotive Repair Shops
2003	BEST VALLEY SMOG & AUTO REPAIR	General Automotive Repair Shops
2003	D&C AUTO REPAIR	General Automotive Repair Shops
2004	D&C AUTO REPAIR	General Automotive Repair Shops
2004	BEST VALLEY SMOG & AUTO REPAIR	General Automotive Repair Shops
2004	ACME TUNE & SMOG	General Automotive Repair Shops
2004	1ST PLACE AUTOMOTIVE	General Automotive Repair Shops
2004	MORENO VALLEY TRANSMISSION	Automotive Transmission Repair Shops
2005	1ST PLACE AUTOMOTIVE	General Automotive Repair Shops
2005	ACME TUNE & SMOG	General Automotive Repair Shops
2005	D&C AUTO REPAIR	General Automotive Repair Shops
2005	MORENO VALLEY TRANSMISSION	Automotive Transmission Repair Shops
2006	D&C AUTO REPAIR	General Automotive Repair Shops
2006	ACME TUNE & SMOG	General Automotive Repair Shops
2006	BRADYS AUTOMOTIVE	General Automotive Repair Shops
2006	1ST PLACE AUTOMOTIVE	General Automotive Repair Shops
2006	MORENO VALLEY TRANSMISSION	Automotive Transmission Repair Shops
2007	MORENO VALLEY TRANSMISSION	Automotive Transmission Repair Shops
2007	D&C AUTO REPAIR	General Automotive Repair Shops
2007	ACME TUNE & SMOG	General Automotive Repair Shops
2007	1ST PLACE AUTOMOTIVE	General Automotive Repair Shops
2007	BRADYS AUTOMOTIVE	General Automotive Repair Shops
2008	D&C AUTO REPAIR	General Automotive Repair Shops
2008	ACME TUNE & SMOG	General Automotive Repair Shops
2008	BRADYS AUTOMOTIVE	General Automotive Repair Shops
2010	D&C AUTO REPAIR	General Automotive Repair Shops
2012	XPERT AUTOMOTIVE	General Automotive Repair Shops
2013	AMERICAN AUTOMOTIVE	General Automotive Repair Shops
2013	XPERT AUTOMOTIVE	General Automotive Repair Shops
2014	AMERICAN AUTOMOTIVE	General Automotive Repair Shops

A5 **GBM CYLINDERS HEADS** **EDR Hist Auto** **1020850707**
NNW **23910 ALESSANDRO BLVD** **N/A**
< 1/8 **MORENO VALLEY, CA 92553**
0.021 mi.
109 ft. **Site 5 of 11 in cluster A**

Relative:
Higher

Actual:
1572 ft.

EDR Hist Auto

Year:	Name:	Type:
2003	GBM CYLINDERS HEADS	General Automotive Repair Shops
2004	GBM CYLINDERS HEADS	General Automotive Repair Shops
2005	GBM CYLINDERS HEADS	Automotive Repair Shops, NEC, NEC
2006	GBM CYLINDERS HEADS	Automotive Repair Shops, NEC, NEC
2007	GBM CYLINDERS HEADS	Automotive Repair Shops, NEC, NEC

GBM CYLINDERS HEADS (Continued) **1020850707**

2008 GBM CYLINDERS HEADS Automotive Repair Shops, NEC, NEC

A6 North < 1/8 0.021 mi. 113 ft. **STAR BRIGHT CLEANERS** **RCRA-SQG** **1000350923**
23962 ALESSANDRO **FINDS** **CAD981631096**
MORENO VALLEY, CA 92553 **ECHO**

Site 6 of 11 in cluster A

Relative: Higher

Actual: 1572 ft.

RCRA-SQG:

Date form received by agency:	09/01/1996
Facility name:	STAR BRIGHT CLEANERS
Facility address:	23962 ALESSANDRO MORENO VALLEY, CA 92553
EPA ID:	CAD981631096
Contact:	Not reported
Contact address:	Not reported Not reported
Contact country:	US
Contact telephone:	Not reported
Contact email:	Not reported
EPA Region:	09
Land type:	Facility is not located on Indian land. Additional information is not known.
Classification:	Small Small Quantity Generator
Description:	Handler: generates more than 100 and less than 1000 kg of hazardous waste during any calendar month and accumulates less than 6000 kg of hazardous waste at any time; or generates 100 kg or less of hazardous waste during any calendar month, and accumulates more than 1000 kg of hazardous waste at any time

Owner/Operator Summary:

Owner/operator name:	KEN JONES
Owner/operator address:	NOT REQUIRED NOT REQUIRED, ME 99999
Owner/operator country:	Not reported
Owner/operator telephone:	(415) 555-1212
Legal status:	Private
Owner/Operator Type:	Owner
Owner/Op start date:	Not reported
Owner/Op end date:	Not reported

Owner/operator name:	NOT REQUIRED
Owner/operator address:	NOT REQUIRED NOT REQUIRED, ME 99999
Owner/operator country:	Not reported
Owner/operator telephone:	(415) 555-1212
Legal status:	Private
Owner/Operator Type:	Operator
Owner/Op start date:	Not reported
Owner/Op end date:	Not reported

Handler Activities Summary:

U.S. importer of hazardous waste:	No
Mixed waste (haz. and radioactive):	No
Recycler of hazardous waste:	No
Transporter of hazardous waste:	No
Treater, storer or disposer of HW:	No
Underground injection activity:	No

STAR BRIGHT CLEANERS (Continued) **1000350923**

On-site burner exemption: No
Furnace exemption: No
Used oil fuel burner: No
Used oil processor: No
User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

Historical Generators:
Date form received by agency: 02/09/1987
Site name: STAR BRIGHT CLEANERS
Classification: Large Quantity Generator

Violation Status: No violations found

Evaluation Action Summary:
Evaluation date: 07/28/1992
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State Contractor/Grantee

FINDS:

Registry ID: 110006472450

Environmental Interest/Information System
RCRAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

Click this hyperlink while viewing on your computer to access additional FINDS: detail in the EDR Site Report.

ECHO:
Envid: 1000350923
Registry ID: 110006472450
DFR URL: http://echo.epa.gov/detailed-facility-report?fid=110006472450

A7 **MENOS NO 2 AUTO REPAIR** **RCRA-SQG** **1004675782**
North **23952 ALESSANDRO BLVD UNIT B** **FINDS** **CAR000077032**
< 1/8 **MORENO VALLEY, CA 92553**
0.021 mi.
113 ft. **Site 7 of 11 in cluster A**

Relative:
Higher

Actual:
1572 ft.

RCRA-SQG:
Date form received by agency: 07/03/2000
Facility name: MENOS NO 2 AUTO REPAIR
Facility address: 23952 ALESSANDRO BLVD UNIT B
MORENO VALLEY, CA 92553
EPA ID: CAR000077032

MENOS NO 2 AUTO REPAIR (Continued) **1004675782**

Contact: MIKE RICO
Contact address: 23952 ALESSANDRO BLVD UNIT B
MORENO VALLEY, CA 92553
Contact country: US
Contact telephone: (909) 653-1246
Contact email: Not reported
EPA Region: 09
Classification: Small Small Quantity Generator
Description: Handler: generates more than 100 and less than 1000 kg of hazardous waste during any calendar month and accumulates less than 6000 kg of hazardous waste at any time; or generates 100 kg or less of hazardous waste during any calendar month, and accumulates more than 1000 kg of hazardous waste at any time

Owner/Operator Summary:
Owner/operator name: MANUEL REAAEL
Owner/operator address: 23952 ALESSANDRO BLVD UNIT B
MORENO VALLEY, CA 92553
Owner/operator country: Not reported
Owner/operator telephone: (909) 653-1246
Legal status: Private
Owner/Operator Type: Owner
Owner/Op start date: Not reported
Owner/Op end date: Not reported

Handler Activities Summary:
U.S. importer of hazardous waste: No
Mixed waste (haz. and radioactive): No
Recycler of hazardous waste: No
Transporter of hazardous waste: No
Treater, storer or disposer of HW: No
Underground injection activity: No
On-site burner exemption: No
Furnace exemption: No
Used oil fuel burner: No
Used oil processor: No
User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

. Waste code: D039
. Waste name: TETRACHLOROETHYLENE

Violation Status: No violations found

FINDS:

Registry ID: 110006486837

Environmental Interest/Information System
RCRAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and

MENOS NO 2 AUTO REPAIR (Continued) **1004675782**

corrective action activities required under RCRA.

Click this hyperlink while viewing on your computer to access additional FINDS: detail in the EDR Site Report.

A8 North < 1/8 0.021 mi. 113 ft. **MARK C BLOOME CO** **RCRA-SQG** **1000266025**
23920 ALESSANDRO BLVD **FINDS** **CAD981163082**
MORENO VALLEY, CA 92553 **ECHO**

Site 8 of 11 in cluster A

Relative: Higher

Actual: 1572 ft.

RCRA-SQG:

Date form received by agency:	09/01/1996
Facility name:	MARK C BLOOME CO
Facility address:	23920 ALESSANDRO BLVD MORENO VALLEY, CA 92553
EPA ID:	CAD981163082
Mailing address:	1600 E HILL ST LONG BEACH, CA 90802
Contact:	Not reported
Contact address:	Not reported Not reported
Contact country:	US
Contact telephone:	Not reported
Contact email:	Not reported
EPA Region:	09
Classification:	Small Small Quantity Generator
Description:	Handler: generates more than 100 and less than 1000 kg of hazardous waste during any calendar month and accumulates less than 6000 kg of hazardous waste at any time; or generates 100 kg or less of hazardous waste during any calendar month, and accumulates more than 1000 kg of hazardous waste at any time

Owner/Operator Summary:

Owner/operator name:	MARK C BLOOME CO
Owner/operator address:	NOT REQUIRED NOT REQUIRED, ME 99999
Owner/operator country:	Not reported
Owner/operator telephone:	(415) 555-1212
Legal status:	Private
Owner/Operator Type:	Owner
Owner/Op start date:	Not reported
Owner/Op end date:	Not reported

Owner/operator name:	NOT REQUIRED
Owner/operator address:	NOT REQUIRED NOT REQUIRED, ME 99999
Owner/operator country:	Not reported
Owner/operator telephone:	(415) 555-1212
Legal status:	Private
Owner/Operator Type:	Operator
Owner/Op start date:	Not reported
Owner/Op end date:	Not reported

Handler Activities Summary:

U.S. importer of hazardous waste: No

MARK C BLOOME CO (Continued) **1000266025**

Mixed waste (haz. and radioactive): No
Recycler of hazardous waste: No
Transporter of hazardous waste: No
Treater, storer or disposer of HW: No
Underground injection activity: No
On-site burner exemption: No
Furnace exemption: No
Used oil fuel burner: No
Used oil processor: No
User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

Historical Generators:
Date form received by agency: 11/15/1985
Site name: MARK C BLOOME CO
Classification: Large Quantity Generator

Violation Status: No violations found

FINDS:

Registry ID: 110006469142

Environmental Interest/Information System
RCRAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

Click this hyperlink while viewing on your computer to access additional FINDS: detail in the EDR Site Report.

ECHO:
Envid: 1000266025
Registry ID: 110006469142
DFR URL: http://echo.epa.gov/detailed-facility-report?fid=110006469142

A9
North
< 1/8
0.021 mi.
113 ft.

MORENO VALLEY TRANS **RCRA-SQG** **1001967625**
23920 ALESSANDRO UNIT F **FINDS** **CAR000071282**
MORENO VALLEY, CA 92553 **ECHO**

Site 9 of 11 in cluster A

Relative:
Higher

Actual:
1572 ft.

RCRA-SQG:
Date form received by agency: 04/20/2000
Facility name: MORENO VALLEY TRANS
Facility address: 23920 ALESSANDRO UNIT F
MORENO VALLEY, CA 92553
EPA ID: CAR000071282
Contact: KER BANKS
Contact address: 23920 ALESSANDRO UNIT F

MORENO VALLEY TRANS (Continued) **1001967625**

MORENO CALLEY, CA 92388
Contact country: US
Contact telephone: (909) 653-4041
Contact email: Not reported
EPA Region: 09
Classification: Small Small Quantity Generator
Description: Handler: generates more than 100 and less than 1000 kg of hazardous waste during any calendar month and accumulates less than 6000 kg of hazardous waste at any time; or generates 100 kg or less of hazardous waste during any calendar month, and accumulates more than 1000 kg of hazardous waste at any time

Owner/Operator Summary:
Owner/operator name: MORENO VALLEY TRANS
Owner/operator address: 23920 ALESSANDRO UNIT F
MORENO CALLEY, CA 92388
Owner/operator country: Not reported
Owner/operator telephone: (909) 653-4041
Legal status: Private
Owner/Operator Type: Owner
Owner/Op start date: Not reported
Owner/Op end date: Not reported

Handler Activities Summary:
U.S. importer of hazardous waste: No
Mixed waste (haz. and radioactive): No
Recycler of hazardous waste: No
Transporter of hazardous waste: No
Treater, storer or disposer of HW: No
Underground injection activity: No
On-site burner exemption: No
Furnace exemption: No
Used oil fuel burner: No
Used oil processor: No
User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

. Waste code: D000
. Waste name: Not Defined

. Waste code: D039
. Waste name: TETRACHLOROETHYLENE

Violation Status: No violations found

FINDS:

Registry ID: 110008288539

Environmental Interest/Information System
California Hazardous Waste Tracking System - Datamart (HWTS-DATAMART) provides California with information on hazardous waste shipments for generators, transporters, and treatment, storage, and disposal facilities.

MORENO VALLEY TRANS (Continued) **1001967625**

RCRAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

Click this hyperlink while viewing on your computer to access additional FINDS: detail in the EDR Site Report.

ECHO:
Envid: 1001967625
Registry ID: 110008288539
DFR URL: http://echo.epa.gov/detailed-facility-report?fid=110008288539

A10
NNW
< 1/8
0.022 mi.
114 ft.

VICKYNO AUTO WINDOW TINT **EDR Hist Auto** **1020649808**
23900 ALESSANDRO BLVD **N/A**
MORENO VALLEY, CA 92553

Site 10 of 11 in cluster A

Relative:
Higher

Actual:
1572 ft.

EDR Hist Auto

Year:	Name:	Type:
2005	VICKYNO AUTO WINDOW TINT	General Automotive Repair Shops
2006	VICKYNO AUTO WINDOW TINT	General Automotive Repair Shops
2007	VICKYNO AUTO WINDOW TINT	General Automotive Repair Shops
2008	VICKYNO AUTO WINDOW TINT	General Automotive Repair Shops

---

A11
NNW
< 1/8
0.024 mi.
126 ft.

MOBILE PROS TRAILER & LIFT GAT **EDR Hist Auto** **1021301222**
23890 ALESSANDRO BLVD **N/A**
MORENO VALLEY, CA 92553

Site 11 of 11 in cluster A

Relative:
Higher

Actual:
1572 ft.

EDR Hist Auto

Year:	Name:	Type:
2010	MOBILE PROS TRAILER & LIFT GAT	General Automotive Repair Shops
2011	MOBILE PROS TRAILER & LIFT GAT	General Automotive Repair Shops

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12
NE
< 1/8
0.063 mi.
334 ft.

CSK AUTO INC **EDR Hist Auto** **1020274475**
24021 ALESSANDRO BLVD **N/A**
MORENO VALLEY, CA 92553

Relative:
Higher

Actual:
1570 ft.

EDR Hist Auto

Year:	Name:	Type:
2003	CSK AUTO INC	Auto And Home Supply Stores

B13 NW < 1/8 0.111 mi. 586 ft. | **99 CLEANERS 23750 ALESSANDRO BLVD MORENO VALLEY, CA 92553** | **RCRA-SQG FINDS ECHO DRYCLEANERS HAZNET** | **1000819660 CAD983656554**

Site 1 of 3 in cluster B

Relative: Higher

Actual: 1571 ft.

RCRA-SQG:

Date form received by agency:	01/06/1993
Facility name:	99 CLEANERS
Facility address:	23750 ALESSANDRO BLVD MORENO VALLEY, CA 92553
EPA ID:	CAD983656554
Mailing address:	ALESSANDRO BLVD MORENO VALLEY, CA 92553
Contact:	BE PHAM
Contact address:	23750 ALESSANDRO BLVD MORENO VALLEY, CA 92553
Contact country:	US
Contact telephone:	(714) 653-2729
Contact email:	Not reported
EPA Region:	09
Classification:	Small Small Quantity Generator
Description:	Handler: generates more than 100 and less than 1000 kg of hazardous waste during any calendar month and accumulates less than 6000 kg of hazardous waste at any time; or generates 100 kg or less of hazardous waste during any calendar month, and accumulates more than 1000 kg of hazardous waste at any time

Owner/Operator Summary:

Owner/operator name:	BE PHAM
Owner/operator address:	23750 ALESSANDRO BLVD NO L1060 MORENO VALLEY, CA 92553
Owner/operator country:	Not reported
Owner/operator telephone:	(714) 653-2729
Legal status:	Private
Owner/Operator Type:	Owner
Owner/Op start date:	Not reported
Owner/Op end date:	Not reported

Handler Activities Summary:

U.S. importer of hazardous waste:	No
Mixed waste (haz. and radioactive):	No
Recycler of hazardous waste:	No
Transporter of hazardous waste:	No
Treater, storer or disposer of HW:	No
Underground injection activity:	No
On-site burner exemption:	No
Furnace exemption:	No
Used oil fuel burner:	No
Used oil processor:	No
User oil refiner:	No
Used oil fuel marketer to burner:	No
Used oil Specification marketer:	No
Used oil transfer facility:	No
Used oil transporter:	No

Violation Status: No violations found

99 CLEANERS (Continued) **1000819660**

FINDS:

Registry ID: 110002890471

Environmental Interest/Information System
RCRAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

Click this hyperlink while viewing on your computer to access additional FINDS: detail in the EDR Site Report.

ECHO:

Envid:	1000819660
Registry ID:	110002890471
DFR URL:	http://echo.epa.gov/detailed-facility-report?fid=110002890471

DRYCLEANERS:

EPA Id:	CAL000265973
NAICS Code:	81232
NAICS Description:	Drycleaning and Laundry Services (except Coin-Operated)
SIC Code:	7211
SIC Description:	Power Laundries, Family and Commercial
Create Date:	02/05/2003
Facility Active:	No
Inactive Date:	06/30/2003
Facility Addr2:	Not reported
Owner Name:	JUAN SALDANA
Owner Address:	23750 ALESSANDRO BLVD STE L106
Owner Address 2:	Not reported
Owner Telephone:	9096564734
Contact Name:	JUAN SALDANA
Contact Address:	23750 ALESSANDRO BLVD STE L106
Contact Address 2:	Not reported
Contact Telephone:	9096564734
Mailing Name:	Not reported
Mailing Address 1:	23750 ALESSANDRO BLVD STE L106
Mailing Address 2:	Not reported
Mailing City:	MORENO VALLEY
Mailing State:	CA
Mailing Zip:	92553
Owner Fax:	Not reported
Region Code:	4

EPA Id:	CAL000319087
NAICS Code:	81232
NAICS Description:	Drycleaning and Laundry Services (except Coin-Operated)
SIC Code:	7211
SIC Description:	Power Laundries, Family and Commercial
Create Date:	04/27/2007
Facility Active:	No
Inactive Date:	06/30/2007

99 CLEANERS (Continued) **1000819660**

Facility Addr2:	Not reported
Owner Name:	JUANA MARTINEZ
Owner Address:	23750 ALESSANDRO BLVD STE L106
Owner Address 2:	Not reported
Owner Telephone:	9516537007
Contact Name:	JUANA MARTINEZ
Contact Address:	23750 ALESSANDRO BLVD STE L106
Contact Address 2:	Not reported
Contact Telephone:	9516537007
Mailing Name:	Not reported
Mailing Address 1:	23750 ALESSANDRO BLVD STE L106
Mailing Address 2:	Not reported
Mailing City:	MORENO VALLEY
Mailing State:	CA
Mailing Zip:	92553
Owner Fax:	Not reported
Region Code:	4

EPA Id:	CAD983656554
NAICS Code:	81232
NAICS Description:	Drycleaning and Laundry Services (except Coin-Operated)
SIC Code:	7211
SIC Description:	Power Laundries, Family and Commercial
Create Date:	01/06/1993
Facility Active:	No
Inactive Date:	06/30/2001
Facility Addr2:	Not reported
Owner Name:	PHUONG NGUYEN
Owner Address:	23750 ALESSANDRO BLVD NO L1060
Owner Address 2:	Not reported
Owner Telephone:	7146532729
Contact Name:	PHONG NGUYEN/OWNER
Contact Address:	23750 ALESSANDRO BLVD
Contact Address 2:	Not reported
Contact Telephone:	7146532729
Mailing Name:	Not reported
Mailing Address 1:	23750 ALESSANDRO BLVD
Mailing Address 2:	Not reported
Mailing City:	MORENO VALLEY
Mailing State:	CA
Mailing Zip:	925538811
Owner Fax:	Not reported
Region Code:	9

HAZNET:

envid:	1000819660
Year:	1998
GEPAID:	CAD983656554
Contact:	PHUONG NGUYEN
Telephone:	7146532729
Mailing Name:	Not reported
Mailing Address:	23750 ALESSANDRO BLVD
Mailing City,St,Zip:	MORENO VALLEY, CA 925538811
Gen County:	Not reported
TSD EPA ID:	CAD981397417
TSD County:	Not reported
Waste Category:	Halogenated solvents (chloroforms, methyl chloride, perchloroethylene,

99 CLEANERS (Continued) **1000819660**

	etc)
Disposal Method:	Recycler
Tons:	.7549
Cat Decode:	Not reported
Method Decode:	Not reported
Facility County:	Riverside

envid:	1000819660
Year:	1998
GEPAID:	CAD983656554
Contact:	PHUONG NGUYEN
Telephone:	7146532729
Mailing Name:	Not reported
Mailing Address:	23750 ALESSANDRO BLVD
Mailing City,St,Zip:	MORENO VALLEY, CA 925538811
Gen County:	Not reported
TSD EPA ID:	CAD981397417
TSD County:	Not reported
Waste Category:	Not reported
Disposal Method:	Recycler
Tons:	.0000
Cat Decode:	Not reported
Method Decode:	Not reported
Facility County:	Riverside

envid:	1000819660
Year:	1997
GEPAID:	CAD983656554
Contact:	PHUONG NGUYEN
Telephone:	7146532729
Mailing Name:	Not reported
Mailing Address:	23750 ALESSANDRO BLVD
Mailing City,St,Zip:	MORENO VALLEY, CA 925538811
Gen County:	Not reported
TSD EPA ID:	CAD981397417
TSD County:	Not reported
Waste Category:	Not reported
Disposal Method:	Recycler
Tons:	.0000
Cat Decode:	Not reported
Method Decode:	Not reported
Facility County:	Riverside

envid:	1000819660
Year:	1997
GEPAID:	CAD983656554
Contact:	PHUONG NGUYEN
Telephone:	7146532729
Mailing Name:	Not reported
Mailing Address:	23750 ALESSANDRO BLVD
Mailing City,St,Zip:	MORENO VALLEY, CA 925538811
Gen County:	Not reported
TSD EPA ID:	CAD981397417
TSD County:	Not reported
Waste Category:	Halogenated solvents (chloroforms, methyl chloride, perchloroethylene, etc)
Disposal Method:	Recycler

99 CLEANERS (Continued) **1000819660**

Tons:	21.7851
Cat Decode:	Not reported
Method Decode:	Not reported
Facility County:	Riverside

envid:	1000819660
Year:	1996
GEPAID:	CAD983656554
Contact:	PHUONG NGUYEN
Telephone:	7146532729
Mailing Name:	Not reported
Mailing Address:	23750 ALESSANDRO BLVD
Mailing City,St,Zip:	MORENO VALLEY, CA 925538811
Gen County:	Not reported
TSD EPA ID:	CAD981397417
TSD County:	Not reported
Waste Category:	Halogenated solvents (chloroforms, methyl chloride, perchloroethylene, etc)
Disposal Method:	Recycler
Tons:	1.5470
Cat Decode:	Not reported
Method Decode:	Not reported
Facility County:	Riverside

Click this hyperlink while viewing on your computer to access
2 additional CA_HAZNET: record(s) in the EDR Site Report.

B14 **99 CLEANERS** **DRYCLEANERS** **S103948114**
NW **23750 ALESSANDRO LVD** **N/A**
< 1/8 **MORENO VALLEY, CA 92553**
0.111 mi.
586 ft. **Site 2 of 3 in cluster B**

Relative:
Higher

Actual:
1571 ft.

DRYCLEANERS:

EPA Id:	CAL000116087
NAICS Code:	81232
NAICS Description:	Drycleaning and Laundry Services (except Coin-Operated)
SIC Code:	7211
SIC Description:	Power Laundries, Family and Commercial
Create Date:	04/23/1994
Facility Active:	No
Inactive Date:	06/30/2001
Facility Addr2:	Not reported
Owner Name:	SINH TRAN
Owner Address:	23750 ALESSANDRO BLVD
Owner Address 2:	Not reported
Owner Telephone:	0000000000
Contact Name:	PHUONG NGUYEN
Contact Address:	23750 ALESSANDRO LVD
Contact Address 2:	Not reported
Contact Telephone:	--
Mailing Name:	Not reported
Mailing Address 1:	23750 ALESSANDRO BLVD L-106
Mailing Address 2:	Not reported
Mailing City:	MORENO VALLEY
Mailing State:	CA
Mailing Zip:	925530000
Owner Fax:	Not reported

99 CLEANERS (Continued) **S103948114**

Region Code: 4

B15
NW
< 1/8
0.111 mi.
586 ft.

99 CLEANERS **EDR Hist Cleaner** **1019917704**
23750 ALESSANDRO BLVD **N/A**
MORENO VALLEY, CA 92553

Site 3 of 3 in cluster B

Relative:
Higher

Actual:
1571 ft.

EDR Hist Cleaner

Year:	Name:	Type:
1992	99 CLEANERS	Drycleaning Plants, Except Rugs
1993	99 CLEANERS	Drycleaning Plants, Except Rugs
1994	99 CLEANERS	Drycleaning Plants, Except Rugs
1995	99 CLEANERS	Drycleaning Plants, Except Rugs
1996	99 CLEANERS	Drycleaning Plants, Except Rugs
1997	99 CLEANERS	Drycleaning Plants, Except Rugs
1998	99 CLEANERS	Drycleaning Plants, Except Rugs
1999	99 CLEANERS	Drycleaning Plants, Except Rugs
2000	99 CLEANERS	Drycleaning Plants, Except Rugs
2001	SALDANA JUAN	Drycleaning Plants, Except Rugs
2002	SALDANA JUAN	Drycleaning Plants, Except Rugs
2003	SALDANA JUAN	Drycleaning Plants, Except Rugs
2004	SALDANA JUAN	Drycleaning Plants, Except Rugs
2005	RUNNING DRY CLEANERS	Drycleaning Plants, Except Rugs, NEC
2005	SALDANA JUAN	Drycleaning Plants, Except Rugs
2006	SALDANA JUAN	Drycleaning Plants, Except Rugs
2006	RUNNING DRY CLEANERS	Drycleaning Plants, Except Rugs, NEC
2007	RUNNING DRY CLEANERS	Drycleaning Plants, Except Rugs, NEC
2007	SALDANA JUAN	Drycleaning Plants, Except Rugs
2008	RUNNING DRY CLEANERS	Drycleaning Plants, Except Rugs, NEC
2009	RUNNING DRY CLEANERS	Drycleaning Plants, Except Rugs, NEC

C16
WNW
1/4-1/2
0.333 mi.
1756 ft.

ARCO AM/PM **LUST** **U002244640**
23501 ALESSANDRO BLVD **UST** **N/A**
MORENO VALLEY, CA 92553

Site 1 of 2 in cluster C

Relative:
Higher

Actual:
1572 ft.

LUST:

Region:	STATE
Global Id:	T0606500632
Latitude:	33.916901618079
Longitude:	-117.251977458826
Case Type:	LUST Cleanup Site
Status:	Completed - Case Closed
Status Date:	07/11/2001
Lead Agency:	RIVERSIDE COUNTY LOP
Case Worker:	RIV
Local Agency:	RIVERSIDE COUNTY LOP
RB Case Number:	083303648T
LOC Case Number:	200016218
File Location:	Local Agency Warehouse
Potential Media Affect:	Soil
Potential Contaminants of Concern:	Gasoline
Site History:	Not reported

ARCO AM/PM (Continued) **U002244640**

Click here to access the California GeoTracker records for this facility:

Contact:

Global Id:	T0606500632
Contact Type:	Regional Board Caseworker
Contact Name:	VALERIE JAHN-BULL
Organization Name:	SANTA ANA RWQCB (REGION 8)
Address:	3737 MAIN STREET, SUITE 500
City:	RIVERSIDE
Email:	vjahn-bull@waterboards.ca.gov
Phone Number:	9517824903

Status History:

Global Id:	T0606500632
Status:	Completed - Case Closed
Status Date:	07/11/2001
Global Id:	T0606500632
Status:	Open - Case Begin Date
Status Date:	09/25/1998
Global Id:	T0606500632
Status:	Open - Site Assessment
Status Date:	09/25/1998

Regulatory Activities:

Global Id:	T0606500632
Action Type:	Other
Date:	04/12/2000
Action:	Leak Reported
Global Id:	T0606500632
Action Type:	ENFORCEMENT
Date:	04/01/2009
Action:	File review - #RCDEH upload site file 5/29/2015
Global Id:	T0606500632
Action Type:	ENFORCEMENT
Date:	04/02/2009
Action:	Closure/No Further Action Letter - #Site Closure
Global Id:	T0606500632
Action Type:	Other
Date:	09/25/1998
Action:	Leak Discovery
Global Id:	T0606500632
Action Type:	Other
Date:	09/26/1998
Action:	Leak Stopped

LUST REG 8:

Region:	8
County:	Riverside

ARCO AM/PM (Continued) **U002244640**

Regional Board:	Santa Ana Region
Facility Status:	Case Closed
Case Number:	083303648T
Local Case Num:	Not reported
Case Type:	Soil only
Substance:	Gasoline
Qty Leaked:	Not reported
Abate Method:	Not reported
Cross Street:	GRAHAM
Enf Type:	Not reported
Funding:	Not reported
How Discovered:	OM
How Stopped:	Not reported
Leak Cause:	UNK
Leak Source:	UNK
Global ID:	T0606500632
How Stopped Date:	9/26/1998
Enter Date:	3/9/2000
Date Confirmation of Leak Began:	Not reported
Date Preliminary Assessment Began:	9/25/1998
Discover Date:	9/25/1998
Enforcement Date:	Not reported
Close Date:	7/11/2001
Date Prelim Assessment Workplan Submitted:	Not reported
Date Pollution Characterization Began:	Not reported
Date Remediation Plan Submitted:	Not reported
Date Remedial Action Underway:	Not reported
Date Post Remedial Action Monitoring:	Not reported
Enter Date:	3/9/2000
GW Qualifies:	Not reported
Soil Qualifies:	Not reported
Operator:	Not reported
Facility Contact:	Not reported
Interim:	Not reported
Oversite Program:	LUST
Latitude:	33.916963
Longitude:	-117.252416
MTBE Date:	Not reported
Max MTBE GW:	Not reported
MTBE Concentration:	0
Max MTBE Soil:	Not reported
MTBE Fuel:	1
MTBE Tested:	Site NOT Tested for MTBE.Includes Unknown and Not Analyzed.
MTBE Class:	*
Staff:	VJJ
Staff Initials:	BER
Lead Agency:	Local Agency
Local Agency:	33000L
Hydr Basin #:	SAN JACINTO (8-5)
Beneficial:	Not reported
Priority:	Not reported
Cleanup Fund Id:	Not reported
Work Suspended:	No
Summary:	Not reported

RIVERSIDE CO. LUST:
Region: RIVERSIDE

ARCO AM/PM (Continued) **U002244640**

Facility ID: 200016218
Employee: Boltinghous-LOP
Site Closed: Yes
Case Type: Soil only
Facility Status: closed/action completed
Casetype Decode: Soil only is impacted
Fstatus Decode: Closed/Action completed

UST:
Facility ID: PR24412
Permitting Agency: Riverside County Department of Environmental Health
Latitude: 33.91713
Longitude: -117.25226

RIVERSIDE CO. UST:
Region: RIVERSIDE
Total Tanks: 3

C17 WNW 1/4-1/2 0.333 mi. 1756 ft. | **ARCO AM/PM MINI MARKET #5128** | **SWEEPS UST** | **S101590125**
23501 ALESSANDRO BLVD | **CA FID UST** | **N/A**
MORENO VALLEY, CA 92388 | **HIST CORTESE**

Site 2 of 2 in cluster C

Relative: Higher

Actual: 1572 ft.

SWEEPS UST:
Status: Active
Comp Number: 17
Number: 1
Board Of Equalization: 44-000506
Referral Date: 10-21-92
Action Date: 10-21-92
Created Date: 09-14-88
Owner Tank Id: 000077
SWRCB Tank Id: 33-000-000017-000001
Tank Status: A
Capacity: 12000
Active Date: 10-21-92
Tank Use: M.V. FUEL
STG: P
Content: REG UNLEADED
Number Of Tanks: 3

Status: Active
Comp Number: 17
Number: 1
Board Of Equalization: 44-000506
Referral Date: 10-21-92
Action Date: 10-21-92
Created Date: 09-14-88
Owner Tank Id: 000077
SWRCB Tank Id: 33-000-000017-000002
Tank Status: A
Capacity: 12000
Active Date: 10-21-92
Tank Use: M.V. FUEL
STG: P
Content: LEADED

ARCO AM/PM MINI MARKET #5128 (Continued) **S101590125**

Number Of Tanks: Not reported

Status: Active
Comp Number: 17
Number: 1
Board Of Equalization: 44-000506
Referral Date: 10-21-92
Action Date: 10-21-92
Created Date: 09-14-88
Owner Tank Id: 000077
SWRCB Tank Id: 33-000-000017-000003
Tank Status: A
Capacity: 12000
Active Date: 10-21-92
Tank Use: M.V. FUEL
STG: P
Content: REG UNLEADED
Number Of Tanks: Not reported

CA FID UST:
Facility ID: 33004554
Regulated By: UTNKA
Regulated ID: Not reported
Cortese Code: Not reported
SIC Code: Not reported
Facility Phone: Not reported
Mail To: Not reported
Mailing Address: 17315 STUDEBAKER RD
Mailing Address 2: Not reported
Mailing City,St,Zip: MORENO VALLEY 92388
Contact: Not reported
Contact Phone: Not reported
DUNs Number: Not reported
NPDES Number: Not reported
EPA ID: Not reported
Comments: Not reported
Status: Active

HIST CORTESE:
Region: CORTESE
Facility County Code: 33
Reg By: LTNKA
Reg Id: 083303648T

D18 **MOBIL STATION 18-A3E** **LUST** **S105181431**
ENE **24440 ALESSANDRO BLVD** **N/A**
1/4-1/2 **MORENO VALLEY, CA 92553**
0.494 mi.
2607 ft. **Site 1 of 2 in cluster D**

Relative:
Higher

Actual:
1582 ft.

LUST REG 8:
Region: 8
County: Riverside
Regional Board: Santa Ana Region
Facility Status: Leak being confirmed
Case Number: 083303815T
Local Case Num: 200117362

MOBIL STATION 18-A3E (Continued) **S105181431**

Case Type:	Aquifer affected
Substance:	Gasoline
Qty Leaked:	Not reported
Abate Method:	Not reported
Cross Street:	INDIAN AVE
Enf Type:	Not reported
Funding:	Not reported
How Discovered:	Subsurface Monitoring
How Stopped:	Not reported
Leak Cause:	UNK
Leak Source:	UNK
Global ID:	T0606599291
How Stopped Date:	3/2/2001
Enter Date:	Not reported
Date Confirmation of Leak Began:	3/2/2001
Date Preliminary Assessment Began:	Not reported
Discover Date:	3/2/2001
Enforcement Date:	Not reported
Close Date:	Not reported
Date Prelim Assessment Workplan Submitted:	Not reported
Date Pollution Characterization Began:	Not reported
Date Remediation Plan Submitted:	Not reported
Date Remedial Action Underway:	Not reported
Date Post Remedial Action Monitoring:	Not reported
Enter Date:	Not reported
GW Qualifies:	=
Soil Qualifies:	=
Operator:	Not reported
Facility Contact:	Not reported
Interim:	Not reported
Oversite Program:	LUST
Latitude:	33.917437
Longitude:	-117.236468
MTBE Date:	5/14/2004
Max MTBE GW:	281000
MTBE Concentration:	0
Max MTBE Soil:	38000
MTBE Fuel:	1
MTBE Tested:	MTBE Detected. Site tested for MTBE & MTBE detected
MTBE Class:	*
Staff:	RS
Staff Initials:	SCB
Lead Agency:	Local Agency
Local Agency:	33000L
Hydr Basin #:	SAN JACINTO (8-5)
Beneficial:	Not reported
Priority:	Not reported
Cleanup Fund Id:	Not reported
Work Suspended:	Not reported
Summary:	Haz Mat incident report filed

D19 ENE 1/4-1/2 0.494 mi. 2607 ft. | **EXXON MOBIL OIL CORP**
24440 ALESSANDRO BLVD
MORENO VALLEY, CA 92553 | **RCRA-LQG LUST FINDS** | **1007200118 CAL000055779**

Site 2 of 2 in cluster D

Relative: Higher

Actual: 1582 ft.

RCRA-LQG:

Date form received by agency:	02/28/2002
Facility name:	EXXON MOBIL OIL CORP
Facility address:	24440 ALESSANDRO BLVD MORENO VALLEY, CA 92553
EPA ID:	CAL000055779
Mailing address:	12265 W BAYAUD AVE LAKEWOOD, CO 80228
Contact:	JOHN HOOVER
Contact address:	Not reported Not reported
Contact country:	US
Contact telephone:	(800) 253-8054
Contact email:	Not reported
EPA Region:	09
Classification:	Large Quantity Generator
Description:	Handler: generates 1,000 kg or more of hazardous waste during any calendar month; or generates more than 1 kg of acutely hazardous waste during any calendar month; or generates more than 100 kg of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month; or generates 1 kg or less of acutely hazardous waste during any calendar month, and accumulates more than 1 kg of acutely hazardous waste at any time; or generates 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulates more than 100 kg of that material at any time

Handler Activities Summary:

U.S. importer of hazardous waste:	No
Mixed waste (haz. and radioactive):	No
Recycler of hazardous waste:	No
Transporter of hazardous waste:	No
Treater, storer or disposer of HW:	No
Underground injection activity:	No
On-site burner exemption:	No
Furnace exemption:	No
Used oil fuel burner:	No
Used oil processor:	No
User oil refiner:	No
Used oil fuel marketer to burner:	No
Used oil Specification marketer:	No
Used oil transfer facility:	No
Used oil transporter:	No

Violation Status: No violations found

LUST:

Region:	STATE
Global Id:	T0606599291
Latitude:	33.9177358751416
Longitude:	-117.23557746041

EXXON MOBIL OIL CORP (Continued) **1007200118**

Case Type:	LUST Cleanup Site
Status:	Open - Verification Monitoring
Status Date:	05/27/2016
Lead Agency:	RIVERSIDE COUNTY LOP
Case Worker:	LS
Local Agency:	RIVERSIDE COUNTY LOP
RB Case Number:	083303815T
LOC Case Number:	200117362
File Location:	Local Agency
Potential Media Affect:	Aquifer used for drinking water supply
Potential Contaminants of Concern:	Gasoline
Site History:	***Data prior to 2005 does not appear in GeoTracker. Consult agency file for all site data*** On February 28, 2001, soil sampling associated with Senate Bill 989 (SB-989) pipe upgrades were collected. TPH-g, benzene, and MtBE were detected in soil samples at concentrations of up to 1,700 ppm, 210 ppb, and 12,000 ppb, respectively. Approximately 50 tons of soil were removed from the site. Soil grab samples indicated TPH-g, ethylbenzene, total xylenes, and MtBE in soil at concentrations up to 2,100 ppm, 3,600 ppm, 74,000 ppb, and 2,200 ppb, Respectively. The site was placed in LOP. . On November 8, 9, and 12, 2001, five soil borings (SB1 through SB5) were advanced and completed as groundwater monitoring wells (MW-1 through MW-5). Groundwater was encountered beneath the site at an average depth of approximately 60 feet bgs. TPH-g was detected in one soil sample, MW-3 at 40 feet bgs, at a concentration of 0.55 ppm. Benzene was detected in one soil sample, MW-3 at 60 feet bgs, at a concentration of 1 ppb. MtBE was detected in a number of the soil samples collected with the maximum concentration of 18 ppm detected in soil sample MW-1 at 35 feet bgs. On May 20 and 21, 2002, five additional soil borings (B-6 through B-10) were advanced. The maximum concentration of MtBE detected, 38 ppm was in soil boring B-7 at 40 feet bgs. From October 1 through October 3, 2002, three additional groundwater monitoring wells (MW-6 through MW-8) were installed. TPH-g was detected in 11 of the 33 soil samples collected, and MtBE was detected in 20 of the 33 soil samples. Benzene, toluene, ethylbenzene and total xylenes (BTEX) were not detected. The maximum concentration of TPH-g in soil, 7.4 ppm, was detected in MW-7 at 45 feet bgs. The maximum concentration of MtBE in soil, 24 ppm was detected in MW-6 at 40 feet bgs. Concentrations of tBA were detected in most of the soil samples collected from MW-6, with the maximum concentration of 26 ppm detected in the sample collected from 30 feet bgs. Soil samples collected from MW-7 and MW-8 were not reported to contain tBA. On September 29 and 30, 2003, three vapor extraction wells (VEW-1 through VEW-3) were installed around the perimeter of the USTs and screened from approximately 18 to 4 feet bgs. No soil samples were taken. On October 4, 2003, a 24-hour SVE test was conducted to evaluate the vapor flow capacity of well VEW-1. The radius of influence (ROI) for VEW-1 was calculated to be approximately 144 feet. Concentrations of TPH-g were detected in all the vapor samples collected at concentrations ranging from 135 ppmv to 198 ppmv. Benzene was not detected. MtBE was detected at concentrations ranging from 320,000 ppbv 1,100,000 ppbv. On February 13, 2004, two borings, B-11 and B-12, were drilled adjacent to VEW-2 and VEW-3, respectively to collect and submit soil samples for chemical analysis. TPH-g and BTEX components were not detected within soil samples collected from soil borings B-11 and B-12. MtBE was detected at concentrations ranging from 1.2 ppm to 4.8 ppm tBA was

EXXON MOBIL OIL CORP (Continued) **1007200118**

detected ranging from 50 ppb to 240 ppb. tAME was detected, ranging from 15 ppb to 49 ppb. From September 20 through September 22, 2004, six additional groundwater monitoring wells (MW-9 through MW-14) were installed at the site. TPH-g was reported at a concentration of 1.1 ppm. Concentrations of MtBE were detected in six samples, ranging from 11 ppb to 1,1 ppm. tBA was detected up to 110 ppb. One additional groundwater monitoring well (MW-17) was installed north of the site. During well installation, toluene, ethylbenzene, and total xylenes were detected at 9 ppm, 21 ppm, and 87 ppm, respectively. Approximately 237 pounds of TPHg and 105 pounds of MTBE were removed. Rebound testing was completed in April and May, 2008. Three confirmation borings, CB-1, CB-2, and CB-3, were advanced May 29 and 30, 2008 to a total depth of 60 feet bgs in the vicinity of VEW-1, VEW-2, and VEW-3, respectively. Groundwater. was encountered at 45. TPHg was ND above the water table in all three borings. All three boring had TPHg levels, up to 2.5 ppm, under the water. Benzene was detected at 0.86J ppb at 55 in boring 3. MTBE was detected under the water table in all three wells, with levels up to 3.7 ppm in CB-1 and up to 2.5 in CB-2. TBA was detected in boring 1 and 2 under the water table. CB01 had up to 10 ppm and CB-2 had up to 8.5 ppm. Waterloo oxygen emitters have been operating at the site in MW-1 and MW-6 since January 2008 until March 2016. Groundwater has been sampled quarterly since Dec. 2001. Quarterly groundwater overpurging conducted starting in Nov. 2010 using wells MW-1, MW-2, and MW-6 until March 2016. A total of 7924 gallons of groundwater were removed. Two hydropunch borings were advanced off-site on the south side of Alessandro Blvd on March 10, 2011. Groundwater grab samples were taken at 55 in HP-1 and at 50 in HP-2. No TPHg, or BTEX were detected in HP-1, however 0.42 ppb MTBE was detected. HP-2 had 100 ppb TPHg, 0.41J ppb benzene, 0.35J ppb toluene, 4.3J ppb TBA, 74 ppb ethanol, 7.5J ppb 2-butanone, 0.51J ppb chloromethane. Based on the low gw concentrations from the off-site borings, Kleinfelder felt the hydrocarbon concentrations south of the site have been adequately assessed and installation of monitoring wells does not appear to be warranted. Two post overpurging groundwater sampling events are to be conducted. The September 2016 event went from 2000 ppb TPHG just before the purging was discontinued to 2100 ppb. Benzene was not detected. MTBE went from 2600 ppb just before purging was discontinued to 1900 ppb. TBA went from 800 ppb just before purging was discontinued to 330 ppb

Click here to access the California GeoTracker records for this facility:

Contact:

Global Id:	T0606599291
Contact Type:	Local Agency Caseworker
Contact Name:	LINDA SHURLOW
Organization Name:	RIVERSIDE COUNTY LOP
Address:	47950 Arabia Street, Suite A
City:	Indio
Email:	lshurlow@rivcocha.org
Phone Number:	7608637570

Global Id:	T0606599291
Contact Type:	Regional Board Caseworker
Contact Name:	ROSE SCOTT
Organization Name:	SANTA ANA RWQCB (REGION 8)
Address:	3737 MAIN STREET, SUITE 500

EXXON MOBIL OIL CORP (Continued) **1007200118**

City: RIVERSIDE
Email: rscott@waterboards.ca.gov
Phone Number: 9513206375

Status History:

Global Id: T0606599291
Status: Open - Case Begin Date
Status Date: 02/28/2001

Global Id: T0606599291
Status: Open - Remediation
Status Date: 10/22/2004

Global Id: T0606599291
Status: Open - Remediation
Status Date: 11/02/2004

Global Id: T0606599291
Status: Open - Site Assessment
Status Date: 04/24/2001

Global Id: T0606599291
Status: Open - Site Assessment
Status Date: 11/01/2004

Global Id: T0606599291
Status: Open - Verification Monitoring
Status Date: 05/27/2016

Regulatory Activities:

Global Id: T0606599291
Action Type: ENFORCEMENT
Date: 04/14/2009
Action: File review

Global Id: T0606599291
Action Type: ENFORCEMENT
Date: 07/27/2010
Action: Staff Letter - #RCDEH 072710

Global Id: T0606599291
Action Type: ENFORCEMENT
Date: 05/06/2013
Action: Staff Letter - #RCDEH 050613

Global Id: T0606599291
Action Type: Other
Date: 03/02/2001
Action: Leak Reported

Global Id: T0606599291
Action Type: RESPONSE
Date: 07/15/2011
Action: Monitoring Report - Quarterly

Global Id: T0606599291

EXXON MOBIL OIL CORP (Continued) **1007200118**

Action Type: RESPONSE
Date: 10/15/2011
Action: Monitoring Report - Quarterly

Global Id: T0606599291
Action Type: RESPONSE
Date: 10/15/2014
Action: Monitoring Report - Quarterly

Global Id: T0606599291
Action Type: RESPONSE
Date: 04/15/2015
Action: Monitoring Report - Annually

Global Id: T0606599291
Action Type: ENFORCEMENT
Date: 10/22/2008
Action: File review

Global Id: T0606599291
Action Type: ENFORCEMENT
Date: 06/21/2010
Action: Technical Correspondence / Assistance / Other - #RCDEH 062110

Global Id: T0606599291
Action Type: ENFORCEMENT
Date: 07/31/2009
Action: Staff Letter - #RCDEH073109

Global Id: T0606599291
Action Type: RESPONSE
Date: 01/15/2010
Action: Monitoring Report - Quarterly

Global Id: T0606599291
Action Type: RESPONSE
Date: 10/15/2009
Action: Monitoring Report - Quarterly

Global Id: T0606599291
Action Type: RESPONSE
Date: 04/15/2010
Action: Monitoring Report - Annually

Global Id: T0606599291
Action Type: RESPONSE
Date: 07/15/2010
Action: Monitoring Report - Quarterly

Global Id: T0606599291
Action Type: RESPONSE
Date: 10/15/2010
Action: Monitoring Report - Quarterly

Global Id: T0606599291
Action Type: ENFORCEMENT
Date: 07/09/2007

EXXON MOBIL OIL CORP (Continued) **1007200118**

Action: File review

Global Id: T0606599291
Action Type: ENFORCEMENT
Date: 03/11/2013
Action: Technical Correspondence / Assistance / Other - #RCDEH 031113

Global Id: T0606599291
Action Type: ENFORCEMENT
Date: 08/21/2008
Action: Technical Correspondence / Assistance / Other

Global Id: T0606599291
Action Type: RESPONSE
Date: 04/15/2007
Action: Monitoring Report - Quarterly

Global Id: T0606599291
Action Type: RESPONSE
Date: 07/15/2007
Action: Monitoring Report - Quarterly

Global Id: T0606599291
Action Type: RESPONSE
Date: 10/15/2007
Action: Monitoring Report - Quarterly

Global Id: T0606599291
Action Type: RESPONSE
Date: 07/15/2015
Action: Monitoring Report - Quarterly

Global Id: T0606599291
Action Type: RESPONSE
Date: 04/15/2016
Action: Monitoring Report - Quarterly

Global Id: T0606599291
Action Type: ENFORCEMENT
Date: 04/30/2008
Action: File review

Global Id: T0606599291
Action Type: ENFORCEMENT
Date: 02/19/2008
Action: Technical Correspondence / Assistance / Other - #021908

Global Id: T0606599291
Action Type: ENFORCEMENT
Date: 12/15/2016
Action: File review - #RCDEH site summary

Global Id: T0606599291
Action Type: ENFORCEMENT
Date: 07/10/2009
Action: File review

EXXON MOBIL OIL CORP (Continued) **1007200118**

Global Id: T0606599291
Action Type: ENFORCEMENT
Date: 04/26/2010
Action: Staff Letter - #RCDEH 042610

Global Id: T0606599291
Action Type: ENFORCEMENT
Date: 06/01/2016
Action: Technical Correspondence / Assistance / Other - #RCDEH 060116

Global Id: T0606599291
Action Type: Other
Date: 02/28/2001
Action: Leak Stopped

Global Id: T0606599291
Action Type: RESPONSE
Date: 01/15/2011
Action: Monitoring Report - Quarterly

Global Id: T0606599291
Action Type: RESPONSE
Date: 10/15/2015
Action: Monitoring Report - Quarterly

Global Id: T0606599291
Action Type: ENFORCEMENT
Date: 06/21/2010
Action: Technical Correspondence / Assistance / Other - #062110

Global Id: T0606599291
Action Type: ENFORCEMENT
Date: 08/01/2008
Action: Technical Correspondence / Assistance / Other

Global Id: T0606599291
Action Type: ENFORCEMENT
Date: 09/22/2010
Action: Staff Letter - #RCDEH 092210

Global Id: T0606599291
Action Type: ENFORCEMENT
Date: 09/15/2011
Action: Technical Correspondence / Assistance / Other - #RCDEH 091511

Global Id: T0606599291
Action Type: RESPONSE
Date: 10/15/2016
Action: Monitoring Report - Quarterly

Global Id: T0606599291
Action Type: ENFORCEMENT
Date: 01/14/2009
Action: File review

Global Id: T0606599291
Action Type: ENFORCEMENT

EXXON MOBIL OIL CORP (Continued) **1007200118**

Date: 03/06/2008
Action: File review

Global Id: T0606599291
Action Type: RESPONSE
Date: 04/15/2011
Action: Monitoring Report - Annually

Global Id: T0606599291
Action Type: RESPONSE
Date: 04/15/2012
Action: Monitoring Report - Annually

Global Id: T0606599291
Action Type: RESPONSE
Date: 10/15/2012
Action: Monitoring Report - Quarterly

Global Id: T0606599291
Action Type: RESPONSE
Date: 01/02/2013
Action: Pilot Study / Treatability Workplan - Regulator Responded

Global Id: T0606599291
Action Type: ENFORCEMENT
Date: 06/19/2014
Action: Staff Letter - #RCDEH 061914

Global Id: T0606599291
Action Type: ENFORCEMENT
Date: 04/05/2016
Action: File review - #RCDEH upload site file 4/5/2016

Global Id: T0606599291
Action Type: RESPONSE
Date: 01/15/2012
Action: Monitoring Report - Quarterly

Global Id: T0606599291
Action Type: RESPONSE
Date: 04/15/2013
Action: Monitoring Report - Quarterly

Global Id: T0606599291
Action Type: RESPONSE
Date: 10/15/2013
Action: Monitoring Report - Quarterly

Global Id: T0606599291
Action Type: RESPONSE
Date: 04/15/2014
Action: Monitoring Report - Annually

Global Id: T0606599291
Action Type: Other
Date: 03/02/2001
Action: Leak Discovery

EXXON MOBIL OIL CORP (Continued) **1007200118**

Global Id: T0606599291
Action Type: RESPONSE
Date: 01/15/2015
Action: Monitoring Report - Quarterly

Global Id: T0606599291
Action Type: REMEDIATION
Date: 02/28/2001
Action: Excavation

Global Id: T0606599291
Action Type: REMEDIATION
Date: 10/22/2004
Action: Soil Vapor Extraction (SVE)

Global Id: T0606599291
Action Type: REMEDIATION
Date: 01/01/2008
Action: Other (Use Description Field)

Global Id: T0606599291
Action Type: REMEDIATION
Date: 11/01/2010
Action: Pump & Treat (P&T) Groundwater

RIVERSIDE CO. LUST:
Region: RIVERSIDE
Facility ID: 200117362
Employee: Shurlow-LOP
Site Closed: Not Closed
Case Type: Drinking Water Aquifer affected
Facility Status: 5C
Casetype Decode: An Aquifer used for Drinking Water supply has been contaminated.
Fstatus Decode: Not reported

FINDS:

Registry ID: 110055673604

Environmental Interest/Information System
STATE MASTER

Click this hyperlink while viewing on your computer to access additional FINDS: detail in the EDR Site Report.

20 East 1/2-1 0.517 mi. 2728 ft. | **RANCHO VERDE HIGH ADDITION**
17750 LA SALLE STREET
MORENO VALLEY, CA 92553 | **ENVIROSTOR SCH** | **S118756751 N/A**

Relative: Higher

Actual: 1573 ft.

ENVIROSTOR:

Facility ID:	33820009
Status:	No Action Required
Status Date:	12/14/2000
Site Code:	404134
Site Type:	School Investigation
Site Type Detailed:	School
Acres:	Not reported
NPL:	NO
Regulatory Agencies:	DTSC
Lead Agency:	DTSC
Program Manager:	Not reported
Supervisor:	Javier Hinojosa
Division Branch:	Southern California Schools & Brownfields Outreach
Assembly:	61
Senate:	31
Special Program:	Not reported
Restricted Use:	NO
Site Mgmt Req:	NONE SPECIFIED
Funding:	School District
Latitude:	33.91571
Longitude:	-117.2350
APN:	NONE SPECIFIED
Past Use:	* EDUCATIONAL SERVICES
Potential COC:	NONE SPECIFIED No Contaminants found
Confirmed COC:	NONE SPECIFIED
Potential Description:	NMA
Alias Name:	RANCHO VERDE HIGH SCHOOL ADDITION
Alias Type:	Alternate Name
Alias Name:	VAL VERDE UNIFIED SCHOOL DISTRICT
Alias Type:	Alternate Name
Alias Name:	VAL VERDE USD-RANCHO VERDE HI SCH
Alias Type:	Alternate Name
Alias Name:	404134
Alias Type:	Project Code (Site Code)
Alias Name:	33820009
Alias Type:	Envirostor ID Number

Completed Info:

Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Cost Recovery Closeout Memo
Completed Date:	11/22/2000
Comments:	CRU Memo completed.
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Phase 1
Completed Date:	12/14/2000
Comments:	Not reported
Future Area Name:	Not reported
Future Sub Area Name:	Not reported
Future Document Type:	Not reported

RANCHO VERDE HIGH ADDITION (Continued) **S118756751**

Future Due Date:	Not reported
Schedule Area Name:	Not reported
Schedule Sub Area Name:	Not reported
Schedule Document Type:	Not reported
Schedule Due Date:	Not reported
Schedule Revised Date:	Not reported

SCH:

Facility ID:	33820009
Site Type:	School Investigation
Site Type Detail:	School
Site Mgmt. Req.:	NONE SPECIFIED
Acres:	Not reported
National Priorities List:	NO
Cleanup Oversight Agencies:	DTSC
Lead Agency:	DTSC
Lead Agency Description:	* DTSC
Project Manager:	Not reported
Supervisor:	Javier Hinojosa
Division Branch:	Southern California Schools & Brownfields Outreach
Site Code:	404134
Assembly:	61
Senate:	31
Special Program Status:	Not reported
Status:	No Action Required
Status Date:	12/14/2000
Restricted Use:	NO
Funding:	School District
Latitude:	33.91571
Longitude:	-117.2350
APN:	NONE SPECIFIED
Past Use:	* EDUCATIONAL SERVICES
Potential COC:	NONE SPECIFIED, No Contaminants found
Confirmed COC:	NONE SPECIFIED
Potential Description:	NMA
Alias Name:	RANCHO VERDE HIGH SCHOOL ADDITION
Alias Type:	Alternate Name
Alias Name:	VAL VERDE UNIFIED SCHOOL DISTRICT
Alias Type:	Alternate Name
Alias Name:	VAL VERDE USD-RANCHO VERDE HI SCH
Alias Type:	Alternate Name
Alias Name:	404134
Alias Type:	Project Code (Site Code)
Alias Name:	33820009
Alias Type:	Envirostor ID Number

Completed Info:

Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Cost Recovery Closeout Memo
Completed Date:	11/22/2000
Comments:	CRU Memo completed.
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Phase 1

RANCHO VERDE HIGH ADDITION (Continued) **S118756751**

Completed Date:	12/14/2000
Comments:	Not reported
Future Area Name:	Not reported
Future Sub Area Name:	Not reported
Future Document Type:	Not reported
Future Due Date:	Not reported
Schedule Area Name:	Not reported
Schedule Sub Area Name:	Not reported
Schedule Document Type:	Not reported
Schedule Due Date:	Not reported
Schedule Revised Date:	Not reported

21
SE
1/2-1
0.625 mi.
3299 ft.

PROPOSED ALTERNATIVE SCHOOL SITE **ENVIROSTOR** **S108407566**
SEC CACTUS AVENUE AND INDIAN STREET **SCH** **N/A**
MORENO VALLEY, CA 92553

Relative:
Lower

Actual:
1553 ft.

ENVIROSTOR:

Facility ID:	60000563
Status:	No Further Action
Status Date:	12/04/2007
Site Code:	404735
Site Type:	School Investigation
Site Type Detailed:	School
Acres:	8.19
NPL:	NO
Regulatory Agencies:	SMBRP
Lead Agency:	SMBRP
Program Manager:	Aslam Shareef
Supervisor:	Shahir Haddad
Division Branch:	Southern California Schools & Brownfields Outreach
Assembly:	61
Senate:	31
Special Program:	Not reported
Restricted Use:	NO
Site Mgmt Req:	NONE SPECIFIED
Funding:	School District
Latitude:	33.9094
Longitude:	-117.2342
APN:	NONE SPECIFIED
Past Use:	AGRICULTURAL - ROW CROPS, ENGINE TESTING/REPAIR, EQUIPMENT/INSTRUMENT REPAIR, MACHINE SHOP
Potential COC:	Arsenic Benzene Chlordane DDD DDE DDT Lead TPH-diesel TPH-gas TPH-JET FUEL TPH-MOTOR OIL Cobalt Nickel Toluene Xylenes
Confirmed COC:	30550-NO 30024-NO 30025-NO 30154-NO 30407-NO 30001-NO 30003-NO 30004-NO 30006-NO 30007-NO 30008-NO 30013-NO 3002501-NO 3002502-NO 30593-NO
Potential Description:	SOIL, SV
Alias Name:	404735
Alias Type:	Project Code (Site Code)
Alias Name:	60000563
Alias Type:	Envirostor ID Number

Completed Info:

Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported

PROPOSED ALTERNATIVE SCHOOL SITE (Continued) **S108407566**

Completed Document Type: Cost Recovery Closeout Memo
Completed Date: 12/04/2007
Comments: Project close out Cost Recovery Unit Memorandum .

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Preliminary Endangerment Assessment Workplan
Completed Date: 06/21/2007
Comments: PEA Workplan approval sent to the district on June 21, 2007

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Phase 1
Completed Date: 03/08/2007
Comments: Received Phase I report as background information for upcoming PEA.

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Preliminary Endangerment Assessment Report
Completed Date: 12/04/2007
Comments: PEA approval sent to the RP

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Environmental Oversight Agreement
Completed Date: 03/15/2007
Comments: Signed Agreement sent (FedEx) to District.

Future Area Name: Not reported
Future Sub Area Name: Not reported
Future Document Type: Not reported
Future Due Date: Not reported
Schedule Area Name: Not reported
Schedule Sub Area Name: Not reported
Schedule Document Type: Not reported
Schedule Due Date: Not reported
Schedule Revised Date: Not reported

SCH:

Facility ID: 60000563
Site Type: School Investigation
Site Type Detail: School
Site Mgmt. Req.: NONE SPECIFIED
Acres: 8.19
National Priorities List: NO
Cleanup Oversight Agencies: SMBRP
Lead Agency: SMBRP
Lead Agency Description: DTSC - Site Cleanup Program
Project Manager: Aslam Shareef
Supervisor: Shahir Haddad
Division Branch: Southern California Schools & Brownfields Outreach
Site Code: 404735
Assembly: 61
Senate: 31
Special Program Status: Not reported
Status: No Further Action

PROPOSED ALTERNATIVE SCHOOL SITE (Continued) **S108407566**

Status Date: 12/04/2007
Restricted Use: NO
Funding: School District
Latitude: 33.9094
Longitude: -117.2342
APN: NONE SPECIFIED
Past Use: AGRICULTURAL - ROW CROPS, ENGINE TESTING/REPAIR, EQUIPMENT/INSTRUMENT REPAIR, MACHINE SHOP
Potential COC: Arsenic, Benzene, Chlordane, DDD, DDE, DDT, Lead, TPH-diesel, TPH-gas, TPH-JET FUEL, TPH-MOTOR OIL, Cobalt, Nickel, Toluene, Xylenes
Not reported
Confirmed COC: 30550-NO, 30024-NO, 30025-NO, 30154-NO, 30407-NO, 30001-NO, 30003-NO, 30004-NO, 30006-NO, 30007-NO, 30008-NO, 30013-NO, 3002501-NO, 3002502-NO, 30593-NO
Potential Description: SOIL, SV
Alias Name: 404735
Alias Type: Project Code (Site Code)
Alias Name: 60000563
Alias Type: Envirostor ID Number

Completed Info:

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Cost Recovery Closeout Memo
Completed Date: 12/04/2007
Comments: Project close out Cost Recovery Unit Memorandum .

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Preliminary Endangerment Assessment Workplan
Completed Date: 06/21/2007
Comments: PEA Workplan approval sent to the district on June 21, 2007

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Phase 1
Completed Date: 03/08/2007
Comments: Received Phase I report as background information for upcoming PEA.

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Preliminary Endangerment Assessment Report
Completed Date: 12/04/2007
Comments: PEA approval sent to the RP

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Environmental Oversight Agreement
Completed Date: 03/15/2007
Comments: Signed Agreement sent (FedEx) to District.

Future Area Name: Not reported
Future Sub Area Name: Not reported
Future Document Type: Not reported
Future Due Date: Not reported
Schedule Area Name: Not reported
Schedule Sub Area Name: Not reported
Schedule Document Type: Not reported

PROPOSED ALTERNATIVE SCHOOL SITE (Continued) **S108407566**

Schedule Due Date: Not reported
Schedule Revised Date: Not reported

22
North
1/2-1
0.819 mi.
4323 ft.

ELEMENTARY SCHOOL NO. 26
HEACOCK STREET/ATWOOD AVENUE
MORENO VALLEY, CA 92553

ENVIROSTOR **S118756833**
SCH **N/A**

Relative:
Higher

Actual:
1610 ft.

ENVIROSTOR:
Facility ID: 36880002
Status: No Action Required
Status Date: 10/08/2004
Site Code: 404568
Site Type: School Investigation
Site Type Detailed: School
Acres: 10.5
NPL: NO
Regulatory Agencies: DTSC
Lead Agency: DTSC
Program Manager: Amit Pathak
Supervisor: Shahir Haddad
Division Branch: Southern California Schools & Brownfields Outreach
Assembly: 61
Senate: 31
Special Program: Not reported
Restricted Use: NO
Site Mgmt Req: NONE SPECIFIED
Funding: School District
Latitude: 33.9289
Longitude: -117.2424
APN: NONE SPECIFIED
Past Use: RESIDENTIAL AREA
Potential COC: NONE SPECIFIED No Contaminants found
Confirmed COC: NONE SPECIFIED
Potential Description: NMA
Alias Name: MORENO VALLEY USD-PRPSD ELEM SCHOOL # 26
Alias Type: Alternate Name
Alias Name: 404568
Alias Type: Project Code (Site Code)
Alias Name: 36880002
Alias Type: Envirostor ID Number

Completed Info:
Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Phase 1
Completed Date: 10/08/2004
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Cost Recovery Closeout Memo
Completed Date: 12/10/2004
Comments: Not reported

Future Area Name: Not reported
Future Sub Area Name: Not reported

ELEMENTARY SCHOOL NO. 26 (Continued) **S118756833**

Future Document Type:	Not reported
Future Due Date:	Not reported
Schedule Area Name:	Not reported
Schedule Sub Area Name:	Not reported
Schedule Document Type:	Not reported
Schedule Due Date:	Not reported
Schedule Revised Date:	Not reported

SCH:

Facility ID:	36880002
Site Type:	School Investigation
Site Type Detail:	School
Site Mgmt. Req.:	NONE SPECIFIED
Acres:	10.5
National Priorities List:	NO
Cleanup Oversight Agencies:	DTSC
Lead Agency:	DTSC
Lead Agency Description:	* DTSC
Project Manager:	Amit Pathak
Supervisor:	Shahir Haddad
Division Branch:	Southern California Schools & Brownfields Outreach
Site Code:	404568
Assembly:	61
Senate:	31
Special Program Status:	Not reported
Status:	No Action Required
Status Date:	10/08/2004
Restricted Use:	NO
Funding:	School District
Latitude:	33.9289
Longitude:	-117.2424
APN:	NONE SPECIFIED
Past Use:	RESIDENTIAL AREA
Potential COC:	NONE SPECIFIED, No Contaminants found
Confirmed COC:	NONE SPECIFIED
Potential Description:	NMA
Alias Name:	MORENO VALLEY USD-PRPSD ELEM SCHOOL # 26
Alias Type:	Alternate Name
Alias Name:	404568
Alias Type:	Project Code (Site Code)
Alias Name:	36880002
Alias Type:	Envirostor ID Number

Completed Info:

Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Phase 1
Completed Date:	10/08/2004
Comments:	Not reported

Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Cost Recovery Closeout Memo
Completed Date:	12/10/2004
Comments:	Not reported

ELEMENTARY SCHOOL NO. 26 (Continued) **S118756833**

Future Area Name:	Not reported
Future Sub Area Name:	Not reported
Future Document Type:	Not reported
Future Due Date:	Not reported
Schedule Area Name:	Not reported
Schedule Sub Area Name:	Not reported
Schedule Document Type:	Not reported
Schedule Due Date:	Not reported
Schedule Revised Date:	Not reported

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23 ENE 1/2-1 0.862 mi. 4552 ft.

BAY AVENUE ELEMENTARY SCHOOL
24801 BAY AVENUE
MORENO VALLEY, CA 92553

ENVIROSTOR SCH **S105628794 N/A**

Relative: Higher

Actual: 1583 ft.

ENVIROSTOR:

Facility ID:	33820010
Status:	No Further Action
Status Date:	08/19/2003
Site Code:	404308
Site Type:	School Investigation
Site Type Detailed:	School
Acres:	8
NPL:	NO
Regulatory Agencies:	DTSC
Lead Agency:	DTSC
Program Manager:	Not reported
Supervisor:	Javier Hinojosa
Division Branch:	Southern California Schools & Brownfields Outreach
Assembly:	61
Senate:	31
Special Program:	Not reported
Restricted Use:	NO
Site Mgmt Req:	NONE SPECIFIED
Funding:	School District
Latitude:	33.91837
Longitude:	-117.2151
APN:	NONE SPECIFIED
Past Use:	* EDUCATIONAL SERVICES, AGRICULTURAL - ROW CROPS
Potential COC:	DDD DDE DDT
Confirmed COC:	30006-NO 30007-NO 30008-NO
Potential Description:	SOIL
Alias Name:	AKA: RAMONA ELEM SCHOOL
Alias Type:	Alternate Name
Alias Name:	BAY AVENUE ELEMENTARY SCHOOL
Alias Type:	Alternate Name
Alias Name:	MORENO VALLEY UNIFIED SCHOOL DISTRICT
Alias Type:	Alternate Name
Alias Name:	MORENO VALLEY USD-BAY AVENUE ELEM SCHOOL
Alias Type:	Alternate Name
Alias Name:	404308
Alias Type:	Project Code (Site Code)
Alias Name:	33820010
Alias Type:	Envirostor ID Number

Completed Info:

Completed Area Name:	PROJECT WIDE

BAY AVENUE ELEMENTARY SCHOOL (Continued) **S105628794**

Completed Sub Area Name: Not reported
Completed Document Type: Cost Recovery Closeout Memo
Completed Date: 09/08/2003
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Environmental Oversight Agreement
Completed Date: 01/31/2002
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Site Inspections/Visit (Non LUR)
Completed Date: 03/14/2002
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Preliminary Endangerment Assessment Report
Completed Date: 08/19/2003
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Technical Report
Completed Date: 05/10/2002
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: * Workplan
Completed Date: 12/24/2002
Comments: Not reported

Future Area Name: Not reported
Future Sub Area Name: Not reported
Future Document Type: Not reported
Future Due Date: Not reported
Schedule Area Name: Not reported
Schedule Sub Area Name: Not reported
Schedule Document Type: Not reported
Schedule Due Date: Not reported
Schedule Revised Date: Not reported

SCH:

Facility ID: 33820010
Site Type: School Investigation
Site Type Detail: School
Site Mgmt. Req.: NONE SPECIFIED
Acres: 8
National Priorities List: NO
Cleanup Oversight Agencies: DTSC
Lead Agency: DTSC
Lead Agency Description: * DTSC
Project Manager: Not reported

BAY AVENUE ELEMENTARY SCHOOL (Continued) **S105628794**

Supervisor:	Javier Hinojosa
Division Branch:	Southern California Schools & Brownfields Outreach
Site Code:	404308
Assembly:	61
Senate:	31
Special Program Status:	Not reported
Status:	No Further Action
Status Date:	08/19/2003
Restricted Use:	NO
Funding:	School District
Latitude:	33.91837
Longitude:	-117.2151
APN:	NONE SPECIFIED
Past Use:	* EDUCATIONAL SERVICES, AGRICULTURAL - ROW CROPS
Potential COC:	DDD, DDE, DDT
Confirmed COC:	30006-NO, 30007-NO, 30008-NO
Potential Description:	SOIL
Alias Name:	AKA: RAMONA ELEM SCHOOL
Alias Type:	Alternate Name
Alias Name:	BAY AVENUE ELEMENTARY SCHOOL
Alias Type:	Alternate Name
Alias Name:	MORENO VALLEY UNIFIED SCHOOL DISTRICT
Alias Type:	Alternate Name
Alias Name:	MORENO VALLEY USD-BAY AVENUE ELEM SCHOOL
Alias Type:	Alternate Name
Alias Name:	404308
Alias Type:	Project Code (Site Code)
Alias Name:	33820010
Alias Type:	Envirostor ID Number

Completed Info:

Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Cost Recovery Closeout Memo
Completed Date:	09/08/2003
Comments:	Not reported
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Environmental Oversight Agreement
Completed Date:	01/31/2002
Comments:	Not reported
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Site Inspections/Visit (Non LUR)
Completed Date:	03/14/2002
Comments:	Not reported
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Preliminary Endangerment Assessment Report
Completed Date:	08/19/2003
Comments:	Not reported
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Technical Report

BAY AVENUE ELEMENTARY SCHOOL (Continued) **S105628794**

Completed Date:	05/10/2002
Comments:	Not reported
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	* Workplan
Completed Date:	12/24/2002
Comments:	Not reported
Future Area Name:	Not reported
Future Sub Area Name:	Not reported
Future Document Type:	Not reported
Future Due Date:	Not reported
Schedule Area Name:	Not reported
Schedule Sub Area Name:	Not reported
Schedule Document Type:	Not reported
Schedule Due Date:	Not reported
Schedule Revised Date:	Not reported

24
West
1/2-1
0.870 mi.
4594 ft.

RIVERSIDE COUNTY DEPT OF WASTE RESOURCES **ENVIROSTOR** **S109348567**
14310 FREDERICK STREET **HWT** **N/A**
MORENO VALLEY, CA 92553

Relative:
Lower

Actual:
1564 ft.

ENVIROSTOR:

Facility ID:	80000870
Status:	Inactive - Action Required
Status Date:	11/30/2010
Site Code:	401438
Site Type:	Military Evaluation
Site Type Detailed:	FUDS
Acres:	53.3
NPL:	NO
Regulatory Agencies:	SMBRP
Lead Agency:	SMBRP
Program Manager:	Daniel Cordero
Supervisor:	Manny Alonzo
Division Branch:	Cleanup Cypress
Assembly:	61
Senate:	31
Special Program:	Not reported
Restricted Use:	NO
Site Mgmt Req:	NONE SPECIFIED
Funding:	DERA
Latitude:	33.89166
Longitude:	-117.2597
APN:	NONE SPECIFIED
Past Use:	FIRING RANGE - SMALL ARMS ETC...
Potential COC:	Explosives (UXO, MEC Munitions Debris (MD
Confirmed COC:	30011-NO 32000-NO
Potential Description:	SOIL
Alias Name:	CA99799F999100
Alias Type:	Federal Facility ID
Alias Name:	J09CA7168
Alias Type:	INPR
Alias Name:	401438
Alias Type:	Project Code (Site Code)

RIVERSIDE COUNTY DEPT OF WASTE RESOURCES (Continued) **S109348567**

Alias Name: 80000870
Alias Type: Envirostor ID Number

Completed Info:
Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Preliminary Endangerment Assessment Tech Memo
Completed Date: 03/02/2009
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Preliminary Endangerment Assessment Workplan
Completed Date: 07/02/2009
Comments: Final site specific work plan received.

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Preliminary Assessment/Site Inspection Report (PA/SI)
Completed Date: 07/22/2009
Comments: Comments included the SI phase of this project is done.

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Correspondence
Completed Date: 09/14/1998
Comments: Not reported

Future Area Name: Not reported
Future Sub Area Name: Not reported
Future Document Type: Not reported
Future Due Date: Not reported
Schedule Area Name: Not reported
Schedule Sub Area Name: Not reported
Schedule Document Type: Not reported
Schedule Due Date: Not reported
Schedule Revised Date: Not reported

HWT:
Reg Num: 3450
Expiration Date: 06/30/2017

25
SE
1/2-1
0.897 mi.
4737 ft.

BADGER SPRINGS MIDDLE SCHOOL EXPANSION **ENVIROSTOR** **S105089230**
24750 DELPHINIUM AVENUE **SCH** **N/A**
MORENO VALLEY, CA 92553

Relative:
Lower

Actual:
1549 ft.

ENVIROSTOR:
Facility ID: 60000826
Status: No Further Action
Status Date: 06/24/2008
Site Code: 404778
Site Type: School Investigation
Site Type Detailed: School
Acres: 0.21
NPL: NO
Regulatory Agencies: SMBRP

BADGER SPRINGS MIDDLE SCHOOL EXPANSION (Continued) **S105089230**

Lead Agency:	SMBRP
Program Manager:	Not reported
Supervisor:	Shahir Haddad
Division Branch:	Southern California Schools & Brownfields Outreach
Assembly:	61
Senate:	31
Special Program:	Not reported
Restricted Use:	NO
Site Mgmt Req:	NONE SPECIFIED
Funding:	School District
Latitude:	33.90641
Longitude:	-117.2318
APN:	NONE SPECIFIED
Past Use:	AGRICULTURAL - ROW CROPS, SCHOOL - ELEMENTARY
Potential COC:	Arsenic Chlordane DDD DDE DDT Endrin Toxaphene Arsenic Chlordane DDD DDE DDT Toxaphene
Confirmed COC:	Not reported
Potential Description:	SOIL, SOIL
Alias Name:	404778
Alias Type:	Project Code (Site Code)
Alias Name:	60000826
Alias Type:	Envirostor ID Number

Completed Info:

Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Environmental Oversight Agreement
Completed Date:	03/04/2008
Comments:	Agreement signed by Branch Chief, Sharon Fair . Copy sent to District. Not reported

Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Cost Recovery Closeout Memo
Completed Date:	06/27/2008
Comments:	Not reported

Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Preliminary Endangerment Assessment Workplan
Completed Date:	03/20/2008
Comments:	DTSC concurred with the proposed sampling approach.

Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Preliminary Endangerment Assessment Report
Completed Date:	06/24/2008
Comments:	PEA Report approved with No Further Action determination.

Future Area Name:	Not reported
Future Sub Area Name:	Not reported
Future Document Type:	Not reported
Future Due Date:	Not reported
Schedule Area Name:	Not reported
Schedule Sub Area Name:	Not reported
Schedule Document Type:	Not reported
Schedule Due Date:	Not reported
Schedule Revised Date:	Not reported

BADGER SPRINGS MIDDLE SCHOOL EXPANSION (Continued) **S105089230**

SCH:

Facility ID:	60000826
Site Type:	School Investigation
Site Type Detail:	School
Site Mgmt. Req.:	NONE SPECIFIED
Acres:	0.21
National Priorities List:	NO
Cleanup Oversight Agencies:	SMBRP
Lead Agency:	SMBRP
Lead Agency Description:	DTSC - Site Cleanup Program
Project Manager:	Not reported
Supervisor:	Shahir Haddad
Division Branch:	Southern California Schools & Brownfields Outreach
Site Code:	404778
Assembly:	61
Senate:	31
Special Program Status:	Not reported
Status:	No Further Action
Status Date:	06/24/2008
Restricted Use:	NO
Funding:	School District
Latitude:	33.90641
Longitude:	-117.2318
APN:	NONE SPECIFIED
Past Use:	AGRICULTURAL - ROW CROPS, SCHOOL - ELEMENTARY
Potential COC:	Arsenic, Chlordane, DDD, DDE, DDT, Endrin, Toxaphene, Arsenic, Chlordane, DDD, DDE, DDT, Toxaphene

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26
West
1/2-1
0.924 mi.
4878 ft.

MARCH FIELD SKEET RANGE **UXO** **1018150389**
N/A

NO CITY, CA

Relative:
Lower

Actual:
1563 ft.

UXO:

DoD Component:	FUDS
Sort Order:	5
Installation Name:	MARCH FIELD
Facility Address 2:	Not reported
Site ID:	01OEW
Site Type:	Trap and Skeet Range
Latitude:	33.913799
Longitude:	-117.262001

27
SE
1/2-1
0.972 mi.
5131 ft.

CHAPARRAL ELEMENTARY SCHOOL **ENVIROSTOR** **S118756708**
24850 DELPHINIUM AVENUE **SCH** **N/A**
MORENO VALLEY, CA 92553

Relative:
Lower

Actual:
1549 ft.

ENVIROSTOR:

Facility ID:	33010055
Status:	No Action Required
Status Date:	03/28/2002
Site Code:	404309
Site Type:	School Investigation

CHAPARRAL ELEMENTARY SCHOOL (Continued) **S118756708**

Site Type Detailed: School
Acres: 9
NPL: NO
Regulatory Agencies: SMBRP
Lead Agency: SMBRP
Program Manager: Not reported
Supervisor: Mark Malinowski
Division Branch: Southern California Schools & Brownfields Outreach
Assembly: 61
Senate: 31
Special Program: Not reported
Restricted Use: NO
Site Mgmt Req: NONE SPECIFIED
Funding: School District
Latitude: 33.90708
Longitude: -117.23
APN: NONE SPECIFIED
Past Use: AGRICULTURAL - ROW CROPS
Potential COC: NONE SPECIFIED No Contaminants found
Confirmed COC: NONE SPECIFIED
Potential Description: NMA
Alias Name: CHAPARRAL ELEMENTARY SCHOOL
Alias Type: Alternate Name
Alias Name: MORENO VALLEY UNIFIED SCHOOL DISTRICT
Alias Type: Alternate Name
Alias Name: MORENO VALLEY USD-CHAPARREL ELEM SCHOOL
Alias Type: Alternate Name
Alias Name: 404309
Alias Type: Project Code (Site Code)
Alias Name: 33010055
Alias Type: Envirostor ID Number

Completed Info:
Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Cost Recovery Closeout Memo
Completed Date: 05/16/2002
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Phase 1
Completed Date: 03/28/2002
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Site Inspections/Visit (Non LUR)
Completed Date: 03/14/2002
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Environmental Oversight Agreement
Completed Date: 01/31/2002
Comments: Not reported

Future Area Name: Not reported

CHAPARRAL ELEMENTARY SCHOOL (Continued) **S118756708**

Future Sub Area Name:	Not reported
Future Document Type:	Not reported
Future Due Date:	Not reported
Schedule Area Name:	Not reported
Schedule Sub Area Name:	Not reported
Schedule Document Type:	Not reported
Schedule Due Date:	Not reported
Schedule Revised Date:	Not reported

SCH:

Facility ID:	33010055
Site Type:	School Investigation
Site Type Detail:	School
Site Mgmt. Req.:	NONE SPECIFIED
Acres:	9
National Priorities List:	NO
Cleanup Oversight Agencies:	SMBRP
Lead Agency:	SMBRP
Lead Agency Description:	DTSC - Site Cleanup Program
Project Manager:	Not reported
Supervisor:	Mark Malinowski
Division Branch:	Southern California Schools & Brownfields Outreach
Site Code:	404309
Assembly:	61
Senate:	31
Special Program Status:	Not reported
Status:	No Action Required
Status Date:	03/28/2002
Restricted Use:	NO
Funding:	School District
Latitude:	33.90708
Longitude:	-117.23
APN:	NONE SPECIFIED
Past Use:	AGRICULTURAL - ROW CROPS
Potential COC:	NONE SPECIFIED, No Contaminants found
Confirmed COC:	NONE SPECIFIED
Potential Description:	NMA
Alias Name:	CHAPARRAL ELEMENTARY SCHOOL
Alias Type:	Alternate Name
Alias Name:	MORENO VALLEY UNIFIED SCHOOL DISTRICT
Alias Type:	Alternate Name
Alias Name:	MORENO VALLEY USD-CHAPARREL ELEM SCHOOL
Alias Type:	Alternate Name
Alias Name:	404309
Alias Type:	Project Code (Site Code)
Alias Name:	33010055
Alias Type:	Envirostor ID Number

Completed Info:

Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Cost Recovery Closeout Memo
Completed Date:	05/16/2002
Comments:	Not reported

Completed Area Name:	PROJECT WIDE

CHAPARRAL ELEMENTARY SCHOOL (Continued) **S118756708**

Completed Sub Area Name: Not reported
Completed Document Type: Phase 1
Completed Date: 03/28/2002
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Site Inspections/Visit (Non LUR)
Completed Date: 03/14/2002
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Environmental Oversight Agreement
Completed Date: 01/31/2002
Comments: Not reported

Future Area Name: Not reported
Future Sub Area Name: Not reported
Future Document Type: Not reported
Future Due Date: Not reported
Schedule Area Name: Not reported
Schedule Sub Area Name: Not reported
Schedule Document Type: Not reported
Schedule Due Date: Not reported
Schedule Revised Date: Not reported

Count: 8 records.

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
HEMET	S107538190		CORNER OF STATE & STETSON	92553	CDL
MORENO VALLEY	S109149568	PROPOSED ALESSANDRO ADMINISTRATION	ALESSANDRO BOULEVARD/CHARA STR	92553	ENVIROSTOR, SCH
MORENO VALLEY	S108985918	U.S. AIR FORCE - MARCH AFB (FORMER	N/A GRAHAM		SLIC
MORENO VALLEY	S106568096	INDIAN MIDDLE SCHOOL	INDIAN AVENUE / IRIS AVENUE	92551	ENVIROSTOR, SCH
RIVERSIDE	S108985920	RIVERSIDE PLUME	N/A RIVERSIDE II BASIN		SLIC
RIVERSIDE	S104970783	UCR - PARKING LOT 6	UNIVERSITY OF CALIF, RIVERSIDE		LUST
RIVERSIDE	S108985921	UCR (PESTICIDE PITS)	N/A UNIVERSITY AVENUE		SLIC
RIVERSIDE COUNTY	S107541240		WINEVILLE, SW CORNER OF GAGELE		CDL

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Number of Days to Update: Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL: National Priority List

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 04/05/2017
Date Data Arrived at EDR: 04/21/2017
Date Made Active in Reports: 05/12/2017
Number of Days to Update: 21

Source: EPA
Telephone: N/A
Last EDR Contact: 07/07/2017
Next Scheduled EDR Contact: 10/16/2017
Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 6
Telephone: 214-655-6659

EPA Region 3
Telephone 215-814-5418

EPA Region 7
Telephone: 913-551-7247

EPA Region 4
Telephone 404-562-8033

EPA Region 8
Telephone: 303-312-6774

EPA Region 5
Telephone 312-886-6686

EPA Region 9
Telephone: 415-947-4246

EPA Region 10
Telephone 206-553-8665

Proposed NPL: Proposed National Priority List Sites

A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 04/05/2017
Date Data Arrived at EDR: 04/21/2017
Date Made Active in Reports: 05/12/2017
Number of Days to Update: 21

Source: EPA
Telephone: N/A
Last EDR Contact: 07/07/2017
Next Scheduled EDR Contact: 10/16/2017
Data Release Frequency: Quarterly

NPL LIENS: Federal Superfund Liens

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991
Date Data Arrived at EDR: 02/02/1994
Date Made Active in Reports: 03/30/1994
Number of Days to Update: 56

Source: EPA
Telephone: 202-564-4267
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

Federal Delisted NPL site list

Delisted NPL: National Priority List Deletions

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 04/05/2017
Date Data Arrived at EDR: 04/21/2017
Date Made Active in Reports: 05/12/2017
Number of Days to Update: 21

Source: EPA
Telephone: N/A
Last EDR Contact: 07/07/2017
Next Scheduled EDR Contact: 10/16/2017
Data Release Frequency: Quarterly

Federal CERCLIS list

FEDERAL FACILITY: Federal Facility Site Information listing

A listing of National Priority List (NPL) and Base Realignment and Closure (BRAC) sites found in the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Database where EPA Federal Facilities Restoration and Reuse Office is involved in cleanup activities.

Date of Government Version: 11/07/2016
Date Data Arrived at EDR: 01/05/2017
Date Made Active in Reports: 04/07/2017
Number of Days to Update: 92

Source: Environmental Protection Agency
Telephone: 703-603-8704
Last EDR Contact: 07/07/2017
Next Scheduled EDR Contact: 10/16/2017
Data Release Frequency: Varies

SEMS: Superfund Enterprise Management System

SEMS (Superfund Enterprise Management System) tracks hazardous waste sites, potentially hazardous waste sites, and remedial activities performed in support of EPA's Superfund Program across the United States. The list was formerly know as CERCLIS, renamed to SEMS by the EPA in 2015. The list contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This dataset also contains sites which are either proposed to or on the National Priorities List (NPL) and the sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 02/07/2017
Date Data Arrived at EDR: 04/19/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 16

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 06/08/2017
Next Scheduled EDR Contact: 07/31/2017
Data Release Frequency: Quarterly

Federal CERCLIS NFRAP site list

SEMS-ARCHIVE: Superfund Enterprise Management System Archive

SEMS-ARCHIVE (Superfund Enterprise Management System Archive) tracks sites that have no further interest under the Federal Superfund Program based on available information. The list was formerly known as the CERCLIS-NFRAP, renamed to SEMS ARCHIVE by the EPA in 2015. EPA may perform a minimal level of assessment work at a site while it is archived if site conditions change and/or new information becomes available. Archived sites have been removed and archived from the inventory of SEMS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list the site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. The decision does not necessarily mean that there is no hazard associated with a given site; it only means that. based upon available information, the location is not judged to be potential NPL site.

Date of Government Version: 02/07/2017
Date Data Arrived at EDR: 04/19/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 16

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 06/08/2017
Next Scheduled EDR Contact: 07/31/2017
Data Release Frequency: Quarterly

Federal RCRA CORRACTS facilities list

CORRACTS: Corrective Action Report
CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 12/12/2016
Date Data Arrived at EDR: 12/28/2016
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 44

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 06/29/2017
Next Scheduled EDR Contact: 10/09/2017
Data Release Frequency: Quarterly

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF: RCRA - Treatment, Storage and Disposal
RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 12/12/2016
Date Data Arrived at EDR: 12/28/2016
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 44

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 06/29/2017
Next Scheduled EDR Contact: 10/09/2017
Data Release Frequency: Quarterly

Federal RCRA generators list

RCRA-LQG: RCRA - Large Quantity Generators
RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 12/12/2016
Date Data Arrived at EDR: 12/28/2016
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 44

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 06/29/2017
Next Scheduled EDR Contact: 10/09/2017
Data Release Frequency: Quarterly

RCRA-SQG: RCRA - Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 12/12/2016
Date Data Arrived at EDR: 12/28/2016
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 44

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 06/29/2017
Next Scheduled EDR Contact: 10/09/2017
Data Release Frequency: Quarterly

RCRA-CESQG: RCRA - Conditionally Exempt Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 12/12/2016
Date Data Arrived at EDR: 12/28/2016
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 44

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 06/29/2017
Next Scheduled EDR Contact: 10/09/2017
Data Release Frequency: Varies

Federal institutional controls / engineering controls registries

LUCIS: Land Use Control Information System

LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 12/28/2016
Date Data Arrived at EDR: 01/04/2017
Date Made Active in Reports: 04/07/2017
Number of Days to Update: 93

Source: Department of the Navy
Telephone: 843-820-7326
Last EDR Contact: 05/15/2017
Next Scheduled EDR Contact: 08/28/2017
Data Release Frequency: Varies

US ENG CONTROLS: Engineering Controls Sites List

A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 02/13/2017
Date Data Arrived at EDR: 02/28/2017
Date Made Active in Reports: 06/09/2017
Number of Days to Update: 101

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 05/31/2017
Next Scheduled EDR Contact: 09/11/2017
Data Release Frequency: Varies

US INST CONTROL: Sites with Institutional Controls

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 02/13/2017
Date Data Arrived at EDR: 02/28/2017
Date Made Active in Reports: 06/09/2017
Number of Days to Update: 101

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 05/31/2017
Next Scheduled EDR Contact: 09/11/2017
Data Release Frequency: Varies

Federal ERNS list

ERNS: Emergency Response Notification System

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 09/26/2016
Date Data Arrived at EDR: 09/29/2016
Date Made Active in Reports: 11/11/2016
Number of Days to Update: 43

Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 06/28/2017
Next Scheduled EDR Contact: 10/09/2017
Data Release Frequency: Annually

State- and tribal - equivalent NPL

RESPONSE: State Response Sites

Identifies confirmed release sites where DTSC is involved in remediation, either in a lead or oversight capacity. These confirmed release sites are generally high-priority and high potential risk.

Date of Government Version: 01/30/2017
Date Data Arrived at EDR: 01/31/2017
Date Made Active in Reports: 05/23/2017
Number of Days to Update: 112

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 05/02/2017
Next Scheduled EDR Contact: 08/14/2017
Data Release Frequency: Quarterly

State- and tribal - equivalent CERCLIS

ENVIROSTOR: EnviroStor Database

The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifes sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.

Date of Government Version: 01/30/2017
Date Data Arrived at EDR: 01/31/2017
Date Made Active in Reports: 05/23/2017
Number of Days to Update: 112

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 05/02/2017
Next Scheduled EDR Contact: 08/14/2017
Data Release Frequency: Quarterly

State and tribal landfill and/or solid waste disposal site lists

SWF/LF (SWIS): Solid Waste Information System

Active, Closed and Inactive Landfills. SWF/LF records typically contain an inve ntory of solid waste disposal facilities or landfills. These may be active or i nactive facilities or open dumps that failed to meet RCRA Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 02/13/2017
Date Data Arrived at EDR: 02/15/2017
Date Made Active in Reports: 05/02/2017
Number of Days to Update: 76

Source: Department of Resources Recycling and Recovery
Telephone: 916-341-6320
Last EDR Contact: 05/17/2017
Next Scheduled EDR Contact: 08/28/2017
Data Release Frequency: Quarterly

State and tribal leaking storage tank lists

LUST: Leaking Underground Fuel Tank Report (GEOTRACKER)
Leaking Underground Storage Tank (LUST) Sites included in GeoTracker. GeoTracker is the Water Boards data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

Date of Government Version: 03/13/2017
Date Data Arrived at EDR: 03/14/2017
Date Made Active in Reports: 05/02/2017
Number of Days to Update: 49

Source: State Water Resources Control Board
Telephone: see region list
Last EDR Contact: 06/14/2017
Next Scheduled EDR Contact: 09/25/2017
Data Release Frequency: Quarterly

LUST REG 6V: Leaking Underground Storage Tank Case Listing
Leaking Underground Storage Tank locations. Inyo, Kern, Los Angeles, Mono, San Bernardino counties.

Date of Government Version: 06/07/2005
Date Data Arrived at EDR: 06/07/2005
Date Made Active in Reports: 06/29/2005
Number of Days to Update: 22

Source: California Regional Water Quality Control Board Victorville Branch Office (6)
Telephone: 760-241-7365
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: No Update Planned

LUST REG 4: Underground Storage Tank Leak List
Los Angeles, Ventura counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/07/2004
Date Data Arrived at EDR: 09/07/2004
Date Made Active in Reports: 10/12/2004
Number of Days to Update: 35

Source: California Regional Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6710
Last EDR Contact: 09/06/2011
Next Scheduled EDR Contact: 12/19/2011
Data Release Frequency: No Update Planned

LUST REG 3: Leaking Underground Storage Tank Database
Leaking Underground Storage Tank locations. Monterey, San Benito, San Luis Obispo, Santa Barbara, Santa Cruz counties.

Date of Government Version: 05/19/2003
Date Data Arrived at EDR: 05/19/2003
Date Made Active in Reports: 06/02/2003
Number of Days to Update: 14

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-542-4786
Last EDR Contact: 07/18/2011
Next Scheduled EDR Contact: 10/31/2011
Data Release Frequency: No Update Planned

LUST REG 2: Fuel Leak List
Leaking Underground Storage Tank locations. Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma counties.

Date of Government Version: 09/30/2004
Date Data Arrived at EDR: 10/20/2004
Date Made Active in Reports: 11/19/2004
Number of Days to Update: 30

Source: California Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-622-2433
Last EDR Contact: 09/19/2011
Next Scheduled EDR Contact: 01/02/2012
Data Release Frequency: Quarterly

LUST REG 1: Active Toxic Site Investigation
Del Norte, Humboldt, Lake, Mendocino, Modoc, Siskiyou, Sonoma, Trinity counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/01/2001
Date Data Arrived at EDR: 02/28/2001
Date Made Active in Reports: 03/29/2001
Number of Days to Update: 29

Source: California Regional Water Quality Control Board North Coast (1)
Telephone: 707-570-3769
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

LUST REG 6L: Leaking Underground Storage Tank Case Listing
For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/09/2003
Date Data Arrived at EDR: 09/10/2003
Date Made Active in Reports: 10/07/2003
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Lahontan Region (6)
Telephone: 530-542-5572
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: No Update Planned

LUST REG 5: Leaking Underground Storage Tank Database
Leaking Underground Storage Tank locations. Alameda, Alpine, Amador, Butte, Colusa, Contra Costa, Calveras, El Dorado, Fresno, Glenn, Kern, Kings, Lake, Lassen, Madera, Mariposa, Merced, Modoc, Napa, Nevada, Placer, Plumas, Sacramento, San Joaquin, Shasta, Solano, Stanislaus, Sutter, Tehama, Tulare, Tuolumne, Yolo, Yuba counties.

Date of Government Version: 07/01/2008
Date Data Arrived at EDR: 07/22/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 9

Source: California Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-4834
Last EDR Contact: 07/01/2011
Next Scheduled EDR Contact: 10/17/2011
Data Release Frequency: No Update Planned

LUST REG 7: Leaking Underground Storage Tank Case Listing
Leaking Underground Storage Tank locations. Imperial, Riverside, San Diego, Santa Barbara counties.

Date of Government Version: 02/26/2004
Date Data Arrived at EDR: 02/26/2004
Date Made Active in Reports: 03/24/2004
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Colorado River Basin Region (7)
Telephone: 760-776-8943
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

LUST REG 8: Leaking Underground Storage Tanks
California Regional Water Quality Control Board Santa Ana Region (8). For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/14/2005
Date Data Arrived at EDR: 02/15/2005
Date Made Active in Reports: 03/28/2005
Number of Days to Update: 41

Source: California Regional Water Quality Control Board Santa Ana Region (8)
Telephone: 909-782-4496
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: Varies

LUST REG 9: Leaking Underground Storage Tank Report
Orange, Riverside, San Diego counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 03/01/2001
Date Data Arrived at EDR: 04/23/2001
Date Made Active in Reports: 05/21/2001
Number of Days to Update: 28

Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-637-5595
Last EDR Contact: 09/26/2011
Next Scheduled EDR Contact: 01/09/2012
Data Release Frequency: No Update Planned

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 11/14/2016
Date Data Arrived at EDR: 01/26/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 99

Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 04/28/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Varies

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 10/14/2016
Date Data Arrived at EDR: 01/27/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 98

Source: EPA Region 4
Telephone: 404-562-8677
Last EDR Contact: 04/28/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Semi-Annually

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 10/07/2016
Date Data Arrived at EDR: 01/26/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 99

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 04/28/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Quarterly

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 10/06/2016
Date Data Arrived at EDR: 01/26/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 99

Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 04/28/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Quarterly

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 10/01/2016
Date Data Arrived at EDR: 01/26/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 99

Source: EPA Region 6
Telephone: 214-665-6597
Last EDR Contact: 04/28/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Varies

INDIAN LUST R5: Leaking Underground Storage Tanks on Indian Land
Leaking underground storage tanks located on Indian Land in Michigan, Minnesota and Wisconsin.

Date of Government Version: 11/14/2016
Date Data Arrived at EDR: 01/26/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 99

Source: EPA, Region 5
Telephone: 312-886-7439
Last EDR Contact: 04/28/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Varies

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 10/17/2016
Date Data Arrived at EDR: 01/26/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 99

Source: EPA Region 8
Telephone: 303-312-6271
Last EDR Contact: 04/28/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Quarterly

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 09/01/2016
Date Data Arrived at EDR: 01/26/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 99

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 04/28/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Varies

SLIC: Statewide SLIC Cases (GEOTRACKER)
Cleanup Program Sites (CPS; also known as Site Cleanups [SC] and formerly known as Spills, Leaks, Investigations, and Cleanups [SLIC] sites) included in GeoTracker. GeoTracker is the Water Boards data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

Date of Government Version: 03/13/2017
Date Data Arrived at EDR: 03/14/2017
Date Made Active in Reports: 05/02/2017
Number of Days to Update: 49

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 06/14/2017
Next Scheduled EDR Contact: 09/25/2017
Data Release Frequency: Varies

SLIC REG 1: Active Toxic Site Investigations
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2003
Date Data Arrived at EDR: 04/07/2003
Date Made Active in Reports: 04/25/2003
Number of Days to Update: 18

Source: California Regional Water Quality Control Board, North Coast Region (1)
Telephone: 707-576-2220
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

SLIC REG 2: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/30/2004
Date Data Arrived at EDR: 10/20/2004
Date Made Active in Reports: 11/19/2004
Number of Days to Update: 30

Source: Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-286-0457
Last EDR Contact: 09/19/2011
Next Scheduled EDR Contact: 01/02/2012
Data Release Frequency: Quarterly

SLIC REG 3: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/18/2006
Date Data Arrived at EDR: 05/18/2006
Date Made Active in Reports: 06/15/2006
Number of Days to Update: 28

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-549-3147
Last EDR Contact: 07/18/2011
Next Scheduled EDR Contact: 10/31/2011
Data Release Frequency: Semi-Annually

SLIC REG 4: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/17/2004
Date Data Arrived at EDR: 11/18/2004
Date Made Active in Reports: 01/04/2005
Number of Days to Update: 47

Source: Region Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6600
Last EDR Contact: 07/01/2011
Next Scheduled EDR Contact: 10/17/2011
Data Release Frequency: Varies

SLIC REG 5: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/01/2005
Date Data Arrived at EDR: 04/05/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 16

Source: Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-3291
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: Semi-Annually

SLIC REG 6V: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/24/2005
Date Data Arrived at EDR: 05/25/2005
Date Made Active in Reports: 06/16/2005
Number of Days to Update: 22

Source: Regional Water Quality Control Board, Victorville Branch
Telephone: 619-241-6583
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: Semi-Annually

SLIC REG 6L: SLIC Sites
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/07/2004
Date Data Arrived at EDR: 09/07/2004
Date Made Active in Reports: 10/12/2004
Number of Days to Update: 35

Source: California Regional Water Quality Control Board, Lahontan Region
Telephone: 530-542-5574
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

SLIC REG 7: SLIC List
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/24/2004
Date Data Arrived at EDR: 11/29/2004
Date Made Active in Reports: 01/04/2005
Number of Days to Update: 36

Source: California Regional Quality Control Board, Colorado River Basin Region
Telephone: 760-346-7491
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

SLIC REG 8: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2008
Date Data Arrived at EDR: 04/03/2008
Date Made Active in Reports: 04/14/2008
Number of Days to Update: 11

Source: California Region Water Quality Control Board Santa Ana Region (8)
Telephone: 951-782-3298
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: Semi-Annually

SLIC REG 9: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/10/2007
Date Data Arrived at EDR: 09/11/2007
Date Made Active in Reports: 09/28/2007
Number of Days to Update: 17

Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-467-2980
Last EDR Contact: 08/08/2011
Next Scheduled EDR Contact: 11/21/2011
Data Release Frequency: Annually

State and tribal registered storage tank lists

FEMA UST: Underground Storage Tank Listing
A listing of all FEMA owned underground storage tanks.

Date of Government Version: 01/01/2010
Date Data Arrived at EDR: 02/16/2010
Date Made Active in Reports: 04/12/2010
Number of Days to Update: 55

Source: FEMA
Telephone: 202-646-5797
Last EDR Contact: 07/14/2017
Next Scheduled EDR Contact: 10/23/2017
Data Release Frequency: Varies

UST: Active UST Facilities
Active UST facilities gathered from the local regulatory agencies

Date of Government Version: 03/12/2017
Date Data Arrived at EDR: 03/16/2017
Date Made Active in Reports: 05/12/2017
Number of Days to Update: 57

Source: SWRCB
Telephone: 916-341-5851
Last EDR Contact: 06/14/2017
Next Scheduled EDR Contact: 09/25/2017
Data Release Frequency: Semi-Annually

AST: Aboveground Petroleum Storage Tank Facilities
A listing of aboveground storage tank petroleum storage tank locations.

Date of Government Version: 07/06/2016
Date Data Arrived at EDR: 07/12/2016
Date Made Active in Reports: 09/19/2016
Number of Days to Update: 69

Source: California Environmental Protection Agency
Telephone: 916-327-5092
Last EDR Contact: 06/21/2017
Next Scheduled EDR Contact: 10/09/2017
Data Release Frequency: Quarterly

INDIAN UST R5: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 5 (Michigan, Minnesota and Wisconsin and Tribal Nations).

Date of Government Version: 01/14/2017
Date Data Arrived at EDR: 01/26/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 99

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 04/28/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Varies

INDIAN UST R6: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 6 (Louisiana, Arkansas, Oklahoma, New Mexico, Texas and 65 Tribes).

Date of Government Version: 10/01/2016
Date Data Arrived at EDR: 01/26/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 99

Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 04/28/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Semi-Annually

INDIAN UST R7: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 7 (Iowa, Kansas, Missouri, Nebraska, and 9 Tribal Nations).

Date of Government Version: 09/01/2016
Date Data Arrived at EDR: 01/26/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 99

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 04/28/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Varies

INDIAN UST R8: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming and 27 Tribal Nations).

Date of Government Version: 10/17/2016
Date Data Arrived at EDR: 01/26/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 99

Source: EPA Region 8
Telephone: 303-312-6137
Last EDR Contact: 04/28/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Quarterly

INDIAN UST R9: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 9 (Arizona, California, Hawaii, Nevada, the Pacific Islands, and Tribal Nations).

Date of Government Version: 10/06/2016
Date Data Arrived at EDR: 01/26/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 99

Source: EPA Region 9
Telephone: 415-972-3368
Last EDR Contact: 04/28/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Quarterly

INDIAN UST R1: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont and ten Tribal Nations).

Date of Government Version: 11/14/2016
Date Data Arrived at EDR: 01/26/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 99

Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 04/28/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Varies

INDIAN UST R4: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and Tribal Nations)

Date of Government Version: 10/14/2016
Date Data Arrived at EDR: 01/27/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 98

Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 04/28/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Semi-Annually

INDIAN UST R10: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 10 (Alaska, Idaho, Oregon, Washington, and Tribal Nations).

Date of Government Version: 10/07/2016
Date Data Arrived at EDR: 01/26/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 99

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 04/28/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Quarterly

State and tribal voluntary cleanup sites

INDIAN VCP R1: Voluntary Cleanup Priority Listing

A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 07/27/2015
Date Data Arrived at EDR: 09/29/2015
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 142

Source: EPA, Region 1
Telephone: 617-918-1102
Last EDR Contact: 06/27/2017
Next Scheduled EDR Contact: 10/09/2017
Data Release Frequency: Varies

INDIAN VCP R7: Voluntary Cleanup Priority Lisitng

A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27

Source: EPA, Region 7
Telephone: 913-551-7365
Last EDR Contact: 04/20/2009
Next Scheduled EDR Contact: 07/20/2009
Data Release Frequency: Varies

VCP: Voluntary Cleanup Program Properties

Contains low threat level properties with either confirmed or unconfirmed releases and the project proponents have request that DTSC oversee investigation and/or cleanup activities and have agreed to provide coverage for DTSC's costs.

Date of Government Version: 01/30/2017
Date Data Arrived at EDR: 01/31/2017
Date Made Active in Reports: 05/23/2017
Number of Days to Update: 112

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 05/02/2017
Next Scheduled EDR Contact: 08/14/2017
Data Release Frequency: Quarterly

State and tribal Brownfields sites

BROWNFIELDS: Considered Brownfieds Sites Listing
A listing of sites the SWRCB considers to be Brownfields since these are sites have come to them through the MOA Process.

Date of Government Version: 01/03/2017
Date Data Arrived at EDR: 01/04/2017
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 57

Source: State Water Resources Control Board
Telephone: 916-323-7905
Last EDR Contact: 06/28/2017
Next Scheduled EDR Contact: 10/09/2017
Data Release Frequency: Varies

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS: A Listing of Brownfields Sites
Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. Assessment, Cleanup and Redevelopment Exchange System (ACRES) stores information reported by EPA Brownfields grant recipients on brownfields properties assessed or cleaned up with grant funding as well as information on Targeted Brownfields Assessments performed by EPA Regions. A listing of ACRES Brownfield sites is obtained from Cleanups in My Community. Cleanups in My Community provides information on Brownfields properties for which information is reported back to EPA, as well as areas served by Brownfields grant programs.

Date of Government Version: 03/02/2017
Date Data Arrived at EDR: 03/02/2017
Date Made Active in Reports: 04/07/2017
Number of Days to Update: 36

Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 06/20/2017
Next Scheduled EDR Contact: 10/02/2017
Data Release Frequency: Semi-Annually

Local Lists of Landfill / Solid Waste Disposal Sites

WMUDS/SWAT: Waste Management Unit Database
Waste Management Unit Database System. WMUDS is used by the State Water Resources Control Board staff and the Regional Water Quality Control Boards for program tracking and inventory of waste management units. WMUDS is composed of the following databases: Facility Information, Scheduled Inspections Information, Waste Management Unit Information, SWAT Program Information, SWAT Report Summary Information, SWAT Report Summary Data, Chapter 15 (formerly Subchapter 15) Information, Chapter 15 Monitoring Parameters, TPCA Program Information, RCRA Program Information, Closure Information, and Interested Parties Information.

Date of Government Version: 04/01/2000
Date Data Arrived at EDR: 04/10/2000
Date Made Active in Reports: 05/10/2000
Number of Days to Update: 30

Source: State Water Resources Control Board
Telephone: 916-227-4448
Last EDR Contact: 05/05/2017
Next Scheduled EDR Contact: 08/21/2017
Data Release Frequency: No Update Planned

SWRCY: Recycler Database
A listing of recycling facilities in California.

Date of Government Version: 03/13/2017
Date Data Arrived at EDR: 03/14/2017
Date Made Active in Reports: 05/03/2017
Number of Days to Update: 50

Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 06/14/2017
Next Scheduled EDR Contact: 09/25/2017
Data Release Frequency: Quarterly

HAULERS: Registered Waste Tire Haulers Listing
A listing of registered waste tire haulers.

Date of Government Version: 01/13/2017
Date Data Arrived at EDR: 01/17/2017
Date Made Active in Reports: 05/31/2017
Number of Days to Update: 134

Source: Integrated Waste Management Board
Telephone: 916-341-6422
Last EDR Contact: 05/15/2017
Next Scheduled EDR Contact: 08/28/2017
Data Release Frequency: Varies

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands
Location of open dumps on Indian land.

Date of Government Version: 12/31/1998
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52

Source: Environmental Protection Agency
Telephone: 703-308-8245
Last EDR Contact: 05/01/2017
Next Scheduled EDR Contact: 08/14/2017
Data Release Frequency: Varies

ODI: Open Dump Inventory
An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985
Date Data Arrived at EDR: 08/09/2004
Date Made Active in Reports: 09/17/2004
Number of Days to Update: 39

Source: Environmental Protection Agency
Telephone: 800-424-9346
Last EDR Contact: 06/09/2004
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations
A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 01/12/2009
Date Data Arrived at EDR: 05/07/2009
Date Made Active in Reports: 09/21/2009
Number of Days to Update: 137

Source: EPA, Region 9
Telephone: 415-947-4219
Last EDR Contact: 04/24/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: No Update Planned

IHS OPEN DUMPS: Open Dumps on Indian Land
A listing of all open dumps located on Indian Land in the United States.

Date of Government Version: 04/01/2014
Date Data Arrived at EDR: 08/06/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 176

Source: Department of Health & Human Serivces, Indian Health Service
Telephone: 301-443-1452
Last EDR Contact: 05/05/2017
Next Scheduled EDR Contact: 08/14/2017
Data Release Frequency: Varies

Local Lists of Hazardous waste / Contaminated Sites

US HIST CDL: National Clandestine Laboratory Register
A listing of clandestine drug lab locations that have been removed from the DEAs National Clandestine Laboratory Register.

Date of Government Version: 02/09/2017
Date Data Arrived at EDR: 03/08/2017
Date Made Active in Reports: 06/09/2017
Number of Days to Update: 93

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 02/28/2017
Next Scheduled EDR Contact: 06/12/2017
Data Release Frequency: No Update Planned

HIST CAL-SITES: Calsites Database
The Calsites database contains potential or confirmed hazardous substance release properties. In 1996, California EPA reevaluated and significantly reduced the number of sites in the Calsites database. No longer updated by the state agency. It has been replaced by ENVIROSTOR.

Date of Government Version: 08/08/2005
Date Data Arrived at EDR: 08/03/2006
Date Made Active in Reports: 08/24/2006
Number of Days to Update: 21

Source: Department of Toxic Substance Control
Telephone: 916-323-3400
Last EDR Contact: 02/23/2009
Next Scheduled EDR Contact: 05/25/2009
Data Release Frequency: No Update Planned

SCH: School Property Evaluation Program

This category contains proposed and existing school sites that are being evaluated by DTSC for possible hazardous materials contamination. In some cases, these properties may be listed in the CalSites category depending on the level of threat to public health and safety or the environment they pose.

Date of Government Version: 01/30/2017
Date Data Arrived at EDR: 01/31/2017
Date Made Active in Reports: 05/23/2017
Number of Days to Update: 112

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 05/02/2017
Next Scheduled EDR Contact: 08/14/2017
Data Release Frequency: Quarterly

CDL: Clandestine Drug Labs

A listing of drug lab locations. Listing of a location in this database does not indicate that any illegal drug lab materials were or were not present there, and does not constitute a determination that the location either requires or does not require additional cleanup work.

Date of Government Version: 12/31/2016
Date Data Arrived at EDR: 03/17/2017
Date Made Active in Reports: 05/10/2017
Number of Days to Update: 54

Source: Department of Toxic Substances Control
Telephone: 916-255-6504
Last EDR Contact: 07/14/2017
Next Scheduled EDR Contact: 10/23/2017
Data Release Frequency: Varies

TOXIC PITS: Toxic Pits Cleanup Act Sites

Toxic PITS Cleanup Act Sites. TOXIC PITS identifies sites suspected of containing hazardous substances where cleanup has not yet been completed.

Date of Government Version: 07/01/1995
Date Data Arrived at EDR: 08/30/1995
Date Made Active in Reports: 09/26/1995
Number of Days to Update: 27

Source: State Water Resources Control Board
Telephone: 916-227-4364
Last EDR Contact: 01/26/2009
Next Scheduled EDR Contact: 04/27/2009
Data Release Frequency: No Update Planned

US CDL: Clandestine Drug Labs

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 02/09/2017
Date Data Arrived at EDR: 03/08/2017
Date Made Active in Reports: 06/09/2017
Number of Days to Update: 93

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 05/31/2017
Next Scheduled EDR Contact: 09/11/2017
Data Release Frequency: Quarterly

Local Lists of Registered Storage Tanks

SWEEPS UST: SWEEPS UST Listing

Statewide Environmental Evaluation and Planning System. This underground storage tank listing was updated and maintained by a company contacted by the SWRCB in the early 1990's. The listing is no longer updated or maintained. The local agency is the contact for more information on a site on the SWEEPS list.

Date of Government Version: 06/01/1994
Date Data Arrived at EDR: 07/07/2005
Date Made Active in Reports: 08/11/2005
Number of Days to Update: 35

Source: State Water Resources Control Board
Telephone: N/A
Last EDR Contact: 06/03/2005
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

UST MENDOCINO: Mendocino County UST Database
A listing of underground storage tank locations in Mendocino County.

Date of Government Version: 03/09/2017
Date Data Arrived at EDR: 03/17/2017
Date Made Active in Reports: 05/23/2017
Number of Days to Update: 67

Source: Department of Public Health
Telephone: 707-463-4466
Last EDR Contact: 05/24/2017
Next Scheduled EDR Contact: 09/11/2017
Data Release Frequency: Annually

HIST UST: Hazardous Substance Storage Container Database
The Hazardous Substance Storage Container Database is a historical listing of UST sites. Refer to local/county source for current data.

Date of Government Version: 10/15/1990
Date Data Arrived at EDR: 01/25/1991
Date Made Active in Reports: 02/12/1991
Number of Days to Update: 18

Source: State Water Resources Control Board
Telephone: 916-341-5851
Last EDR Contact: 07/26/2001
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

CA FID UST: Facility Inventory Database
The Facility Inventory Database (FID) contains a historical listing of active and inactive underground storage tank locations from the State Water Resource Control Board. Refer to local/county source for current data.

Date of Government Version: 10/31/1994
Date Data Arrived at EDR: 09/05/1995
Date Made Active in Reports: 09/29/1995
Number of Days to Update: 24

Source: California Environmental Protection Agency
Telephone: 916-341-5851
Last EDR Contact: 12/28/1998
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

Local Land Records

LIENS: Environmental Liens Listing
A listing of property locations with environmental liens for California where DTSC is a lien holder.

Date of Government Version: 03/06/2017
Date Data Arrived at EDR: 03/07/2017
Date Made Active in Reports: 04/21/2017
Number of Days to Update: 45

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 06/02/2017
Next Scheduled EDR Contact: 09/18/2017
Data Release Frequency: Varies

LIENS 2: CERCLA Lien Information
A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 02/18/2014
Date Data Arrived at EDR: 03/18/2014
Date Made Active in Reports: 04/24/2014
Number of Days to Update: 37

Source: Environmental Protection Agency
Telephone: 202-564-6023
Last EDR Contact: 06/09/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Varies

DEED: Deed Restriction Listing

Site Mitigation and Brownfields Reuse Program Facility Sites with Deed Restrictions & Hazardous Waste Management Program Facility Sites with Deed / Land Use Restriction. The DTSC Site Mitigation and Brownfields Reuse Program (SMBRP) list includes sites cleaned up under the program's oversight and generally does not include current or former hazardous waste facilities that required a hazardous waste facility permit. The list represents deed restrictions that are active. Some sites have multiple deed restrictions. The DTSC Hazardous Waste Management Program (HWMP) has developed a list of current or former hazardous waste facilities that have a recorded land use restriction at the local county recorder's office. The land use restrictions on this list were required by the DTSC HWMP as a result of the presence of hazardous substances that remain on site after the facility (or part of the facility) has been closed or cleaned up. The types of land use restriction include deed notice, deed restriction, or a land use restriction that binds current and future owners.

Date of Government Version: 03/06/2017
Date Data Arrived at EDR: 03/07/2017
Date Made Active in Reports: 05/23/2017
Number of Days to Update: 77

Source: DTSC and SWRCB
Telephone: 916-323-3400
Last EDR Contact: 06/06/2017
Next Scheduled EDR Contact: 09/18/2017
Data Release Frequency: Semi-Annually

Records of Emergency Release Reports

HMIRS: Hazardous Materials Information Reporting System
Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 12/28/2016
Date Data Arrived at EDR: 12/28/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 37

Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 06/28/2017
Next Scheduled EDR Contact: 10/09/2017
Data Release Frequency: Annually

CHMIRS: California Hazardous Material Incident Report System
California Hazardous Material Incident Reporting System. CHMIRS contains information on reported hazardous material incidents (accidental releases or spills).

Date of Government Version: 12/06/2016
Date Data Arrived at EDR: 01/25/2017
Date Made Active in Reports: 05/10/2017
Number of Days to Update: 105

Source: Office of Emergency Services
Telephone: 916-845-8400
Last EDR Contact: 04/28/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Varies

LDS: Land Disposal Sites Listing (GEOTRACKER)
Land Disposal sites (Landfills) included in GeoTracker. GeoTracker is the Water Boards data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

Date of Government Version: 03/13/2017
Date Data Arrived at EDR: 03/14/2017
Date Made Active in Reports: 05/02/2017
Number of Days to Update: 49

Source: State Water Qualilty Control Board
Telephone: 866-480-1028
Last EDR Contact: 06/14/2017
Next Scheduled EDR Contact: 09/25/2017
Data Release Frequency: Quarterly

MCS: Military Cleanup Sites Listing (GEOTRACKER)
Military sites (consisting of: Military UST sites; Military Privatized sites; and Military Cleanup sites [formerly known as DoD non UST]) included in GeoTracker. GeoTracker is the Water Boards data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

Date of Government Version: 03/13/2017
Date Data Arrived at EDR: 03/14/2017
Date Made Active in Reports: 05/02/2017
Number of Days to Update: 49

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 06/14/2017
Next Scheduled EDR Contact: 09/25/2017
Data Release Frequency: Quarterly

SPILLS 90: SPILLS90 data from FirstSearch

Spills 90 includes those spill and release records available exclusively from FirstSearch databases. Typically, they may include chemical, oil and/or hazardous substance spills recorded after 1990. Duplicate records that are already included in EDR incident and release records are not included in Spills 90.

Date of Government Version: 06/06/2012
Date Data Arrived at EDR: 01/03/2013
Date Made Active in Reports: 02/22/2013
Number of Days to Update: 50

Source: FirstSearch
Telephone: N/A
Last EDR Contact: 01/03/2013
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

Other Ascertainable Records

RCRA NonGen / NLR: RCRA - Non Generators / No Longer Regulated

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 12/12/2016
Date Data Arrived at EDR: 12/28/2016
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 44

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 06/29/2017
Next Scheduled EDR Contact: 10/09/2017
Data Release Frequency: Varies

FUDS: Formerly Used Defense Sites

The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 01/31/2015
Date Data Arrived at EDR: 07/08/2015
Date Made Active in Reports: 10/13/2015
Number of Days to Update: 97

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 02/24/2017
Next Scheduled EDR Contact: 06/05/2017
Data Release Frequency: Varies

DOD: Department of Defense Sites

This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 11/10/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 62

Source: USGS
Telephone: 888-275-8747
Last EDR Contact: 07/12/2017
Next Scheduled EDR Contact: 10/23/2017
Data Release Frequency: Semi-Annually

FEDLAND: Federal and Indian Lands

Federally and Indian administrated lands of the United States. Lands included are administrated by: Army Corps of Engineers, Bureau of Reclamation, National Wild and Scenic River, National Wildlife Refuge, Public Domain Land, Wilderness, Wilderness Study Area, Wildlife Management Area, Bureau of Indian Affairs, Bureau of Land Management, Department of Justice, Forest Service, Fish and Wildlife Service, National Park Service.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 02/06/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 339

Source: U.S. Geological Survey
Telephone: 888-275-8747
Last EDR Contact: 07/14/2017
Next Scheduled EDR Contact: 10/23/2017
Data Release Frequency: N/A

SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners Listing

The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of states with established drycleaner remediation programs. Currently the member states are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Date of Government Version: 01/01/2017
Date Data Arrived at EDR: 02/03/2017
Date Made Active in Reports: 04/07/2017
Number of Days to Update: 63

Source: Environmental Protection Agency
Telephone: 615-532-8599
Last EDR Contact: 05/19/2017
Next Scheduled EDR Contact: 08/28/2017
Data Release Frequency: Varies

US FIN ASSUR: Financial Assurance Information

All owners and operators of facilities that treat, store, or dispose of hazardous waste are required to provide proof that they will have sufficient funds to pay for the clean up, closure, and post-closure care of their facilities.

Date of Government Version: 02/13/2017
Date Data Arrived at EDR: 02/15/2017
Date Made Active in Reports: 05/12/2017
Number of Days to Update: 86

Source: Environmental Protection Agency
Telephone: 202-566-1917
Last EDR Contact: 05/17/2017
Next Scheduled EDR Contact: 08/28/2017
Data Release Frequency: Quarterly

EPA WATCH LIST: EPA WATCH LIST

EPA maintains a "Watch List" to facilitate dialogue between EPA, state and local environmental agencies on enforcement matters relating to facilities with alleged violations identified as either significant or high priority. Being on the Watch List does not mean that the facility has actually violated the law only that an investigation by EPA or a state or local environmental agency has led those organizations to allege that an unproven violation has in fact occurred. Being on the Watch List does not represent a higher level of concern regarding the alleged violations that were detected, but instead indicates cases requiring additional dialogue between EPA, state and local agencies - primarily because of the length of time the alleged violation has gone unaddressed or unresolved.

Date of Government Version: 08/30/2013
Date Data Arrived at EDR: 03/21/2014
Date Made Active in Reports: 06/17/2014
Number of Days to Update: 88

Source: Environmental Protection Agency
Telephone: 617-520-3000
Last EDR Contact: 05/08/2017
Next Scheduled EDR Contact: 08/21/2017
Data Release Frequency: Quarterly

2020 COR ACTION: 2020 Corrective Action Program List

The EPA has set ambitious goals for the RCRA Corrective Action program by creating the 2020 Corrective Action Universe. This RCRA cleanup baseline includes facilities expected to need corrective action. The 2020 universe contains a wide variety of sites. Some properties are heavily contaminated while others were contaminated but have since been cleaned up. Still others have not been fully investigated yet, and may require little or no remediation. Inclusion in the 2020 Universe does not necessarily imply failure on the part of a facility to meet its RCRA obligations.

Date of Government Version: 04/22/2013
Date Data Arrived at EDR: 03/03/2015
Date Made Active in Reports: 03/09/2015
Number of Days to Update: 6

Source: Environmental Protection Agency
Telephone: 703-308-4044
Last EDR Contact: 05/05/2017
Next Scheduled EDR Contact: 08/21/2017
Data Release Frequency: Varies

TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 01/15/2015
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 14

Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 06/21/2017
Next Scheduled EDR Contact: 10/02/2017
Data Release Frequency: Every 4 Years

TRIS: Toxic Chemical Release Inventory System

Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 11/24/2015
Date Made Active in Reports: 04/05/2016
Number of Days to Update: 133

Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 05/26/2017
Next Scheduled EDR Contact: 09/04/2017
Data Release Frequency: Annually

SSTS: Section 7 Tracking Systems

Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 12/10/2010
Date Made Active in Reports: 02/25/2011
Number of Days to Update: 77

Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 04/26/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Annually

ROD: Records Of Decision

Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 11/25/2013
Date Data Arrived at EDR: 12/12/2013
Date Made Active in Reports: 02/24/2014
Number of Days to Update: 74

Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 06/09/2017
Next Scheduled EDR Contact: 09/18/2017
Data Release Frequency: Annually

RMP: Risk Management Plans

When Congress passed the Clean Air Act Amendments of 1990, it required EPA to publish regulations and guidance for chemical accident prevention at facilities using extremely hazardous substances. The Risk Management Program Rule (RMP Rule) was written to implement Section 112(r) of these amendments. The rule, which built upon existing industry codes and standards, requires companies of all sizes that use certain flammable and toxic substances to develop a Risk Management Program, which includes a(n): Hazard assessment that details the potential effects of an accidental release, an accident history of the last five years, and an evaluation of worst-case and alternative accidental releases; Prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and Emergency response program that spells out emergency health care, employee training measures and procedures for informing the public and response agencies (e.g the fire department) should an accident occur.

Date of Government Version: 02/01/2017
Date Data Arrived at EDR: 02/09/2017
Date Made Active in Reports: 04/07/2017
Number of Days to Update: 57

Source: Environmental Protection Agency
Telephone: 202-564-8600
Last EDR Contact: 04/21/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Varies

RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995
Date Data Arrived at EDR: 07/03/1995
Date Made Active in Reports: 08/07/1995
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4104
Last EDR Contact: 06/02/2008
Next Scheduled EDR Contact: 09/01/2008
Data Release Frequency: No Update Planned

PRP: Potentially Responsible Parties
A listing of verified Potentially Responsible Parties

Date of Government Version: 10/25/2013
Date Data Arrived at EDR: 10/17/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 3

Source: EPA
Telephone: 202-564-6023
Last EDR Contact: 06/06/2017
Next Scheduled EDR Contact: 08/21/2017
Data Release Frequency: Quarterly

PADS: PCB Activity Database System
PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 01/20/2016
Date Data Arrived at EDR: 04/28/2016
Date Made Active in Reports: 09/02/2016
Number of Days to Update: 127

Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 04/10/2017
Next Scheduled EDR Contact: 07/24/2017
Data Release Frequency: Annually

ICIS: Integrated Compliance Information System
The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 11/18/2016
Date Data Arrived at EDR: 11/23/2016
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 79

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 07/07/2017
Next Scheduled EDR Contact: 10/23/2017
Data Release Frequency: Quarterly

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
Last EDR Contact: 05/19/2017
Next Scheduled EDR Contact: 09/04/2017
Data Release Frequency: Quarterly

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA
Telephone: 202-566-1667
Last EDR Contact: 05/19/2017
Next Scheduled EDR Contact: 09/04/2017
Data Release Frequency: Quarterly

MLTS: Material Licensing Tracking System
MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 08/30/2016
Date Data Arrived at EDR: 09/08/2016
Date Made Active in Reports: 10/21/2016
Number of Days to Update: 43

Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 05/08/2017
Next Scheduled EDR Contact: 08/21/2017
Data Release Frequency: Quarterly

COAL ASH DOE: Steam-Electric Plant Operation Data
A listing of power plants that store ash in surface ponds.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 08/07/2009
Date Made Active in Reports: 10/22/2009
Number of Days to Update: 76

Source: Department of Energy
Telephone: 202-586-8719
Last EDR Contact: 06/05/2017
Next Scheduled EDR Contact: 09/18/2017
Data Release Frequency: Varies

COAL ASH EPA: Coal Combustion Residues Surface Impoundments List
A listing of coal combustion residues surface impoundments with high hazard potential ratings.

Date of Government Version: 07/01/2014
Date Data Arrived at EDR: 09/10/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: N/A
Last EDR Contact: 06/05/2017
Next Scheduled EDR Contact: 09/18/2017
Data Release Frequency: Varies

PCB TRANSFORMER: PCB Transformer Registration Database
The database of PCB transformer registrations that includes all PCB registration submittals.

Date of Government Version: 02/01/2011
Date Data Arrived at EDR: 10/19/2011
Date Made Active in Reports: 01/10/2012
Number of Days to Update: 83

Source: Environmental Protection Agency
Telephone: 202-566-0517
Last EDR Contact: 04/28/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Varies

RADINFO: Radiation Information Database
The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

Date of Government Version: 01/04/2017
Date Data Arrived at EDR: 01/06/2017
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 35

Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 07/12/2017
Next Scheduled EDR Contact: 10/16/2017
Data Release Frequency: Quarterly

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing
A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing
A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2008
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

DOT OPS: Incident and Accident Data
Department of Transporation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 07/31/2012
Date Data Arrived at EDR: 08/07/2012
Date Made Active in Reports: 09/18/2012
Number of Days to Update: 42

Source: Department of Transporation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 05/02/2017
Next Scheduled EDR Contact: 08/14/2017
Data Release Frequency: Varies

CONSENT: Superfund (CERCLA) Consent Decrees
Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 09/30/2016
Date Data Arrived at EDR: 11/18/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 77

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 06/21/2017
Next Scheduled EDR Contact: 10/09/2017
Data Release Frequency: Varies

BRS: Biennial Reporting System
The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2013
Date Data Arrived at EDR: 02/24/2015
Date Made Active in Reports: 09/30/2015
Number of Days to Update: 218

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 05/26/2017
Next Scheduled EDR Contact: 09/04/2017
Data Release Frequency: Biennially

INDIAN RESERV: Indian Reservations
This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 07/14/2015
Date Made Active in Reports: 01/10/2017
Number of Days to Update: 546

Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 07/11/2017
Next Scheduled EDR Contact: 10/23/2017
Data Release Frequency: Semi-Annually

FUSRAP: Formerly Utilized Sites Remedial Action Program
DOE established the Formerly Utilized Sites Remedial Action Program (FUSRAP) in 1974 to remediate sites where radioactive contamination remained from Manhattan Project and early U.S. Atomic Energy Commission (AEC) operations.

Date of Government Version: 12/23/2016
Date Data Arrived at EDR: 12/27/2016
Date Made Active in Reports: 02/17/2017
Number of Days to Update: 52

Source: Department of Energy
Telephone: 202-586-3559
Last EDR Contact: 05/05/2017
Next Scheduled EDR Contact: 08/21/2017
Data Release Frequency: Varies

UMTRA: Uranium Mill Tailings Sites
Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 09/14/2010
Date Data Arrived at EDR: 10/07/2011
Date Made Active in Reports: 03/01/2012
Number of Days to Update: 146

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 05/22/2017
Next Scheduled EDR Contact: 09/04/2017
Data Release Frequency: Varies

LEAD SMELTER 1: Lead Smelter Sites
A listing of former lead smelter site locations.

Date of Government Version: 12/05/2016
Date Data Arrived at EDR: 01/05/2017
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 36

Source: Environmental Protection Agency
Telephone: 703-603-8787
Last EDR Contact: 07/07/2017
Next Scheduled EDR Contact: 10/16/2017
Data Release Frequency: Varies

LEAD SMELTER 2: Lead Smelter Sites
A list of several hundred sites in the U.S. where secondary lead smelting was done from 1931and 1964. These sites may pose a threat to public health through ingestion or inhalation of contaminated soil or dust

Date of Government Version: 04/05/2001
Date Data Arrived at EDR: 10/27/2010
Date Made Active in Reports: 12/02/2010
Number of Days to Update: 36

Source: American Journal of Public Health
Telephone: 703-305-6451
Last EDR Contact: 12/02/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

US AIRS (AFS): Aerometric Information Retrieval System Facility Subsystem (AFS)
The database is a sub-system of Aerometric Information Retrieval System (AIRS). AFS contains compliance data on air pollution point sources regulated by the U.S. EPA and/or state and local air regulatory agencies. This information comes from source reports by various stationary sources of air pollution, such as electric power plants, steel mills, factories, and universities, and provides information about the air pollutants they produce. Action, air program, air program pollutant, and general level plant data. It is used to track emissions and compliance data from industrial plants.

Date of Government Version: 10/12/2016
Date Data Arrived at EDR: 10/26/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 100

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 06/21/2017
Next Scheduled EDR Contact: 10/09/2017
Data Release Frequency: Annually

US AIRS MINOR: Air Facility System Data
A listing of minor source facilities.

Date of Government Version: 10/12/2016
Date Data Arrived at EDR: 10/26/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 100

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 06/21/2017
Next Scheduled EDR Contact: 10/09/2017
Data Release Frequency: Annually

US MINES: Mines Master Index File
Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 02/08/2017
Date Data Arrived at EDR: 02/28/2017
Date Made Active in Reports: 04/07/2017
Number of Days to Update: 38

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 05/31/2017
Next Scheduled EDR Contact: 09/11/2017
Data Release Frequency: Semi-Annually

US MINES 2: Ferrous and Nonferrous Metal Mines Database Listing
This map layer includes ferrous (ferrous metal mines are facilities that extract ferrous metals, such as iron ore or molybdenum) and nonferrous (Nonferrous metal mines are facilities that extract nonferrous metals, such as gold, silver, copper, zinc, and lead) metal mines in the United States.

Date of Government Version: 12/05/2005
Date Data Arrived at EDR: 02/29/2008
Date Made Active in Reports: 04/18/2008
Number of Days to Update: 49

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 05/31/2017
Next Scheduled EDR Contact: 09/11/2017
Data Release Frequency: Varies

US MINES 3: Active Mines & Mineral Plants Database Listing

Active Mines and Mineral Processing Plant operations for commodities monitored by the Minerals Information Team of the USGS.

Date of Government Version: 04/14/2011
Date Data Arrived at EDR: 06/08/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 97

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 06/02/2017
Next Scheduled EDR Contact: 09/11/2017
Data Release Frequency: Varies

ABANDONED MINES: Abandoned Mines

An inventory of land and water impacted by past mining (primarily coal mining) is maintained by OSMRE to provide information needed to implement the Surface Mining Control and Reclamation Act of 1977 (SMCRA). The inventory contains information on the location, type, and extent of AML impacts, as well as, information on the cost associated with the reclamation of those problems. The inventory is based upon field surveys by State, Tribal, and OSMRE program officials. It is dynamic to the extent that it is modified as new problems are identified and existing problems are reclaimed.

Date of Government Version: 03/14/2017
Date Data Arrived at EDR: 03/17/2017
Date Made Active in Reports: 04/07/2017
Number of Days to Update: 21

Source: Department of Interior
Telephone: 202-208-2609
Last EDR Contact: 06/09/2017
Next Scheduled EDR Contact: 09/25/2017
Data Release Frequency: Quarterly

FINDS: Facility Index System/Facility Registry System

Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 04/04/2017
Date Data Arrived at EDR: 04/07/2017
Date Made Active in Reports: 05/12/2017
Number of Days to Update: 35

Source: EPA
Telephone: (415) 947-8000
Last EDR Contact: 06/07/2017
Next Scheduled EDR Contact: 09/18/2017
Data Release Frequency: Quarterly

ECHO: Enforcement & Compliance History Information

ECHO provides integrated compliance and enforcement information for about 800,000 regulated facilities nationwide.

Date of Government Version: 03/19/2017
Date Data Arrived at EDR: 03/21/2017
Date Made Active in Reports: 05/12/2017
Number of Days to Update: 52

Source: Environmental Protection Agency
Telephone: 202-564-2280
Last EDR Contact: 06/07/2017
Next Scheduled EDR Contact: 09/18/2017
Data Release Frequency: Quarterly

UXO: Unexploded Ordnance Sites

A listing of unexploded ordnance site locations

Date of Government Version: 10/25/2015
Date Data Arrived at EDR: 01/29/2016
Date Made Active in Reports: 04/05/2016
Number of Days to Update: 67

Source: Department of Defense
Telephone: 571-373-0407
Last EDR Contact: 07/17/2017
Next Scheduled EDR Contact: 10/30/2017
Data Release Frequency: Varies

DOCKET HWC: Hazardous Waste Compliance Docket Listing
A complete list of the Federal Agency Hazardous Waste Compliance Docket Facilities.

Date of Government Version: 06/02/2016
Date Data Arrived at EDR: 06/03/2016
Date Made Active in Reports: 09/02/2016
Number of Days to Update: 91

Source: Environmental Protection Agency
Telephone: 202-564-0527
Last EDR Contact: 05/24/2017
Next Scheduled EDR Contact: 09/11/2017
Data Release Frequency: Varies

FUELS PROGRAM: EPA Fuels Program Registered Listing
This listing includes facilities that are registered under the Part 80 (Code of Federal Regulations) EPA Fuels Programs. All companies now are required to submit new and updated registrations.

Date of Government Version: 02/22/2017
Date Data Arrived at EDR: 02/22/2017
Date Made Active in Reports: 05/12/2017
Number of Days to Update: 79

Source: EPA
Telephone: 800-385-6164
Last EDR Contact: 05/24/2017
Next Scheduled EDR Contact: 09/04/2017
Data Release Frequency: Quarterly

CA BOND EXP. PLAN: Bond Expenditure Plan
Department of Health Services developed a site-specific expenditure plan as the basis for an appropriation of Hazardous Substance Cleanup Bond Act funds. It is not updated.

Date of Government Version: 01/01/1989
Date Data Arrived at EDR: 07/27/1994
Date Made Active in Reports: 08/02/1994
Number of Days to Update: 6

Source: Department of Health Services
Telephone: 916-255-2118
Last EDR Contact: 05/31/1994
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

CORTESE: "Cortese" Hazardous Waste & Substances Sites List
The sites for the list are designated by the State Water Resource Control Board (LUST), the Integrated Waste Board (SWF/LS), and the Department of Toxic Substances Control (Cal-Sites).

Date of Government Version: 12/28/2016
Date Data Arrived at EDR: 12/28/2016
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 64

Source: CAL EPA/Office of Emergency Information
Telephone: 916-323-3400
Last EDR Contact: 06/28/2017
Next Scheduled EDR Contact: 10/09/2017
Data Release Frequency: Quarterly

DRYCLEANERS: Cleaner Facilities
A list of drycleaner related facilities that have EPA ID numbers. These are facilities with certain SIC codes: power laundries, family and commercial; garment pressing and cleaner's agents; linen supply; coin-operated laundries and cleaning; drycleaning plants, except rugs; carpet and upholster cleaning; industrial launderers; laundry and garment services.

Date of Government Version: 03/09/2017
Date Data Arrived at EDR: 04/11/2017
Date Made Active in Reports: 05/23/2017
Number of Days to Update: 42

Source: Department of Toxic Substance Control
Telephone: 916-327-4498
Last EDR Contact: 07/13/2017
Next Scheduled EDR Contact: 09/18/2017
Data Release Frequency: Annually

EMI: Emissions Inventory Data
Toxics and criteria pollutant emissions data collected by the ARB and local air pollution agencies.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 09/23/2016
Date Made Active in Reports: 10/24/2016
Number of Days to Update: 31

Source: California Air Resources Board
Telephone: 916-322-2990
Last EDR Contact: 06/23/2017
Next Scheduled EDR Contact: 10/02/2017
Data Release Frequency: Varies

ENF: Enforcement Action Listing

A listing of Water Board Enforcement Actions. Formal is everything except Oral/Verbal Communication, Notice of Violation, Expedited Payment Letter, and Staff Enforcement Letter.

Date of Government Version: 01/23/2017
Date Data Arrived at EDR: 01/27/2017
Date Made Active in Reports: 05/25/2017
Number of Days to Update: 118

Source: State Water Resoruces Control Board
Telephone: 916-445-9379
Last EDR Contact: 07/19/2017
Next Scheduled EDR Contact: 11/08/2017
Data Release Frequency: Varies

Financial Assurance 1: Financial Assurance Information Listing

Financial Assurance information

Date of Government Version: 04/25/2016
Date Data Arrived at EDR: 04/29/2016
Date Made Active in Reports: 06/21/2016
Number of Days to Update: 53

Source: Department of Toxic Substances Control
Telephone: 916-255-3628
Last EDR Contact: 06/02/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Varies

Financial Assurance 2: Financial Assurance Information Listing

A listing of financial assurance information for solid waste facilities. Financial assurance is intended to ensure that resources are available to pay for the cost of closure, post-closure care, and corrective measures if the owner or operator of a regulated facility is unable or unwilling to pay.

Date of Government Version: 02/14/2017
Date Data Arrived at EDR: 02/17/2017
Date Made Active in Reports: 05/25/2017
Number of Days to Update: 97

Source: California Integrated Waste Management Board
Telephone: 916-341-6066
Last EDR Contact: 05/15/2017
Next Scheduled EDR Contact: 08/28/2017
Data Release Frequency: Varies

HAZNET: Facility and Manifest Data

Facility and Manifest Data. The data is extracted from the copies of hazardous waste manifests received each year by the DTSC. The annual volume of manifests is typically 700,000 - 1,000,000 annually, representing approximately 350,000 - 500,000 shipments. Data are from the manifests submitted without correction, and therefore many contain some invalid values for data elements such as generator ID, TSD ID, waste category, and disposal method. This database begins with calendar year 1993.

Date of Government Version: 12/31/2015
Date Data Arrived at EDR: 10/12/2016
Date Made Active in Reports: 12/15/2016
Number of Days to Update: 64

Source: California Environmental Protection Agency
Telephone: 916-255-1136
Last EDR Contact: 07/12/2017
Next Scheduled EDR Contact: 10/23/2017
Data Release Frequency: Annually

ICE: ICE

Contains data pertaining to the Permitted Facilities with Inspections / Enforcements sites tracked in Envirostor.

Date of Government Version: 11/21/2016
Date Data Arrived at EDR: 11/22/2016
Date Made Active in Reports: 01/23/2017
Number of Days to Update: 62

Source: Department of Toxic Subsances Control
Telephone: 877-786-9427
Last EDR Contact: 05/24/2017
Next Scheduled EDR Contact: 09/04/2017
Data Release Frequency: Quarterly

HIST CORTESE: Hazardous Waste & Substance Site List

The sites for the list are designated by the State Water Resource Control Board [LUST], the Integrated Waste Board [SWF/LS], and the Department of Toxic Substances Control [CALSITES]. This listing is no longer updated by the state agency.

Date of Government Version: 04/01/2001
Date Data Arrived at EDR: 01/22/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 76

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 01/22/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

HWP: EnviroStor Permitted Facilities Listing
Detailed information on permitted hazardous waste facilities and corrective action ("cleanups") tracked in EnviroStor.

Date of Government Version: 11/21/2016
Date Data Arrived at EDR: 11/22/2016
Date Made Active in Reports: 01/23/2017
Number of Days to Update: 62

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 05/24/2017
Next Scheduled EDR Contact: 09/04/2017
Data Release Frequency: Quarterly

HWT: Registered Hazardous Waste Transporter Database
A listing of hazardous waste transporters. In California, unless specifically exempted, it is unlawful for any person to transport hazardous wastes unless the person holds a valid registration issued by DTSC. A hazardous waste transporter registration is valid for one year and is assigned a unique registration number.

Date of Government Version: 04/11/2017
Date Data Arrived at EDR: 04/13/2017
Date Made Active in Reports: 04/26/2017
Number of Days to Update: 13

Source: Department of Toxic Substances Control
Telephone: 916-440-7145
Last EDR Contact: 07/12/2017
Next Scheduled EDR Contact: 10/23/2017
Data Release Frequency: Quarterly

MINES: Mines Site Location Listing
A listing of mine site locations from the Office of Mine Reclamation.

Date of Government Version: 09/12/2016
Date Data Arrived at EDR: 09/14/2016
Date Made Active in Reports: 10/14/2016
Number of Days to Update: 30

Source: Department of Conservation
Telephone: 916-322-1080
Last EDR Contact: 06/14/2017
Next Scheduled EDR Contact: 09/25/2017
Data Release Frequency: Varies

MWMP: Medical Waste Management Program Listing
The Medical Waste Management Program (MWMP) ensures the proper handling and disposal of medical waste by permitting and inspecting medical waste Offsite Treatment Facilities (PDF) and Transfer Stations (PDF) throughout the state. MWMP also oversees all Medical Waste Transporters.

Date of Government Version: 12/02/2016
Date Data Arrived at EDR: 12/06/2016
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 86

Source: Department of Public Health
Telephone: 916-558-1784
Last EDR Contact: 06/06/2017
Next Scheduled EDR Contact: 09/18/2017
Data Release Frequency: Varies

NPDES: NPDES Permits Listing
A listing of NPDES permits, including stormwater.

Date of Government Version: 11/14/2016
Date Data Arrived at EDR: 11/15/2016
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 107

Source: State Water Resources Control Board
Telephone: 916-445-9379
Last EDR Contact: 05/17/2017
Next Scheduled EDR Contact: 08/28/2017
Data Release Frequency: Quarterly

PEST LIC: Pesticide Regulation Licenses Listing
A listing of licenses and certificates issued by the Department of Pesticide Regulation. The DPR issues licenses and/or certificates to: Persons and businesses that apply or sell pesticides; Pest control dealers and brokers; Persons who advise on agricultural pesticide applications.

Date of Government Version: 12/06/2016
Date Data Arrived at EDR: 12/06/2016
Date Made Active in Reports: 03/03/2017
Number of Days to Update: 87

Source: Department of Pesticide Regulation
Telephone: 916-445-4038
Last EDR Contact: 06/07/2017
Next Scheduled EDR Contact: 09/18/2017
Data Release Frequency: Quarterly

PROC: Certified Processors Database
A listing of certified processors.

Date of Government Version: 03/13/2017
Date Data Arrived at EDR: 03/14/2017
Date Made Active in Reports: 05/03/2017
Number of Days to Update: 50

Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 06/14/2017
Next Scheduled EDR Contact: 09/25/2017
Data Release Frequency: Quarterly

NOTIFY 65: Proposition 65 Records
Listings of all Proposition 65 incidents reported to counties by the State Water Resources Control Board and the Regional Water Quality Control Board. This database is no longer updated by the reporting agency.

Date of Government Version: 12/16/2016
Date Data Arrived at EDR: 12/22/2016
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 70

Source: State Water Resources Control Board
Telephone: 916-445-3846
Last EDR Contact: 06/16/2017
Next Scheduled EDR Contact: 10/02/2017
Data Release Frequency: No Update Planned

UIC: UIC Listing
A listing of wells identified as underground injection wells, in the California Oil and Gas Wells database.

Date of Government Version: 01/20/2017
Date Data Arrived at EDR: 03/14/2017
Date Made Active in Reports: 05/03/2017
Number of Days to Update: 50

Source: Deaprtment of Conservation
Telephone: 916-445-2408
Last EDR Contact: 06/14/2017
Next Scheduled EDR Contact: 09/25/2017
Data Release Frequency: Varies

WASTEWATER PITS: Oil Wastewater Pits Listing
Water officials discovered that oil producers have been dumping chemical-laden wastewater into hundreds of unlined pits that are operating without proper permits. Inspections completed by the Central Valley Regional Water Quality Control Board revealed the existence of previously unidentified waste sites. The water board?s review found that more than one-third of the region?s active disposal pits are operating without permission.

Date of Government Version: 04/15/2015
Date Data Arrived at EDR: 04/17/2015
Date Made Active in Reports: 06/23/2015
Number of Days to Update: 67

Source: RWQCB, Central Valley Region
Telephone: 559-445-5577
Last EDR Contact: 07/14/2017
Next Scheduled EDR Contact: 10/23/2017
Data Release Frequency: Varies

WDS: Waste Discharge System
Sites which have been issued waste discharge requirements.

Date of Government Version: 06/19/2007
Date Data Arrived at EDR: 06/20/2007
Date Made Active in Reports: 06/29/2007
Number of Days to Update: 9

Source: State Water Resources Control Board
Telephone: 916-341-5227
Last EDR Contact: 05/22/2017
Next Scheduled EDR Contact: 09/04/2017
Data Release Frequency: Quarterly

WIP: Well Investigation Program Case List
Well Investigation Program case in the San Gabriel and San Fernando Valley area.

Date of Government Version: 07/03/2009
Date Data Arrived at EDR: 07/21/2009
Date Made Active in Reports: 08/03/2009
Number of Days to Update: 13

Source: Los Angeles Water Quality Control Board
Telephone: 213-576-6726
Last EDR Contact: 06/27/2017
Next Scheduled EDR Contact: 10/09/2017
Data Release Frequency: Varies

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP: EDR Proprietary Manufactured Gas Plants

The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

EDR Hist Auto: EDR Exclusive Historic Gas Stations

EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR Hist Cleaner: EDR Exclusive Historic Dry Cleaners

EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA LF: Recovered Government Archive Solid Waste Facilities List

The EDR Recovered Government Archive Landfill database provides a list of landfills derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Resources Recycling and Recovery in California.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 01/13/2014
Number of Days to Update: 196

Source: Department of Resources Recycling and Recovery
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

RGA LUST: Recovered Government Archive Leaking Underground Storage Tank

The EDR Recovered Government Archive Leaking Underground Storage Tank database provides a list of LUST incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the State Water Resources Control Board in California.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 12/30/2013
Number of Days to Update: 182

Source: State Water Resources Control Board
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

COUNTY RECORDS

ALAMEDA COUNTY:

Contaminated Sites

A listing of contaminated sites overseen by the Toxic Release Program (oil and groundwater contamination from chemical releases and spills) and the Leaking Underground Storage Tank Program (soil and ground water contamination from leaking petroleum USTs).

Date of Government Version: 04/10/2017
Date Data Arrived at EDR: 04/11/2017
Date Made Active in Reports: 05/12/2017
Number of Days to Update: 31

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 07/07/2017
Next Scheduled EDR Contact: 10/23/2017
Data Release Frequency: Semi-Annually

Underground Tanks

Underground storage tank sites located in Alameda county.

Date of Government Version: 04/10/2017
Date Data Arrived at EDR: 04/11/2017
Date Made Active in Reports: 05/02/2017
Number of Days to Update: 21

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 07/07/2017
Next Scheduled EDR Contact: 04/24/2047
Data Release Frequency: Semi-Annually

AMADOR COUNTY:

CUPA Facility List

Cupa Facility List

Date of Government Version: 03/06/2017
Date Data Arrived at EDR: 03/08/2017
Date Made Active in Reports: 04/14/2017
Number of Days to Update: 37

Source: Amador County Environmental Health
Telephone: 209-223-6439
Last EDR Contact: 06/16/2017
Next Scheduled EDR Contact: 09/18/2017
Data Release Frequency: Varies

BUTTE COUNTY:

CUPA Facility Listing

Cupa facility list.

Date of Government Version: 01/31/2017
Date Data Arrived at EDR: 02/07/2017
Date Made Active in Reports: 05/12/2017
Number of Days to Update: 94

Source: Public Health Department
Telephone: 530-538-7149
Last EDR Contact: 07/19/2017
Next Scheduled EDR Contact: 10/23/2017
Data Release Frequency: No Update Planned

CALVERAS COUNTY:

CUPA Facility Listing
Cupa Facility Listing

Date of Government Version: 01/09/2017
Date Data Arrived at EDR: 01/11/2017
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 50

Source: Calveras County Environmental Health
Telephone: 209-754-6399
Last EDR Contact: 06/27/2017
Next Scheduled EDR Contact: 10/09/2017
Data Release Frequency: Quarterly

COLUSA COUNTY:

CUPA Facility List
Cupa facility list.

Date of Government Version: 02/23/2017
Date Data Arrived at EDR: 02/24/2017
Date Made Active in Reports: 05/12/2017
Number of Days to Update: 77

Source: Health & Human Services
Telephone: 530-458-0396
Last EDR Contact: 06/02/2017
Next Scheduled EDR Contact: 08/21/2017
Data Release Frequency: Varies

CONTRA COSTA COUNTY:

Site List
List includes sites from the underground tank, hazardous waste generator and business plan/2185 programs.

Date of Government Version: 11/17/2016
Date Data Arrived at EDR: 11/22/2016
Date Made Active in Reports: 01/26/2017
Number of Days to Update: 65

Source: Contra Costa Health Services Department
Telephone: 925-646-2286
Last EDR Contact: 05/01/2017
Next Scheduled EDR Contact: 08/14/2017
Data Release Frequency: Semi-Annually

DEL NORTE COUNTY:

CUPA Facility List
Cupa Facility list

Date of Government Version: 01/31/2017
Date Data Arrived at EDR: 02/03/2017
Date Made Active in Reports: 04/14/2017
Number of Days to Update: 70

Source: Del Norte County Environmental Health Division
Telephone: 707-465-0426
Last EDR Contact: 05/01/2017
Next Scheduled EDR Contact: 08/14/2017
Data Release Frequency: Varies

EL DORADO COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 02/24/2017
Date Data Arrived at EDR: 02/28/2017
Date Made Active in Reports: 05/12/2017
Number of Days to Update: 73

Source: El Dorado County Environmental Management Department
Telephone: 530-621-6623
Last EDR Contact: 05/01/2017
Next Scheduled EDR Contact: 08/14/2017
Data Release Frequency: Varies

FRESNO COUNTY:

CUPA Resources List

Certified Unified Program Agency. CUPA's are responsible for implementing a unified hazardous materials and hazardous waste management regulatory program. The agency provides oversight of businesses that deal with hazardous materials, operate underground storage tanks or aboveground storage tanks.

Date of Government Version: 04/06/2017
Date Data Arrived at EDR: 04/07/2017
Date Made Active in Reports: 05/17/2017
Number of Days to Update: 40

Source: Dept. of Community Health
Telephone: 559-445-3271
Last EDR Contact: 06/29/2017
Next Scheduled EDR Contact: 10/16/2017
Data Release Frequency: Semi-Annually

GLENN COUNTY:

CUPA Facility List

Cupa facility list

Date of Government Version: 12/02/2016
Date Data Arrived at EDR: 02/03/2017
Date Made Active in Reports: 05/25/2017
Number of Days to Update: 111

Source: Glenn County Air Pollution Control District
Telephone: 830-934-6500
Last EDR Contact: 04/24/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Varies

HUMBOLDT COUNTY:

CUPA Facility List

CUPA facility list.

Date of Government Version: 03/20/2017
Date Data Arrived at EDR: 03/21/2017
Date Made Active in Reports: 05/17/2017
Number of Days to Update: 57

Source: Humboldt County Environmental Health
Telephone: N/A
Last EDR Contact: 05/22/2017
Next Scheduled EDR Contact: 09/04/2017
Data Release Frequency: Varies

IMPERIAL COUNTY:

CUPA Facility List

Cupa facility list.

Date of Government Version: 01/23/2017
Date Data Arrived at EDR: 01/25/2017
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 36

Source: San Diego Border Field Office
Telephone: 760-339-2777
Last EDR Contact: 04/24/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Varies

INYO COUNTY:

CUPA Facility List
Cupa facility list.

Date of Government Version: 03/09/2017
Date Data Arrived at EDR: 03/09/2017
Date Made Active in Reports: 05/25/2017
Number of Days to Update: 77

Source: Inyo County Environmental Health Services
Telephone: 760-878-0238
Last EDR Contact: 06/02/2017
Next Scheduled EDR Contact: 09/04/2017
Data Release Frequency: Varies

KERN COUNTY:

Underground Storage Tank Sites & Tank Listing
Kern County Sites and Tanks Listing.

Date of Government Version: 02/07/2017
Date Data Arrived at EDR: 02/10/2017
Date Made Active in Reports: 05/02/2017
Number of Days to Update: 81

Source: Kern County Environment Health Services Department
Telephone: 661-862-8700
Last EDR Contact: 05/05/2017
Next Scheduled EDR Contact: 08/21/2017
Data Release Frequency: Quarterly

KINGS COUNTY:

CUPA Facility List
A listing of sites included in the county's Certified Unified Program Agency database. California's Secretary for Environmental Protection established the unified hazardous materials and hazardous waste regulatory program as required by chapter 6.11 of the California Health and Safety Code. The Unified Program consolidates the administration, permits, inspections, and enforcement activities.

Date of Government Version: 03/06/2017
Date Data Arrived at EDR: 03/07/2017
Date Made Active in Reports: 05/17/2017
Number of Days to Update: 71

Source: Kings County Department of Public Health
Telephone: 559-584-1411
Last EDR Contact: 05/22/2017
Next Scheduled EDR Contact: 09/04/2017
Data Release Frequency: Varies

LAKE COUNTY:

CUPA Facility List
Cupa facility list

Date of Government Version: 01/18/2017
Date Data Arrived at EDR: 01/20/2017
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 41

Source: Lake County Environmental Health
Telephone: 707-263-1164
Last EDR Contact: 07/17/2017
Next Scheduled EDR Contact: 10/30/2017
Data Release Frequency: Varies

LASSEN COUNTY:

CUPA Facility List
Cupa facility list

Date of Government Version: 11/30/2016
Date Data Arrived at EDR: 02/03/2017
Date Made Active in Reports: 05/25/2017
Number of Days to Update: 111

Source: Lassen County Environmental Health
Telephone: 530-251-8528
Last EDR Contact: 11/30/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Varies

LOS ANGELES COUNTY:

San Gabriel Valley Areas of Concern
San Gabriel Valley areas where VOC contamination is at or above the MCL as designated by region 9 EPA office.

Date of Government Version: 03/30/2009
Date Data Arrived at EDR: 03/31/2009
Date Made Active in Reports: 10/23/2009
Number of Days to Update: 206

Source: EPA Region 9
Telephone: 415-972-3178
Last EDR Contact: 06/16/2017
Next Scheduled EDR Contact: 10/02/2017
Data Release Frequency: No Update Planned

HMS: Street Number List
Industrial Waste and Underground Storage Tank Sites.

Date of Government Version: 11/14/2016
Date Data Arrived at EDR: 11/18/2016
Date Made Active in Reports: 01/23/2017
Number of Days to Update: 66

Source: Department of Public Works
Telephone: 626-458-3517
Last EDR Contact: 07/07/2017
Next Scheduled EDR Contact: 10/23/2017
Data Release Frequency: Semi-Annually

List of Solid Waste Facilities
Solid Waste Facilities in Los Angeles County.

Date of Government Version: 04/17/2017
Date Data Arrived at EDR: 04/18/2017
Date Made Active in Reports: 05/02/2017
Number of Days to Update: 14

Source: La County Department of Public Works
Telephone: 818-458-5185
Last EDR Contact: 07/18/2017
Next Scheduled EDR Contact: 10/30/2017
Data Release Frequency: Varies

City of Los Angeles Landfills
Landfills owned and maintained by the City of Los Angeles.

Date of Government Version: 01/01/2016
Date Data Arrived at EDR: 01/26/2016
Date Made Active in Reports: 03/22/2016
Number of Days to Update: 56

Source: Engineering & Construction Division
Telephone: 213-473-7869
Last EDR Contact: 07/13/2017
Next Scheduled EDR Contact: 10/30/2017
Data Release Frequency: Varies

Site Mitigation List
Industrial sites that have had some sort of spill or complaint.

Date of Government Version: 03/29/2016
Date Data Arrived at EDR: 04/06/2016
Date Made Active in Reports: 06/13/2016
Number of Days to Update: 68

Source: Community Health Services
Telephone: 323-890-7806
Last EDR Contact: 07/17/2017
Next Scheduled EDR Contact: 10/30/2017
Data Release Frequency: Annually

City of El Segundo Underground Storage Tank
Underground storage tank sites located in El Segundo city.

Date of Government Version: 01/17/2017
Date Data Arrived at EDR: 01/18/2017
Date Made Active in Reports: 05/10/2017
Number of Days to Update: 112

Source: City of El Segundo Fire Department
Telephone: 310-524-2236
Last EDR Contact: 07/13/2017
Next Scheduled EDR Contact: 10/30/2017
Data Release Frequency: Semi-Annually

City of Long Beach Underground Storage Tank
Underground storage tank sites located in the city of Long Beach.

Date of Government Version: 03/09/2017
Date Data Arrived at EDR: 03/10/2017
Date Made Active in Reports: 05/03/2017
Number of Days to Update: 54

Source: City of Long Beach Fire Department
Telephone: 562-570-2563
Last EDR Contact: 04/24/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Annually

City of Torrance Underground Storage Tank
Underground storage tank sites located in the city of Torrance.

Date of Government Version: 01/10/2017
Date Data Arrived at EDR: 01/13/2017
Date Made Active in Reports: 05/03/2017
Number of Days to Update: 110

Source: City of Torrance Fire Department
Telephone: 310-618-2973
Last EDR Contact: 07/07/2017
Next Scheduled EDR Contact: 10/23/2017
Data Release Frequency: Semi-Annually

MADERA COUNTY:

CUPA Facility List
A listing of sites included in the county's Certified Unified Program Agency database. California's Secretary for Environmental Protection established the unified hazardous materials and hazardous waste regulatory program as required by chapter 6.11 of the California Health and Safety Code. The Unified Program consolidates the administration, permits, inspections, and enforcement activities.

Date of Government Version: 03/03/2017
Date Data Arrived at EDR: 03/07/2017
Date Made Active in Reports: 05/17/2017
Number of Days to Update: 71

Source: Madera County Environmental Health
Telephone: 559-675-7823
Last EDR Contact: 05/22/2017
Next Scheduled EDR Contact: 09/04/2017
Data Release Frequency: Varies

MARIN COUNTY:

Underground Storage Tank Sites
Currently permitted USTs in Marin County.

Date of Government Version: 03/31/2017
Date Data Arrived at EDR: 04/06/2017
Date Made Active in Reports: 05/03/2017
Number of Days to Update: 27

Source: Public Works Department Waste Management
Telephone: 415-473-6647
Last EDR Contact: 06/29/2017
Next Scheduled EDR Contact: 10/16/2017
Data Release Frequency: Semi-Annually

MERCED COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 02/22/2017
Date Data Arrived at EDR: 02/23/2017
Date Made Active in Reports: 05/17/2017
Number of Days to Update: 83

Source: Merced County Environmental Health
Telephone: 209-381-1094
Last EDR Contact: 07/13/2017
Next Scheduled EDR Contact: 09/04/2017
Data Release Frequency: Varies

MONO COUNTY:

CUPA Facility List
CUPA Facility List

Date of Government Version: 02/21/2017
Date Data Arrived at EDR: 03/02/2017
Date Made Active in Reports: 05/17/2017
Number of Days to Update: 76

Source: Mono County Health Department
Telephone: 760-932-5580
Last EDR Contact: 05/24/2017
Next Scheduled EDR Contact: 09/11/2017
Data Release Frequency: Varies

MONTEREY COUNTY:

CUPA Facility Listing
CUPA Program listing from the Environmental Health Division.

Date of Government Version: 06/24/2016
Date Data Arrived at EDR: 06/27/2016
Date Made Active in Reports: 08/09/2016
Number of Days to Update: 43

Source: Monterey County Health Department
Telephone: 831-796-1297
Last EDR Contact: 05/22/2017
Next Scheduled EDR Contact: 09/04/2017
Data Release Frequency: Varies

NAPA COUNTY:

Sites With Reported Contamination
A listing of leaking underground storage tank sites located in Napa county.

Date of Government Version: 01/09/2017
Date Data Arrived at EDR: 01/11/2017
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 50

Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 05/24/2017
Next Scheduled EDR Contact: 09/11/2017
Data Release Frequency: No Update Planned

Closed and Operating Underground Storage Tank Sites
Underground storage tank sites located in Napa county.

Date of Government Version: 03/15/2017
Date Data Arrived at EDR: 03/16/2017
Date Made Active in Reports: 05/09/2017
Number of Days to Update: 54

Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 05/24/2017
Next Scheduled EDR Contact: 09/11/2017
Data Release Frequency: No Update Planned

NEVADA COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 02/09/2017
Date Data Arrived at EDR: 02/10/2017
Date Made Active in Reports: 05/17/2017
Number of Days to Update: 96

Source: Community Development Agency
Telephone: 530-265-1467
Last EDR Contact: 05/01/2017
Next Scheduled EDR Contact: 08/14/2017
Data Release Frequency: Varies

ORANGE COUNTY:

List of Industrial Site Cleanups
Petroleum and non-petroleum spills.

Date of Government Version: 02/06/2017
Date Data Arrived at EDR: 02/10/2017
Date Made Active in Reports: 04/21/2017
Number of Days to Update: 70

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 05/08/2017
Next Scheduled EDR Contact: 08/21/2017
Data Release Frequency: Annually

List of Underground Storage Tank Cleanups
Orange County Underground Storage Tank Cleanups (LUST).

Date of Government Version: 11/04/2016
Date Data Arrived at EDR: 11/11/2016
Date Made Active in Reports: 01/23/2017
Number of Days to Update: 73

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 05/08/2017
Next Scheduled EDR Contact: 08/21/2017
Data Release Frequency: Quarterly

List of Underground Storage Tank Facilities
Orange County Underground Storage Tank Facilities (UST).

Date of Government Version: 02/06/2017
Date Data Arrived at EDR: 02/07/2017
Date Made Active in Reports: 05/03/2017
Number of Days to Update: 85

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 05/09/2017
Next Scheduled EDR Contact: 08/21/2017
Data Release Frequency: Quarterly

PLACER COUNTY:

Master List of Facilities
List includes aboveground tanks, underground tanks and cleanup sites.

Date of Government Version: 09/02/2016
Date Data Arrived at EDR: 09/06/2016
Date Made Active in Reports: 10/14/2016
Number of Days to Update: 38

Source: Placer County Health and Human Services
Telephone: 530-745-2363
Last EDR Contact: 06/02/2017
Next Scheduled EDR Contact: 09/18/2017
Data Release Frequency: Semi-Annually

PLUMAS COUNTY:

CUPA Facility List
Plumas County CUPA Program facilities.

Date of Government Version: 01/31/2017
Date Data Arrived at EDR: 02/03/2017
Date Made Active in Reports: 05/25/2017
Number of Days to Update: 111

Source: Plumas County Environmental Health
Telephone: 530-283-6355
Last EDR Contact: 06/29/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Varies

RIVERSIDE COUNTY:

Listing of Underground Tank Cleanup Sites
Riverside County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 04/18/2017
Date Data Arrived at EDR: 04/20/2017
Date Made Active in Reports: 04/21/2017
Number of Days to Update: 1

Source: Department of Environmental Health
Telephone: 951-358-5055
Last EDR Contact: 06/19/2017
Next Scheduled EDR Contact: 10/02/2017
Data Release Frequency: Quarterly

Underground Storage Tank Tank List
Underground storage tank sites located in Riverside county.

Date of Government Version: 01/19/2017
Date Data Arrived at EDR: 01/25/2017
Date Made Active in Reports: 05/03/2017
Number of Days to Update: 98

Source: Department of Environmental Health
Telephone: 951-358-5055
Last EDR Contact: 06/19/2017
Next Scheduled EDR Contact: 10/02/2017
Data Release Frequency: Quarterly

SACRAMENTO COUNTY:

Toxic Site Clean-Up List
List of sites where unauthorized releases of potentially hazardous materials have occurred.

Date of Government Version: 11/07/2016
Date Data Arrived at EDR: 01/05/2017
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 56

Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 07/06/2017
Next Scheduled EDR Contact: 10/16/2017
Data Release Frequency: Quarterly

Master Hazardous Materials Facility List

Any business that has hazardous materials on site - hazardous material storage sites, underground storage tanks, waste generators.

Date of Government Version: 11/08/2016
Date Data Arrived at EDR: 01/05/2017
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 56

Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 07/06/2017
Next Scheduled EDR Contact: 10/16/2017
Data Release Frequency: Quarterly

SAN BENITO COUNTY:

CUPA Facility List

Cupa facility list

Date of Government Version: 11/30/2016
Date Data Arrived at EDR: 02/09/2017
Date Made Active in Reports: 05/25/2017
Number of Days to Update: 105

Source: San Benito County Environmental Health
Telephone: N/A
Last EDR Contact: 05/05/2017
Next Scheduled EDR Contact: 08/21/2017
Data Release Frequency: Varies

SAN BERNARDINO COUNTY:

Hazardous Material Permits

This listing includes underground storage tanks, medical waste handlers/generators, hazardous materials handlers, hazardous waste generators, and waste oil generators/handlers.

Date of Government Version: 12/09/2016
Date Data Arrived at EDR: 12/13/2016
Date Made Active in Reports: 03/03/2017
Number of Days to Update: 80

Source: San Bernardino County Fire Department Hazardous Materials Division
Telephone: 909-387-3041
Last EDR Contact: 05/08/2017
Next Scheduled EDR Contact: 08/21/2017
Data Release Frequency: Quarterly

SAN DIEGO COUNTY:

Hazardous Materials Management Division Database

The database includes: HE58 - This report contains the business name, site address, business phone number, establishment 'H' permit number, type of permit, and the business status. HE17 - In addition to providing the same information provided in the HE58 listing, HE17 provides inspection dates, violations received by the establishment, hazardous waste generated, the quantity, method of storage, treatment/disposal of waste and the hauler, and information on underground storage tanks. Unauthorized Release List - Includes a summary of environmental contamination cases in San Diego County (underground tank cases, non-tank cases, groundwater contamination, and soil contamination are included.)

Date of Government Version: 10/05/2016
Date Data Arrived at EDR: 12/06/2016
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 86

Source: Hazardous Materials Management Division
Telephone: 619-338-2268
Last EDR Contact: 06/07/2017
Next Scheduled EDR Contact: 09/18/2017
Data Release Frequency: Quarterly

Solid Waste Facilities
San Diego County Solid Waste Facilities.

Date of Government Version: 10/31/2015
Date Data Arrived at EDR: 11/07/2015
Date Made Active in Reports: 01/04/2016
Number of Days to Update: 58

Source: Department of Health Services
Telephone: 619-338-2209
Last EDR Contact: 04/24/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Varies

Environmental Case Listing
The listing contains all underground tank release cases and projects pertaining to properties contaminated with hazardous substances that are actively under review by the Site Assessment and Mitigation Program.

Date of Government Version: 03/23/2010
Date Data Arrived at EDR: 06/15/2010
Date Made Active in Reports: 07/09/2010
Number of Days to Update: 24

Source: San Diego County Department of Environmental Health
Telephone: 619-338-2371
Last EDR Contact: 06/05/2017
Next Scheduled EDR Contact: 09/18/2017
Data Release Frequency: No Update Planned

SAN FRANCISCO COUNTY:

Local Oversite Facilities
A listing of leaking underground storage tank sites located in San Francisco county.

Date of Government Version: 09/19/2008
Date Data Arrived at EDR: 09/19/2008
Date Made Active in Reports: 09/29/2008
Number of Days to Update: 10

Source: Department Of Public Health San Francisco County
Telephone: 415-252-3920
Last EDR Contact: 05/05/2017
Next Scheduled EDR Contact: 08/21/2017
Data Release Frequency: Quarterly

Underground Storage Tank Information
Underground storage tank sites located in San Francisco county.

Date of Government Version: 02/28/2017
Date Data Arrived at EDR: 03/02/2017
Date Made Active in Reports: 05/03/2017
Number of Days to Update: 62

Source: Department of Public Health
Telephone: 415-252-3920
Last EDR Contact: 05/05/2017
Next Scheduled EDR Contact: 08/21/2017
Data Release Frequency: Quarterly

SAN JOAQUIN COUNTY:

San Joaquin Co. UST
A listing of underground storage tank locations in San Joaquin county.

Date of Government Version: 03/21/2017
Date Data Arrived at EDR: 03/23/2017
Date Made Active in Reports: 05/09/2017
Number of Days to Update: 47

Source: Environmental Health Department
Telephone: N/A
Last EDR Contact: 06/16/2017
Next Scheduled EDR Contact: 10/02/2017
Data Release Frequency: Semi-Annually

SAN LUIS OBISPO COUNTY:

CUPA Facility List
Cupa Facility List.

Date of Government Version: 02/21/2017
Date Data Arrived at EDR: 02/21/2017
Date Made Active in Reports: 05/23/2017
Number of Days to Update: 91

Source: San Luis Obispo County Public Health Department
Telephone: 805-781-5596
Last EDR Contact: 06/02/2017
Next Scheduled EDR Contact: 09/04/2017
Data Release Frequency: Varies

SAN MATEO COUNTY:

Business Inventory
List includes Hazardous Materials Business Plan, hazardous waste generators, and underground storage tanks.

Date of Government Version: 03/15/2017
Date Data Arrived at EDR: 04/07/2017
Date Made Active in Reports: 05/10/2017
Number of Days to Update: 33

Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 06/09/2017
Next Scheduled EDR Contact: 09/25/2017
Data Release Frequency: Annually

Fuel Leak List
A listing of leaking underground storage tank sites located in San Mateo county.

Date of Government Version: 03/15/2017
Date Data Arrived at EDR: 04/07/2017
Date Made Active in Reports: 04/21/2017
Number of Days to Update: 14

Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 06/09/2017
Next Scheduled EDR Contact: 09/25/2017
Data Release Frequency: Semi-Annually

SANTA BARBARA COUNTY:

CUPA Facility Listing
CUPA Program Listing from the Environmental Health Services division.

Date of Government Version: 09/08/2011
Date Data Arrived at EDR: 09/09/2011
Date Made Active in Reports: 10/07/2011
Number of Days to Update: 28

Source: Santa Barbara County Public Health Department
Telephone: 805-686-8167
Last EDR Contact: 05/22/2017
Next Scheduled EDR Contact: 09/04/2017
Data Release Frequency: Varies

SANTA CLARA COUNTY:

Cupa Facility List
Cupa facility list

Date of Government Version: 02/22/2017
Date Data Arrived at EDR: 02/23/2017
Date Made Active in Reports: 05/23/2017
Number of Days to Update: 89

Source: Department of Environmental Health
Telephone: 408-918-1973
Last EDR Contact: 05/22/2017
Next Scheduled EDR Contact: 09/04/2017
Data Release Frequency: Varies

HIST LUST - Fuel Leak Site Activity Report
A listing of open and closed leaking underground storage tanks. This listing is no longer updated by the county. Leaking underground storage tanks are now handled by the Department of Environmental Health.

Date of Government Version: 03/29/2005
Date Data Arrived at EDR: 03/30/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 22

Source: Santa Clara Valley Water District
Telephone: 408-265-2600
Last EDR Contact: 03/23/2009
Next Scheduled EDR Contact: 06/22/2009
Data Release Frequency: No Update Planned

LOP Listing
A listing of leaking underground storage tanks located in Santa Clara county.

Date of Government Version: 03/03/2014
Date Data Arrived at EDR: 03/05/2014
Date Made Active in Reports: 03/18/2014
Number of Days to Update: 13

Source: Department of Environmental Health
Telephone: 408-918-3417
Last EDR Contact: 05/24/2017
Next Scheduled EDR Contact: 09/11/2017
Data Release Frequency: Annually

Hazardous Material Facilities
Hazardous material facilities, including underground storage tank sites.

Date of Government Version: 11/07/2016
Date Data Arrived at EDR: 11/10/2016
Date Made Active in Reports: 01/24/2017
Number of Days to Update: 75

Source: City of San Jose Fire Department
Telephone: 408-535-7694
Last EDR Contact: 05/05/2017
Next Scheduled EDR Contact: 08/21/2017
Data Release Frequency: Annually

SANTA CRUZ COUNTY:

CUPA Facility List
CUPA facility listing.

Date of Government Version: 01/21/2017
Date Data Arrived at EDR: 02/22/2017
Date Made Active in Reports: 05/23/2017
Number of Days to Update: 90

Source: Santa Cruz County Environmental Health
Telephone: 831-464-2761
Last EDR Contact: 05/22/2017
Next Scheduled EDR Contact: 09/04/2017
Data Release Frequency: Varies

SHASTA COUNTY:

CUPA Facility List
Cupa Facility List.

Date of Government Version: 03/14/2017
Date Data Arrived at EDR: 03/17/2017
Date Made Active in Reports: 05/23/2017
Number of Days to Update: 67

Source: Shasta County Department of Resource Management
Telephone: 530-225-5789
Last EDR Contact: 05/22/2017
Next Scheduled EDR Contact: 09/04/2017
Data Release Frequency: Varies

SOLANO COUNTY:

Leaking Underground Storage Tanks
A listing of leaking underground storage tank sites located in Solano county.

Date of Government Version: 11/29/2016
Date Data Arrived at EDR: 12/21/2016
Date Made Active in Reports: 12/22/2016
Number of Days to Update: 1

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 06/09/2017
Next Scheduled EDR Contact: 09/25/2017
Data Release Frequency: Quarterly

Underground Storage Tanks
Underground storage tank sites located in Solano county.

Date of Government Version: 03/15/2017
Date Data Arrived at EDR: 03/17/2017
Date Made Active in Reports: 05/03/2017
Number of Days to Update: 47

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 06/09/2017
Next Scheduled EDR Contact: 09/25/2017
Data Release Frequency: Quarterly

SONOMA COUNTY:

Cupa Facility List
Cupa Facility list

Date of Government Version: 03/01/2017
Date Data Arrived at EDR: 03/30/2017
Date Made Active in Reports: 05/23/2017
Number of Days to Update: 54

Source: County of Sonoma Fire & Emergency Services Department
Telephone: 707-565-1174
Last EDR Contact: 06/21/2017
Next Scheduled EDR Contact: 10/09/2017
Data Release Frequency: Varies

Leaking Underground Storage Tank Sites
A listing of leaking underground storage tank sites located in Sonoma county.

Date of Government Version: 01/04/2017
Date Data Arrived at EDR: 01/06/2017
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 55

Source: Department of Health Services
Telephone: 707-565-6565
Last EDR Contact: 06/21/2017
Next Scheduled EDR Contact: 10/09/2017
Data Release Frequency: Quarterly

STANISLAUS COUNTY:

CUPA Facility List
Cupa facility list

Date of Government Version: 01/20/2017
Date Data Arrived at EDR: 01/24/2017
Date Made Active in Reports: 05/18/2017
Number of Days to Update: 114

Source: Stanislaus County Department of Ennvironmental Protection
Telephone: 209-525-6751
Last EDR Contact: 07/17/2017
Next Scheduled EDR Contact: 10/30/2017
Data Release Frequency: Varies

SUTTER COUNTY:

Underground Storage Tanks
Underground storage tank sites located in Sutter county.

Date of Government Version: 12/02/2016
Date Data Arrived at EDR: 12/06/2016
Date Made Active in Reports: 01/10/2017
Number of Days to Update: 35

Source: Sutter County Department of Agriculture
Telephone: 530-822-7500
Last EDR Contact: 06/02/2017
Next Scheduled EDR Contact: 09/18/2017
Data Release Frequency: Semi-Annually

TEHAMA COUNTY:

CUPA Facility List
Cupa facilities

Date of Government Version: 01/05/2017
Date Data Arrived at EDR: 02/10/2017
Date Made Active in Reports: 05/25/2017
Number of Days to Update: 104

Source: Tehama County Department of Environmental Health
Telephone: 530-527-8020
Last EDR Contact: 05/05/2017
Next Scheduled EDR Contact: 08/21/2017
Data Release Frequency: Varies

TRINITY COUNTY:

CUPA Facility List
Cupa facility list

Date of Government Version: 01/23/2017
Date Data Arrived at EDR: 01/25/2017
Date Made Active in Reports: 05/18/2017
Number of Days to Update: 113

Source: Department of Toxic Substances Control
Telephone: 760-352-0381
Last EDR Contact: 04/24/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Varies

TULARE COUNTY:

CUPA Facility List
Cupa program facilities

Date of Government Version: 01/05/2017
Date Data Arrived at EDR: 02/10/2017
Date Made Active in Reports: 05/25/2017
Number of Days to Update: 104

Source: Tulare County Environmental Health Services Division
Telephone: 559-624-7400
Last EDR Contact: 06/29/2017
Next Scheduled EDR Contact: 08/21/2017
Data Release Frequency: Varies

TUOLUMNE COUNTY:

CUPA Facility List
Cupa facility list

Date of Government Version: 01/25/2017
Date Data Arrived at EDR: 01/27/2017
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 34

Source: Divison of Environmental Health
Telephone: 209-533-5633
Last EDR Contact: 04/24/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Varies

VENTURA COUNTY:

Business Plan, Hazardous Waste Producers, and Operating Underground Tanks
The BWT list indicates by site address whether the Environmental Health Division has Business Plan (B), Waste Producer (W), and/or Underground Tank (T) information.

Date of Government Version: 12/27/2016
Date Data Arrived at EDR: 01/27/2017
Date Made Active in Reports: 05/10/2017
Number of Days to Update: 103

Source: Ventura County Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 04/24/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Quarterly

Inventory of Illegal Abandoned and Inactive Sites
Ventura County Inventory of Closed, Illegal Abandoned, and Inactive Sites.

Date of Government Version: 12/01/2011
Date Data Arrived at EDR: 12/01/2011
Date Made Active in Reports: 01/19/2012
Number of Days to Update: 49

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 06/29/2017
Next Scheduled EDR Contact: 10/16/2017
Data Release Frequency: Annually

Listing of Underground Tank Cleanup Sites
Ventura County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 05/29/2008
Date Data Arrived at EDR: 06/24/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 37

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 05/15/2017
Next Scheduled EDR Contact: 08/28/2017
Data Release Frequency: Quarterly

Medical Waste Program List
To protect public health and safety and the environment from potential exposure to disease causing agents, the Environmental Health Division Medical Waste Program regulates the generation, handling, storage, treatment and disposal of medical waste throughout the County.

Date of Government Version: 09/26/2016
Date Data Arrived at EDR: 10/27/2016
Date Made Active in Reports: 01/24/2017
Number of Days to Update: 89

Source: Ventura County Resource Management Agency
Telephone: 805-654-2813
Last EDR Contact: 04/24/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Quarterly

Underground Tank Closed Sites List
Ventura County Operating Underground Storage Tank Sites (UST)/Underground Tank Closed Sites List.

Date of Government Version: 02/27/2017
Date Data Arrived at EDR: 03/15/2017
Date Made Active in Reports: 05/03/2017
Number of Days to Update: 49

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 06/14/2017
Next Scheduled EDR Contact: 09/25/2017
Data Release Frequency: Quarterly

YOLO COUNTY:

Underground Storage Tank Comprehensive Facility Report
Underground storage tank sites located in Yolo county.

Date of Government Version: 03/31/2017
Date Data Arrived at EDR: 04/06/2017
Date Made Active in Reports: 05/03/2017
Number of Days to Update: 27

Source: Yolo County Department of Health
Telephone: 530-666-8646
Last EDR Contact: 06/29/2017
Next Scheduled EDR Contact: 10/16/2017
Data Release Frequency: Annually

YUBA COUNTY:

CUPA Facility List
CUPA facility listing for Yuba County.

Date of Government Version: 01/30/2017
Date Data Arrived at EDR: 01/31/2017
Date Made Active in Reports: 05/23/2017
Number of Days to Update: 112

Source: Yuba County Environmental Health Department
Telephone: 530-749-7523
Last EDR Contact: 05/01/2017
Next Scheduled EDR Contact: 08/14/2017
Data Release Frequency: Varies

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

CT MANIFEST: Hazardous Waste Manifest Data
Facility and manifest data. Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a tsd facility.

Date of Government Version: 07/30/2013
Date Data Arrived at EDR: 08/19/2013
Date Made Active in Reports: 10/03/2013
Number of Days to Update: 45

Source: Department of Energy & Environmental Protection
Telephone: 860-424-3375
Last EDR Contact: 05/15/2017
Next Scheduled EDR Contact: 08/28/2017
Data Release Frequency: No Update Planned

NJ MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2015
Date Data Arrived at EDR: 09/29/2016
Date Made Active in Reports: 01/03/2017
Number of Days to Update: 96

Source: Department of Environmental Protection
Telephone: N/A
Last EDR Contact: 07/10/2017
Next Scheduled EDR Contact: 10/23/2017
Data Release Frequency: Annually

NY MANIFEST: Facility and Manifest Data
Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a TSD facility.

Date of Government Version: 01/30/2017
Date Data Arrived at EDR: 02/01/2017
Date Made Active in Reports: 02/13/2017
Number of Days to Update: 12

Source: Department of Environmental Conservation
Telephone: 518-402-8651
Last EDR Contact: 05/03/2017
Next Scheduled EDR Contact: 08/14/2017
Data Release Frequency: Annually

PA MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2015
Date Data Arrived at EDR: 07/22/2016
Date Made Active in Reports: 11/22/2016
Number of Days to Update: 123

Source: Department of Environmental Protection
Telephone: 717-783-8990
Last EDR Contact: 07/17/2017
Next Scheduled EDR Contact: 10/30/2017
Data Release Frequency: Annually

RI MANIFEST: Manifest information
Hazardous waste manifest information

Date of Government Version: 12/31/2013
Date Data Arrived at EDR: 06/19/2015
Date Made Active in Reports: 07/15/2015
Number of Days to Update: 26

Source: Department of Environmental Management
Telephone: 401-222-2797
Last EDR Contact: 05/22/2017
Next Scheduled EDR Contact: 09/04/2017
Data Release Frequency: Annually

WI MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2016
Date Data Arrived at EDR: 04/13/2017
Date Made Active in Reports: 07/14/2017
Number of Days to Update: 92

Source: Department of Natural Resources
Telephone: N/A
Last EDR Contact: 06/12/2017
Next Scheduled EDR Contact: 09/25/2017
Data Release Frequency: Annually

Oil/Gas Pipelines
Source: PennWell Corporation
Petroleum Bundle (Crude Oil, Refined Products, Petrochemicals, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)) N = Natural Gas Bundle (Natural Gas, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)). This map includes information copyrighted by PennWell Corporation. This information is provided on a best effort basis and PennWell Corporation does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of PennWell.

Electric Power Transmission Line Data
Source: PennWell Corporation
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Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:
Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.

Daycare Centers: Licensed Facilities
Source: Department of Social Services
Telephone: 916-657-4041

Flood Zone Data: This data was obtained from the Federal Emergency Management Agency (FEMA). It depicts 100-year and 500-year flood zones as defined by FEMA. It includes the National Flood Hazard Layer (NFHL) which incorporates Flood Insurance Rate Map (FIRM) data and Q3 data from FEMA in areas not covered by NFHL.
Source: FEMA
Telephone: 877-336-2627
Date of Government Version: 2003, 2015

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetland Inventory
Source: Department of Fish & Game
Telephone: 916-445-0411

Current USGS 7.5 Minute Topographic Map
Source: U.S. Geological Survey

STREET AND ADDRESS INFORMATION

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GEOCHECK ®- PHYSICAL SETTING SOURCE ADDENDUM

TARGET PROPERTY ADDRESS

SW CORNER OF ALESSANDRO BLVD. & HEACOCK STREET
SW CORNER OF ALESSANDRO BLVD. & HEACOCK STREET
MORENO VALLEY, CA 92553

TARGET PROPERTY COORDINATES

Latitude (North):	33.91547 - 33˚ 54' 55.69''
Longitude (West):	117.244983 - 117˚ 14' 41.94''
Universal Tranverse Mercator:	Zone 11
UTM X (Meters):	477353.4
UTM Y (Meters):	3752616.2
Elevation:	1565 ft. above sea level

USGS TOPOGRAPHIC MAP

Target Property Map:	5641326 SUNNYMEAD, CA
Version Date:	2012
West Map:	5641312 RIVERSIDE EAST, CA
Version Date:	2012

EDR's GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

Assessment of the impact of contaminant migration generally has two principal investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW DIRECTION INFORMATION

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

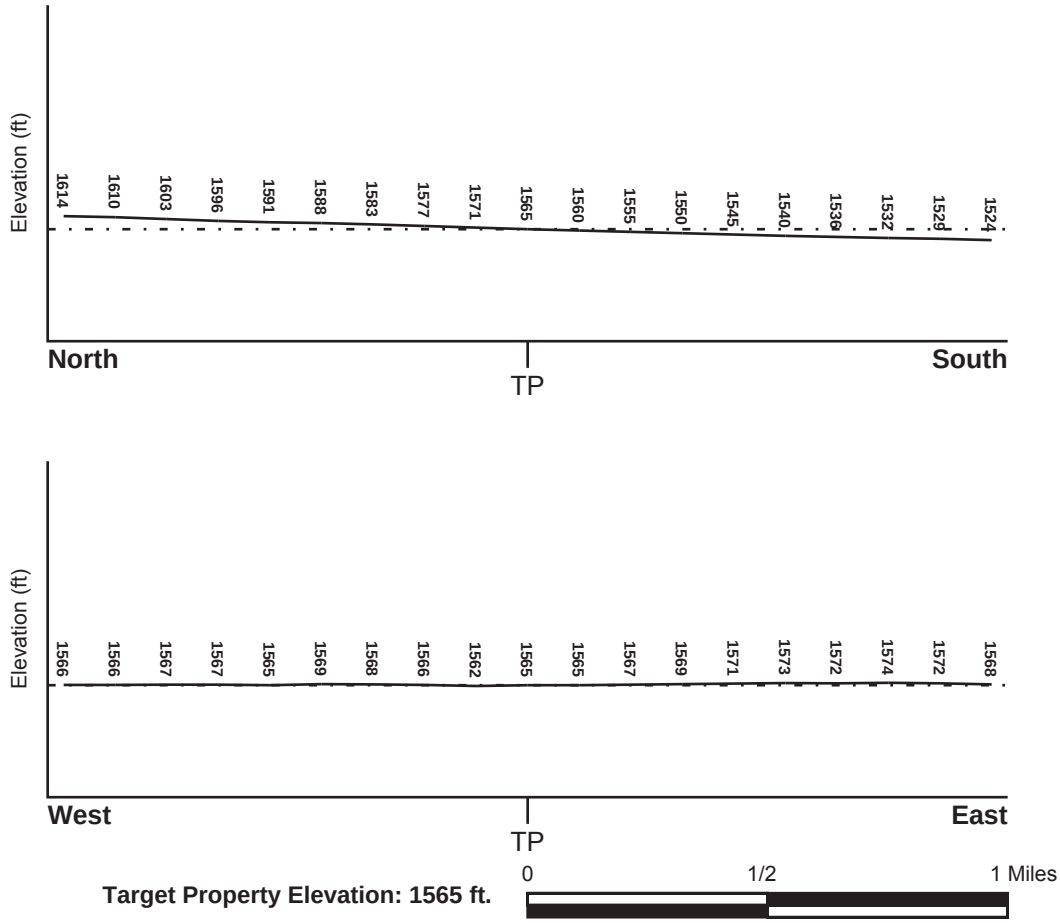
TOPOGRAPHIC INFORMATION

Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

TARGET PROPERTY TOPOGRAPHY

General Topographic Gradient: General South

SURROUNDING TOPOGRAPHY: ELEVATION PROFILES



Target Property Elevation: 1565 ft.

Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

HYDROLOGIC INFORMATION

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

FEMA FLOOD ZONE

Flood Plain Panel at Target Property	FEMA Source Type
06065C0761G	FEMA FIRM Flood data

Additional Panels in search area:	FEMA Source Type
06065C0745G	FEMA FIRM Flood data
06065C0765G	FEMA FIRM Flood data

NATIONAL WETLAND INVENTORY

NWI Quad at Target Property	NWI Electronic Data Coverage
NOT AVAILABLE	YES - refer to the Overview Map and Detail Map

HYDROGEOLOGIC INFORMATION

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Site-Specific Hydrogeological Data*:

Search Radius:	1.25 miles
Status:	Not found

AQUIFLOW®

Search Radius: 1.000 Mile.

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

MAP ID	LOCATION FROM TP	GENERAL DIRECTION GROUNDWATER FLOW
3	1/2 - 1 Mile West	Not Reported
1G	1/2 - 1 Mile West	Not Reported

For additional site information, refer to Physical Setting Source Map Findings.

* ©1996 Site−specific hydrogeological data gathered by CERCLIS Alerts, Inc., Bainbridge Island, WA. All rights reserved. All of the information and opinions presented are those of the cited EPA report(s), which were completed under a Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS) investigation.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW VELOCITY INFORMATION

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil strata data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

ROCK STRATIGRAPHIC UNIT

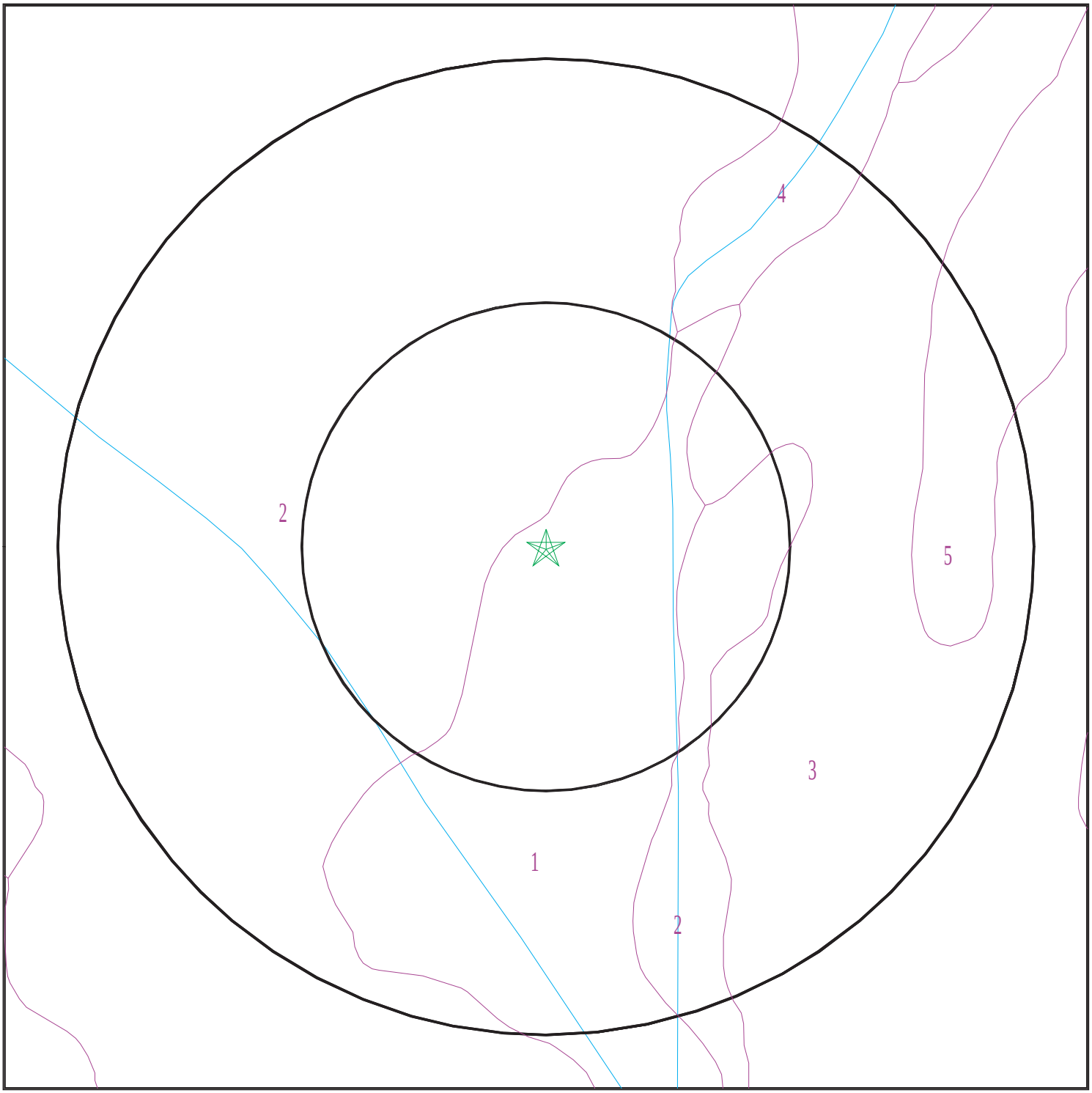
Era:	Mesozoic
System:	Cretaceous
Series:	Cretaceous granitic rocks
Code:	Kg *(decoded above as Era, System & Series)*

GEOLOGIC AGE IDENTIFICATION

Category: Plutonic and Intrusive Rocks

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

SSURGO SOIL MAP - 05001710.2r



Target Property
SSURGO Soil
Water

0 1/16 1/8 1/4 Miles

N

SITE NAME:	SW Corner of Alessandro Blvd. & Heacock Street	CLIENT:	SCS Engineers
ADDRESS:	SW Corner of Alessandro Blvd. & Heacock Street Moreno Valley CA 92553	CONTACT:	Kim Braun
		INQUIRY #:	05001710.2r
LAT/LONG:	33.91547 / 117.244983	DATE:	July 24, 2017 1:18 pm

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GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. The following information is based on Soil Conservation Service SSURGO data.

Soil Map ID: 1

Soil Component Name: GREENFIELD

Soil Surface Texture: sandy loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	25 inches	sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 42 Min: 14	Max: 7.8 Min: 6.1
2	25 inches	42 inches	fine sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 42 Min: 14	Max: 7.8 Min: 6.1
3	42 inches	59 inches	loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), silt.	Max: 14 Min: 4	Max: 7.8 Min: 6.1

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
4	59 inches	72 inches	stratified loamy sand to sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 42 Min: 14	Max: 8.4 Min: 6.6

Soil Map ID: 2

Soil Component Name: MONSERATE

Soil Surface Texture: sandy loam

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	9 inches	sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 14 Min: 4	Max: 7.3 Min: 6.1
2	9 inches	27 inches	sandy clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 4 Min: 1.4	Max: 7.3 Min: 6.1

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
3	27 inches	44 inches	indurated	Not reported	Not reported	Max: 0.01 Min: 0	Max: Min:
4	44 inches	57 inches	cemented	Not reported	Not reported	Max: 0.01 Min: 0	Max: Min:
5	57 inches	70 inches	loamy coarse sand	Granular materials (35 pct. or less passing No. 200), Stone Fragments, Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 14 Min: 4	Max: 8.4 Min: 6.6

Soil Map ID: 3

Soil Component Name: PACHAPPA

Soil Surface Texture: fine sandy loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	20 inches	fine sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 14 Min: 4	Max: 7.8 Min: 6.1

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
2	20 inches	62 inches	loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 14 Min: 4	Max: 7.8 Min: 6.6

Soil Map ID: 4

Soil Component Name: RAMONA

Soil Surface Texture: sandy loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Moderate

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	14 inches	sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 14 Min: 4	Max: 7.3 Min: 5.6
2	14 inches	22 inches	fine sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay. FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), silt.	Max: 14 Min: 4	Max: 7.3 Min: 6.1

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
3	22 inches	68 inches	sandy clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Clayey sand.	Max: 4 Min: 1.4	Max: 7.3 Min: 6.1
4	68 inches	74 inches	gravelly sandy loam	Granular materials (35 pct. or less passing No. 200), Stone Fragments, Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Clayey sand. COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 4 Min: 1.4	Max: 8.4 Min: 6.6

Soil Map ID: 5

Soil Component Name: HANFORD

Soil Surface Texture: coarse sandy loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Somewhat excessively drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	7 inches	coarse sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 42 Min: 14	Max: 7.8 Min: 5.6

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
2	7 inches	40 inches	fine sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 42 Min: 14	Max: 7.8 Min: 5.6
3	40 inches	59 inches	stratified loamy sand to coarse sandy loam	Granular materials (35 pct. or less passing No. 200), Stone Fragments, Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 141 Min: 42	Max: 7.8 Min: 5.6

LOCAL / REGIONAL WATER AGENCY RECORDS

EDR Local/Regional Water Agency records provide water well information to assist the environmental professional in assessing sources that may impact ground water flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

WELL SEARCH DISTANCE INFORMATION

DATABASE	SEARCH DISTANCE (miles)
Federal USGS	1.000
Federal FRDS PWS	Nearest PWS within 0.001 miles
State Database	1.000

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
No Wells Found		

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
No PWS System Found		

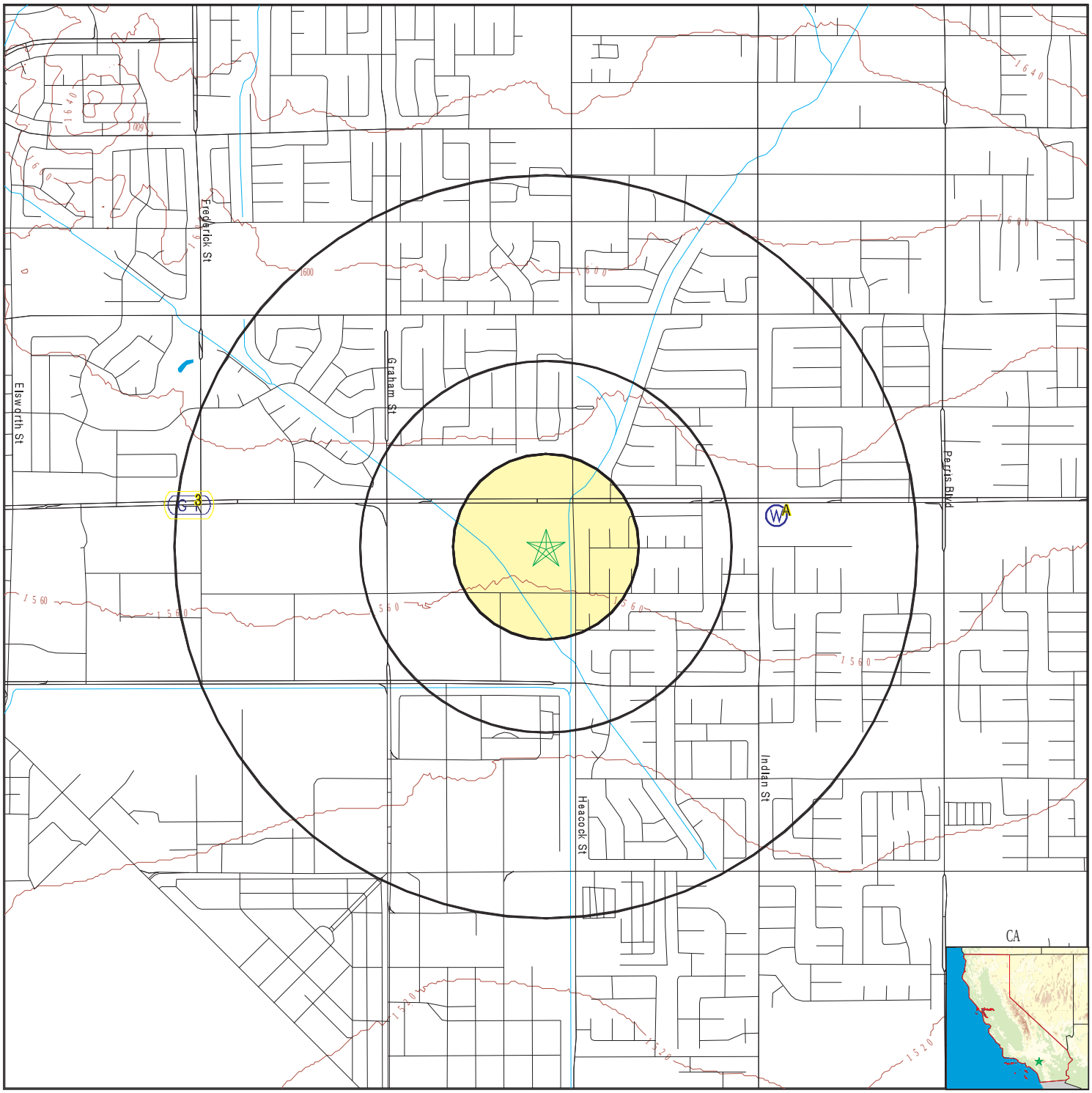
Note: PWS System location is not always the same as well location.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

STATE DATABASE WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
A1	3498	1/2 - 1 Mile East
A2	3497	1/2 - 1 Mile East

PHYSICAL SETTING SOURCE MAP - 05001710.2r



0 1/4 1/2 1 Miles

- County Boundary
- Major Roads
- Contour Lines
- Earthquake Fault Lines
- Earthquake epicenter, Richter 5 or greater
- Water Wells
- Public Water Supply Wells
- Cluster of Multiple Icons
- Groundwater Flow Direction
- GI Indeterminate Groundwater Flow at Location
- GV Groundwater Flow Varies at Location
- HD Closest Hydrogeological Data
- Oil, gas or related wells

N

SITE NAME:	SW Corner of Alessandro Blvd. & Heacock Street	CLIENT:	SCS Engineers
ADDRESS:	SW Corner of Alessandro Blvd. & Heacock Street Moreno Valley CA 92553	CONTACT:	Kim Braun
		INQUIRY #:	05001710.2r
LAT/LONG:	33.91547 / 117.244983	DATE:	July 24, 2017 1:18 pm

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Map ID Direction Distance Elevation			Database	EDR ID Number
A1 **East** **1/2 - 1 Mile** **Higher**			**CA WELLS**	**3498**

Water System Information:

Prime Station Code:	03S/03W-06N03 S	User ID:	WAT
FRDS Number:	3310010002	County:	Riverside
District Number:	14	Station Type:	WELL/AMBNT/MUN/INTAKE/SUPPLY
Water Type:	Well/Groundwater	Well Status:	Active Raw
Source Lat/Long:	335500.0 1171400.0	Precision:	Undefined
Source Name:	WELL 02		
System Number:	3310010		
System Name:	Moreno Valley Mutual WC		
Organization That Operates System:			
	24195 Fir Avenue		
	Moreno Valley, CA 92553		
Pop Served:	3000	Connections:	850
Area Served:	SUNNYMEAD & VICINITY		

A2 **East** **1/2 - 1 Mile** **Higher**			**CA WELLS**	**3497**

Water System Information:

Prime Station Code:	03S/03W-06N02 S	User ID:	WAT
FRDS Number:	3310010001	County:	Riverside
District Number:	14	Station Type:	WELL/AMBNT/MUN/INTAKE/SUPPLY
Water Type:	Well/Groundwater	Well Status:	Abandoned
Source Lat/Long:	335500.0 1171400.0	Precision:	Undefined
Source Name:	WELL 01 - ABANDONED		
System Number:	3310010		
System Name:	Moreno Valley Mutual WC		
Organization That Operates System:			
	24195 Fir Avenue		
	Moreno Valley, CA 92553		
Pop Served:	3000	Connections:	850
Area Served:	SUNNYMEAD & VICINITY		

---

3 **West** **1/2 - 1 Mile** **Higher**	Site ID:	083302648T	**AQUIFLOW**	**50177**
	Groundwater Flow:	Not Reported		
	Shallow Water Depth:	100		
	Deep Water Depth:	Not Reported		
	Average Water Depth:	Not Reported		
	Date:	08/21/1996		

1G **West** **1/2 - 1 Mile** **Lower**	Site ID:	083302648T	**AQUIFLOW**	**50177**
	Groundwater Flow:	Not Reported		
	Shallow Water Depth:	100		
	Deep Water Depth:	Not Reported		
	Average Water Depth:	Not Reported		
	Date:	08/21/1996		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS
RADON

AREA RADON INFORMATION

State Database: CA Radon

Radon Test Results

Zipcode	Num Tests	> 4 pCi/L
92553	13	0

Federal EPA Radon Zone for RIVERSIDE County: 2

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

Federal Area Radon Information for RIVERSIDE COUNTY, CA

Number of sites tested: 12

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	0.117 pCi/L	100%	0%	0%
Living Area - 2nd Floor	0.450 pCi/L	100%	0%	0%
Basement	1.700 pCi/L	100%	0%	0%

PHYSICAL SETTING SOURCE RECORDS SEARCHED

TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)
Source: United States Geologic Survey
EDR acquired the USGS 7.5' Digital Elevation Model in 2002 and updated it in 2006. The 7.5 minute DEM corresponds to the USGS 1:24,000- and 1:25,000-scale topographic quadrangle maps. The DEM provides elevation data with consistent elevation units and projection.

Current USGS 7.5 Minute Topographic Map
Source: U.S. Geological Survey

HYDROLOGIC INFORMATION

Flood Zone Data: This data was obtained from the Federal Emergency Management Agency (FEMA). It depicts 100-year and 500-year flood zones as defined by FEMA. It includes the National Flood Hazard Layer (NFHL) which incorporates Flood Insurance Rate Map (FIRM) data and Q3 data from FEMA in areas not covered by NFHL.
Source: FEMA
Telephone: 877-336-2627
Date of Government Version: 2003, 2015

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetland Inventory
Source: Department of Fish & Game
Telephone: 916-445-0411

HYDROGEOLOGIC INFORMATION

AQUIFLOW[R] Information System
Source: EDR proprietary database of groundwater flow information
EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table information.

GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit
Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

STATSGO: State Soil Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)
The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) leads the national Conservation Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps.

SSURGO: Soil Survey Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)
Telephone: 800-672-5559
SSURGO is the most detailed level of mapping done by the Natural Resources Conservation Service, mapping scales generally range from 1:12,000 to 1:63,360. Field mapping methods using national standards are used to construct the soil maps in the Soil Survey Geographic (SSURGO) database. SSURGO digitizing duplicates the original soil survey maps. This level of mapping is designed for use by landowners, townships and county natural resource planning and management.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

LOCAL / REGIONAL WATER AGENCY RECORDS

FEDERAL WATER WELLS

PWS: Public Water Systems
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)
This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

STATE RECORDS

Water Well Database
Source: Department of Water Resources
Telephone: 916-651-9648

California Drinking Water Quality Database
Source: Department of Public Health
Telephone: 916-324-2319
The database includes all drinking water compliance and special studies monitoring for the state of California since 1984. It consists of over 3,200,000 individual analyses along with well and water system information.

OTHER STATE DATABASE INFORMATION

California Oil and Gas Well Locations
Source: Department of Conservation
Telephone: 916-323-1779
Oil and Gas well locations in the state.

RADON

State Database: CA Radon
Source: Department of Health Services
Telephone: 916-324-2208
Radon Database for California

Area Radon Information
Source: USGS
Telephone: 703-356-4020
The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones
Source: EPA
Telephone: 703-356-4020
Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

OTHER

Airport Landing Facilities: Private and public use landing facilities
Source: Federal Aviation Administration, 800-457-6656

Epicenters: World earthquake epicenters, Richter 5 or greater
Source: Department of Commerce, National Oceanic and Atmospheric Administration

California Earthquake Fault Lines: The fault lines displayed on EDR's Topographic map are digitized quaternary fault lines, prepared in 1975 by the United State Geological Survey. Additional information (also from 1975) regarding activity at specific fault lines comes from California's Preliminary Fault Activity Map prepared by the California Division of Mines and Geology.

STREET AND ADDRESS INFORMATION

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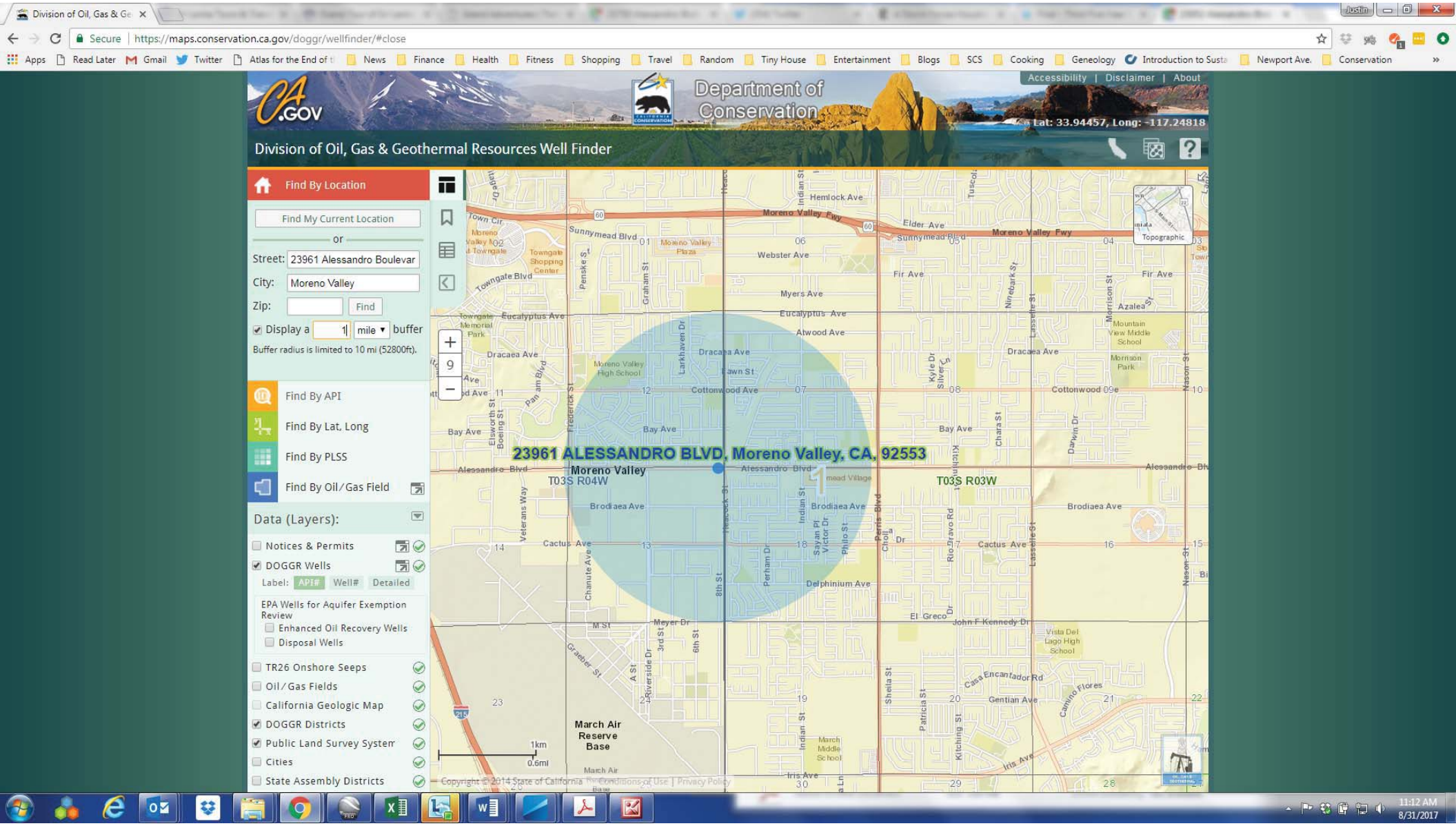
APPENDIX E

REGULATORY AGENCY AND ONLINE FILE REVIEW INFORMATION



Division of Oil, Gas & Ge
Secure | https://maps.conservation.ca.gov/doggr/wellfinder/#close
Apps Read Later Gmail Twitter Atlas for the End of t News Finance Health Fitness Shopping Travel Random Tiny House Entertainment Blogs SCS Cooking Geneology Introduction to Susta Newport Ave. Conservation
Accessibility | Disclaimer | About
CA.GOV
Department of Conservation
Lat: 33.94457, Long: -117.24818
Division of Oil, Gas & Geothermal Resources Well Finder
Find By Location
Find My Current Location
or
Street: 23961 Alessandro Boulevar
City: Moreno Valley
Zip:
Find
Display a 1 mile buffer
Buffer radius is limited to 10 mi (52800ft).
Find By API
Find By Lat, Long
Find By PLSS
Find By Oil/Gas Field
Data (Layers):
Notices & Permits
DOGGR Wells
Label: API# Well# Detailed
EPA Wells for Aquifer Exemption Review
Enhanced Oil Recovery Wells
Disposal Wells
TR26 Onshore Seeps
Oil/Gas Fields
California Geologic Map
DOGGR Districts
Public Land Survey System
Cities
State Assembly Districts
23961 ALESSANDRO BLVD, Moreno Valley, CA, 92553
Moreno Valley
T03S R04W
T03S R03W
Moreno Valley Fwy
Alessandro Blvd
Sunnymead Blvd
Brodiaea Ave
Cactus Ave
Bay Ave
Dracaea Ave
Eucalyptus Ave
Cottonwood Ave
Delphinium Ave
Webster Ave
Myers Ave
Atwood Ave
Hemlock Ave
Elder Ave
Fir Ave
Azalea St
Meyer Dr
John F Kennedy Dr
Gentian Ave
Iris Ave
Casa Encantador Rd
Moreno Valley High School
Mountain View Middle School
Vista Del Lago High School
March Air Reserve Base
March Middle School
Topographic
1km
0.6mi
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11:12 AM
8/31/2017

NPMS Public Viewer

https://pvnpms.phmsa.dot.gov/PublicViewer/

Public Viewer

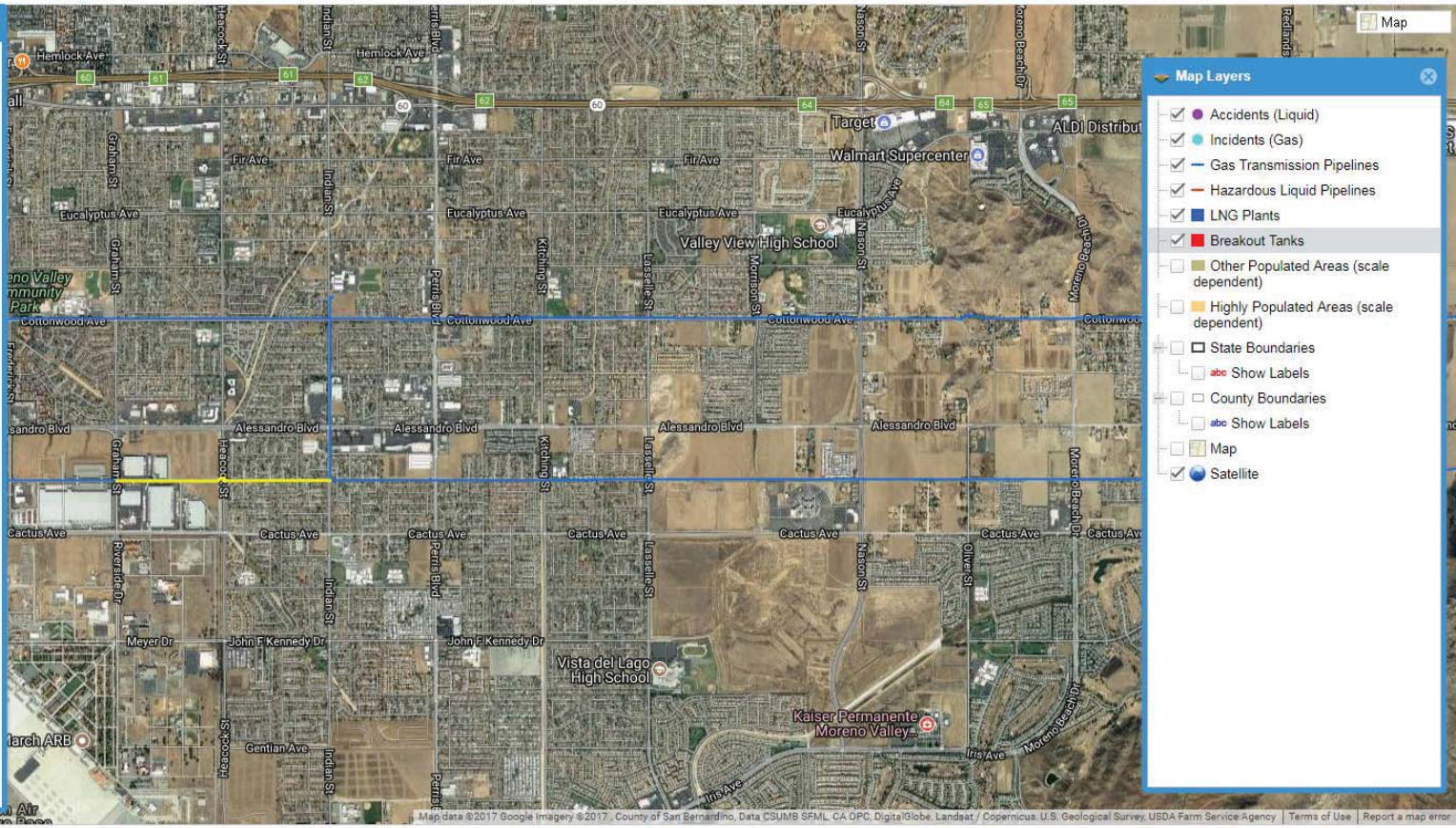
Log Out | Change County

Map Layers | Query Tools | Enter search term (min 4 chars) | Help

Identify - Total 1 record(s) found

18484

Attribute	Value
Category: PIPELINE ATTRIBUTES	
OPERATOR ID	18484
OPERATOR NAME	SOUTHERN CALIFORNIA GAS CO
SYSTEM NAME	TRANSMISSION
SUBSYSTEM NAME	
PIPELINE ID	117
MILES	0.97
COMMODITY CATEGORY	Natural Gas
COMMODITY DESCRIPTION	NATURAL GAS
INTERSTATE DESIGNATION	N
PIPELINE STATUS CODE	In Service
REVISION DATE	03/15/2016
Category: GENERAL CONTACT	
FIRST NAME	Kris
LAST NAME	Keas
TITLE	Pipeline Integrity Manager
ENTITY	
PHONE	(213) 244-5036
EMAIL	NPMS_Inquiries@semprautilities.com
ADDRESS	555 West 5th Street GT11A5
CITY	Los Angeles
STATE	CA
ZIP	90013



Ready | Zoom Level: 14 of 19 (1:24,000) Closest Zoom for Pipelines | 33.945940, -117.201810 | COUNTY : Riverside, CA

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11:16 AM 8/31/2017

APPENDIX F

RESUMES OF PROJECT PERSONNEL

J. JUSTIN RAUZON, REPA

Education

MEM – Environmental Management, Duke University, 2014
BS – Zoology (*Double Emphasis*: Human and Marine Biology), Brigham Young University, 2004

Professional Licenses

Registered Environmental Property Assessor (REPA), National Registry of Environmental Professionals (No. 485639)

Specialty Certifications

OSHA 40-Hour Health and Safety Training for Hazardous Waste Workers
8-Hour Annual Refresher Training for Hazardous Waste Site Activities
OSHA 16-Hour Initial Asbestos Operations and Maintenance Training
Thermo Scientific Niton XRF Analyzer Operator's Training
First-Aid and CPR Training

Professional Affiliation

Society of American Military Engineers

Professional Experience

Mr. Rauzon has more than 10 years of environmental services experience, all with SCS. Fluent in Spanish, Mr. Rauzon is an SCS Senior Project Professional with a diverse background in biological and environmental sciences, and regularly performs environmental assessments and compliance audits at sites in the US and in Latin America. He has technical and management experience with soil, soil vapor, and groundwater investigations at industrial, commercial, landfill, greenfield, and residential properties. He has extensive experience with environmental laws and regulations in both the US and Mexico. His work experience includes all project phases, from development of cost estimates for various site assessment and cleanup programs to implementing remediation programs and interfacing with regulatory agencies.

Environmental Management

Selected projects in which Mr. Rauzon has participated include:

Due diligence assessments of properties prior to real estate transfer of properties in California, Arizona, New Jersey, Mexico, Puerto Rico, and the Dominican Republic. Mr. Rauzon has completed numerous due diligence assessments of properties prior to acquisition, disposition, or loan financing by investment banks, insurance companies, corporations, non-profit entities, real estate developers, and private parties. Projects have included Phase I assessments that meet federal All Appropriate Investigation (AAI) regulations, American Society for Testing and Materials (ASTM) standards, and client-specific guidelines; inspections for asbestos and lead-based paint; Phase II investigations; preparation of abatement and remediation

cost estimates; and regulatory agency coordination. These projects frequently involve review of previous environmental reports and investigation of current and past on-site operations, regulatory agency records searches, evaluation of historical property use information, identification of nearby potentially contaminated sites, and development of appropriate conclusions about environmental risks. Investigations involve preparation of work plans, soil boring and subsequent sampling, groundwater well installation and sampling, soil gas probe installation and sampling, precision mapping, evaluation of contaminants in accordance with regulatory requirements or generally accepted guidelines, preparation of investigation report, and analysis of applicable remedial alternatives. Mr. Rauzon has served as the Project Manager for sites that have received regulatory closure from various regulatory agencies.

Planning, coordinating, and supervising remedial actions that included excavation, transport, and disposal of contaminated soils and water. Investigations involve preparation of Remedial Action Plans (RAPs), direction of fieldwork, oversight of confirmatory sampling, and interfacing with regulatory agencies.

The characterization of hazardous waste materials. These projects include collection of soil and/or liquid samples to profile the waste materials, interpretation of laboratory results, and evaluation of disposal/recycling options to minimize the costs and liabilities to clients associated with the removal of wastes.

Assessment and certification of hazardous waste tank systems. These investigations involve working with a Professional Engineer to complete field inspections of hazardous waste tanks, associated ancillary equipment, leak-detection systems, and secondary containment devices, as well as interfacing with regulatory agencies.

Project Management

Project Manager for due diligence investigation of a portfolio with more than 300 industrial sites throughout Mexico. SCS services included conducting Phase I and Phase II environmental assessments within the strict timeline of the $1.2 billion industrial real estate transaction. Subsequent to the closing of the deal, SCS provided ongoing consulting services to facilitate integration and management of various facilities with ongoing environmental issues.

Project Manager for hazardous materials consulting services in support of the State Route 91 Corridor Improvement Project in Orange and Riverside Counties, CA. SCS services included sampling and inventory of potentially hazardous materials associated with more than 25 bridges along the SR-91 and I-15 freeways; environmental assessments on properties within the proposed freeway expansion area; and soil testing for herbicides, pesticides, and fungicides on several land parcels.

Project Manager for investigation and remediation of industrial facility located in Fontana, CA. SCS conducted a series of environmental assessments, investigations, and remedial activities that provided sufficient information to identify environmental issues and business risks, and facilitate the client's successful purchase of property. A number of recognized environmental conditions, including releases of coal tar, solvents, heavy metals, and total petroleum hydrocarbons, were identified. Project activities conducted during the acquisition and redevelopment of the property included shallow and deep soil and soil vapor investigations;

installation of groundwater monitoring wells and subsequent groundwater sampling; subsequent remedial excavation under San Bernardino County Fire Department (SBCFD) oversight to obtain closure; and excavation and off-site disposition of contaminated soil.

Mr. Rauzon has participated in a certified health and safety program in compliance with OSHA Standard 29 CFR 1910.120. He is knowledgeable in incident response operations, team functions, personnel safety, and field equipment. He is able to recognize and evaluate potential chemical and physical hazards and associated risks in field operations; discuss and use personal protective equipment (PPE), such as respiratory protection and protective clothing; use and interpret direct-reading instruments; and examine and establish Standard Operating Safety Guidelines to ensure safe and effective response operations.

Publications

Rauzon, J. J. Mexico: Environmental Due Diligence and the Mexican Waste Law. EHS Journal. November 13, 2010.

JULIO A. NUNO, REPA, CESCO

Education

MS – Environmental Engineering, University of Southern California, 1982
BS – Biological Sciences, University of Southern California, 1979

Professional Licenses/Certifications

Registered Environmental Property Assessor (REPA), National Registry of Environmental Professionals (No. 443198)
Certified Environmental and Safety Compliance Officer (CESCO), National Registry of Environmental Professionals (No. 265109)

Professional Affiliations

Water Environment Federation
California Water Environment Association
National Groundwater Association

Professional Experience

Mr. Nuno has over 32 years of environmental services experience, all with SCS, and extensive expertise in property evaluation and due diligence; site assessment, investigation, and remediation; underground storage tank (UST) assessment, upgrading, removal, and leakage cleanup; and hazardous waste management. He works extensively with regulatory agencies, fully understands regulations pertaining to petroleum hydrocarbons and hazardous waste, and has worked on numerous projects associated with real estate transactions to assess the potential for releases, characterize releases of contaminants to soil, soil vapor, and groundwater, implement remedial measures, and develop cost estimates for assessing and mitigating impacts. An SCS Vice President responsible for Environmental Services in Southern California and Nevada, Mr. Nuno has directed SCS's contributions to a number of major projects, including construction of the Staples Center and the Phoenix Award-winning Chesterfield Square project, both in Los Angeles, CA.

A summary of Mr. Nuno's project experience is provided below.

Hazardous Waste/Materials Management

Project Manager for closure of an ordnance production and ramjet test facility, Van Nuys, CA. Project involved closure of a facility that contained Resource Conservation and Recovery Act (RCRA) hazardous waste management units. Closure activities included implementing a plan approved by the California Environmental Protection Agency (CEPA) and the Department of Toxic Substances Control (DTSC), conducting an inventory and sampling various containers of hazardous materials, preparing a preliminary site assessment, conducting an investigation of former underground tanks and hazardous materials storage areas, providing asbestos management services, installing/monitoring groundwater wells, and remediating impacted areas. Mr. Nuno served as the primary contact for the DTSC and SCS's client.

Managed a 2-year multiple assignment contract to provide environmental services to the Port of Los Angeles. Projects included preliminary site assessments of numerous properties scheduled for acquisition by the Port, implementation of subsurface investigations for two closed shipyards, development of a sampling plan and collection of surface soil samples from property used for the storage of various hazardous materials, collection and analysis of samples from building materials for asbestos, and collection and analysis of samples from creosote wharf pilings to evaluate disposal options. Mr. Nuno's responsibilities included coordinating site activities, interfacing with Port personnel, reviewing project submittals, preparation of monthly progress reports, management of subcontractors, and interfacing with regulatory agencies.

Due diligence assessments of properties prior to acquisition, Southern California. Mr. Nuno has completed various due diligence assessments of properties prior to acquisition by real estate developers, City Redevelopment Agencies, corporations, non-profit entities, and private parties. Projects have included Phase I assessments that meet federal All Appropriate Investigation (AAI) regulations and ASTM standards, inspections for asbestos and lead-based paint, Phase II investigations, preparation of abatement and remediation cost estimates, and regulatory agency coordination. On behalf of the City of Pico Rivera, Mr. Nuno served as the Project Manager for the first closure issued by the Los Angeles Regional Water Quality Control Board (RWQCB) under the Polanco Bill.

Regulatory compliance assessment of a manufacturing facility, Bell, CA. Evaluation of facility operations was conducted to determine compliance with environmental regulations, including materials management, permitting, and maintenance of records. A report was prepared that summarized the applicable regulations and provided recommendations.

Managed a multi-year contract for environmental services at the Long Beach Naval Shipyard and Terminal Island Naval Complex. Projects completed under the contract included preparation of a hazardous materials Spill Prevention Control and Countermeasures (SPCC) Plan, evaluation of wastewater discharges from industrial sources, preparation of a closure plan for a permitted hazardous waste storage facility, design of three hazardous waste staging facilities, and implementation of a site closure investigation.

Project to determine whether impoundment ponds used for the treatment of wastewater generated during operations involved in explosives formulation and packing should be permitted as hazardous waste treatment facilities, Naval Weapons Center, China Lake, CA. This project, completed at a military facility, involved interviewing personnel familiar with operations, collecting wastewater and sediment from the impoundments for subsequent analysis per regulatory requirements, and presenting results in a final written report.

Hazardous waste/materials management program for the Nevada Department of Transportation. Visits were made to each field maintenance station and major maintenance stations located throughout the state to determine the types of hazardous materials used, and methods of handling and disposal. The final report contained (1) suggestions for improving hazardous waste/materials management practices; (2) a policy document for the hazardous materials; and (3) a training program for personnel involved in hazardous waste management.

Guidance to the California Department of Health Services in performing and implementing an audit program for facilities generating hazardous wastes. The objective of the audits was to

evaluate present waste/materials management practices and offer recommendations that would reduce the volume of wastes generated. Recommendations were evaluated on the basis of cost effectiveness and ease of implementation. Audit programs were developed for three industries: the paint and body segment of the automotive repair industry, the marine shipyard maintenance and repair industry, and the precious metals recovery industry. Mr. Nuno participated in many of the facility audits and prepared portions of the reports submitted to the client.

Inventory of oil-filled electrical equipment at properties owned by the State of California to determine if this equipment contains polychlorinated biphenyl (PCB). Project consisted of collecting information and determining potential pathways and receptors in the event that a failure had occurred. Mr. Nuno's role on this project was to visit facilities throughout the state, identify electrical equipment that may contain PCB's and inventory that equipment.

Preparation of SPCC Plans. Mr. Nuno has directed and managed several projects that have involved preparation of SPCC Plans, including several at container facilities within the Port of Long Beach, an airship operation in Carson, a printing operation, and an aerospace facility at the Van Nuys Airport. Plans were prepared in accordance with federal regulations.

Second Party Review of Environmental Impact Report (EIR) for Proposed Intermodal Facility. As part of a review prior to submittal for public evaluation, Mr. Nuno reviewed sections of the EIR pertaining to Hazards and Hazardous Materials. A critical review was conducted, with comments provided for consideration as part of the final draft document.

Independent Review of Reports, Various Locations. Mr. Nuno has been retained on several occasions to review documents and provide an opinion regarding those documents. Clients have included the City of El Monte, City of Buena Park, Retirement Housing Foundation, Doerken Properties, and Olive Branch Development.

Porter Ranch Dust Monitoring. During grading activities for a major residential development, notices of violation were issued to the grading contractor by the South Coast Air Quality Management District (AQMD). Mr. Nuno's role on this project consisted of attending meetings with the AQMD, preparing a dust mitigation plan, and coordinating staff to provide dust monitoring during grading.

Site Assessment and Remediation

For the Staples Center/LA Live in Los Angeles, served as Project Director for assessment and cleanup of properties acquired as part of the support area (parking lots, future hotels, and other support operations). The project included Phase I Environmental Site Assessments (ESAs) of properties on several blocks surrounding the center, implementation of subsurface investigations to assess potential contaminants from past on-site operations to soil and groundwater, risk evaluation and negotiation of cleanup levels with regulatory agencies, and implementation and oversight during remediation. Due to the Staples Center's construction schedule, SCS's work was completed on an expedited basis.

Former Refinery, Santa Fe Springs, CA. Mr. Nuno was the principal investigator in advance of a real estate transaction that involved a former refinery. Mr. Nuno reviewed previous investigative reports and a remedial action plan (RAP) for completeness, provided remediation recommendations based on available data, and prepared cost estimates for site development.

City of Irwindale, CA. A Phase II investigation was conducted concerning a parcel of land proposed for residential development that had historical uses that may have resulted in releases of hazardous materials. A proposed investigation approach was developed by Mr. Nuno that assessed soil and soil vapor. Wipe samples were also collected in one building that had been reported as a clandestine drug laboratory.

Due Diligence and Permitting for a Nationwide Building Materials Manufacturer, various locations in the U.S. and Canada. Mr. Nuno served as the primary interface between our client and SCS staff within several SCS offices conducting Phase I ESAs on manufacturing facilities throughout the U.S. and Canada. Mr. Nuno developed project budgets, coordinated SCS staff efforts, reported findings, and served as principal reviewer for deliverables.

City of El Monte Gateway project, El Monte, CA. This project, completed for the City of El Monte, consisted of initial studies in preparation for development of 14 acres used by the City's Public Works Yard, a portion of which was a former burn dump. Mr. Nuno was involved in the review of previous documents, working with regulatory agencies to obtain necessary approvals for the proposed development, and interfacing with the site developers. Regulatory involvement included the DTSC, Los Angeles County Local Enforcement Agency (LEA), CalRecycle, and South Coast Air Quality Control Management District (AQCMD). As Project Director, Mr. Nuno reviewed previous environmental investigations, prepared a Workplan for additional investigation and implementation, including a cap for lead-impacted soils. During development, Mr. Nuno provided consulting services to the developer of the site, reviewed analytical data for soil samples collected during excavation for re-compaction, and interfaced with DTSC.

Preparation of a Remedial Action Plan (RAP) and Remedial Design Documents for the Los Angeles Unified School District (LAUSD) South Region Elementary School No. 6. Mr. Nuno served as the principal contact for preparation of a RAP and remedial design documents. The documents were completed to address requirements of the DTSC and were approved for implementation. The design included excavation of soils impacted by pesticides, petroleum hydrocarbons, and volatile organic compounds (VOCs), and in-situ remediation of VOC-impacted soil using vapor extraction.

Malibu Civic Center, Limited Phase I ESA for Proposed Wastewater Treatment Facility, Malibu, CA. Mr. Nuno served as the Project Director for the assessment of a proposed wastewater treatment facility in Malibu, CA. The assessment included an area approximately 1.15 by 2.13 miles, and consisted of a proposed project area with a Wastewater Treatment Plant (WTP), two injection well areas, six pump stations, and numerous piping runs within city streets. For the Limited Phase I ESA, the WTP, injection well areas, and pump station areas were inspected to identify possible recognized environmental conditions. Historical review was conducted for each of the project areas. A database search of known sites that have reported releases was also conducted for the project area. Potential recognized environmental conditions within the project area (i.e., leaking USTs, solvent use, dry cleaners, other release sites) were identified in the final report.

Due Diligence associated with acquisitions of the Los Angeles Dodgers baseball organization, Los Angeles, CA and Vero Beach, FL. Mr. Nuno was responsible for coordinating assessments of Dodger Stadium in Los Angeles and the training facility in Vero Beach, FL, initially as part of

the acquisition by Fox Entertainment Group and again when acquired by Frank McCourt. The assessments included Phase I ESAs, lead-based paint surveys, and inspections for asbestos-containing materials. Subsurface investigations of certain areas of both facilities were also completed under his direction.

Investigations and remediation of former dry cleaning facilities, Torrance, Stanton, and La Verne, CA. Investigations have been completed at numerous active and former dry cleaning facilities to assess the potential for releases of solvents. Investigations have consisted of soil vapor assessments, collection of bulk soil samples, and groundwater monitoring. Additional evaluations have been completed to define the extent of the plume and obtain information to evaluate remedial alternatives. Implemented remedial measures have included excavation, vapor extraction, monitored natural attenuation, and risk management. Contractors were retained to implement portions of the remediation, and Mr. Nuno reviewed submitted bids as well as interacted with the contractors to ensure that work was completed in accordance with bid requirements. Remediation efforts were complicated since structures overlying the impacted areas were to remain in place.

Remedial investigation, groundwater well installation and monitoring, and evaluation of mitigation measures for a former refinery in Central California. Mr. Nuno served as Project Manager for the site investigation and was responsible for coordination of site activities, interpretation of analytical data, and interfacing with SCS's client and regulatory agency personnel.

Naval Assessment and Control of Installation Pollutants program conducted at 16 Navy and Marine Corps facilities, San Diego, CA. As part of the Department of Defense (DOD) installation restoration program, potentially contaminated sites resulting from the past use, storage, handling, and disposal of hazardous materials were identified at each of the 16 facilities that were assessed under this program. The project consisted of the review of archival and base records, interviews with long-term or retired base personnel, conducting on-site inspections/surveys, and writing a final written report.

Former Miller Way Landfill closure and removal of soil stockpile from former gun range, South Gate, CA. On behalf of the City of South Gate, Mr. Nuno provided assistance with the closure of a former inert refuse landfill, which included interaction with the Los Angeles RWQCB, preparation of a grading plan for the facility, and providing quality assurance as part of the grading process and installation of drainage structures. Following an inspection by the DTSC, an enforcement order was issued to remove a stockpile of soil contaminated with lead. Under Mr. Nuno's direction, the soil was characterized and disposed of in a cost-effective manner. Mr. Nuno interfaced with DTSC personnel throughout the program. A report was submitted to the DTSC that led to issuance of a no further action letter regarding these soils.

Supplemental site investigation and preparation of a health risk assessment for former industrial zinc plating facility, Long Beach, CA. A removal action was completed at this facility by the Environmental Protection Agency (EPA) after the facility was abandoned. SCS reviewed available reports for the facility, initiated discussions regarding the site with the DTSC, prepared a work plan for additional investigation in accordance with the corrective action agreement, and implemented the investigation that included collection and analysis of soil, soil vapor (subslab and subsoil), indoor air, and groundwater samples. Data collected were used to prepare a health risk assessment submitted to the DTSC, which led to commercial redevelopment approval.

Investigation and Abatement of Pesticide-Impacted Soil, Oxnard, CA. In response to recommendations within a Phase I Environmental Assessment and Soil Sampling report prepared by another consultant for a property proposed for residential development, Mr. Nuno worked with the Ventura County Environmental Health Department (EHD) to develop an abatement approach for elevated concentrations of toxaphene detected in the soil. Based on the information provided, closure was issued by the EHD.

Methane Gas Assessments – Los Angeles, Signal Hill, Long Beach, and Santa Fe Springs, CA. In order to assess potential hazards associated with development within former and existing oil field areas, investigations were conducted to address local requirements and determine protection measures that may be required as part of existing or proposed developments. Investigations consisted of installing several wells, monitoring to assess concentrations of combustible gases, and preparing reports that provided conclusions and recommendations based on the data.

Proposed Redevelopment, Vermont Avenue, Los Angeles, CA. In order to evaluate a property proposed for subterranean construction, Mr. Nuno developed an approach to investigate potential concerns associated with past on-site and off-site uses, which included former automotive repair. The investigation also included a methane gas investigation in accordance with City of Los Angeles requirements. Based on the results of the investigation, regulatory concurrence was received from the Los Angeles County Fire Department, Site Mitigation Unit.

Phase I ESA and Site Characterization, Canoga Park, CA. Available documentation indicated that a portion of a building was used as a dry cleaner. A soil vapor investigation indicated the presence of tetrachloroethylene (PCE) in soil. Assessments of soil vapor, soil, and groundwater were conducted to more fully characterize the extent of the release. In addition, indoor air sampling was conducted to assess the potential for PCE migration into the building.

Site Assessments, Oil and Gas Industry, Central Coast and Bakersfield, CA. Mr. Nuno has been involved in conducting initial assessments and subsurface investigations of oil fields in the Central Coast and Bakersfield areas. The initial assessments included a site inspection and evaluation of background information, including historical aerial photographs to identify potential release areas. Investigations were conducted to assess the potential for releases.

Underground Storage Tanks

University of California, Los Angeles (UCLA). For several years, Mr. Nuno has assisted UCLA in complying with applicable federal, state, and local regulations for USTs throughout the campus. Services provided have included inspections, reviews of existing as-built drawings, coordination of testing, preparation of plans for upgrades or modifications, assisting with plan checks, interfacing with regulatory agencies, conducting sampling, preparation of work plans and closure reports, and providing construction quality assurance (CQA).

City of Buena Park Auto Center, Buena Park, CA. As part of the acquisition of properties that would comprise the Auto Center, SCS completed several Phase I Assessments and Phase II Investigations. One of the properties assessed was determined to have been a former gasoline service station that had impacted both soil and groundwater. Investigations of soil and groundwater were completed under Mr. Nuno's direction and a RAP was submitted for the mitigation of fuel

hydrocarbons. Groundwater monitoring was conducted on a semi-annual basis through cleanup. Based on this investigation, a transaction was structured for the purchase of the property.

City of South Gate Department of Public Works, South Gate, CA. Following failed SB 989 tests of fueling system and emergency USTs, evaluations of the existing installations were conducted to identify the necessary upgrades. As Project Manager, Mr. Nuno interfaced with SCS's client and regulatory agency personnel for several projects that entailed providing recommendations for upgrading underground tank installations, preparing and reviewing plans and specifications, providing assistance during the bidding process, conducting oversight during installation, collecting soil samples as part of closures, and preparing closure reports.

Retirement Housing Foundation, Angelus Plaza, Los Angeles. As follow-up to a Phase I ESA completed on this property, an investigation was completed to assess the potential for releases of fuel from underground tank systems on the property. Borings were drilled adjacent to the underground tanks and pipelines. Subsequent assistance was provided in evaluating alternatives for replacing one of the underground tanks.

Investigation and remediation of soil and groundwater impacted as a result of release from a UST, Santa Fe Springs, CA. This project consisted of characterizing soil and groundwater with the oversight of the Los Angeles County Department of Public Works and RWQCB. A vapor extraction remediation system was installed to mitigate gasoline-impacted soil. Throughout the remediation effort, groundwater was monitored. Costs were reimbursed under the California Underground Tank Cleanup Fund, requiring all work and associated costs to be reviewed by fund personnel.

Evaluation of alternatives for mitigation of soil contamination from leaking USTs at Los Angeles International Airport (LAX), CA. The evaluated alternatives included excavation and on-site treatment, excavation and hauling to a disposal site, vapor extraction, and no action. Alternatives were evaluated in terms of ease of implementation, regulatory constraints, costs, duration of treatment, and other applicable factors.

RHF Bixby Tower investigation and closure, Long Beach, CA. Available information indicated that a portion of the property occupied by Bixby Tower was a former service station with USTs. A subsurface investigation indicated the presence of low concentrations of petroleum hydrocarbons. Data was submitted to the Long Beach Health Department for review. Based on the data, no further action was issued by the Health Department.

Expert Witness/Litigation Support

Mr. Nuno has provided litigation support on various projects, a representative sampling of which is provided below.

- In support of an eminent domain action to gain access to a property for investigation, Mr. Nuno provided court testimony that included an explanation of the rationale for the investigation, a description of what would be done on site, the amount of time required for the investigation, and how the results would be used. As part of this project, Mr. Nuno appeared in court on four separate occasions.

- Served as an expert witness and provided deposition testimony regarding investigation and remedial activities conducted on a property in Los Angeles County. Soil and groundwater on a property taken through eminent domain by a redevelopment agency had been impacted by a release of fuel hydrocarbons. Mr. Nuno provided testimony regarding the investigation that had been conducted by SCS and the applicability of regulatory requirements to the site. He also critiqued reports prepared by the plaintiff's expert witness.

- Served as an expert witness for a partnership involved in reorganization. Mr. Nuno's involvement regarded mitigation of contaminants on a developed property owned by the partnership, which was formerly utilized for oil production. Mr. Nuno reviewed investigations conducted on the site by others and provided realistic cost estimates for mitigating petroleum hydrocarbons identified in soil on the site.

- On behalf of a defendant that sold several properties throughout Southern California that contained USTs, Mr. Nuno reviewed investigation reports and provided a separate assessment of remedial measures which would be required at each site. Based on this evaluation, a settlement was negotiated.

- For a major manufacturing facility in Silicon Valley, Mr. Nuno evaluated information for a remedial investigation and cleanup action conducted as a result of a release from an aboveground tank containing chlorinated solvents. An opinion was provided regarding the appropriateness of measures taken to investigate and prevent the off-site migration of contaminants.

- Mr. Nuno served as Project Manager for an investigation conducted on a property that had been impacted by oil field operations. He interfaced with legal counsel and assisted SCS's expert witness prepare for deposition and trial testimony.

Mr. Nuno has managed numerous preliminary site assessments and investigations conducted on behalf of law firms. In many cases, the work conducted by SCS formed the basis for negotiating the sale of real property. Mr. Nuno has been involved in meetings with legal counsel of sellers and purchasers to discuss findings and provide opinions of potential liabilities associated with properties.

Publications and Presentations

Nuno, J. A. Site Characterization. American Society of Civil Engineering National Conference on Environmental and Pipeline Engineering. July 2000.

Nuno, J. A., and T. Dong. Contracting with Environmental Consultants. California Redevelopment Association Journal. September 1994.

Dong, T., and J. A. Nuno. Phased Approach to Due Diligence Environmental Assessment. California Redevelopment Association Journal. August 1994.

Nuno, J. A., Sullivan, P. S., and Lister, K. H. Project Plan Development, Site Characterization, Risk Assessment, and Development and Evaluation of Remedial Action Alternatives, American

Society of Civil Engineers/Canadian Society of Civil Engineers Environmental Engineering Conference, 1997.

Devinny, J. S., J. April, D. F. Buss, C. Johnson, K. Khan, K. H. Lister, J. A. Nuno, P. S. Sullivan, M. Tagoe, and D. Williams. The ASCE Draft Environmental Site Remediation Manual. Practice Periodical of Hazardous, Toxic, and Radioactive Waste Management. Volume 1, Number 3. July 1997.

KEVIN W. GREEN, PG

Education

BS – Marine Biology, California State University, Long Beach, 1978

Professional Licenses

Professional Geologist – California, 1994 (No. 5906)
Professional Geologist – Wyoming, 2009 (No. PG-3702)

Professional Affiliations

National Ground Water Association
Groundwater Resources Association of California

Professional Experience

Mr. Green has a background in geology and paleontology. Since joining SCS in 1987, he has participated in numerous projects related to the investigation and remediation of hazardous chemicals in soils and groundwater. Selected project activities include:

- Project Manager for more than a thousand Phase I environmental assessments. These projects–completed in accordance with various lender, ASTM, or government guidelines–consist of evaluating current on-site operations, generation of historical property use information, identifying potentially contaminated sites in the surrounding areas, review of previous reports and/or files maintained by regulatory agencies, and conclusions and recommendations regarding the presence of Recognized Environmental Conditions and further investigation. Project sites have varied from private single-use parcels to hundreds of properties involving multiple tenants associated with state and local government right-of-way improvements.

- Hundreds of investigations of known or suspected hazardous waste sites to identify and characterize chemicals of concern in soil, soil vapor, and groundwater in accordance with regulatory requirements. Contaminants include a variety of hydrocarbon products, solvents, heavy metals, polychlorinated biphenyls (PCBs), and pesticides. Regulatory oversight agencies include the US Environmental Protection Agency (USEPA), Department of Toxic Substances Control (DTSC), and various Regional Water Quality Control Boards (RWQCBs), County Health or Fire Departments, and city Certified Unified Program Agencies (CUPAs).

- Project Manager for numerous soil gas surveys utilized to assess the presence, nature, and extent of volatile organic compounds and/or methane related to contaminated soils, groundwater, and/or landfills. Elements of these projects have included assessments of vapor intrusion, protection of structures from subsurface gases, monitoring of indoor air, and health risk assessments.

- Numerous projects related to the removal, investigation, and remediation of contamination from leaking underground storage tanks. In accordance with requirements of the various regulatory agencies throughout Southern California, these UST projects have included soil, soil gas and groundwater contamination, and have included such tasks as: evaluation of site and regional hydrogeologic conditions; development work plans and health and safety plans; coordinate and conduct tank removals; design of the investigative programs; review and selection of potential remedial alternatives; preparation of summary reports of findings; support of legal counsel in cost recovery actions; and support of client in cost recovery actions with the California UST Cleanup Fund.

- Project Manager for numerous remediation projects involving various hydrocarbon products, pesticides, chlorinated solvents, and/or heavy metals. Remediation projects include excavation and disposal of soils; on- and off-site treatment of soils; recovery and treatment/disposal of free product and groundwater; and the design, installation, and operation of vapor extraction systems for soil and groundwater contaminated with volatile organic compounds.

- Evaluation of environmental conditions at sanitary landfills. Mr. Green was Task Manager for the installation and sampling of groundwater monitoring wells at and adjacent to existing landfills to determine the presence of leachate. This work was done in accordance with state regulations and local ordinances.

- Project Manager for numerous lead-based paint (LBP) surveys and abatement projects for single and multifamily residential developments, commercial and public buildings. These projects consist of determining paint and/or dust sampling methodologies; interpretation of testing results; evaluation and recommendations for appropriate LBP hazards abatement; development of LBP abatement specifications; coordination and selection of licensed LBP abatement subcontractors; collection and analysis of abatement confirmation samples; characterization of waste materials; and preparation of summary reports documenting LBP surveys and the appropriate removal and disposal of LBP-related hazards.

- Expert testimony and research support for litigation related to environmental assessments, and the investigation and remediation of hazardous waste sites.

Project experience is as follows:

Project Manager for assessment and vapor extraction remediation of a former industrial dry cleaning facility. Tasks included initial indoor air assessment for Proposition 65 compliance; coordination of equipment, subcontractors, and personnel for the installation of vapor extraction and monitoring wells, header lines, and vapor extraction system (VES), including acid "scrubber" for treated vapors, treatment pad and enclosure, electrical power, natural gas, water supply and wastewater discharge; city, county and Air Quality Management District (AQMD) permits; operation and maintenance of VES; regulatory reporting; and decommissioning of VES upon regulatory closure.

Project Director for general environmental consulting services for the Community Redevelopment Agency of the City of Los Angeles, CA. With 144 work order directives for services over an approximately 15-year period, these projects include initial site assessments, asbestos-containing material (ACM) surveys, lead-based paint (LBP) surveys, soil gas surveys, soils investigations, groundwater investigations, remedial and abatement activities for soils, asbestos, and LBP, second-party reviews of reports and work completed by other environmental consultants, underground storage tank (UST) removals, groundwater well abandonment, Brownfields consulting, and an environmental audit of hazardous materials handling practices of the client's operations. These projects were completed on vacant, former oil field, residential, commercial, industrial, and manufacturing properties ranging in size from a single lot to a 29-block mixed-use area. In addition to ACMs and LBP, constituents of concern that have been identified include a variety of petroleum hydrocarbon products, chlorinated solvents, heavy metals, PCBs, pesticides, and subsurface combustible gases such as methane and volatile organic compounds.

Project Director for Brownfields Redevelopment Site, Los Angeles, CA. SCS completed several phases of environmental services to facilitate the mixed-use redevelopment of property for a parking garage, childcare center, and affordable housing. Historical machine shop operations had resulted in a release of tetrachloroethylene (PCE) to soils. Although some cleanup was conducted in the early 1990s, residual PCE contamination remained. In accordance with current standards and with the proposed goal of affordable housing and childcare center, SCS re-investigated the site under the oversight of the Los Angeles RWQCB. Services provided for this project included investigations of soil and soil gas, health risk assessment and selection of remedial and mitigation options, design of vapor barrier to protect the building from chlorinated solvents, coordination and oversight remedial excavation, oversight and certification for installation of a sub-building vapor barrier, post-construction monitoring of indoor, background and sub-slab air to confirm that remediation and mitigation measures have met regulatory goals, and coordination of a No Further Action letter from the regulatory authority.

Project Director for due diligence investigations, manufacturing facility, Torrance, CA. SCS conducted a series of environmental assessments, investigations, and remedial activities that provided sufficient information to identify the environmental issues, business risks and facilitate the client's successful sale of property. A number of recognized environmental conditions including former and existing underground fuel storage tanks, a machine shop, wastewater treatment sumps and clarifier, paint shop, chemical storage, and chlorinated solvent degreasing operations were identified. Project activities included: shallow and deep soil and soil vapor investigations, followed by groundwater sampling; geophysical survey and excavations to find an existing diesel UST previously closed in-place, removal of the UST, and remedial excavations under Torrance Fire Department oversight to obtain closure; long-term soil vapor extraction pilot test including a workplan submitted to the Los Angeles RWQCB, installation of vapor extraction and monitoring wells, Soil Vapor Extraction (SVE) Pilot Test Report, and recommendations for further SVE.

Project Manager for the investigation, abatement, and subsequent demolition of a building containing a shooting range, as a part of an RCRA (Resource, Conservation and Recovery Act) facility closure under oversight by the California DTSC. Lead-containing dust from the shooting range was found to have contaminated building materials and soils. This project

involved the selection of remedial methods and contractors, monitoring of workers to assess exposure to lead-containing dust, monitoring of dust emissions during demolition to confirm compliance, confirmation sampling and analyses, characterization of wastes for disposal, and submittal of a summary report documenting the appropriate remediation and disposal of lead-containing wastes.

Project Director for the investigation and remediation of a former wood treating facility under the oversight of the California DTSC. Chemicals of potential concern include pentachlorophenol, creosote, diesel fuel, methylene chloride, zinc, copper, and arsenic. Project elements included a Remedial Investigation/Feasibility Study (RI/FS) report for vadose zone soil, including a Health Risk Assessment; Remedial Action Plan for impacted soil, which recommended capping as the most feasible remedial alternative; a cone penetrometer (CPT) study aimed at further defining site stratigraphy, evaluating for the presence of nonaqueous phase liquids, and mapping the areal distribution of chemicals of concern; quarterly groundwater monitoring from 16 wells; Storm Water Pollution Prevention Plan (SWPPP) and monitoring; and assistance to client in development and/or sale of the property.

Project Manager for well investigation program compliance under RWQCB oversight at a jet engine repair, maintenance, and testing facility. Information from this investigation was used by the USEPA to identify Potentially Responsible Parties for the San Fernando Valley Superfund site. On-site operations included 14 USTs; numerous clarifiers, sumps, and drain lines; plating, machining, and painting shops; a jet engine test facility; and solvent, alkaline, and steam cleaning facilities. Approximately 70 exploratory soil borings were drilled and analyzed for chlorinated solvents, heavy metals, cyanide, and various hydrocarbon products, such as gasoline, machining and waste oils, Stoddard solvent, and jet fuel. A soil gas survey of the facility was also conducted to screen for potential contamination by volatile organic compounds, including the installation of multi-depth, nested soil vapor monitoring wells. Fate and transport modeling of chlorinated solvents was used to assess the potential for impacts to groundwater. The RWQCB issued a No Further Action letter for the investigation and remediation of chlorinated solvents at the site. The project also included design, permitting, construction, and operation and maintenance of a hot air-assisted Vapor Extraction System to remediate Jet A-impacted soils. After 1 year of operation, remediation was sufficient to obtain closure with no further requirements from the RWQCB. Further, as a part of the decommissioning and demolition of the facility, a comprehensive survey for ACMs in nine buildings was conducted. SCS prepared plans and specifications for the abatement of ACMs, assisted the client in selection of an abatement contractor, conducted daily oversight of abatement activities including air monitoring, and prepared a final report documenting the appropriate removal and disposal of ACMs.

Project Director for redevelopment and closure of historical industrial site. Prior to acquisition of this property, SCS conducted a due diligence assessment and several phases of investigation to identify recognized environmental conditions, characterize the nature and extent of contamination, evaluate costs and environmental liabilities, and facilitate the client's successful purchase of the property. Following acquisition, and as a part of site redevelopment and thereafter, SCS provided additional site characterization and remediation services under regulatory oversight and with closure.

Project activities, conducted concurrently with property redevelopment, included:

- Shallow and deep soil and soil vapor investigations for due diligence purposes.
- Oil well abandonment under California Division of Oil, Gas and Geothermal Resources (DOGGR) oversight.
- Permitting and removal of an existing UST and remedial excavation under Los Angeles County Department of Public Works oversight.
- Under RWQCB oversight, shallow soil excavation of a former UST area, installation and operation of a separate SVE system for deeper soil contamination, and installation and monitoring of groundwater wells.

SCS met with the RWQCB on several occasions to make a case for closure under the State Water Resource Control Board's Low Threat UST Case Closure Policy. Upon completion of a closure investigation in October 2013, and a subsequent meeting to defend the case for closure, the RWQCB concurred with SCS's conclusions and approved the closure process under the Low Threat Policy. Following SVE and well abandonment activities, the RWQCB issued a No Further Action letter for the property in July 2014.

Mr. Green has participated in a certified health and safety program in compliance with OSHA Standard 29 CFR 1910.120. He is knowledgeable in incident response operations, team functions, personnel safety, and field equipment. He is able to recognize and evaluate potential chemical and physical hazards and associated risks in field operations; discuss and use personnel protective equipment such as respiratory protection and protective clothing; use and interpret direct-reading instruments; and examine and establish Standard Operating Safety Guidelines to ensure safe and effective response operations.

Mr. Green has been involved in numerous SCS projects related to hazardous waste characterization and management. He has experience in site assessment studies, underground tank investigations and their associated remediation programs, landfill studies, and geologic and hydrogeologic site characterization studies. His work experience includes all project phases from development of cost estimates for various site assessment and cleanup programs, to groundwater monitoring and sampling, to preparation of final reports and interfacing with regulatory agencies.

Litigation Support/Expert Testimony

Mr. Green has provided litigation support and expert testimony to legal counsel, including conducting research, and preparing reports and other supporting documents, in the following environmental cases:

- In August 2013, Mr. Green provided testimony in federal court on behalf of the plaintiff in City of Banning v. Dureau et al., regarding the contractor's emergency response to a waste oil spill that entered the storm drain system. Testimony related to investigative and remedial actions and the applicability of, and compliance with, the National Contingency Plan (NCP). The case was won by the City of Banning.

- In October 2012, Mr. Green was retained as an expert witness by the defendant in Clipper Yacht Company, LLC v. Anderson's Boat Yard, Inc., to review documents, consult with legal counsel, and provide expert opinions at deposition and trial regarding contamination at a boat yard and associated marina in Sausalito, CA. Specific topics of interest include the adequacy of previous investigations and remediation efforts, the sources of contamination (particularly copper), cleanup levels, and likelihood and estimated costs of additional remediation. This case was settled prior to trial.

- In August 2011, as part of the new property owner's litigation against the former tenant (Alfaville, LLC v. L.A. Signal, Inc.), Mr. Green provided testimony as a percipient witness, primarily as to the source and timing of a prior PCE release. In a Phase I Environmental Assessment prepared by SCS in 2008, PCE solvent use by the departing property tenant was identified. Several phases of subsequent site investigation confirmed a release of PCE to soil and soil vapor with likely impacts to groundwater. Groundwater monitoring is on-going under Los Angeles Regional Water Quality Control Board oversight. Remediation by soil vapor extraction may be conducted. This case was settled.

- In November 2008, Mr. Green provided an expert report and court testimony on behalf of the plaintiff in Malcolm Carter Enterprise v. Microsemi Real Estate, Inc. At issue was the evaluation of data for a Phase I Environmental Site Assessment, identification of Recognized Environmental Concerns, regional and site-specific groundwater contamination by chlorinated solvents, selection of an appropriate regulatory agency for remedial oversight, and applicability of the No Further Action letter. This case was won by the plaintiff.

- In 2010, Mr. Green was retained by the defendant in City of Riverside v. Johnson Revocable Trust, et al., to review documents, consult with legal counsel, and provide expert reports and deposition and expert testimony regarding an eminent domain case in Riverside, CA. Specific topics of interest included the adequacy of previous investigation, the source or sources of a PCE release, and the likelihood and estimated costs of remediation. This case was settled prior to trial.

- In 2009, Mr. Green conducted a review of the scope-of-work and fees charged by another environmental consultant conducting expert witness work on a development project in Santa Clarita. A declaration was provided to the Plaintiff's counsel regarding typical consultant fees, and the reasonableness of the time and expenses charged in relation to the final work product.

- In 2006, Mr. Green reviewed documents, consulted with legal counsel, and provided deposition and expert testimony regarding the source and timing of a methyl tertiary butyl ether (MTBE) release at a service station site in Strathmore, CA. This case was settled prior to trial.

- In 2003, Mr. Green provided litigation support regarding the scope and limitations of a Phase I Environmental Assessment as it pertains to a service station site in San Bernardino, CA.

- In 1998, Mr. Green provided expert consulting services related to the use, history, and migration of hexavalent chromium and perchloroethene in soil and groundwater at a former plating site and adjacent Los Angeles Unified School District (LAUSD) school property, and proper allocation of responsibility regarding those issues.

- In 1994, Mr. Green provided a client's in-house and outside legal counsel with technical support on a case involving cost recovery/allocation and potential involvement in the Burbank Operable Unit of the San Fernando Valley Superfund site. This project included assessment of the nature, extent, fate, and transport of potential contaminants (chlorinated solvents, fuels and/or heavy metals), previous and proposed site investigations, possible remedial alternatives and costs, and environmental investigations and/or remediation on properties in the surrounding area.

- Mr. Green has also provided outside legal counsel with technical support for due diligence assessment at a property in Irvine, CA. The client's site was located adjacent to a service station that had groundwater impacted with gasoline-related constituents, including MTBE. His work involved obtaining regulatory records, review, and written summary regarding regulatory requirements and anticipated actions, health risks, and necessity of additional site assessment and/or investigation work on the client's property.

- He has also assisted a client and the client's legal counsel with review of information and response to the Los Angeles RWQCB's request for a Workplan for investigation of suspected hexavalent chromium impacts to soil and groundwater at the client's former operation, located adjacent to the Burbank Airport and within the Burbank Operable Unit of the San Fernando Valley Superfund Site. The Workplan and further investigation were not subsequently required.

- In 1991, Mr. Green provided expert testimony in Azusa Redevelopment Agency v. Exxon, a case involving investigation and remediation of gasoline contaminated soil at a former Exxon station.

- 1991, Mr. Green provided expert testimony for Art Movers, Inc., in a case involving previous site investigations, proposed remedial activities, and potential risks to groundwater resources from perchloroethene-contaminated soils.

Publications and Presentations

Green, K. W. Vapor Encroachment & Intrusion: What are the Real (Estate) Risks? Journal of Property Management. March-April 2014.

Marsh, J. R., and K. W. Green. All Appropriate Inquiry - The New Phase I Standard. California Real Estate Journal. May 8, 2006.

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Marsh, J. R., and K. W. Green. What Your Phase I Assessment Dollars Buy. California Redevelopment Association Journal. July 1994.

PROJECT SPECIFIC PRELIMINARY WATER QUALITY MANAGEMENT PLAN (P-WQMP)

FOR:
PEN17-0143 / LWQ17-0027
BRODIAEA BUSINESS PARK
NEC OF BRODIAEA AVENUE AND HEACOCK STREET
MORENO VALLEY, CA 92553
APNs: 297-170-36 AND 297-170-38

PREPARED FOR:
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SEPTEMBER 19, 2017
NOVEMBER 16, 2017

JOB NO. 3566

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PROJECT SPECIFIC PRELIMINARY WATER QUALITY MANAGEMENT PLAN (P-WQMP)

FOR

"BRODIAEA BUSINESS PARK"

PREPARED BY LUIS PRADO
UNDER THE SUPERVISION OF:

REGISTERED PROFESSIONAL ENGINEER
HAIDOOK I. AGHAIAN
No. 043293
Exp: 3/31/18
CIVIL
STATE OF CALIFORNIA

11/16/2017

HAIDOOK I. AGHAIAN DATE
R.C.E. 43293
EXP. 3/31/18

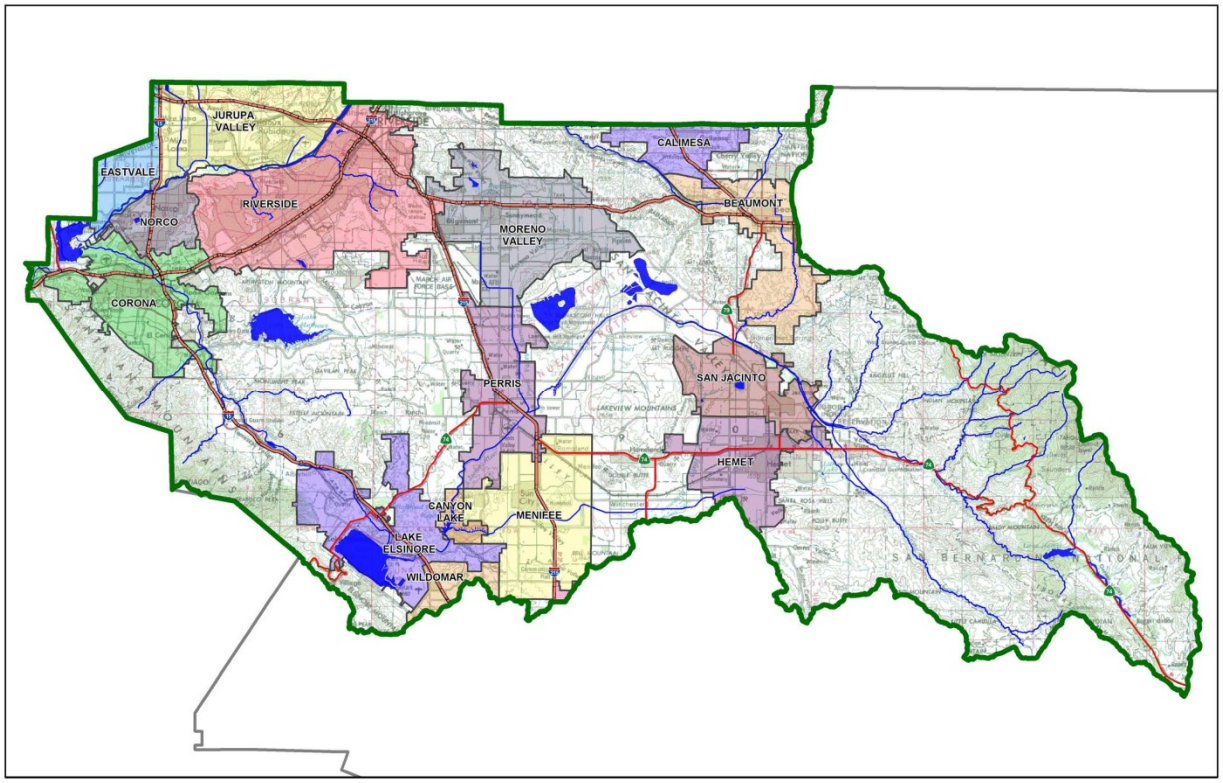
Project Specific Water Quality Management Plan

*A Template for Projects located within the **Santa Ana Watershed** Region of Riverside County*

Project Title: Brodiaea Business Park

Development No: 297-170-36 and 297-170-38

Design Review/Case No: PEN17-0143 / LWQ17-0027



☒ **Preliminary**
☐ **Final**

Original Date Prepared: September 19, 2017

Revision Date(s): November 16, 2017

Prepared for Compliance with
Regional Board Order No. **R8-2010-0033**

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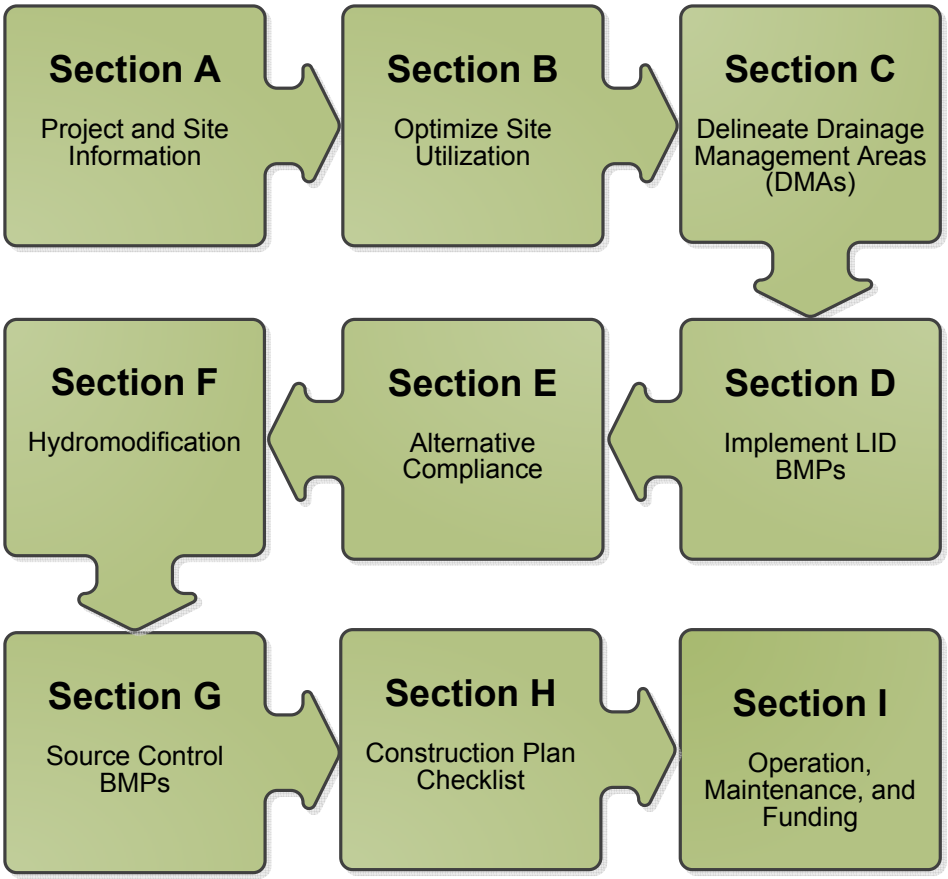
Job No. 3566

A Brief Introduction

This Project-Specific WQMP Template for the **Santa Ana Region** has been prepared to help guide you in documenting compliance for your project. Because this document has been designed to specifically document compliance, you will need to utilize the WQMP Guidance Document as your "how-to" manual to help guide you through this process. Both the Template and Guidance Document go hand-in-hand, and will help facilitate a well prepared Project-Specific WQMP. Below is a flowchart for the layout of this Template that will provide the steps required to document compliance.



OWNER'S CERTIFICATION

This Project-Specific Water Quality Management Plan (WQMP) has been prepared for **Alere Property Group, LLC** by Thienes Engineering, Inc. for the **Brodiaea Business Park** project.

This WQMP is intended to comply with the requirements of Moreno Valley for Riverside County Ordinance No. 827 which includes the requirement for the preparation and implementation of a Project-Specific WQMP.

The undersigned, while owning the property/project described in the preceding paragraph, shall be responsible for the implementation and funding of this WQMP and will ensure that this WQMP is amended as appropriate to reflect up-to-date conditions on the site. In addition, the property owner accepts responsibility for interim operation and maintenance of Stormwater BMPs until such time as this responsibility is formally transferred to a subsequent owner. This WQMP will be reviewed with the facility operator, facility supervisors, employees, tenants, maintenance and service contractors, or any other party (or parties) having responsibility for implementing portions of this WQMP. At least one copy of this WQMP will be maintained at the project site or project office in perpetuity. The undersigned is authorized to certify and to approve implementation of this WQMP. The undersigned is aware that implementation of this WQMP is enforceable under Moreno Valley Water Quality Ordinance (Municipal Code Section 8.10).

"I, the undersigned, certify under penalty of law that the provisions of this WQMP have been reviewed and accepted and that the WQMP will be transferred to future successors in interest."

Owner's Signature Alere Property Group, LLC	NOV 16 2017 Date
Daniel Webb Owner's Printed Name Alere Property Group, LLC	Manager Owner's Title/Position

PREPARER'S CERTIFICATION

"The selection, sizing and design of stormwater treatment and other stormwater quality and quantity control measures in this plan meet the requirements of Regional Water Quality Control Board Order No. **R8-2010-0033** and any subsequent amendments thereto."

Preparer's Signature	11/16/2017 Date
Haidook I. Aghaian Preparer's Printed Name	Senior Civil Engineer Preparer's Title/Position

Preparer's Licensure:

REGISTERED PROFESSIONAL ENGINEER
HAIDOOK I. AGHAIAN
No. 043293
Exp. 3/31/18
CIVIL
STATE OF CALIFORNIA

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

STATE OF CALIFORNIA)
) ss
COUNTY OF ORANGE)

On November 16, 2017, before me, Sandy Jung, a Notary Public, personally appeared Daniel L. Webb, who proved to me on the basis of satisfactory evidence to be the person whose name is subscribed to the within instrument, and acknowledged to me that he executed the same in his authorized capacity, and that by his signature on the instrument the person, or the entity upon behalf of which the person acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Notary Public

SANDY JUNG
Commission # 2141272
Notary Public - California
Orange County
My Comm. Expires Feb 28, 2020

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Section A: Project and Site Information

PROJECT INFORMATION	
Type of Project:	Light Industrial
Planning Area:	Industrial/Business Park
Community Name:	N/A
Development Name:	Brodiaea Business Park
PROJECT LOCATION	
Latitude & Longitude (DMS): 33.915238, -117.244983	
Project Watershed and Sub-Watershed: Santa Ana River & San Jacinto	
APN(s): 297-170-36 and 297-170-38	
Map Book and Page No.: Assessor's Map BK.297 PG.17	
PROJECT CHARACTERISTICS	
Proposed or Potential Land Use(s)	Light Industrial
Proposed or Potential SIC Code(s)	4225
Area of Impervious Project Footprint (SF)	470,448*
Total Area of proposed Impervious Surfaces within the Project Limits (SF)/or Replacement	470,448*
Does the project consist of offsite road improvements?	☒ Y ☐ N
Does the project propose to construct unpaved roads?	☐ Y ☒ N
Is the project part of a larger common plan of development (phased project)?	☐ Y ☒ N
EXISTING SITE CHARACTERISTICS	
Total area of existing Impervious Surfaces within the project limits (SF)	0
Is the project located within any MSHCP Criteria Cell?	☐ Y ☒ N
If so, identify the Cell number:	Not A Part
Are there any natural hydrologic features on the project site?	☐ Y ☒ N
Is a Geotechnical Report attached?	☒ Y ☐ N
If no Geotech. Report, list the NRCS soils type(s) present on the site (A, B, C and/or D)	Types A & C
What is the Water Quality Design Storm Depth for the project?	0.65

*Impervious area from DMA A-1 only.

A.1 Maps and Site Plans

When completing your Project-Specific WQMP, include a map of the local vicinity and existing site. In addition, include all grading, drainage, landscape/plant palette and other pertinent construction plans in Appendix 2. At a **minimum**, your WQMP Site Plan should include the following:

- Drainage Management Areas
- Proposed Structural BMPs
- Drainage Path
- Drainage Infrastructure, Inlets, Overflows
- Source Control BMPs
- Buildings, Roof Lines, Downspouts
- Impervious Surfaces
- Standard Labeling

Use your discretion on whether or not you may need to create multiple sheets or can appropriately accommodate these features on one or two sheets. Keep in mind that the Co-Permittee plan reviewer must be able to easily analyze your project utilizing this template and its associated site plans and maps.

A.2 Identify Receiving Waters

Using Table A.1 below, list in order of upstream to downstream, the receiving waters that the project site is tributary to. Continue to fill each row with the Receiving Water's 303(d) listed impairments (if any), designated beneficial uses, and proximity, if any, to a RARE beneficial use. Include a map of the receiving waters in Appendix 1.

Table A.1 Identification of Receiving Waters

Receiving Waters	EPA Approved 303(d) List Impairments	Designated Beneficial Uses	Proximity to RARE Beneficial Use
Perris Valley Storm Drain	None	N/A	Not classified as a RARE waterbody.
San Jacinto River, Reach 3	None	MUN, AGR, GWR, REC1, REC2, WARM, WILD	Not classified as a RARE waterbody.
Canyon Lake (aka San Jacinto River, Reach 2)	Nutrients, Pathogens	MUN, AGR, GWR, REC1, REC2, WARM, WILD	Not classified as a RARE waterbody.
San Jacinto River, Reach 1	None	MUN, AGR, GWR, REC1, REC2, WARM, WILD	Not classified as a RARE waterbody.
Lake Elsinore	PCBs, Unknown Toxicity, Sediment Toxicity, Nutrients, Organic Enrichment/Low Dissolved Oxygen	MUN, REC1, REC2, WARM, WILD	Not classified as a RARE waterbody.
Temescal Creek, Reach 6	Indicator Bacteria	MUN, GWR, REC1, REC2, WARM, WILD	Not classified as a RARE waterbody.
Temescal Creek, Reach 5	None	MUN, AGR, GWR, REC1, REC2, WARM, WILD, RARE	27 miles
Temescal Creek, Reach 4	None	MUN, AGR, GWR, REC1, REC2, WARM, WILD, RARE	33 miles
Temescal Creek, Reach 3 (aka Lee Lake)	None	MUN, AGR, IND, GWR, REC1, REC2, WARM, WILD	Not classified as a RARE waterbody.
Temescal Creek, Reach 2	None	MUN, AGR, IND, GWR, REC1, REC2, WARM, WILD	Not classified as a RARE waterbody.
Temescal Creek, Reach 1	pH	MUN, REC1, REC2, WARM, WILD	Not classified as a RARE waterbody.
Santa Ana River, Reach 3	Pathogens, Copper, and Lead	MUN, AGR, GWR, REC1, REC2, WARM, WILD, RARE, SPWN	50 miles
The Prado Basin Management Zone	Pathogens, Nutrients	MUN, REC1, REC2, WARM, WILD, RARE	50 miles
Santa Ana River, Reach 2	Indicator Bacteria	MUN, AGR, GWR, REC1, REC2, WARM, WILD, RARE	55 miles

Receiving Waters	EPA Approved 303(d) List Impairments	Designated Beneficial Uses	Proximity to RARE Beneficial Use
Santa Ana River, Reach 1	None	MUN, REC1, REC2, WARM, WILD	Not classified as a RARE waterbody.
Tidal Prism of Santa Ana River and Newport Slough	Enterococcus, Fecal Coliform, Total Coliform	MUN, REC1, REC2, COMM, WILD, RARE, MAR	81 miles
Pacific Ocean Near shore Zone	None	MUN, IND, NAV, REC1, REC2, COMM, WILD, RARE, SPWN, MAR, SHEL	81 miles
Pacific Ocean Offshore Zone	None	MUN, IND, NAV, REC1, REC2, COMM, WILD, RARE, SPWN, MAR	82 miles

A.3 Additional Permits/Approvals required for the Project:

Table A.2 Other Applicable Permits

Agency	Permit Required	
State Department of Fish and Game, 1602 Streambed Alteration Agreement	☐ Y	☒ N
State Water Resources Control Board, Clean Water Act (CWA) Section 401 Water Quality Cert.	☐ Y	☒ N
US Army Corps of Engineers, CWA Section 404 Permit	☐ Y	☒ N
US Fish and Wildlife, Endangered Species Act Section 7 Biological Opinion	☐ Y	☒ N
Statewide Construction General Permit Coverage	☒ Y	☐ N
Statewide Industrial General Permit Coverage	☒ Y	☐ N
Western Riverside MSHCP Consistency Approval (e.g., JPR, DBESP)	☐ Y	☒ N
Other *(please list in the space below as required)* City of Moreno Valley Grading Permit	☒ Y	☐ N
Other *(please list in the space below as required)* City of Moreno Valley Building Permit	☒ Y	☐ N

If yes is answered to any of the questions above, the Co-Permittee may require proof of approval/coverage from those agencies as applicable including documentation of any associated requirements that may affect this Project-Specific WQMP.

Section B: Optimize Site Utilization (LID Principles)

Review of the information collected in Section 'A' will aid in identifying the principal constraints on site design and selection of LID BMPs as well as opportunities to reduce imperviousness and incorporate LID Principles into the site and landscape design. For example, **constraints** might include impermeable soils, high groundwater, groundwater pollution or contaminated soils, steep slopes, geotechnical instability, high-intensity land use, heavy pedestrian or vehicular traffic, utility locations or safety concerns. **Opportunities** might include existing natural areas, low areas, oddly configured or otherwise unbuildable parcels, easements and landscape amenities including open space and buffers (which can double as locations for bioretention BMPs), and differences in elevation (which can provide hydraulic head). Prepare a brief narrative for each of the site optimization strategies described below. This narrative will help you as you proceed with your LID design and explain your design decisions to others.

The 2010 Santa Ana MS4 Permit further requires that LID Retention BMPs (Infiltration Only or Harvest and Use) be used unless it can be shown that those BMPs are infeasible. Therefore, it is important that your narrative identify and justify if there are any constraints that would prevent the use of those categories of LID BMPs. Similarly, you should also note opportunities that exist which will be utilized during project design. Upon completion of identifying Constraints and Opportunities, include these on your WQMP Site plan in Appendix 1.

Site Optimization

The following questions are based upon Section 3.2 of the WQMP Guidance Document. Review of the WQMP Guidance Document will help you determine how best to optimize your site and subsequently identify opportunities and/or constraints, and document compliance.

Did you identify and preserve existing drainage patterns? If so, how? If not, why?

- *There are no creeks, wetlands, or riparian habitats nearby.*
- *Existing drainage patterns flows from north to south. Proposed condition drainage patterns mimic pre-development conditions.*

Did you identify and protect existing vegetation? If so, how? If not, why?

- *Not applicable, there are no sensitive areas.*
- *Ground surface cover consists of exposed soils with sparse to moderate amounts of native weed and grass growth.*

Did you identify and preserve natural infiltration capacity? If so, how? If not, why?

- *Not applicable, natural infiltration capacity is insufficient for BMP purposes. Bioretention BMPs were utilized to filter the design capture volume and discharge through an underdrain. Incidental infiltration it utilized where permissible.*

Did you identify and minimize impervious area? If so, how? If not, why?

- *Impervious area on the site has been minimized to City standards.*
- *Due to the nature of the project site (large trucks), substitution of pavement for landscaping is not feasible. The project does not propose overflow parking where substitution of pavement for landscaping would be optimal. Landscaping has been provided wherever applicable and to the maximum extent practicable.*

- *The entire Design Capture Volume (DCV) is handled by the bioretention BMP. Permeable pavement is not needed to meet the DCV.*

Did you identify and disperse runoff to adjacent pervious areas? If so, how? If not, why?

- *Roof runoff is directed to the proposed bioretention type BMP for treatment.*
- *The site is not on a hillside.*
- *All stormwater runoff will be piped or sheet flow towards the bioretention BMP.*

Section C: Delineate Drainage Management Areas (DMAs)

Utilizing the procedure in Section 3.3 of the WQMP Guidance Document which discusses the methods of delineating and mapping your project site into individual DMAs, complete Table C.1 below to appropriately categorize the types of classification (e.g., Type A, Type B, etc.) per DMA for your project site. Upon completion of this table, this information will then be used to populate and tabulate the corresponding tables for their respective DMA classifications.

Table C.1 DMA Classifications

DMA Name or ID	Surface Type(s)[1]	Area (Sq. Ft.)	Area (Acres)	DMA Type
A-1	Roofs/Conc/Asphalt	470,448	10.80	Type D
A-2	Ornamental Landscaping	23,958	0.55	Type D
B	Ornamental Landscaping	28,314	0.65	Type A

[1]*Reference Table 2-1 in the WQMP Guidance Document to populate this column*

Table C.2 Type 'A', Self-Treating Areas

DMA Name or ID	Area (Sq. Ft.)	Stabilization Type	Irrigation Type (if any)
B	28,314	California Native Vegetation	Timed Sprinklers

Table C.3 Type 'B', Self-Retaining Areas

Self-Retaining Area				**Type 'C' DMAs that are draining to the Self-Retaining Area**		
DMA Name/ ID	Post-project surface type	Area (square feet) [A]	Storm Depth (inches) [B]	DMA Name / ID	[C] from Table C.4 = [C]	Required Retention Depth (inches) [D]
N/A	N/A	N/A	N/A	N/A	N/A	N/A

$$[D] = [B] + \frac{[B]\cdot[C]}{[A]}$$

Table C.4 Type 'C', Areas that Drain to Self-Retaining Areas

DMA					Receiving Self-Retaining DMA		
DMA Name/ ID	Area (square feet)	Post-project surface type	Runoff factor	Product	DMA name /ID	Area (square feet)	Ratio
	[A]		[B]	[C] = [A] x [B]		[D]	[C]/[D]
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table C.5 Type 'D', Areas Draining to BMPs

DMA Name or ID	BMP Name or ID
A-1	BIORETENTION
A-2	BIORETENTION

Note: More than one drainage management area can drain to a single LID BMP, however, one drainage management area may not drain to more than one BMP.

Section D: Implement LID BMPs

D.1 Infiltration Applicability

Is there an approved downstream 'Highest and Best Use' for stormwater runoff (see discussion in Chapter 2.4.4 of the WQMP Guidance Document for further details)? ☐ Y ☒ N

If yes has been checked, Infiltration BMPs shall not be used for the site. If no, continue working through this section to implement your LID BMPs. It is recommended that you contact your Co-Permittee to verify whether or not your project discharges to an approved downstream 'Highest and Best Use' feature.

Geotechnical Report

A Geotechnical Report or Phase I Environmental Site Assessment may be required by the Copermittee to confirm present and past site characteristics that may affect the use of Infiltration BMPs. In addition, the Co-Permittee, at their discretion, may not require a geotechnical report for small projects as described in Chapter 2 of the WQMP Guidance Document. If a geotechnical report has been prepared, include it in Appendix 3. In addition, if a Phase I Environmental Site Assessment has been prepared, include it in Appendix 4.

Is this project classified as a small project consistent with the requirements of Chapter 2 of the WQMP Guidance Document? ☐ Y ☒ N

Infiltration Feasibility

Table D.1 below is meant to provide a simple means of assessing which DMAs on your site support Infiltration BMPs and is discussed in the WQMP Guidance Document in Chapter 2.4.5. Check the appropriate box for each question and then list affected DMAs as applicable. If additional space is needed, add a row below the corresponding answer.

Table D.1 Infiltration Feasibility

Does the project site…	YES	NO
…have any DMAs with a seasonal high groundwater mark shallower than 10 feet?		X
If Yes, list affected DMAs:		
…have any DMAs located within 100 feet of a water supply well?		X
If Yes, list affected DMAs:		
…have any areas identified by the geotechnical report as posing a public safety risk where infiltration of stormwater could have a negative impact?		X
If Yes, list affected DMAs:		
…have measured in-situ infiltration rates of less than 1.6 inches / hour?	X	
If Yes, list affected DMAs: A-1, A-2, and B (entire site)		
…have significant cut and/or fill conditions that would preclude in-situ testing of infiltration rates at the final infiltration surface?		X
If Yes, list affected DMAs:		
…geotechnical report identifies other site-specific factors that would preclude effective and safe infiltration?		X
Describe here:		
…have areas of known soil or groundwater contamination (unless with written authorization from the Regional Board Executive Officer)		X
If yes, list affected DMAs:		

If you answered "Yes" to any of the questions above for any DMA, Infiltration BMPs should not be used for those DMAs and you should proceed to the assessment for Harvest and Use below.

D.2 Harvest and Use Assessment

Please check what applies*:*

☐ Reclaimed water will be used for the non-potable water demands for the project.

☐ Downstream water rights may be impacted by Harvest and Use as approved by the Regional Board (verify with the Copermittee).

☐ The Design Capture Volume will be addressed using Infiltration Only BMPs. In such a case, Harvest and Use BMPs are still encouraged, but it would not be required if the Design Capture Volume will be infiltrated or evapotranspired.

☒ None of the above

If any of the above boxes have been checked, Harvest and Use BMPs need not be assessed for the site. If neither of the above criteria applies, follow the steps below to assess the feasibility of irrigation use, toilet use and other non-potable uses (e.g., industrial use).

Irrigation Use Feasibility

Complete the following steps to determine the feasibility of harvesting stormwater runoff for Irrigation Use BMPs on your site:

Step 1: Identify the total area of irrigated landscape on the site, and the type of landscaping used.

Total Area of Irrigated Landscape: 1.20 acres

Type of Landscaping (Conservation Design or Active Turf): Conservation design

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for irrigation use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: 10.80 acres

Step 3: Cross reference the Design Storm depth for the project site (see Exhibit A of the WQMP Guidance Document) with the left column of Table 2-3 in Chapter 2 to determine the minimum area of Effective Irrigated Area per Tributary Impervious Area (EIATIA).

Enter your EIATIA factor: 1.05

Step 4: Multiply the unit value obtained from Step 3 by the total of impervious areas from Step 2 to develop the minimum irrigated area that would be required.

Minimum required irrigated area: 11.34 acres

Step 5: Determine if harvesting stormwater runoff for irrigation use is feasible for the project by comparing the total area of irrigated landscape (Step 1) to the minimum required irrigated area (Step 4).

Minimum required irrigated area (Step 4)	Available Irrigated Landscape (Step 1)
11.34 acres	1.20 acres

Toilet Use Feasibility

Complete the following steps to determine the feasibility of harvesting stormwater runoff for toilet flushing uses on your site:

Step 1: Identify the projected total number of daily toilet users during the wet season, and account for any periodic shut downs or other lapses in occupancy:

Projected Number of Daily Toilet Users: 165 (# of parking stalls)

Project Type: Industrial

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for toilet use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: 10.80 acres

Step 3: Enter the Design Storm depth for the project site (see Exhibit A) into the left column of Table 2-2 in Chapter 2 to determine the minimum number or toilet users per tributary impervious acre (TUTIA).

Enter your TUTIA factor: 185

Step 4: Multiply the unit value obtained from Step 3 by the total of impervious areas from Step 2 to develop the minimum number of toilet users that would be required.

Minimum number of toilet users: 1,998

Step 5: Determine if harvesting stormwater runoff for toilet flushing use is feasible for the project by comparing the Number of Daily Toilet Users (Step 1) to the minimum required number of toilet users (Step 4).

Minimum required Toilet Users (Step 4)	**Projected number of toilet users (Step 1)**
1,998	*165*

Other Non-Potable Use Feasibility

Are there other non-potable uses for stormwater runoff on the site (e.g. industrial use)? See Chapter 2 of the Guidance for further information. If yes, describe below. If no, write N/A.

N/A

Step 1: Identify the projected average daily non-potable demand, in gallons per day, during the wet season and accounting for any periodic shut downs or other lapses in occupancy or operation.

Average Daily Demand: N/A

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for the identified non-potable use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: N/A

Step 3: Enter the Design Storm depth for the project site (see Exhibit A) into the left column of Table 2-3 in Chapter 2 to determine the minimum demand for non-potable uses per tributary impervious acre.

Enter the factor from Table 2-3: N/A

Step 4: Multiply the unit value obtained from Step 4 by the total of impervious areas from Step 3 to develop the minimum number of gallons per day of non-potable use that would be required.

Minimum required use: N/A

Step 5: Determine if harvesting stormwater runoff for other non-potable use is feasible for the project by comparing the Number of Daily Toilet Users (Step 1) to the minimum required number of toilet users (Step 4).

Minimum required non-potable use (Step 4)	**Projected average daily use (Step 1)**
N/A	N/A

If Irrigation, Toilet and Other Use feasibility anticipated demands are less than the applicable minimum values, Harvest and Use BMPs are not required and you should proceed to utilize LID Bioretention and Biotreatment, unless a site-specific analysis has been completed that demonstrates technical infeasibility as noted in D.3 below.

D.3 Bioretention and Biotreatment Assessment

Other LID Bioretention and Biotreatment BMPs as described in Chapter 2.4.7 of the WQMP Guidance Document are feasible on nearly all development sites with sufficient advance planning.

Select one of the following:

☒ LID Bioretention/Biotreatment BMPs will be used for some or all DMAs of the project as noted below in Section D.4 (note the requirements of Section 3.4.2 in the WQMP Guidance Document).

☐ A site-specific analysis demonstrating the technical infeasibility of all LID BMPs has been performed and is included in Appendix 5. If you plan to submit an analysis demonstrating the technical infeasibility of LID BMPs, request a pre-submittal meeting with the Copermittee to discuss this option. Proceed to Section E to document your alternative compliance measures.

☐ Not applicable

D.4 Feasibility Assessment Summaries

From the Infiltration, Harvest and Use, Bioretention and Biotreatment Sections above, complete Table D.2 below to summarize which LID BMPs are technically feasible, and which are not, based upon the established hierarchy.

Table D.2 LID Prioritization Summary Matrix

DMA Name/ID	LID BMP Hierarchy				Alternative Compliance (Type A, B, C)
	1. Infiltration	2. Harvest and use	3. Bioretention	4. Biotreatment	
A-1	☐	☐	☒	☐	☐
A-2	☐	☐	☒	☐	☐

For those DMAs where LID BMPs are not feasible, provide a brief narrative below summarizing why they are not feasible, include your technical infeasibility criteria in Appendix 5, and proceed to Section E below to document Alternative Compliance measures for those DMAs. Recall that each proposed DMA must pass through the LID BMP hierarchy before alternative compliance measures may be considered.

D.5 LID BMP Sizing

Each LID BMP must be designed to ensure that the Design Capture Volume will be addressed by the selected BMPs. First**,** calculate the Design Capture Volume for each LID BMP using the V_{BMP} worksheet in Appendix F of the LID BMP Design Handbook. Second**,** design the LID BMP to meet the required V_{BMP} using a method approved by the Copermittee. Utilize the worksheets found in the LID BMP Design Handbook or consult with your Copermittee to assist you in correctly sizing your LID BMPs. Complete Table D.3 below to document the Design Capture Volume and the Proposed Volume for each LID BMP. Provide the completed design procedure sheets for each LID BMP in Appendix 6. You may add additional rows to the table below as needed.

Table D.3 DCV Calculations for LID BMPs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
	[A]		[B]	[C]	[A] x [C]			
A-1	470,448	Roofs/Conc/Asphalt	*1.00*	*0.89*	*419,639.6*	*0.65*	*22730.5*	*23,542*
A-2	23,958	Ornamental Landscaping	*0.10*	*0.11*	*2,646.4*	*0.65*	*143.3*	
	494,406				*422,286*	0.65	22,873.8	*23,542*

[B], [C] is obtained as described in Section 2.3.1 of the WQMP Guidance Document

[E] is obtained from Exhibit A in the WQMP Guidance Document

[G] is obtained from a design procedure sheet, such as in LID BMP Design Handbook and placed in Appendix 6

Section E: Alternative Compliance (LID Waiver Program)

LID BMPs are expected to be feasible on virtually all projects. Where LID BMPs have been demonstrated to be infeasible as documented in Section D, other Treatment Control BMPs must be used (subject to LID waiver approval by the Copermittee). Check one of the following Boxes:

☒ LID Principles and LID BMPs have been incorporated into the site design to fully address all Drainage Management Areas. No alternative compliance measures are required for this project and thus this Section is not required to be completed.

- *Or-*

☐ The following Drainage Management Areas are unable to be addressed using LID BMPs. A site-specific analysis demonstrating technical infeasibility of LID BMPs has been approved by the Co-Permittee and included in Appendix 5. Additionally, no downstream regional and/or sub-regional LID BMPs exist or are available for use by the project. The following alternative compliance measures on the following pages are being implemented to ensure that any pollutant loads expected to be discharged by not incorporating LID BMPs, are fully mitigated.

E.1 Identify Pollutants of Concern

Utilizing Table A.1 from Section A above which noted your project's receiving waters and their associated EPA approved 303(d) listed impairments, cross reference this information with that of your selected Priority Development Project Category in Table E.1 below. If the identified General Pollutant Categories are the same as those listed for your receiving waters, then these will be your Pollutants of Concern and the appropriate box or boxes will be checked on the last row. The purpose of this is to document compliance and to help you appropriately plan for mitigating your Pollutants of Concern in lieu of implementing LID BMPs.

Table E.1 Potential Pollutants by Land Use Type

Priority Development Project Categories and/or Project Features (check those that apply)	General Pollutant Categories							
	Bacterial Indicators	Metals	Nutrients	Pesticides (PCBs)	Toxic Organic Compounds	Sediments	Trash & Debris	Oil & Grease
☐ Detached Residential Development	P	N	P	P	N	P	P	P
☐ Attached Residential Development	P	N	P	P	N	P	P	P(2)
☒ Commercial/Industrial Development	P(3)	P	P(1)	P(1)	P(5)	P(1)	P	P
☐ Automotive Repair Shops	N	P	N	N	P(4, 5)	N	P	P
☐ Restaurants (>5,000 ft^2)	P	N	N	N	N	N	P	P
☐ Hillside Development (>5,000 ft^2)	P	N	P	P	N	P	P	P
☒ Parking Lots (>5,000 ft^2)	P(6)	P	P(1)	P(1)	P(4)	P(1)	P	P
☐ Retail Gasoline Outlets	N	P	N	N	P	N	P	P
Project Priority Pollutant(s) of Concern	☒	☒	☐	☒	☒	☐	☐	☐

P = Potential
N = Not Potential
(1) A potential Pollutant if non-native landscaping exists or is proposed onsite; otherwise not expected
(2) A potential Pollutant if the project includes uncovered parking areas; otherwise not expected
(3) A potential Pollutant is land use involving animal waste
(4) Specifically petroleum hydrocarbons
(5) Specifically solvents
(6) Bacterial indicators are routinely detected in pavement runoff

E.2 Stormwater Credits

Projects that cannot implement LID BMPs but nevertheless implement smart growth principles are potentially eligible for Stormwater Credits. Utilize Table 3-8 within the WQMP Guidance Document to identify your Project Category and its associated Water Quality Credit. If not applicable, write N/A.

Table E.2 Water Quality Credits

Qualifying Project Categories	Credit Percentage[2]
N/A	
Total Credit Percentage[1]	

[1]Cannot Exceed 50%
[2]Obtain corresponding data from Table 3-8 in the WQMP Guidance Document

E.3 Sizing Criteria

After you appropriately considered Stormwater Credits for your project, utilize Table E.3 below to appropriately size them to the DCV, or Design Flow Rate, as applicable. Please reference Chapter 3.5.2 of the WQMP Guidance Document for further information.

Table E.3 Treatment Control BMP Sizing

DMA Type/ ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imp Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor				
	[A]		[B]	[C]	[A] x [C]				
N/A	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Design Storm Depth (in)*	*Minimum Design Capture Volume (cubic feet)*	*Total Storm Water Credit % Reduction*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*

[B], [C] is obtained as described in Section 2.3.1 from the WQMP Guidance Document
[E] is obtained from Exhibit A in the WQMP Guidance Document
[G] is for Flow-Based Treatment Control BMPs [G] = 43,560, for Volume-Based Control Treatment BMPs, [G] = 12
[H] is from the Total Credit Percentage as Calculated from Table E.2 above
[I] as obtained from a design procedure sheet from the BMP manufacturer and should be included in Appendix 6

E.4 Treatment Control BMP Selection

Treatment Control BMPs typically provide proprietary treatment mechanisms to treat potential pollutants in runoff, but do not sustain significant biological processes. Treatment Control BMPs must have a removal efficiency of a medium or high effectiveness as quantified below:

- **High**: equal to or greater than 80% removal efficiency
- **Medium**: between 40% and 80% removal efficiency

Such removal efficiency documentation (e.g., studies, reports, etc.) as further discussed in Chapter 3.5.2 of the WQMP Guidance Document, must be included in Appendix 6. In addition, ensure that proposed Treatment Control BMPs are properly identified on the WQMP Site Plan in Appendix 1.

Table E.4 Treatment Control BMP Selection

Selected Treatment Control BMP Name or ID[1]	Priority Pollutant(s) of Concern to Mitigate[2]	Removal Efficiency Percentage[3]
N/A	N/A	N/A

[1] *Treatment Control BMPs must not be constructed within Receiving Waters. In addition, a proposed Treatment Control BMP may be listed more than once if they possess more than one qualifying pollutant removal efficiency.*
[2] *Cross Reference Table E.1 above to populate this column.*
[3] *As documented in a Co-Permittee Approved Study and provided in Appendix 6.*

Section F: Hydromodification

F.1 Hydrologic Conditions of Concern (HCOC) Analysis

Once you have determined that the LID design is adequate to address water quality requirements, you will need to assess if the proposed LID Design may still create a HCOC. Review Chapters 2 and 3 (including Figure 3-7) of the WQMP Guidance Document to determine if your project must mitigate for Hydromodification impacts. If your project meets one of the following criteria which will be indicated by the check boxes below, you do not need to address Hydromodification at this time. However, if the project does not qualify for Exemptions 1, 2 or 3, then additional measures must be added to the design to comply with HCOC criteria. This is discussed in further detail below in Section F.2.

HCOC EXEMPTION 1: The Priority Development Project disturbs less than one acre. The Copermittee has the discretion to require a Project-Specific WQMP to address HCOCs on projects less than one acre on a case by case basis. The disturbed area calculation should include all disturbances associated with larger common plans of development.

Does the project qualify for this HCOC Exemption? ☐ Y ☒ N

If Yes, HCOC criteria do not apply.

HCOC EXEMPTION 2: The volume and time of concentration[1] of storm water runoff for the post-development condition is not significantly different from the pre-development condition for a 2-year return frequency storm (a difference of 5% or less is considered insignificant) using one of the following methods to calculate:

- Riverside County Hydrology Manual
- Technical Release 55 (TR-55): Urban Hydrology for Small Watersheds (NRCS 1986), or derivatives thereof, such as the Santa Barbara Urban Hydrograph Method
- Other methods acceptable to the Co-Permittee

Does the project qualify for this HCOC Exemption? ☒ Y ☐ N

If Yes, report results in Table F.1 below and provide your substantiated hydrologic analysis in Appendix 7.

Table F.1 Hydrologic Conditions of Concern Summary

	2 year – 24 hour		
	Pre-condition	**Post-condition**	**% Difference**
Time of Concentration (min)	31.7	13.6	57%
Volume (Acre-Feet)	0.16	1.31	819%

[1] Time of concentration is defined as the time after the beginning of the rainfall when all portions of the drainage basin are contributing to flow at the outlet.

To meet HCOC requirements, a mitigation volume must be achieved by using LID and hydromodification mitigation BMPs. The mitigation volume required is approximately 0.602 ac-ft (1.31 ac-ft – [1.05 x 0.16 ac-ft] – 0.54 ac-ft). The total mitigation volume provided by the underground detention is 0.604 ac-ft (26,311 cu-ft). As a result, the mitigation volume has been contained by the proposed LID BMP in conjunction with the additional hydromodification mitigation BMP. Since the mitigation volume has been met, it is physically impossible for the project to avoid increasing the time of concentration and reducing peak runoff by more than five percent of pre-development conditions.

HCOC EXEMPTION 3: All downstream conveyance channels to an adequate sump (for example, Prado Dam, Lake Elsinore, Canyon Lake, Santa Ana River, or other lake, reservoir or naturally erosion resistant feature) that will receive runoff from the project are engineered and regularly maintained to ensure design flow capacity; no sensitive stream habitat areas will be adversely affected; or are not identified on the Co-Permittees Hydromodification Sensitivity Maps.

Does the project qualify for this HCOC Exemption? ☐ Y ☒ N

If Yes, HCOC criteria do not apply and note below which adequate sump applies to this HCOC qualifier:

F.2 HCOC Mitigation

If none of the above HCOC Exemption Criteria are applicable, HCOC criteria is considered mitigated if they meet one of the following conditions:

a. Additional LID BMPS are implemented onsite or offsite to mitigate potential erosion or habitat impacts as a result of HCOCs. This can be conducted by an evaluation of site-specific conditions utilizing accepted professional methodologies published by entities such as the California Stormwater Quality Association (CASQA), the Southern California Coastal Water Research Project (SCCRWP), or other Co-Permittee approved methodologies for site-specific HCOC analysis.

b. The project is developed consistent with an approved Watershed Action Plan that addresses HCOC in Receiving Waters.

c. Mimicking the pre-development hydrograph with the post-development hydrograph, for a 2-year return frequency storm. Generally, the hydrologic conditions of concern are not significant, if the post-development hydrograph is no more than 10% greater than pre-development hydrograph. In cases where excess volume cannot be infiltrated or captured and reused, discharge from the site must be limited to a flow rate no greater than 110% of the pre-development 2-year peak flow.

Be sure to include all pertinent documentation used in your analysis of the items a, b or c in Appendix 7.

Section G: Source Control BMPs

Source control BMPs include permanent, structural features that may be required in your project plans — such as roofs over and berms around trash and recycling areas — and Operational BMPs, such as regular sweeping and "housekeeping", that must be implemented by the site's occupant or user. The MEP standard typically requires both types of BMPs. In general, Operational BMPs cannot be substituted for a feasible and effective permanent BMP. Using the Pollutant Sources/Source Control Checklist in Appendix 8, review the following procedure to specify Source Control BMPs for your site:

1. ***Identify Pollutant Sources*:** Review Column 1 in the Pollutant Sources/Source Control Checklist. Check off the potential sources of Pollutants that apply to your site.

2. ***Note Locations on Project-Specific WQMP Exhibit*:** Note the corresponding requirements listed in Column 2 of the Pollutant Sources/Source Control Checklist. Show the location of each Pollutant source and each permanent Source Control BMP in your Project-Specific WQMP Exhibit located in Appendix 1.

3. ***Prepare a Table and Narrative*:** Check off the corresponding requirements listed in Column 3 in the Pollutant Sources/Source Control Checklist. In the left column of Table G.1 below, list each potential source of runoff Pollutants on your site (from those that you checked in the Pollutant Sources/Source Control Checklist). In the middle column, list the corresponding permanent, Structural Source Control BMPs (from Columns 2 and 3 of the Pollutant Sources/Source Control Checklist) used to prevent Pollutants from entering runoff. **Add additional narrative** in this column that explains any special features, materials or methods of construction that will be used to implement these permanent, Structural Source Control BMPs.

4. ***Identify Operational Source Control BMPs:*** To complete your table, refer once again to the Pollutant Sources/Source Control Checklist. List in the right column of your table the Operational BMPs that should be implemented as long as the anticipated activities continue at the site. Copermittee stormwater ordinances require that applicable Source Control BMPs be implemented; the same BMPs may also be required as a condition of a use permit or other revocable Discretionary Approval for use of the site.

Table G.1 Permanent and Operational Source Control Measures

Potential Sources of Runoff pollutants	Permanent Structural Source Control BMPs	Operational Source Control BMPs
A. On-site storm drain inlets	• Mark all inlets with the words "Only Rain Down the Storm Drain" or similar.	• Maintain and periodically repaint or replace inlet markings annually. • Provide stormwater pollution prevention information to new site owners, lessees, or operators upon occupancy and annually thereafter. • See CASQA fact sheet SC-44 for "Drainage System Maintenance," included in Appendix of this document. • Include the following lease agreements: "Tenant shall not allow anyone to discharge anything to storm drain or to store or deposit materials so as to create a potential discharge to storm drains."

Potential Sources of Runoff pollutants	Permanent Structural Source Control BMPs	Operational Source Control BMPs
B. Interior floor drains and elevator shaft sump pumps	• Interior floor drains and elevator shaft sump pumps will be plumbed to sanitary sewer.	• Inspect and maintain drains semi-annually to prevent blockages and overflow.
D2. Landscape / Outdoor Pesticide Use	• Landscape plans will minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution. • Pest-resistant plans will be used adjacent to hardscape. • The landscape plans will consider plants appropriate to the site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.	• Maintain landscaping only using minimum pesticides, when needed. • See Appendix 10 for "Landscape and Gardening" brochure by RCFlood. • Provide Integrated Pest Management (IPM) information to new owners, lessees and operators upon occupancy and annually thereafter. IPM is an effective and environmentally sensitive approach to pest management.
G. Refuse Areas	• Site refuse will be handled by contractor on a weekly basis. • Signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar.	• A minimum of two receptacles will be provided and locate dindoors. Receptacles are to be inspected daily and repairs or replacements to leaky receptacles will be completed immediately. Receptacles are to remain covered with not in use. Dumping of liquid or hazardous wastes is prohibited. A "no hazardous materials" sign will be posted. Spills will be cleaned immediately upon discovery. Spill control materials will be available onsite. See Appendix 10 for CASQA fact sheet SC-34 for "Waste Handling and Disposal."
H. Industrial processes	• All process activities to be performed indoors. No processes to drain to exterior or to storm drain system.	• See Appendix 10 for CASQA fact sheet SC-10 for "Non-Stormwater Discharges"
M. Loading Docks	• Spills will be cleaned up immediately and disposed of properly.	• Move loaded and unloaded items indoors as soon as possible. • See Appendix 10 for CASQA fact sheet SC-30 for "Outdoor Loading and Unloading"
O. Miscellaneous Drain or Wash Water or Other Sources	• A drainage sumps on-site shall feature a sediment sump to reduce the quantity of sediment in pumped water.	
P. Plazas, sidewalks, and parking lots	•	Sweep plazas, sidewalks, and parking lots monthly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into the storm drain system. Collect washwater containing any cleaning agent or degreaser and discharge to the sanitary sewer not to a storm drain.

Section H: Construction Plan Checklist

Populate Table H.1 below to assist the plan checker in an expeditious review of your project. The first two columns will contain information that was prepared in previous steps, while the last column will be populated with the corresponding plan sheets. This table is to be completed with the submittal of your final Project-Specific WQMP.

Table H.1 Construction Plan Cross-reference

BMP No. or ID	BMP Identifier and Description	Corresponding Plan Sheet(s)	Latitude	Longitude
A	On-site storm drain inlets	WQMP Site Map	---	---
B	Interior floor drains and elevator shaft sump pumps	N/A	---	---
D2	Landscape / Outdoor Pesticide Use	On-site Landscape Improvement Plans	---	---
G	Refuse Areas	WQMP Site Map	---	---
H	Industrial processes	WQMP Site Map (indoors, if any)	---	---
M	Loading Docks	WQMP Site Map	---	---
O	Drainage Sumps	WQMP Site Map	33.914611	-117.245565
P	Plazas, sidewalks, and parking lots	N/A	---	---
BIORETENTION	Bioretention	WQMP Site Map	33.914139	-117.245726

Note that the updated table — or Construction Plan WQMP Checklist — is **only a reference tool** to facilitate an easy comparison of the construction plans to your Project-Specific WQMP. Co-Permittee staff can advise you regarding the process required to propose changes to the approved Project-Specific WQMP.

Section I: Operation, Maintenance and Funding

The Copermittee will periodically verify that Stormwater BMPs on your site are maintained and continue to operate as designed. To make this possible, your Copermittee will require that you include in Appendix 9 of this Project-Specific WQMP:

1. A means to finance and implement facility maintenance in perpetuity, including replacement cost.
2. Acceptance of responsibility for maintenance from the time the BMPs are constructed until responsibility for operation and maintenance is legally transferred. A warranty covering a period following construction may also be required.
3. An outline of general maintenance requirements for the Stormwater BMPs you have selected.
4. Figures delineating and designating pervious and impervious areas, location, and type of Stormwater BMP, and tables of pervious and impervious areas served by each facility. Geo-locating the BMPs using a coordinate system of latitude and longitude is recommended to help facilitate a future statewide database system.
5. A separate list and location of self-retaining areas or areas addressed by LID Principles that do not require specialized O&M or inspections but will require typical landscape maintenance as noted in Chapter 5, pages 85-86, in the WQMP Guidance. Include a brief description of typical landscape maintenance for these areas.

Your local Co-Permittee will also require that you prepare and submit a detailed Stormwater BMP Operation and Maintenance Plan that sets forth a maintenance schedule for each of the Stormwater BMPs built on your site. An agreement assigning responsibility for maintenance and providing for inspections and certification may also be required.

Details of these requirements and instructions for preparing a Stormwater BMP Operation and Maintenance Plan are in Chapter 5 of the WQMP Guidance Document.

Maintenance Mechanism: City of Moreno Valley:

STORMWATER TREATMENT DEVICE AND CONTROL MEASURE ACCESS AND MAINTENANCE COVENANT

Alere Property Group, LLC
100 Bayview Circle, Suite 310
Newport Beach, CA 92660
Phone: (949) 797-7034
Contact: Daniel Webb, Vice President

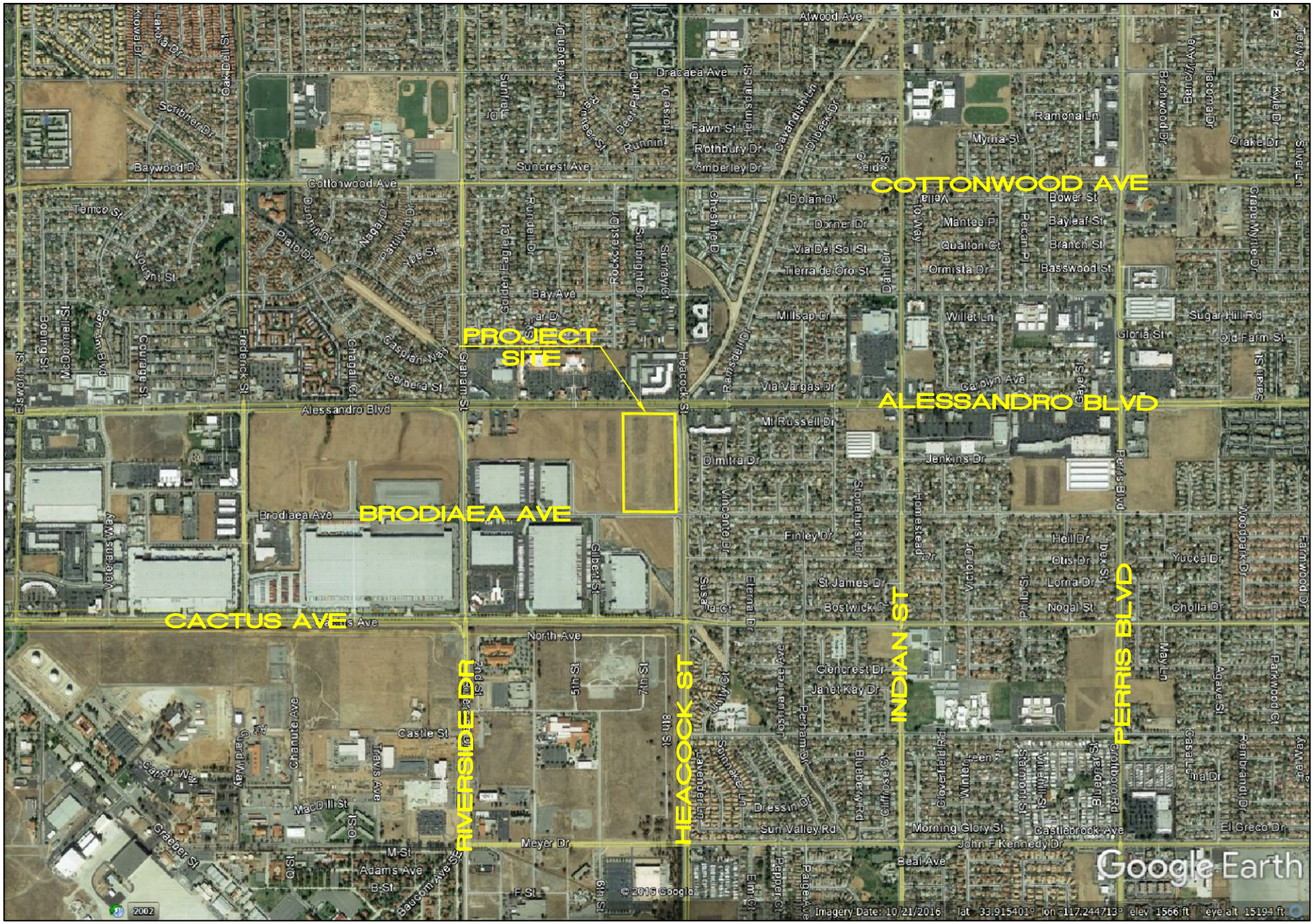
Will the proposed BMPs be maintained by a Home Owners' Association (HOA) or Property Owners Association (POA)?

☐ Y ☒ N

Include your Operation and Maintenance Plan and Maintenance Mechanism in Appendix 9. Additionally, include all pertinent forms of educational materials for those personnel that will be maintaining the proposed BMPs within this Project-Specific WQMP in Appendix 10.

Appendix 1: Maps and Site Plans

Location Map, WQMP Site Plan and Receiving Waters Map



Last Update: 9/19/17
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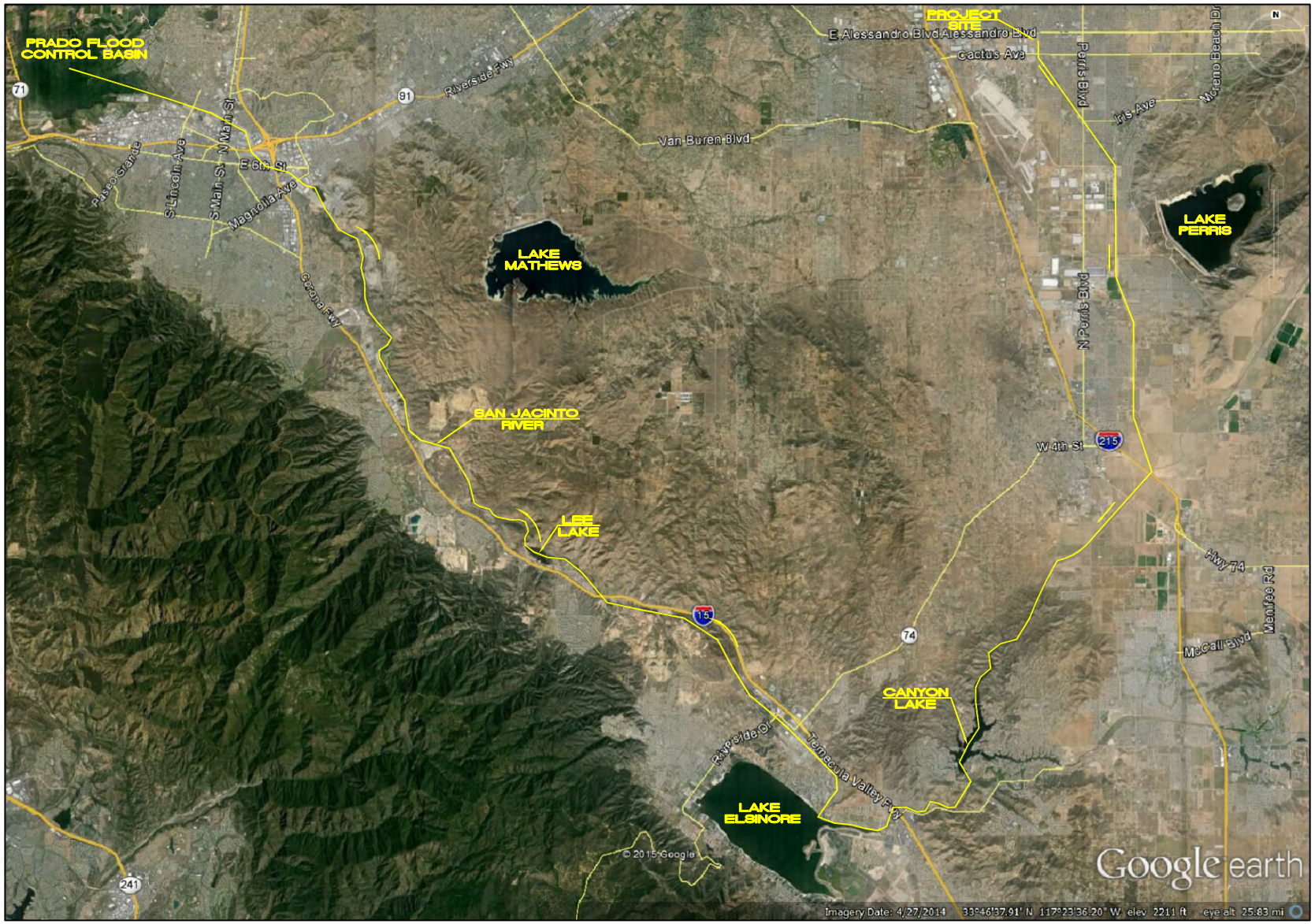
Thienes Engineering, Inc.
CIVIL ENGINEERING • LAND SURVEYING
14349 FIRESTONE BOULEVARD
LA MIRADA, CALIFORNIA 90638
PH.(714)521-4811 FAX(714)521-4173

"VICINITY MAP"

FOR

BRODIAEA BUSINESS PARK



Last Update: 9/19/17
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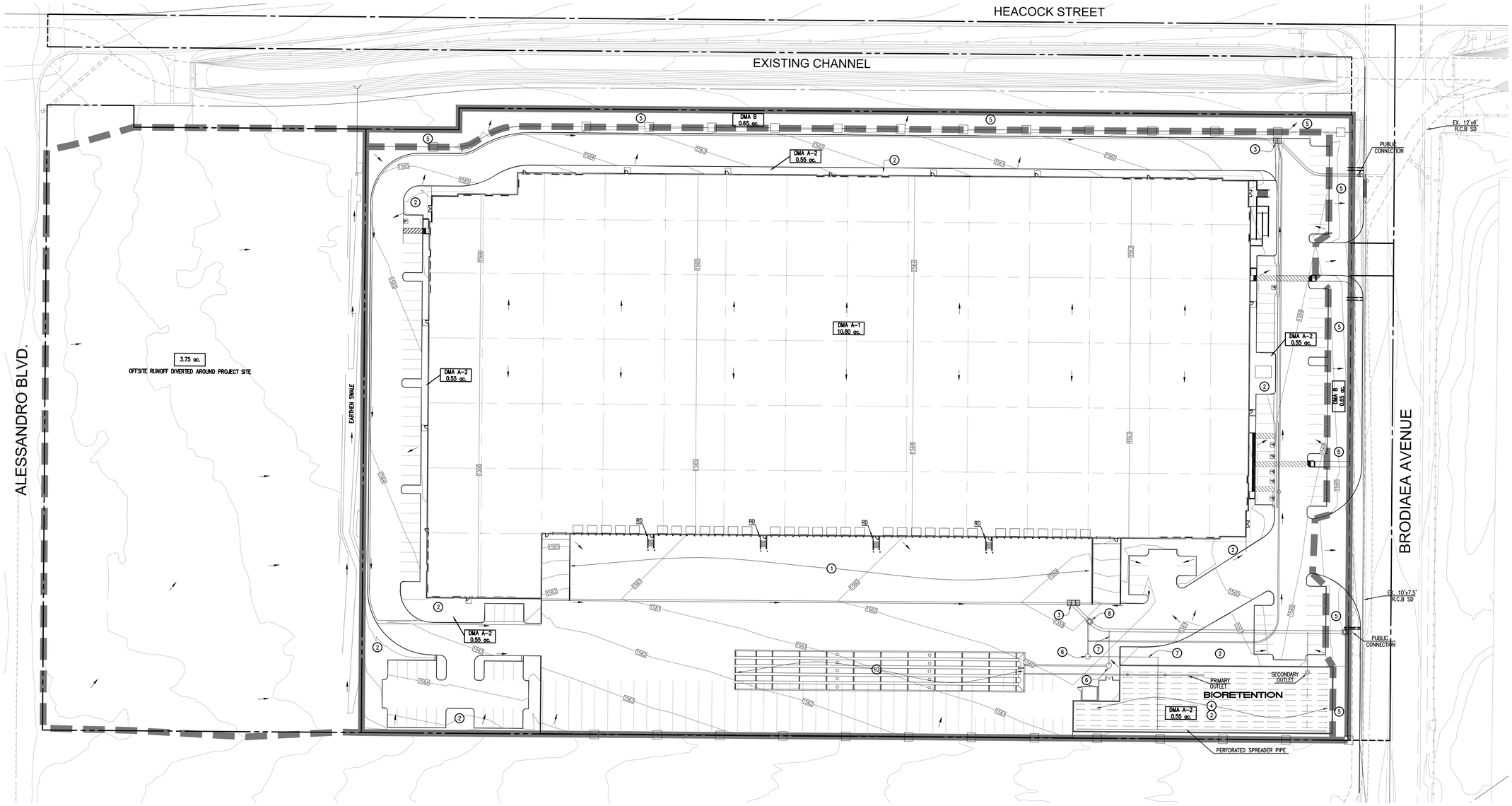
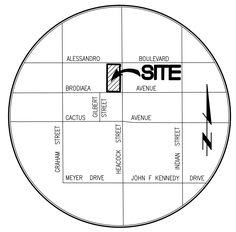
PH.(714)521-4811 FAX(714)521-4173

RECEIVING WATERS
FOR
BRODIAEA BUSINESS PARK





VICINITY MAP
N.T.S.

LEGEND

1. ABOVEGROUND TRUCK DOCK
2. LANDSCAPE/OUTDOOR PESTICIDE USE
3. STORM DRAIN SYSTEM SIGNS "ONLY RAIN DOWN THE STORM DRAIN"
4. BIORETENTION
5. SELF-TREATING AREAS
6. SUMP PUMP
7. DISCHARGE PIPE
8. MANHOLE WITH DIVERSION
9. SD-32: TRASH STORAGE
10. UNDERGROUND DETENTION (HCOC PURPOSES ONLY)

RD ROOF DRAIN
BOUNDARY
SUBAREAS
FLOW LINE

BMP SD-13:

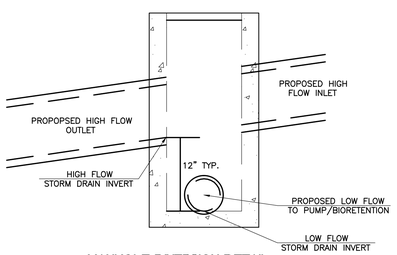
SAMPLE STENCIL TO BE USED NEAR GRATE AND CURB OPENING INLETS

SAMPLE CATCH BASIN STENCIL

DMA ID	PERVIOUS AREA (AC.)	IMPERVIOUS AREA (AC.)	TOTAL AREA (AC.)	BMP ID	MINIMUM AREA REQUIRED (SF)	AREA PROVIDED (SF)	BMP VOLUME REQUIRED (CU-FT)	BMP VOLUME PROVIDED (CU-FT)
DMA A	0.55	10.80	11.35	BIORETENTION	12,708	13,079	22,874	23,542
TOTAL	**0.55**	**10.80**	**11.35**	---	**12,774**	**13,079**	**22,992**	**23,542**

TYPE 'A', SELF-TREATING AREAS

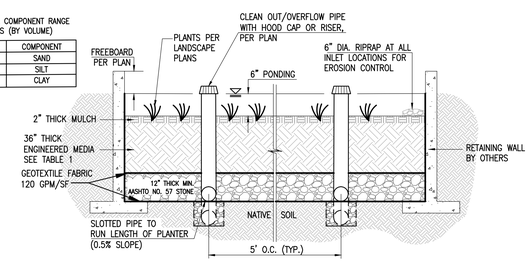
DMA ID	AREA (SF)	STABILIZATION TYPE	IRRIGATION TYPE
DMA B	28,314	ORNAMENTAL LANDSCAPE	TIMED SPRINKLERS



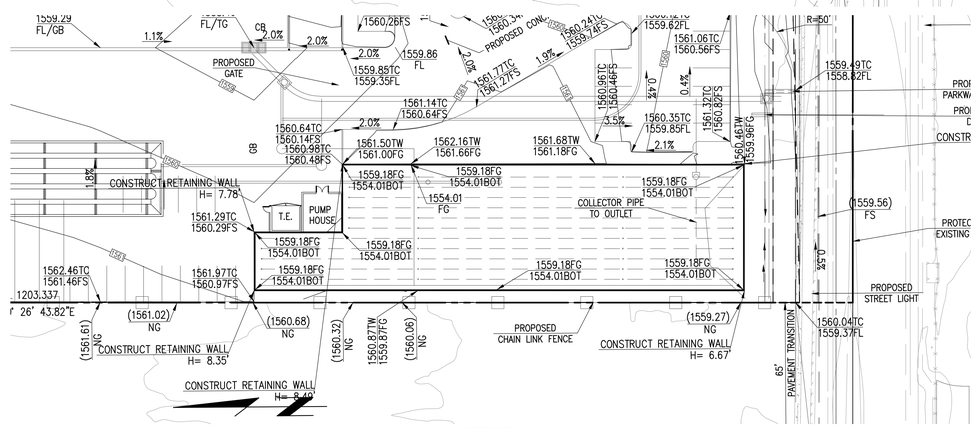
MANHOLE DIVERSION DETAIL
N.T.S.

TABLE 1: MINERAL COMPONENT RANGE REQUIREMENTS (BY VOLUME)

PERCENT RANGE	COMPONENT
70–80	SAND
15–20	SILT
5–10	CLAY



BIORETENTION DETAIL
N.T.S.



BIORETENTION
0 15 30 60 90
SCALE:1"=30'

0 20 40 80 120
SCALE:1"=40'

Last Update: 1/18/18
O:\3500-3599\3566\3566BMPSITEMAP.dwg

PREPARED FOR:
ALERE PROPERTY GROUP, LLC
100 BAYVIEW CIRCLE SUITE 310
NEWPORT BEACH, CA 92660
(949) 509-5000
(949) 509-5001

PREPARED BY:
Thienes Engineering, Inc.
CIVIL ENGINEERING * LAND SURVEYING
14349 FIRESTONE BOULEVARD
LA MIRADA, CALIFORNIA 90638
PH.(714)521-4811 FAX(714)521-4173

CITY OF MORENO VALLEY
PUBLIC WORKS DEPARTMENT

WQMP SITE MAP

BRODIAEA BUSINESS PARK

BRODIAEA AVE AND HEACOCK AVE

Designed by
Date
Checked by
Date
Designed by
Date
Checked by
Date

Approved by Date
Public Works Director R.C.E. XXXXX

Sheet 1 of 1 Sheets

3566/1 OF 1 SHEET

Appendix 2: Construction Plans

Grading and Drainage Plans

MONUMENT & ESTABLISHMENT NOTES:

1. FOUND 1" IRON PIPE TAGGED "LS 3018" IN WELL MONUMENT, DOWN 0.4', PER R1; ACCEPTED AS THE CENTERLINE INTERSECTION OF HEACOCK STREET AND ALESSANDRO BOULEVARD.
2. FOUND 1" IRON PIPE TAGGED "PLS 5137", FLUSH, PER R1; ACCEPTED AS BEING ON THE CENTERLINE INTERSECTION OF HEACOCK STREET AND BRODIAEA AVENUE.
3. FOUND 1" IRON PIPE TAGGED "LS 4457" IN WELL MONUMENT, DOWN 0.3', PER R1; ACCEPTED AS THE SOUTHWEST CORNER OF LOT 7, BLOCK 241 OF R2.
4. FOUND MAG NAIL & WASHER STAMPED "LS 7083", FLUSH, NO REF; ACCEPTED AS THE CENTERLINE INTERSECTION OF ALESSANDRO BOULEVARD AND GRAHAM STREET.
5. FOUND 1" IRON PIPE TAGGED "LS 4457", FLUSH, PER R1; ACCEPTED AS THE CENTERLINE INTERSECTION OF BRODIAEA AVENUE AND GRAHAM STREET.
6. FOUND 1" IRON PIPE WITH RIV. CO. COUNTY TAG IN WELL MONUMENT, DOWN 0.4', PER R1; ACCEPTED AS BEING ON THE CENTERLINE INTERSECTION OF GRAHAM STREET.
7. FOUND 1" IRON PIPE WITH RIV. CO. COUNTY TAG IN WELL MONUMENT, DOWN 0.4', PER R1; ACCEPTED AS BEING ON THE CENTERLINE INTERSECTION OF HEACOCK STREET.
8. FOUND 1" IRON PIPE TAGGED "LS 4457" IN WELL MONUMENT, PER R1; ACCEPTED AS THE CENTERLINE INTERSECTION OF BRODIAEA AVENUE AND GILBERT STREET.
9. S.F.N.; NORTHWEST CORNER OF LOT 1, BLOCK 241 OF R2; ESTABLISHED BY PRORATION BETWEEN 1 AND 4.
10. S.F.N.; SOUTHWEST CORNER OF LOT 8, BLOCK 241 OF R2; ESTABLISHED BY PRORATION BETWEEN 2 AND 3.

MAP & OTHER REFERENCES:

MAP REFERENCES:

R1	PARCEL MAP NO. 32326	P.M.B. 218/34-42
R2	BEAR VALLEY & ALLESANDRO DEVELOPMENT CO.	M.B. 11/10
R3	RECORD OF SURVEY	R.S.B. 73/95-99

LEGAL DESCRIPTION:

THE LAND REFERRED TO HEREON IS SITUATED IN THE CITY OF MORENO VALLEY, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AND IS DESCRIBED AS FOLLOWS:

LOTS 1 AND 8, BLOCK 241, OF BEAR VALLEY AND ALESSANDRO DEVELOPMENT CO., IN THE CITY OF MORENO VALLEY, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AS PER MAP RECORDED IN BOOK 11, PAGE 10 OF MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF RIVERSIDE COUNTY.

EXCEPTING THEREFROM ALL THAT PORTION THEREOF AS GRANTED TO THE COUNTY OF RIVERSIDE, BY DEED RECORDED MAY 2, 1972 AS INSTRUMENT NOS. 56639 AND 56640 OF OFFICIAL RECORDS.

ALSO EXCEPTING THEREFROM THOSE PORTIONS THEREOF AS CONVEYED TO RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT, BY DEED RECORDED JANUARY 3, 1995 AS INSTRUMENT NO. 1006, OFFICIAL RECORDS.

APN: 297-170-036-7 (AFFECTS LOT 1) AND 297-170-038-9 (AFFECTS LOT 8)

TITLE REPORT EXCEPTIONS:

THE FOLLOWING EASEMENTS, STATEMENTS AND MATTERS AS DISCLOSED IN FIRST AMERICAN TITLE INSURANCE COMPANY COMMITMENT FOR TITLE INSURANCE ORDER NUMBER: NCS-833529-ONT1 DATED JANUARY 24, 2017.

NO RESPONSIBILITY FOR COMPLETENESS, ACCURACY OR CONTENT OF SAID COMMITMENT FOR TITLE INSURANCE IS ASSUMED BY THIS MAP.

(NO) INDICATES ITEM NUMBER PER SCHEDULE "B", EXCEPTIONS TO COVERAGE, OF ABOVE COMMITMENT FOR TITLE INSURANCE.

(1-4) TAXES, ASSESSMENTS AND LIEN OF SUPPLEMENTAL OR ESCAPED ASSESSMENTS, IF ANY.

(5) 5. AN EASEMENT OVER SAID LAND FOR PIPELINES, DITCHES, FLUMES, AND RIGHTS INCIDENTAL THERETO, AS SHOWN BY MAP BOOK 11, PAGE 10, RECORDS OF SAN BERNARDINO COUNTY, AS RESERVED,
TO: THE BEAR VALLEY AND ALESSANDRO DEVELOPMENT COMPANY
THE LOCATION OF THE EASEMENT CANNOT BE DETERMINED FROM RECORD INFORMATION. (BLANKET IN NATURE)

(6) 6. AN EASEMENT FOR PIPELINES AND INCIDENTAL PURPOSES, RECORDED JUNE 05, 1948 AS BOOK 911, PAGE 345 OF OFFICIAL RECORDS.
IN FAVOR OF: SOUTHERN CALIFORNIA GAS COMPANY, A CORPORATION, AN UNDIVIDED 3/4 INTEREST AND SOUTHERN COUNTIES GAS COMPANY OF CALIFORNIA, AN UNDIVIDED 1/4 INTEREST
AFFECTS: LOT 8, AS DESCRIBED THEREIN
DOCUMENT(S) DECLARING MODIFICATIONS THEREOF RECORDED MAY 23, 1989 AS INSTRUMENT NO. 169587 OF OFFICIAL RECORDS.
(EASEMENT PLOTTED HEREON)

(7) 7. AN EASEMENT FOR CONDUITS, AND RIGHTS INCIDENTAL THERETO, RECORDED MARCH 04, 1955 AS BOOK 1702, PAGE 559 OF OFFICIAL RECORDS.
IN FAVOR OF: EASTERN MUNICIPAL WATER DISTRICT
AFFECTS: AS DESCRIBED THEREIN
AND AS SET OUT IN MEMO OF AGREEMENT AND IN SUPPLEMENTAL AGREEMENT RECORDED MARCH 4, 1955 IN BOOK 1702, PAGES 467 AND 552, RESPECTIVELY, OFFICIAL RECORDS, AND BY DEED RECORDED NOVEMBER 12, 1969 AS INSTRUMENT NO. 115832, OFFICIAL RECORDS.
THE LOCATION OF THE EASEMENT CANNOT BE DETERMINED FROM RECORD INFORMATION. (EASEMENT IS BLANKET IN NATURE OVER SAID LAND AND OTHER LANDS)

(8) 8. AN EASEMENT FOR SEWAGE TRANSMISSION AND COLLECTION FACILITIES AND INCIDENTAL PURPOSES, RECORDED AUGUST 14, 1989 AS INSTRUMENT NO. 273522 OF OFFICIAL RECORDS.
IN FAVOR OF: EASTERN MUNICIPAL WATER DISTRICT, A MUNICIPAL WATER DISTRICT
AFFECTS: AS DESCRIBED THEREIN
(EASEMENT PLOTTED HEREON)

(9) 9. ANY LIEN, ASSESSMENT, AND /OR VIOLATION OR ENFORCEMENT OF ANY LAW, ORDINANCE, PERMIT OR GOVERNMENTAL REGULATION ARISING FROM THE DOCUMENT ENTITLED NOTICE OF CODE VIOLATION NON COMPLIANCE RECORDED JULY 01, 2009 AS INSTRUMENT NO. 2009-0340294 OF OFFICIAL RECORDS.
(AFFECTS LOT 1)

(10) 10. WATER RIGHTS, CLAIMS OR TITLE TO WATER, WHETHER OR NOT SHOWN BY THE PUBLIC RECORDS.

(11) 11. RIGHTS OF PARTIES IN POSSESSION.

UTILITY PROVIDERS/AGENCIES:

SEWER:
EASTERN MUNICIPAL WATER DISTRICT
2270 TRUMBLE RD., P.O. BOX 8300
PERRIS, CALIFORNIA 92572
ATTN: BRENDA DUMAS
(909) 928-3777

DOMESTIC WATER:
EASTERN MUNICIPAL WATER DISTRICT
2270 TRUMBLE RD., P.O. BOX 8300
PERRIS, CALIFORNIA 92572
ATTN: BRENDA DUMAS
(909) 928-3777

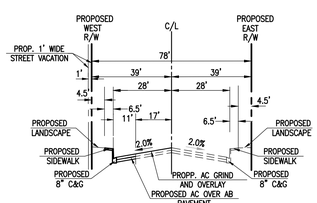
NATURAL GAS SERVICE:
SOUTHERN CALIFORNIA GAS CO.
25200 TRUMBLE ROAD
ROMOLAND, CALIFORNIA 92585
ATTN: VINCE BELLEVILLE
(909) 335-3903

CABLE TELEVISION:
TIME WARNER CABLE
1581 COMMERCE STREET
CORONA, CALIFORNIA 92880
ATTN: DAVID ANDERSON
(951) 549-3977 EXT. 113

SOLID WASTE
WASTE MANAGEMENT
800 S. TEMESCAL ST.
CORONA, CA 92879
(951) 280-5400

TELEPHONE SERVICE:
VERIZON
1980 ORANGE TREE LN, STE. 100
REDLANDS, CALIFORNIA 92374
ATTN: VICKI RODRIGUEZ
(909) 748-6640

ELECTRIC SERVICE:
MORENO VALLEY UTILITY (MVU)
P.O. BOX 88005
MORENO VALLEY, CA 92552-0805
ATTN: DARCY RAMIREZ
(951) 413-3487



TYP. SECTION - BRODIAEA AVE
N.T.S.
INDUSTRIAL COLLECTOR
(STD. NO. MVSI-106A-0)
(T.I.=10)

SURVEYOR'S NOTES:

1. TITLE TO SAID ESTATE OR INTEREST AT THE DATE HEREOF IS VESTED IN: OLINGER RIVERSIDE LIMITED PARTNERSHIP.

2. PROJECT ADDRESS: SWC ALESSANDRO BOULEVARD AND HEACOCK STREET MORENO VALLEY, CALIFORNIA

3. ASSESSOR'S PARCEL NUMBERS: APN: 297-170-036-7 (AFFECTS LOT 1) AND 297-170-038-9 (AFFECTS LOT 8)

4. PARCEL AREAS:
LAND DESCRIBED IN THE TITLE REPORT:

LEGAL DESCRIPTION FEE:	750,374 S.F./17.226 ACRES
EXISTING STREET AREA:	62,503 S.F./1.435 ACRES
PROPOSED BIKE PATH EASEMENT AREA:	20,069 S.F./0.461 ACRES
PROPOSED STREET VACATION AREA ADDITION:	577 S.F./0.013 ACRES
NET AREA = FEE - STREET - EASEMENT + VACATION:	668,379 S.F./15.343 ACRES

5. ZONING INFORMATION:
(THE FOLLOWING ZONE DESIGNATIONS ARE PER CITY OF MORENO VALLEY DEPARTMENT OF ENGINEERING / MAPPING)
GENERAL PLAN DESIGNATION: BP-BUSINESS PARK/LIGHT INDUSTRIAL
ZONE DESIGNATION: BP-INDUSTRIAL/BUSINESS PARK(APN 297-170-036)
BPX-INDUSTRIAL/BUSINESS PARK (MIXED USE DISTRICT: MUN)(APN 297-170-036)
SPECIAL ZONE: CTD 4-MAINTENANCE FUTURE 4 AND ZONE M LANDSCAPED MOJAVIS MARCH AIR RESERVE BASE / INLAND PORT AIRPORT LAND USE COMPATIBILITY PLAN. ZONE E (OTHER AIRPORT ENVIRONS)

NOTE: FOLLOWING ARE SELECTED ZONING AND/OR DEVELOPMENT REQUIREMENTS OF PARTICULAR RELEVANCE TO THE PROPERTY SHOWN HEREON, AND SHOULD NOT BE CONSTRUED AS REPRESENTING THE TOTALITY OF SUCH REQUIREMENTS THAT MAY BE ASSOCIATED WITH SAID PROPERTY. IT IS RECOMMENDED THAT INTERESTED PARTIES CONSULT AN OFFICIAL COPY OF THE COMPLETE MUNICIPAL ZONING CODE, AS WELL AS ANY EXISTING AGREEMENTS OR OTHER SIMILAR DOCUMENTS, FOR A GREATER DEMONSTRATION OF THE REQUIREMENTS ASSOCIATED WITH THE PROPERTY SHOWN HEREON.

6A. SELECTED ZONING REQUIREMENTS (BP-BUSINESS PARK/LIGHT INDUSTRIAL):
(THE FOLLOWING REQUIREMENTS ARE PER CITY OF MORENO VALLEY ZONING CODE)
1) BUILDING SETBACK REQUIREMENTS (SECTION 9.05.040, TABLE 9.05.040-8):
A. FRONT SETBACK: ...(PLOTTED HEREON): 20'
B. INTERIOR SIDE SETBACK: STRUCTURES SHALL BE CONSTRUCTED ON THE PROPERTY LINE OR A MINIMUM OF THREE FEET FROM THE PROPERTY LINE.
C. STREET SIDE SETBACK: 20'
D. REAR SETBACK: STRUCTURES SHALL BE CONSTRUCTED ON THE PROPERTY LINE OR A MINIMUM OF THREE FEET FROM THE PROPERTY LINE.
E. IN THE LI DISTRICT, INDUSTRIAL AND WAREHOUSE, STRUCTURES GREATER THAN FIFTY THOUSAND (50,000) SQUARE FEET IN BUILDING AREA SHALL BE SEPARATED FROM ANY RESIDENTIAL DISTRICT AS DETERMINED BY AN AIR QUALITY AND NOISE IMPACT ANALYSIS. THE MINIMUM SEPARATION DISTANCE FOR SUCH USES SHALL BE TWO HUNDRED FIFTY (250) FEET BETWEEN THE RESIDENTIAL DISTRICT AND THE TRUCK COURT OR LOADING AREA.
2) HEIGHT RESTRICTIONS (SECTION 9.05.040, TABLE 9.05.040-8):
A. STRUCTURE HEIGHT SHALL NOT EXCEED THE PROVISIONS ESTABLISHED BY THE MARCH AIR RESERVE BASE AIR INSTALLATION COMPATIBLE USE STUDY AND FEDERAL AVIATION ADMINISTRATION (FAA) PART 77 STANDARDS (CONICAL SURFACES REQUIREMENT-SEE MARCH INLAND PORT AIRPORT LAYOUT PLAN-APPROXIMATELY SHOWN ON MORENO VALLEY INDUSTRIAL PLAN MAP II-2.
3) LOT AREA, WIDTH AND DEPTH (SECTION 9.05.040, TABLE 9.05.040-8):
A. THE MINIMUM LOT AREA SHALL BE 1 ACRE.
B. THE MINIMUM LOT WIDTH: 200 FEET
C. THE MINIMUM LOT DEPTH: 200 FEET
4) PARKING SPACE REQUIREMENTS (SECTION 9.11.040, Table 9.11.040C-12):
A. MANUFACTURING 1/500 SQ. FT. OF GROSS FLOOR AREA
B. RESEARCH AND DEVELOPMENT 1/350 SQ. FT. OF GROSS FLOOR AREA.
C. WAREHOUSE AND DISTRIBUTION 1/1,000 SQ. FT. OF GROSS FLOOR AREA FOR THE FIRST 20,000 SQ. FT.; 1/EA 2,000 SQ. FT. OF GROSS FLOOR AREA FOR THE SECOND 20,000 SQ. FT.; 1/EA 4,000 SQ. FT. OF GROSS FLOOR AREA FOR AREAS IN EXCESS OF THE INITIAL 40,000 SQ. FT.
NOTE: TRAILER PARKING: PARKING STALLS FOR TRAILERS SHALL BE PROVIDED AT A RATIO OF 1 STALL PER TRUCK LOADING DOCK DOOR. THIS IS IN ADDITION TO THE LOADING PARKING STALL ALREADY PROVIDED AT THE DOCK DOOR.
5) ACCESSIBLE PARKING SPACE REQUIREMENTS (SECTION 9.11.040):

NO. OF AUTOMOBILE SPACES PROVIDED	NO. OF ACCESSIBLE SPACES PROVIDED
1-25	1
26-50	2
51-75	3
76-100	4
101-150	5
151-200	6
201-300	7
301-400	8
401-500	9
501-1,000	2% OF TOTAL SPACES
1,001 AND OVER	20 PLUS 1 FOR EACH 100 SPACES OR FRACTION THEREOF OVER 1,001.

6) MARCH AIR RESERVE BASE / INLAND PORT AIRPORT LAND USE COMPATIBILITY PLAN DATED: NOVEMBER 13, 2014:
A. THE OUTER LIMITS OF ZONE E AND THE AREAS WITHIN THE HIGH TERRAIN ZONE DEFINE THE AIRPORT INFLUENCE AREA FOR MARCH ARB/IPA. ON THE EAST SIDE OF THE AIRFIELD, ZONE E IS ESTABLISHED AT 14,000 FEET FROM THE RUNWAY CENTERLINE. THIS DISTANCE IS EQUIVALENT TO THE OUTER LIMITS OF THE CIVILIAN AIRPORT COASTAL SURFACE, AS ESTABLISHED BY FAR PART 77. THE COMPATIBILITY ZONES ON THE WEST SIDE OF THE AIRPORT ARE MORE EXTENSIVE BECAUSE THOSE AREAS ARE ROUTINELY OVERFLOWN BY BOTH MILITARY AND CIVILIAN AIRCRAFT.
B. NOISE AND OVERFLIGHT FACTORS:
NOISE IMPACT: LOW
BEYOND 55-CNEL CONTOUR
OCCASIONAL OVERFLIGHTS INTRUSIVE TO SOME OUTDOOR ACTIVITIES.
C. SAFETY AND AIRSPACE PROTECTION FACTORS
RISK LEVEL: LOW
WITHIN OUTER OR OCCASIONALLY USED PORTIONS OF FLIGHT CORRIDORS
D. PROHIBITED USES
HAZARDS TO FLIGHT

6B. SELECTED ZONING REQUIREMENTS (BPX-BUSINESS PARK/LIGHT INDUSTRIAL) (MIXED USE DISTRICT: MUN):
(THE FOLLOWING REQUIREMENTS ARE PER CITY OF MORENO VALLEY ZONING CODE)
1) BUILD-TO-ZONE: THE AREA BETWEEN THE MINIMUM AND MAXIMUM SETBACKS WITHIN WHICH THE PRINCIPAL BUILDING'S FRONT FACADE (BUILDING FACADE LINE) IS TO BE LOCATED. SEE "BUILD-TO-ZONE" IN § 9.15.030 (DEFINITIONS). SEE FIGURE 9.07.095S (SECTION 9.07.095, TABLE 9.07.095-10):
A. ALONG ALESSANDRO BLVD.: (PLOTTED HEREON): 0 FT (MIN); 10 FT (MAX)
2) BUILDING SETBACK REQUIREMENTS (SECTION 9.07.095, TABLE 9.07.095-10):
A. ALONG ALESSANDRO BLVD.: (PLOTTED HEREON): 0 FT (MIN); 10 FT (MAX)
B. STREET SIDE SETBACK: 0 FT (MIN); 10 FT (MAX)
C. INTERIOR SIDE SETBACK: 5 FT (MIN); NO MAX
D. REAR SETBACK: 10 FT (MIN); NO MAX
3) HEIGHT RESTRICTIONS (SECTION 9.07.095, TABLE 9.07.095-10):
A. NUMBER OF STORIES: 3 MAX
B. MAXIMUM HEIGHT: 45 FEET
4) PARKING SETBACK REQUIREMENTS (SECTION 9.07.095, TABLE 9.07.095-10):
A. 20 FT MIN SETBACK FROM FRONT LOT LINE; 15 FT MIN SETBACK FROM SIDE LOT LINE
5) OPEN SPACE STANDARDS (SECTION 9.07.095, TABLE 9.07.095-10):
A. PUBLICLY ACCESSIBLE OPEN SPACE) (NONRESIDENTIAL): 10% OF NET LOT AREA

7. THE PROPERTY INDICATED HEREON IS SITUATED WITHIN THE FLOOD INSURANCE RATE MAP (F.I.R.M.) WITH MAP NO. 06065C0761G, EFFECTIVE DATE: AUGUST 28, 2008, COMMUNITY NUMBER: 065074 FOR CITY OF MORENO VALLEY, PANEL NUMBER: 0761, SUFFIX: "G"; ZONE "X-UNSHADED" (AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN).

8. SUBJECT SITE DESCRIBED IN THE TITLE REPORT IS CURRENTLY UNDEVELOPED WITH ZERO BUILDINGS AND NO PARKING SPACES.

9. GEOLOGICAL HAZARDS:
A. ALQUIST-PRIOLO SPECIAL STUDIES ZONES:
SUBJECT PROPERTY IS OUTSIDE OF ALQUIST PRIOLO SPECIAL STUDIES ZONES AS SHOWN ON SPECIAL STUDIES ZONES OFFICIAL MAP FOR SUNNYMEAD QUADRANGLE, EFFECTIVE: JULY 01, 1974.
B. SEISMIC HAZARD ZONES:
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11. SUBSURFACE AND ENVIRONMENTAL CONDITIONS WERE NOT EXAMINED OR CONSIDERED AS PART OF THIS SURVEY.

12. THIS SURVEY DOES NOT INCLUDE LOCATIONS OF OR ENCROACHMENTS BY SUB-SURFACE FOOTINGS AND/OR FOUNDATIONS OF BUILDINGS, WALLS OR OTHER IMPROVEMENTS SHOWN ON THIS MAP.

13. SUBSTRUCTURE UTILITIES ARE SHOWN HEREON BASED SOLELY ON INFORMATION DISCLOSED TO UNDERSIGNED BY LOCAL, STATE AND FEDERAL GOVERNMENTAL AGENCIES AND/OR INFORMATION DISCLOSED TO UNDERSIGNED BY PRIVATE UTILITY COMPANIES. ALTHOUGH SAID SUBSTRUCTURE UTILITIES SHOWN HEREON ARE BELIEVED TO BE REASONABLY ACCURATE, PHYSICAL FIELD VERIFICATION OF THE CHARACTER AND LOCATIONS OF SAID SUBSTRUCTURE UTILITIES IS REQUIRED. THIENES ENGINEERING, INC. MAKES NO GUARANTEE, WARRANTY OR OTHER REPRESENTATION, EITHER EXPRESSLY OR IMPLIED, AS TO THE ACCURACY AND/OR THOROUGHNESS OF SUCH INFORMATION. THEREFORE, ALL GENERALIZED STATEMENTS SHOWN HEREON, INCLUDING BUT NOT LIMITED TO, "ALL UTILITIES," "ALL KNOWN UTILITIES," "ALL UTILITIES KNOWN TO THE UNDERSIGNED," AND THE LIKE, AS WELL AS REFERENCES TO LISTS OF UTILITIES ARE TO BE CONSTRUED AS BEING STRICTLY REFERENCES TO ONLY THOSE UTILITIES DISCLOSED TO THE UNDERSIGNED BY SAID LOCAL, STATE AND FEDERAL GOVERNMENTAL AGENCIES AND/OR INFORMATION DISCLOSED BY SAID PRIVATE UTILITY COMPANIES, AND EXCLUDES ALL UTILITIES AND UTILITY-RELATED INFORMATION, IF ANY, WHICH HAS NOT BEEN DISCLOSED TO THE UNDERSIGNED.

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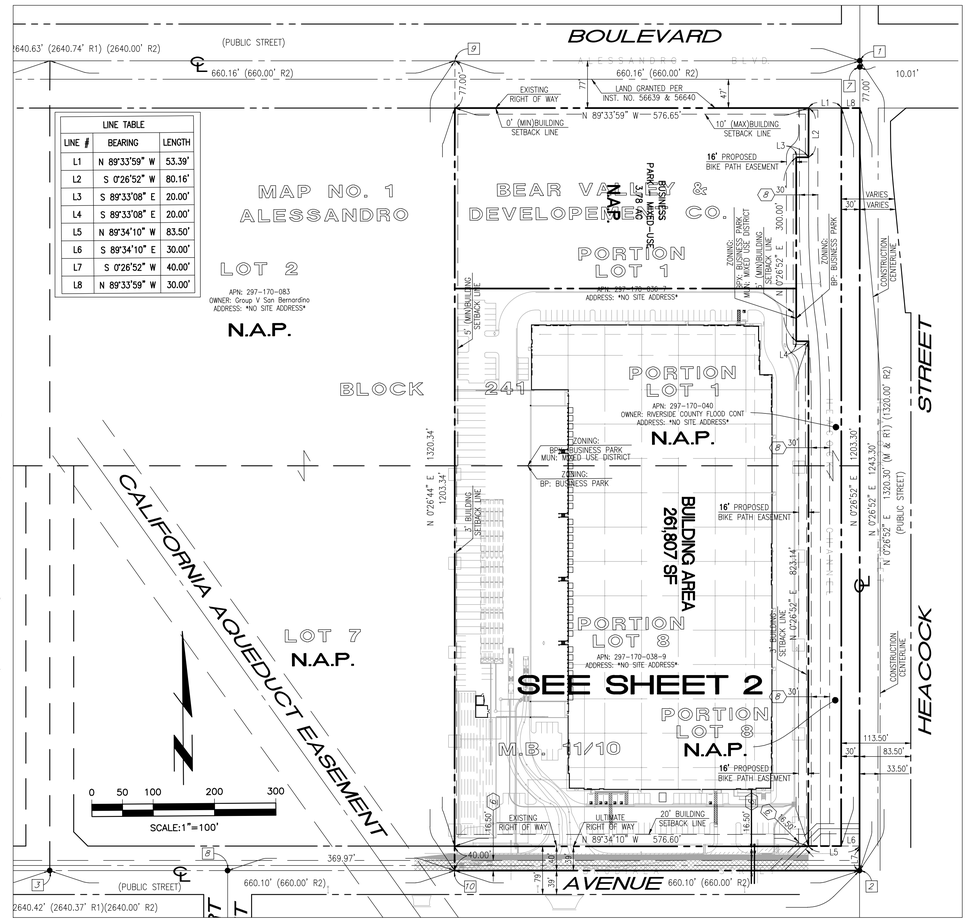
15. PHOTOGRAMMETRIC MAPPING PROCEDURES MAY HAVE BEEN UTILIZED AS THE BASIS FOR THE LOCATION OF CERTAIN FEATURES SHOWN HEREON (EXCLUDING BOUNDARIES) WHERE GROUND MEASUREMENTS ARE NOT OTHERWISE NECESSARY TO LOCATE THOSE FEATURES TO AN APPROPRIATE AND ACCEPTABLE ACCURACY RELATIVE TO A NEARBY BOUNDARY. THE MAP ACCURACY STANDARD SUPPLIED BY THE PHOTOGRAMMETRIST INDICATES THAT NINETY (90) PERCENT OF ALL PLANIMETRIC FEATURES WHICH ARE WELL-DEFINED ON THE PHOTOGRAPHS ARE PLOTTED SO THAT THEIR POSITION ON THE FINISHED MAPS SHALL BE ACCURATE TO WITHIN 0.5 FEET OF THEIR TRUE COORDINATE POSITION, WHICH COULD BE DETERMINED BY TEST SURVEYS. NONE OF THE FEATURES TESTED SHOULD BE MISPLACED BY MORE THAN 1.0 FEET IN SUCH A TEST SURVEY. IF CONTOURS ARE SHOWN HEREON AND IF SAID CONTOURS WERE PLOTTED BY PHOTOGRAMMETRIC MAPPING PROCEDURES, THEN NINETY (90) PERCENT OF THE ELEVATIONS DETERMINED FROM THE SOLID-LINE CONTOURS SHALL HAVE ACCURACY WITH RESPECT TO TRUE ELEVATION OF ONE-HALF (1/2) CONTOUR INTERVAL OR BETTER. THE REMAINING TEN (10) PERCENT OF SUCH ELEVATIONS SHALL BE NOT IN ERROR BY MORE THAN ONE CONTOUR INTERVAL. IN DENSELY WOODED AREAS WHERE HEAVY BRUSH OR TREE COVER OBSCURES THE GROUND, THE CONTOURS ARE SHOWN AS DASHED LINES AND THEY ARE PLOTTED AS ACCURATELY AS POSSIBLE UNDER THOSE CONDITIONS. NINETY (90) PERCENT OF ALL SPOT ELEVATIONS PLOTTED BY PHOTOGRAMMETRIC MAPPING PROCEDURES SHALL HAVE AN ACCURACY OF AT LEAST ONE-FORTH (1/4) THE CONTOUR INTERVAL. THE REMAINING TEN (10) PERCENT SHALL BE NOT IN ERROR BY MORE THAN ONE-HALF (1/2) THE CONTOUR INTERVAL.

16. THERE IS NO OBSERVABLE EVIDENCE OF CHANGES IN STREET RIGHT-OF-WAY LINES, RECENT STREET OR SIDEWALK CONSTRUCTION OR REPAIRS OVER AND ABOVE SITE IMPROVEMENTS DELINEATED HEREON.

LEGENDS

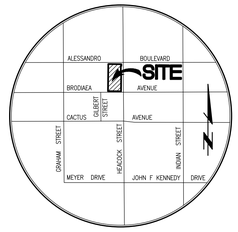
- SCREEN WALL
- FLOW LINE
- GRADE BRAKE
- CENTER LINE
- SLOPE
- 35 — PROPOSED CONTOUR
- CATV — EXIST. CABLE TV CONDUIT
- EXIST. EDGE OF AC PAVEMENT
- EXIST. CURB AND GUTTER
- 8" S — EXIST. SANITARY SEWER
- 24" SD — EXIST. STORM DRAIN
- 3" G — EXIST. GAS LINE
- T — EXIST. TELEPHONE CONDUIT
- 10" W — EXIST. WATER LINE
- 1800 — EXIST. CONTOUR
- NEW PIPE LINE
- EXISTING PROPERTY LINE
- PROPOSED PROPERTY LINE
- ST. OVERLAY EXISTING AC PAVEMENT.
- ST. NEW AC PAVEMENT



LINE TABLE		
LINE #	BEARING	LENGTH
L1	N 89°33'59" W	53.39'
L2	S 0°26'52" W	80.16'
L3	S 89°33'08" E	20.00'
L4	S 89°33'08" E	20.00'
L5	N 89°34'10" W	83.50'
L6	S 89°34'10" E	30.00'
L7	S 0°26'52" W	40.00'
L8	N 89°33'59" W	30.00'

INDEX SHEET:
SHEET 1 - TITLE SHEET
SHEET 2 - CONCEPTUAL GRADING PLAN
SHEET 3 - CONCEPTUAL UTILITY PLAN
SHEET 4 - CONCEPTUAL STORM DRAIN PLAN

INDEX MAP



VICINITY MAP
N.T.S.

12/4/2017

EARTHWORK BALANCE CALCULATIONS
PROJECT: BRODIAEA BUSINESS PARK
JOB# 3566

K.	SITE AREA:	543,315 SF
L.	SUBSIDENCE FACTOR:	0.1375
M.	SHRINKAGE FACTOR:	11.000 %
N.	SITE STRIPPING FACTOR:	0.06
O.	OVEREXCAVATION:	35,034 CY
A.	CALCULATED CUT:	19,275 CY
B.	FOOTING AND UTILITY SPOILS	**6,800** CY
B1.	OFFSITE SPOILS (STREET SPOILS)	**500**
C.	**TOTAL CUT: (A+B)**	**26,575** CY
D.	CALCULATED FILL:	15,873 CY
E.	LIGHT PAVING FILL:	- CY
F.	SUBSIDENCE: (L*K)/27=	2,767 CY
G.	SHRINKAGE: (M/100)C=	2,923 CY
H.	SITE STRIPPING	1,207
I.	OVEREXCAVATION SHRINKAGE	3,854 CY
J.	**TOTAL FILL: (D+E+F+G+H)=**	**26,624** CY
K.	**TOTAL (IMPORT) OR EXPORT:**	**(49)** CY
	SITE ADJUSTMENT	(0.00)

PEN17-0143
Last Update: 11/11/17
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CITY OF MORENO VALLEY
PUBLIC WORKS DEPARTMENT

CONCEPTUAL GRADING PLAN
BRODIAEA BUSINESS PARK
BRODIAEA AVE. AND HEACOCK AVE

PREPARED FOR:
ALERE PROPERTY GROUP LLC
100 BAYVIEW CIRCLE SUITE 310
NEWPORT BEACH, CA 92660
PHONE: (949) 509-5000
FAX: (949) 509-5001

Thienes Engineering, Inc.
CIVIL ENGINEERING • LAND SURVEYING
14349 FIRESTONE BOULEVARD
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PH.(714)521-4811 FAX(714)521-4173

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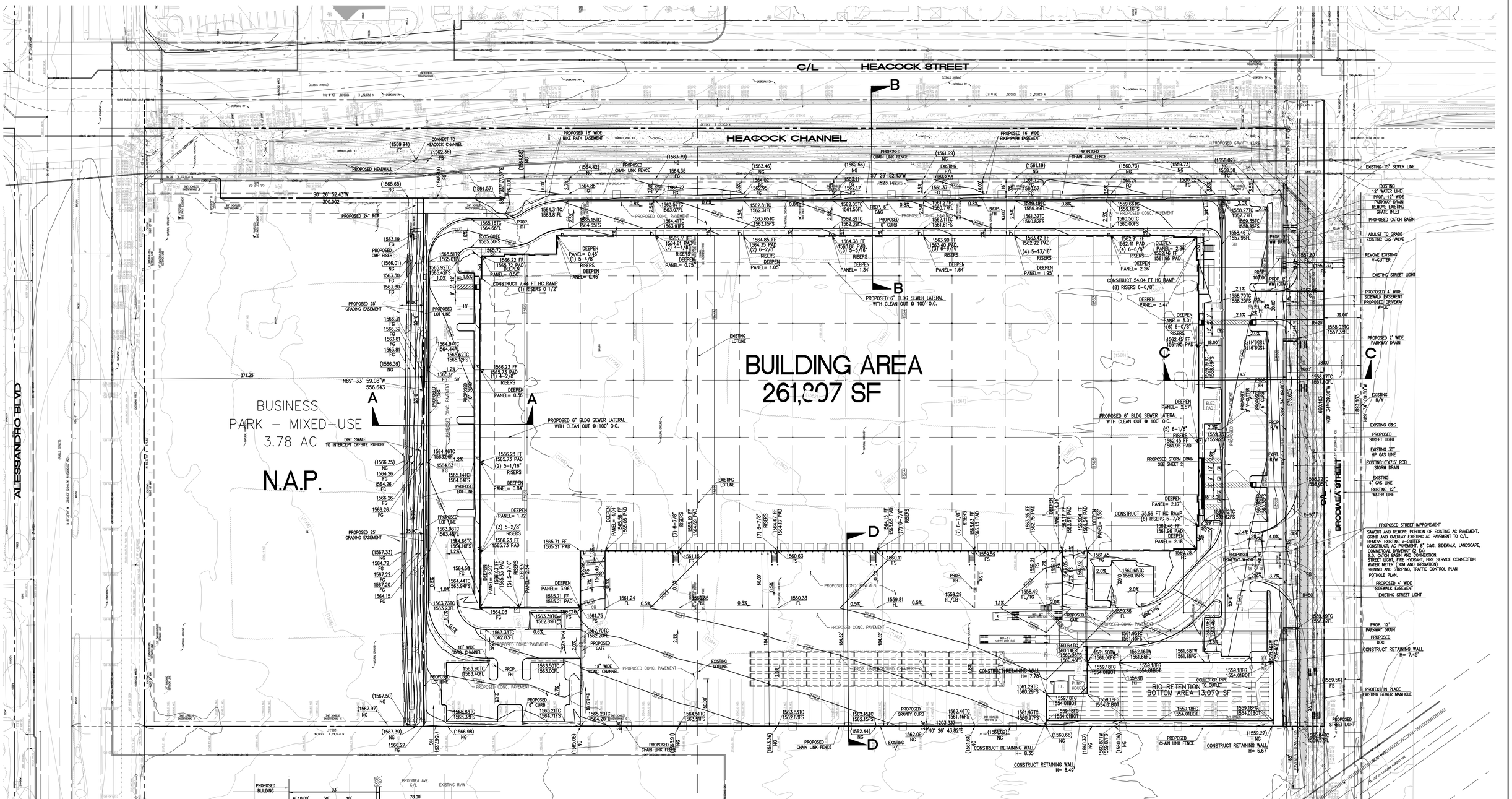
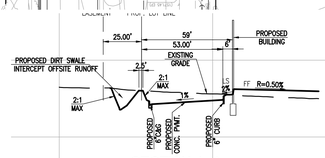
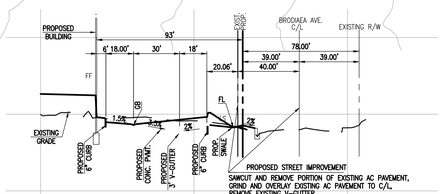
Sheet 1 of 4 Sheets

3566/1 OF 4 SHEET

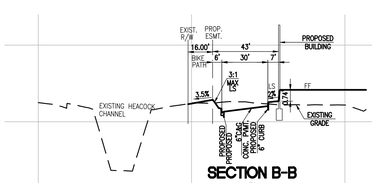




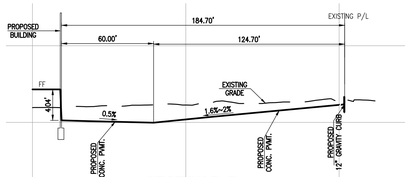
SECTION A-A
NTS



SECTION C-C
NTS



SECTION B-B
NTS



SECTION D-D
NTS

TABLE 1: MINERAL COMPONENT RANGE REQUIREMENTS (BY VOLUME)

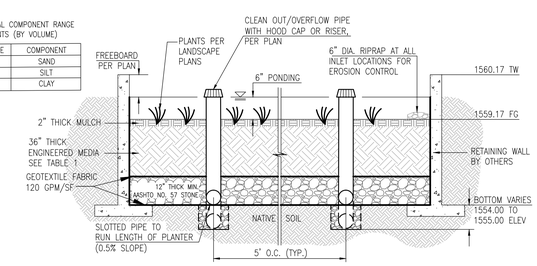
PERCENT RANGE	COMPONENT
70–80	SAND
15–20	SILT
5–10	CLAY

EARTHWORK BALANCE CALCULATIONS

12/4/2017

PROJECT: BRODIAEA BUSINESS PARK
JOB#: 3566

K.	SITE AREA:	543,315	SF
L.	SUBSIDENCE FACTOR:	0.1375	
M.	SHRINKAGE FACTOR:	11.000	%
N.	SITE STRIPPING FACTOR:	0.06	
O.	OVEREXCAVATION:	35,034	CY
A.	CALCULATED CUT:	19,275	CY
B.	FOOTING AND UTILITY SPOILS	6,800	CY
B1.	OFFSITE SPOILS (STREET SPOILS)	500	
C.	**TOTAL CUT: (A+B)**	**26,575**	CY
D.	CALCULATED FILL:	15,873	CY
E.	LIGHT PAVING FILL:	-	CY
F.	SUBSIDENCE: (L+K)/27=	2,767	CY
G.	SHRINKAGE: (M/100)C=	2,923	CY
H.	SITE STRIPPING	1,207	
I.	OVEREXCAVATION SHRINKAGE	3,854	CY
J.	**TOTAL FILL: (D+E+F+G+H)=**	**26,624**	CY
K.	**TOTAL (IMPORT) OR EXPORT:**	**(49)**	CY
	SITE ADJUSTMENT	(0.00)	



TYPICAL BIORETENTION DETAIL

LEGENDS

ST. OVERLAY EXISTING AC PAVEMENT

ST. NEW AC PAVEMENT

0 20 40 80 120

SCALE:1"=40'

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Last Update: 12/2/17
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CITY OF MORENO VALLEY
PUBLIC WORKS DEPARTMENT

CONCEPTUAL GRADING PLAN
BRODIAEA BUSINESS PARK
BRODIAEA AVE. AND HEACOCK AVE

PREPARED FOR:

ALERE PROPERTY GROUP LLC
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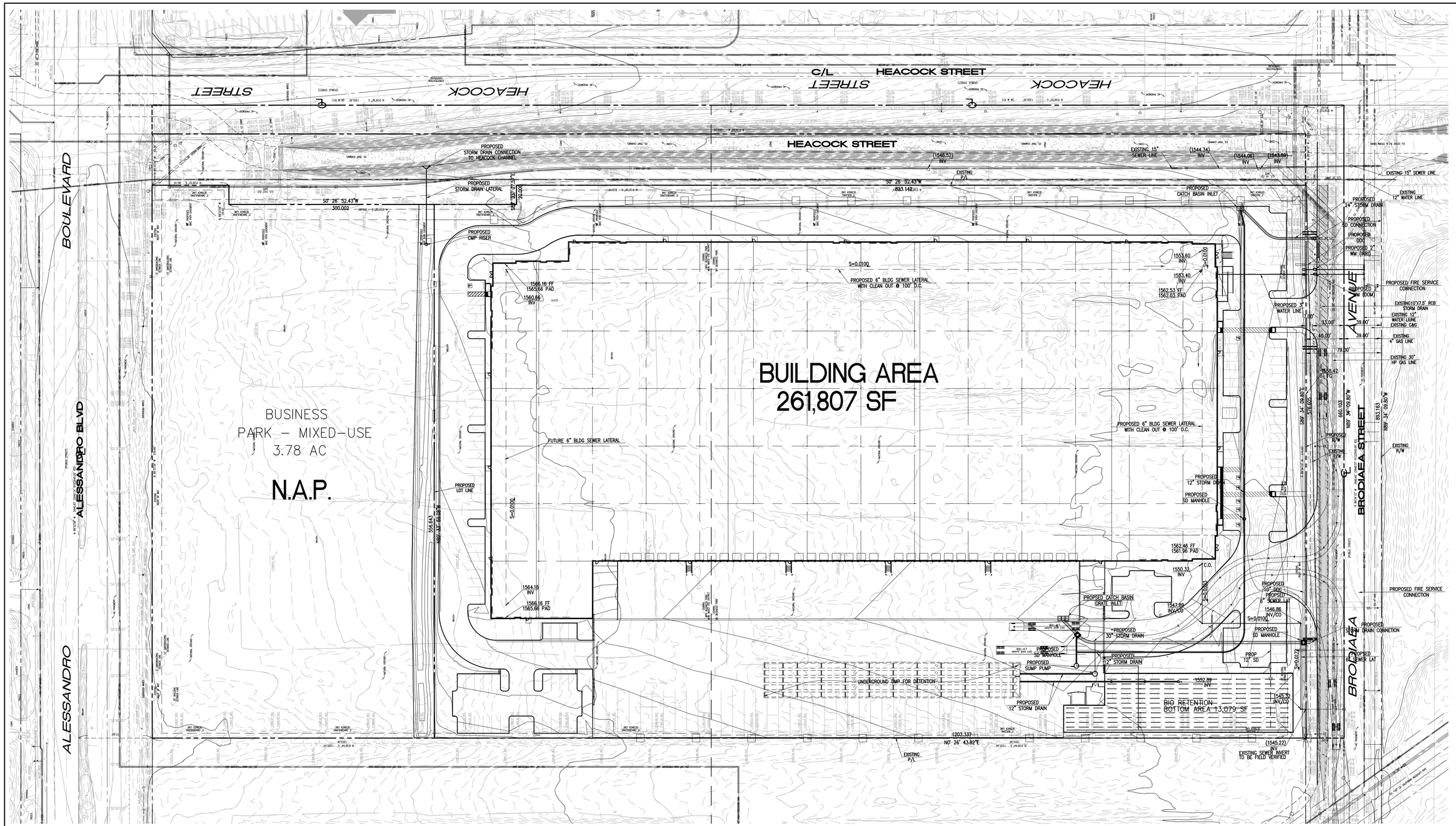

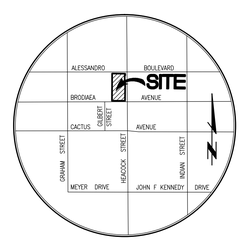

VICINITY MAP
N.T.S.

0 20 40 80 120
SCALE:1"=40'

PEN17-0143

Last Update:6/26/17
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CITY OF MORENO VALLEY
PUBLIC WORKS DEPARTMENT

CONCEPTUAL UTILITY PLAN
BODIAEA BUSINESS PARK
BRODIAEA AVE. AND HEACOCK AVE

PREPARED FOR:

ALERE PROPERTY GROUP LLC
100 BAYVIEW CIRCLE SUITE 310
NEWPORT BEACH, CA 92660
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Sheet 3 of 4 Sheets

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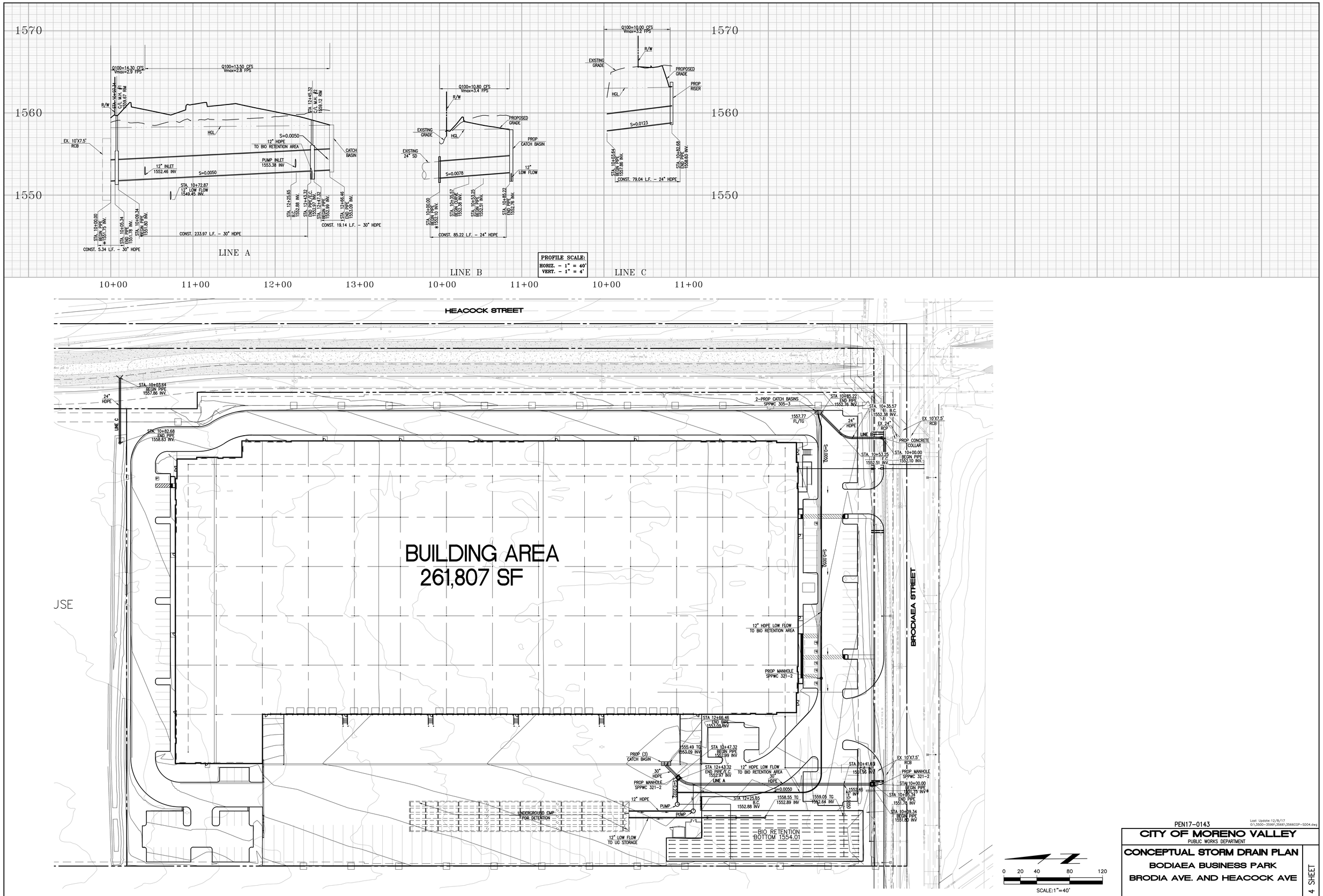

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Last Update:12/8/17
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CITY OF MORENO VALLEY
PUBLIC WORKS DEPARTMENT

CONCEPTUAL STORM DRAIN PLAN
BODIAEA BUSINESS PARK
BRODIA AVE. AND HEACOCK AVE

PREPARED FOR:

ALERE PROPERTY GROUP LLC
100 BAYVIEW CIRCLE SUITE 310
NEWPORT BEACH, CA 92660
PHONE: (949) 509-5000
FAX: (949) 509-5001

Thienes Engineering, Inc.
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Date

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3566/4 OF 4 SHEET

Appendix 3: Soils Information

Geotechnical Study and Other Infiltration Testing Data

NorCal Engineering

Soils and Geotechnical Consultants
10641 Humbolt Street Los Alamitos, CA 90720
(562) 799-9469 Fax (562) 799-9459

August 18, 2017 Project Number 19803-17

Alere Property Group, LLC
100 Bayview Circle, Suite 310
Newport Beach, California 92660

Attn: Clark Neuhoff

RE: **Soil Infiltration Study** - Proposed Warehouse Building Development - Located at the Northwest Corner of Heacock Street and Brodiaea Street, in the City of Moreno Valley, California

Dear Mr. Neuhoff:
Pursuant to your request, this firm has performed a Soil Infiltration Study for the above referenced project. The purpose of this study is to evaluate the feasibility of on-site drainage disposal systems on the subject site. The scope of current work included the following: 1) site reconnaissance; 2) subsurface geotechnical exploration; 3) double ring infiltration testing at two locations; 4) engineering analysis of field test data; and 5) preparation of this report.

Proposed Development

It is currently proposed to a new concrete tilt-up structure totaling 262,000 square feet on the property. Asphaltic and concrete pavement areas and landscaping will also be installed. It is also proposed to install detention/infiltration basin in the southwest corner of the property to capture and infiltrate storm water runoff. Depth of system will be on the order of 4 to 6 feet below existing grades, per Thienes Engineering.

Site Description

The rectangular shaped property is located at the northwest intersection of Heacock Street and Brodiaea Street, in the City of Moreno Valley, as shown on the Vicinity Map, Figure 1. Alessandro Boulevard borders approximately 300 feet north of the site. The Heacock Channel, a concrete-lined storm drain channel, is located along the east property line between the property and the roadway. Vacant land is located to the west.

The property is currently vacant and is covered with a low growth of vegetation.

The site topography is generally flat and drainage pattern is not readily discernible.

Field Exploration

The excavations were completed on August 5, 2017 and testing was completed on that day. The testing consisted of using the double ring infiltrometer at two locations to determine the infiltration rate of the proposed retention/infiltration system. The locations of the tests are shown on the attached Figure 2. The test locations were excavated by backhoe to depths of 4 and 6 feet below existing ground surface (bgs). Excavations were trimmed at 1:1 (horizontal to vertical) inclinations in order to provide safe entry into the excavations. No significant caving occurred to the depths of these test excavations. Detailed descriptions of the subsurface soils are given in the attached test excavations logs in Appendix B. The excavations were backfilled at the conclusion of testing with the soil cuttings and tamped, but were *not* compacted to 90% relative compaction.

In general, the test areas were found to be underlain by surficial fill soils overlying native soils. The soils at test locations consisted of clayey SANDS. These soils were noted to be medium dense to dense and damp.

Groundwater

Groundwater was *not* encountered in our either of our test excavations which extended to a maximum depth of 6 feet. An additional boring was advanced to a depth of 51.5 feet pursuant to the completion of our report titled *Geotechnical Investigation…*, dated August 17, 2017 for the planned development. Groundwater was encountered at a depth of 28 feet in this boring. A copy of the boring log is included in Appendix A for reference and the location of the boring shown on Figure 2.

Infiltration Test Procedure

The infiltration test consisted of the double ring infiltration test per ASTM Method D 3385. The double ring infiltrometer method consists of driving two open cylinders, one inside the other, into the ground, partially filling the ring with water, and then maintaining the liquid at a constant level. The volume of liquid added to the inner ring, to maintain the liquid level constant is the measure of the volume of liquid that infiltrates into the soil.

The volume infiltrated during timed intervals is converted to an incremental infiltration velocity, usually expressed in centimeters per hour or inches per hour and plotted verses elapsed time. The maximum-steady state or average incremental infiltration velocity, depending on the purpose/application of the test is equivalent to the infiltration rate.

Water levels were maintained at a constant level in both the inner ring and annular space between rings throughout the test, to prevent flow of water from one ring to the other.

The volume of liquid used during each measured time interval was converted into an incremental infiltration velocity of both the inner ring in the annular space using the following equations:

For the inner ring calculated as follows:

$$Vir = \Delta Vir / (Air \Delta t)$$

where:

Vir = inner ring incremental infiltration velocity, cm/hr

ΔVir = volume of water used during time interval to maintain constant head in the inner ring, cm^3

Air = internal area of the inner ting, cm^2

Δt = time interval, hr

The last reading obtained was used for design purposes in each of the basin. The testing data sheets are attached in Appendix B and summarized in the *Discussion of Results* section below.

Discussion of Results

The use of on-site disposal system by means of retention/infiltration basins appears to be geotechnically feasible for future development. The field infiltration rates given below may be utilized in the basin design with a safety factor of 2.0 or greater.

Test No.	Depth (feet bgs)	Soil Type	Infiltration Rate (cm/hr)	Infiltration Rate (in/hr)
IT-1	6	clayey SAND	3.3	1.3
IT-2	4	clayey SAND	1.1	0.4

It is our opinion that the site is suitable for stormwater infiltration without increasing the potential of settlement of proposed and existing structures or adversely affecting retaining/basement walls located either on or adjacent to the subject site. In addition, the potential for hydro-consolidation and the susceptibility for any ground settlements are considered low. All systems shall meet the California Regional Water Quality Control Board (CRWQCB) requirements.

Closure

The recommendations and conclusions contained in this report are based upon the soil conditions uncovered in our test excavations. No warranty of the soil condition between our excavations is implied. NorCal Engineering should be notified for possible further recommendations if unexpected to unfavorable conditions are encountered during construction phase. This firm should have the opportunity to review the final plans to verify that all our recommendations are incorporated.

This report and all conclusions are subject to the review of the controlling authorities for the project. Our representative should be present during the grading operations and construction phase to certify that such recommendations are complied within the field.

This infiltration study has been conducted in a manner consistent with the level of care and skill exercised by members of our profession currently practicing under similar conditions in the Southern California area. All work was performed under the supervision of the Geotechnical Engineer. No other warranty, expressed or implied is made. No other warranty, expressed or implied is made.

We appreciate this opportunity to be of service to you. If you have any further questions, please do not hesitate to contact the undersigned.

Respectfully submitted,
NORCAL ENGINEERING

REGISTERED PROFESSIONAL ENGINEER
KEITH D. TUCKER
No. 841
Exp. 12/31/18
GEOTECHNICAL
STATE OF CALIFORNIA

Keith D. Tucker
Project Engineer
R.G.E. 841

Mark A. Burkholder
Project Manager

List of Appendices
(in order of appearance)

Appendix A

Vicinity Map and Test Location Exhibits – Figures 1 and 2

Appendix B

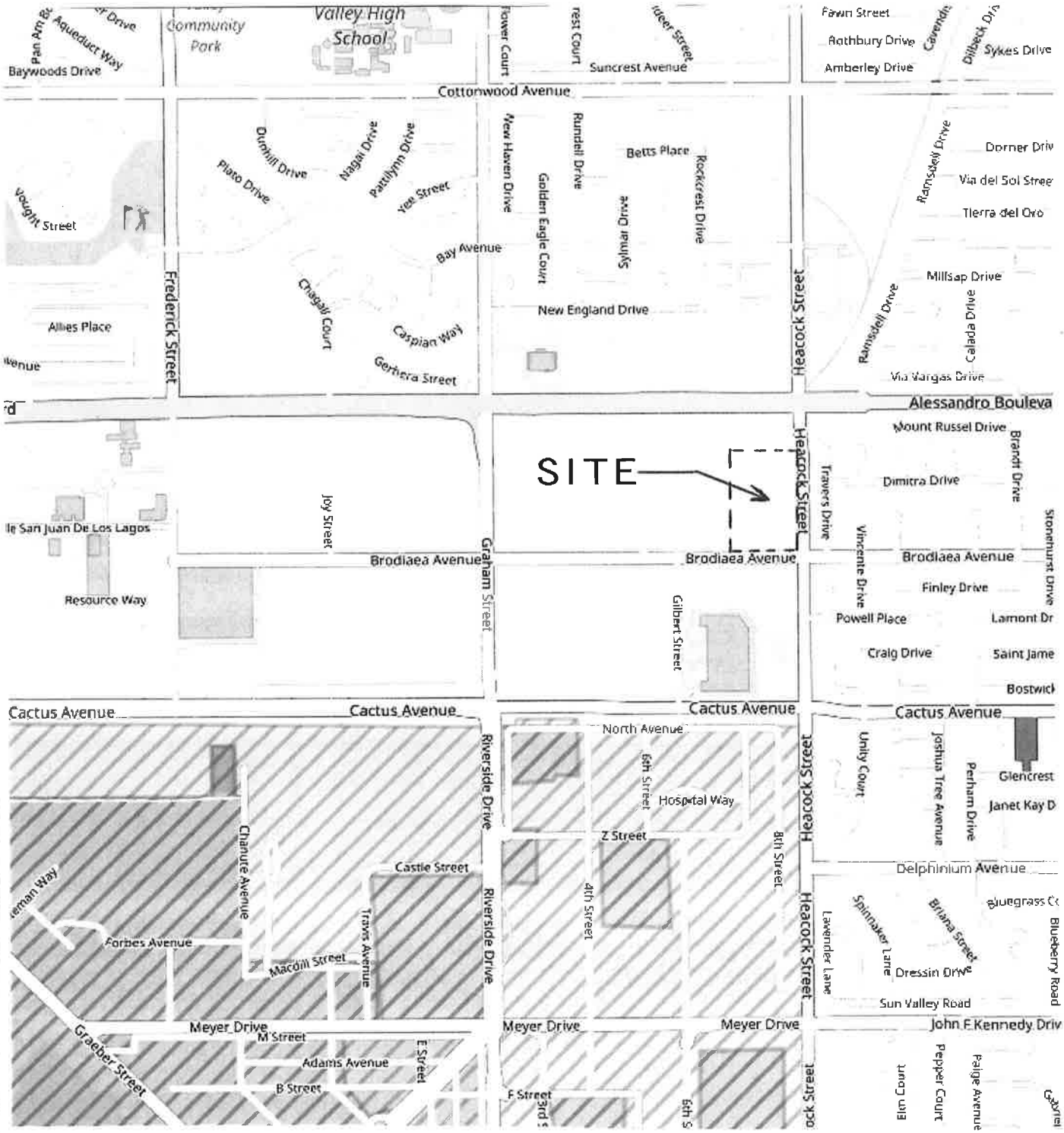
Logs of Test Excavations IT-1 and IT-2

Log of Groundwater Verification Boring B-1

Field Test Data

Calculations

Appendix A



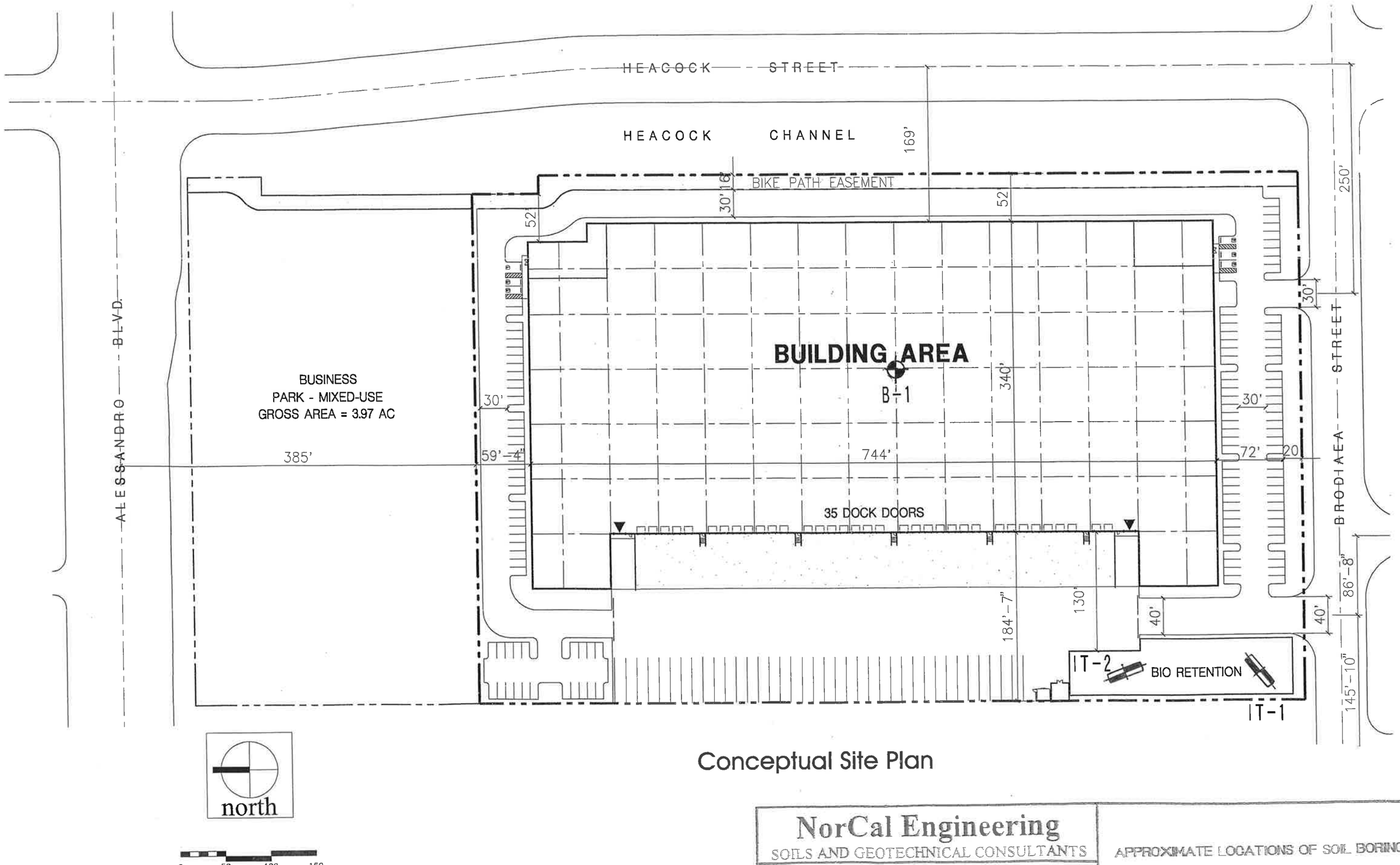
NorCal Engineering

SOILS AND GEOTECHNICAL CONSULTANTS

VICINITY MAP

PROJECT 19803-17	DATE 8/2017

FIG. 1



Conceptual Site Plan

NorCal Engineering
SOILS AND GEOTECHNICAL CONSULTANTS

PROJECT 19803-17 | DATE 8/2017

APPROXIMATE LOCATIONS OF SOIL BORINGS

FIG. 2

Appendix B

MAJOR DIVISION			GRAPHIC SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL, SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	SAND AND SANDY SOILS	CLEAN SAND (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	SANDS WITH FINE (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND-SILT MIXTURES
				SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

UNIFIED SOIL CLASSIFICATION SYSTEM

KEY:

- ■ Indicates 2.5-inch Inside Diameter. Ring Sample.
- ☒ Indicates 2-inch OD Split Spoon Sample (SPT).
- ⧅ Indicates Shelby Tube Sample.
- ◫ Indicates No Recovery.
- ◧ Indicates SPT with 140# Hammer 30 in. Drop.
- ✉ Indicates Bulk Sample.
- ◩ Indicates Small Bag Sample.
- ◨ Indicates Non-Standard
- ☒ Indicates Core Run.

COMPONENT PROPORTIONS

DESCRIPTIVE TERMS	RANGE OF PROPORTION
Trace	1 - 5%
Few	5 - 10%
Little	10 - 20%
Some	20 - 35%
And	35 - 50%

COMPONENT DEFINITIONS

COMPONENT	SIZE RANGE
Boulders	Larger than 12 in
Cobbles	3 in to 12 in
Gravel	3 in to No 4 (4.5mm)
Coarse gravel	3 in to 3/4 in
Fine gravel	3/4 in to No 4 (4.5mm)
Sand	No. 4 (4.5mm) to No. 200 (0.074mm)
Coarse sand	No. 4 (4.5 mm) to No. 10 (2.0 mm)
Medium sand	No. 10 (2.0 mm) to No. 40 (0.42 mm)
Fine sand	No. 40 (0.42 mm) to No. 200 (0.074 mm)
Silt and Clay	Smaller than No. 200 (0.074 mm)

MOISTURE CONTENT

DRY	Absence of moisture, dusty, dry to the touch.
DAMP	Some perceptible moisture; below optimum
MOIST	No visible water; near optimum moisture content
WET	Visible free water, usually soil is below water table.

RELATIVE DENSITY OR CONSISTENCY VERSUS SPT N -VALUE

COHESIONLESS SOILS		COHESIVE SOILS		
Density	N (blows/ft)	Consistency	N (blows/ft)	Approximate Undrained Shear Strength (psf)
Very Loose	0 to 4	Very Soft	0 to 2	< 250
Loose	4 to 10	Soft	2 to 4	250 - 500
Medium Dense	10 to 30	Medium Stiff	4 to 8	500 - 1000
Dense	30 to 50	Stiff	8 to 15	1000 - 2000
Very Dense	over 50	Very Stiff	15 to 30	2000 - 4000
		Hard	over 30	> 4000

Alere Property Group, LLC
19803-17

Log of Test Excavation IT-1

Boring Location: Heacock and Brodiaea, Moreno Valley	
Date of Drilling: 8/5/17	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:
Surface Elevation: Not Measured	

Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: Relative Compaction
0		FILL SOILS Clayey SAND with occasional gravel, roots Brown, loose, dry					
		NATURAL SOILS Clayey SAND Brown, medium dense to dense, damp					
5		GWT not encountered					
		Boring completed at depth of 6'					
10							
15							
20							
25							
30							
35							

NorCal Engineering

SuperLog CivilTech Software, USA www.civiltech.com File: C:\Superlog4\PROJECT\19803-17.log Date: 8/17/2017

Alere Property Group, LLC
19803-17

Log of Test Excavation IT-2

Boring Location: Heacock and Brodiaea, Moreno Valley	
Date of Drilling: 8/5/17	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:
Surface Elevation: Not Measured	

Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: Relative Compaction
0		FILL SOILS Clayey SAND with occasional gravel, roots Brown, loose, dry					
		NATURAL SOILS Clayey SAND Brown, medium dense to dense, damp					
5		Boring completed at depth of 4'					
10							
15							
20							
25							
30							
35							

GWT not encountered

SuperLog CivilTech Software, USA www.civiltech.com File: C:\Superlog4\PROJECT\19803-17.log Date: 8/17/2017

NorCal Engineering

NORCAL ENGINEERING

SOILS AND GEOTECHNICAL CONSULTANTS

Project:	**Alere, LLC**
Project No:	19803-17
Date:	8/5/17
Test No.	IT-1
Depth:	6'
Tested By:	P.L.

	TIME (hr/min)	CHANGE TIME (min)	CUMULATIVE TIME (min)	INNER RING READING (cm)	INNER RING CHANGE	INNER RING FLOW (cc)	OUTER RING READING (cm)	OUTER RING CHANGE (cm)	OUTER RING FLOW (cc)	INNER RING INF RATE (cm/hr)	OUTER RING INF RATE (cm/hr)	INNER RING INF RATE (ft/hr)
1	8:03			41.8			105.1					
	8:13	10	10	42.6	0.8		105.9	0.8				
2	8:13			42.6			105.9					
	8:23	10	20	43.5	0.9		106.7	0.8				
3	8:23			43.5			106.7					
	8:33	10	30	44.3	0.8		107.5	0.8				
4	8:33			44.3			107.5					
	8:43	10	40	45.0	0.7		108.1	0.6				
5	8:43			45.0			108.1					
	8:53	10	50	45.6	0.6		108.9	0.8				
6	8:53			45.6			108.9					
	9:03	10	60	46.3	0.7		109.5	0.6				
7	9:03			46.3			109.5					
	9:13	10	70	46.9	0.6		110.0	0.5				
8	9:13			46.9			110.0					
	9:23	10	80	47.4	0.5		110.6	0.6				
9	9:23			47.4			110.6					
	9:33	10	90	47.9	0.5		111.2	0.6				
10	9:33			47.9			111.2					
	9:43	10	100	48.4	0.5		111.7	0.5				
11	9:43			48.4			111.7					
	9:53	10	110	48.9	0.5		112.1	0.4				
12	9:53			48.9			112.1					
	10:03	10	120	49.5	0.6		112.6	0.5				

NORCAL ENGINEERING

SOILS AND GEOTECHNICAL CONSULTANTS

Project:	**Alere, LLC**
Project No:	19803-17
Date:	8/5/17
Test No.	IT-2
Depth:	4'
Tested By:	P.L.

	TIME (hr/min)	CHANGE TIME (min)	CUMULATIVE TIME (min)	INNER RING READING (cm)	INNER RING CHANGE	INNER RING FLOW (cc)	OUTER RING READING (cm)	OUTER RING CHANGE (cm)	OUTER RING FLOW (cc)	INNER RING INF RATE (cm/hr)	OUTER RING INF RATE (cm/hr)	INNER RING INF RATE (ft/hr)
1	10:28			106.8			49.6					
	10:38	10	10	107.2	0.4		50.4	0.8				
2	10:38			107.2			50.4					
	10:48	10	20	107.5	0.5		50.8	0.4				
3	10:48			107.5			50.8					
	10:58	10	30	107.9	0.4		51.2	0.4				
4	10:58			107.9			51.2					
	11:08	10	40	108.1	0.2		51.3	0.1				
5	11:08			108.1			51.3					
	11:18	10	50	108.3	0.2		51.6	0.3				
6	11:18			108.3			51.6					
	11:28	10	60	108.5	0.2		51.8	0.2				
7	11:28			108.5			51.8					
	11:38	10	70	108.7	0.2		52.0	0.2				
8	11:38			108.7			52.0					
	11:48	10	80	108.8	0.1		52.2	0.2				
9	11:48			108.8			52.2					
	11:58	10	90	109.0	0.2		52.3	0.1				
10	11:58			109.0			52.3					
	12:08	10	100	109.2	0.2		52.5	0.2				
11	12:08			109.2			52.5					
	12:18	10	110	109.4	0.2		52.7	0.2				
12	12:18			109.4			52.7					
	12:28	10	120	109.6	0.1		52.8	0.1				

GEOTECHNICAL INVESTIGATION

Proposed Warehouse Building Development
Northwest Corner Heacock Street and
Brodiaea Street
Moreno Valley, California

Alere Property Group, LLC
100 Bayview Circle, Suite 310
Newport Beach, California 92660

Project Number 19803-17
August 16, 2017

NorCal Engineering

NorCal Engineering

SOILS AND GEOTECHNICAL CONSULTANTS
10641 HUMBOLT STREET LOS ALAMITOS, CA 90720
(562)799-9469 FAX (562)799-9459

August 17, 2017 Project Number 19803-17

Alere Property Group, LLC
100 Bayview Circle, Suite 310
Newport Beach, California 92660

Attn: Clark Neuhoff

RE: **GEOTECHNICAL INVESTIGATION** - Proposed Warehouse Building Development - Located at the Northwest Corner of Heacock Street and Brodiaea Street, in the City of Moreno Valley, California

Dear Mr. Neuhoff:
Pursuant to your request, this firm has performed this Geotechnical Investigation for the above referenced project. The purpose of this investigation is to evaluate the geotechnical conditions of subject property and to provide recommendations for the proposed development. This geotechnical engineering report presents the findings of our study along with conclusions and recommendations for development.

1.0 STRUCTURAL CONSIDERATIONS

1.1 Proposed Development

It is currently proposed to a new concrete tilt-up structure totaling 262,000 square feet on the property. Asphaltic and concrete pavement areas and landscaping will also be installed. Grading for the development will include cut and fill procedures. Final building plans shall be reviewed by this firm prior to submittal for city approval to determine the need for any additional study and revised recommendations pertinent to the proposed development, if necessary.

2.0 SITE DESCRIPTION

2.1 **Location:** The rectangular shaped property is located at the northwest intersection of Heacock Street and Brodiaea Street, in the City of Moreno Valley, as shown on the Vicinity Map, Figure 1. Alessandro Boulevard borders approximately 300 feet north of the site. The Heacock Channel, a concrete-lined storm drain channel, is located along the east property line between the property and the roadway. Vacant land is located to the west.

2.2 **Existing Improvements:** The property is currently vacant and is covered with a low growth of vegetation.

2.3 **Drainage:** The site topography is generally flat and drainage pattern is not readily discernible.

3.0 SEISMICITY EVALUATION

The proposed development lies outside of any Alquist Priolo Special Studies Zone and the potential for damage due to direct fault rupture is considered unlikely.

The following seismic design parameters are provided and are in accordance with the 2016 California Building Code (CBC) as determined using the USGS Seismic Design tool (http://geohazards.usgs.gov/designmaps/us/application.php) for the referenced project. Design map summary report and the detailed report from the website are included in Appendix A.

Seismic Design Parameters

Site Location – Region 1	Latitude	33.9152°
	Longitude	-117.2450°
Seismic Use Group	II	
Site Class	D	
Risk Category	I/II/III	
Maximum Spectral Response Acceleration	S_S	1.504g
	S_1	0.627g
Adjusted Maximum Acceleration	S_{MS}	1.504g
	S_{M1}	0.941g
Design Spectral Response Acceleration Parameters	S_{DS}	1.003g
	S_{D1}	0.627g

The San Jacinto (San Bernardino) Fault zone is located approximately 8.5 kilometers northeast of the site and is capable of producing a Magnitude 6.9 earthquake. Ground shaking originating from earthquakes along other active faults in the region is expected to induce lower horizontal accelerations due to smaller anticipated earthquakes and/or greater distances to other faults.

4.0 FIELD INVESTIGATION

4.1 Site Exploration

The investigation consisted of the placement of three (3) subsurface exploratory boring by hollow-stem auger drill rig and fifteen (15) excavations by backhoe. Explorations extended to a maximum depth of 51.5 feet below current ground elevations. The explorations were placed at accessible locations throughout the site.

The explorations were visually classified and logged by a field engineer with locations of the subsurface excavations are shown on the attached Figure 2. Detailed descriptions of the subsurface conditions are listed on the logs in Appendix B. It should be noted that the transition from one soil type to another as shown on the excavation logs is approximate and may in fact be a gradual transition. The soils encountered are described as follows:

Fill/Disturbed Top Soils– Fill and disturbed top soils classifying as clayey SAND to sandy, clayey SILT with some gravel, concrete pieces and roots were encountered in the explorations to depths ranging from 1 to 2 feet. These soils were noted to be loose/soft and dry.

Native Soils – Native soils classifying as clayey SAND were encountered beneath the upper fill soils. These soils were noted to be medium dense and damp to moist. Sand, silt and clay content varied with depth of exploration.

4.2 Groundwater

Groundwater was encountered at a depth of approximately 28 feet at the site.

5.0 LABORATORY TESTS

Relatively undisturbed samples of the subsurface soils were obtained to perform laboratory testing and analysis for direct shear, consolidation tests, and to determine in-place moisture/densities. These relatively undisturbed ring samples were obtained by driving a thin-walled steel sampler lined with one-inch long brass rings with an inside diameter of 2.42 inches into the undisturbed soils.

Bulk bag samples were obtained in the upper soils for expansion index tests, corrosion tests, resistance value and maximum density tests. Wall loadings on the order of 4,000 lbs./lin.ft. and maximum compression loads on the order of 100 kips were utilized for testing and design purposes. All test results are included in Appendix C, unless otherwise noted.

5.1 **Field moisture content** (ASTM:D 2216-10) and the dry density of the ring samples were determined in the laboratory. This data is listed on the logs of explorations.

5.2 **Maximum density tests** (ASTM: D-1557-12) were performed on typical samples of the upper soils. Results of these tests are shown on Table I.

5.3 **Expansion index tests** (ASTM: D-4829-11) were performed on remolded samples of the upper soils to determine the expansive characteristics and to provide any necessary recommendations for reinforcement of the slabs-on-grade and the foundations. Results of these tests are provided on Table II and are discussed later in this report.

5.4 **Direct shear tests** (ASTM: D-3080-11) were performed on undisturbed and/or remolded samples of the subsurface soils. These tests were performed to determine parameters for the calculation of the allowable soil bearing capacity. The test is performed under saturated conditions at loads of 1,000 lbs./sq.ft., 2,000 lbs./sq.ft., and 3,000 lbs./sq.ft. with results shown on Plates A - C.

5.5 **Consolidation tests** (ASTM: D-2435-11) were performed on undisturbed samples to determine the differential and total settlement which may be anticipated based upon the proposed loads. Water was added to the samples at a surcharge of one KSF and the settlement curves are plotted on Plates D - F.

5.6 **Soluble sulfate, pH, Resistivity and Chloride tests** to determine potential corrosive effects of soils on concrete and metal structures were performed in the laboratory. Test results are given in Tables III – VI and are discussed later in this report.

5.7 **Resistance 'R' Value tests** (CA 301) were conducted on a representative soil sample to determine preliminary pavement section design for the proposed pavement areas. Test results are provided in Table VII and recommended pavement sections are provided later within the text of this report.

6.0 LIQUEFACTION EVALUATION

The site is expected to experience ground shaking and earthquake activity that is typical of Southern California area. It is during severe ground shaking that loose, granular soils below the groundwater table can liquefy. A review of the exploratory boring log B-1 and the laboratory test results on selected soil samples obtained indicate the following soil classifications, field blowcounts and amounts of fines passing through the No. 200 sieve.

Field Blowcount and Gradation Data – *Boring B-1*

Location	Classification	Blowcounts (blows/ft)*	Relative Density	% Passing No. 200 Sieve
B-1 @ 5'	SC	26	Dense	42
B-1 @ 10'	SC	50+	Very Dense	51
B-1 @ 15'	SC	59	Very Dense	43
B-1 @ 20'	SC	27	Dense	42
B-1 @ 25'	SC	41	Very Dense	51
B-1 @ 30'	SM	54	Very Dense	29
B-1 @ 35'	SM	41	Very Dense	20
B-1 @ 40'	ML	25	Very Stiff	49
B-1 @ 45'	SM	49	Very Dense	20
B-1 @ 50'	SW	47	Very Dense	7

Our liquefaction evaluation indicates the potential for liquefaction at this site is low due to dense to very dense sand soils and groundwater at 28 feet. Based on a Magnitude 6.7 earthquake with a peak ground acceleration of 0.578g at the site, seismic-induced settlements should be on the order of less than 1 inch. These settlements should occur rather uniformly across the lot with differential settlements on the order of less than ½ inch over a 100 feet (horizontal) distance in the building pad area.

7.0 CONCLUSIONS AND RECOMMENDATIONS

Based upon our evaluations, the proposed development is acceptable from a geotechnical engineering standpoint. By following the recommendations and guidelines set forth in our report, the structures and grading will be safe from excessive settlements under the anticipated design loadings and conditions. The proposed grading and development shall meet all requirements of the City Building Ordinance and will not impose any adverse effect on existing adjacent land or structures.

The following recommendations are based upon soil conditions encountered in our field investigation; these near-surface soil conditions could vary across the site. Variations in the soil conditions may not become evident until the commencement of grading operations for the proposed development and revised recommendations from the soils engineer may be necessary based upon the conditions encountered.

7.1 Site Grading Recommendations

It is recommended that site inspections be performed by a representative of this firm during all grading and construction of the development to verify the findings and recommendations documented in this report. Any unusual conditions which may be encountered in the course of the project development may require the need for additional study and revised recommendations.

Any vegetation and organic laden soils shall be removed and hauled from proposed grading areas prior to and during the grading operations if encountered. Existing vegetation shall not be mixed or disced into the soils. Any removed soils may be reutilized as compacted fill once any deleterious material or oversized materials (in excess of eight inches) is removed. Grading operations shall be performed in accordance with the attached *Specifications for Placement of Compacted Fill.*

7.1.1 **Removal and Recompaction Recommendations**

The upper existing fill soils (1 to 2 feet) shall be removed to competent native materials, the exposed surface scarified to a depth of 8 inches, brought to within 2% of optimum moisture content and compacted to a minimum of 90% of the laboratory standard (ASTM: D-1557-07) prior to placement of any additional compacted fill soils and pavement. *The upper 12 inches of soils beneath building pad and concrete paving shall be compacted to a minimum of 95%.* Grading shall extend a minimum of 5 horizontal feet outside the edges of foundations or equidistant to the depth of fill placed, whichever is greater. Care should be taken to provide or maintain adequate lateral support for all adjacent improvements and structures at all times during the grading operations and construction phase.

Adequate drainage away from the structures, pavement and slopes should be provided at all times.

It is likely that isolated areas of undiscovered fill not described in this report or materials disturbed during demolition operations will be encountered on site; if found, these areas should be treated as discussed earlier. A diligent search shall also be conducted during grading operations in an effort to uncover any underground structures, irrigation or utility lines. If encountered, these structures and lines shall be either removed or properly abandoned prior to the proposed construction. Abandonment procedures will be provided once underground structures are encountered.

If placement of slabs-on-grade and pavement is not performed immediately upon completion of grading operations, additional testing and grading of the areas may be necessary prior to continuation of construction operations. Likewise, if adverse weather conditions occur which may damage the subgrade soils, additional assessment by the soils engineer as to the suitability of the supporting soils may be needed.

7.1.2 Fill Blanket Recommendations

Due to the potential for differential settlement of structures supported on both compacted fill and native soils, it is recommended that all foundations be underlain by a uniform compacted fill blanket at least 3 feet in thickness. The fill blanket shall extend a minimum of 5 horizontal feet outside the edges of foundations or equidistant to the depth of fill placed, whichever is greater.

Building floor slabs should be underlain by a minimum of 2 feet of compacted fill soils.

7.1.3 Shrinkage and Subsidence

Results of our in-place density tests reveal that the soil shrinkage will be on the order of 8 to 10% due to excavation and recompaction, based upon the assumption that the fill is compacted to 92% of the maximum dry density per ASTM standards. Subsidence should be 0.10 feet due to earthwork operations. The volume change does not include any allowance for vegetation or organic stripping, removal of subsurface improvements or topographic approximations.

Although these values are only approximate, they represent our best estimate of shrinkage values which will likely occur during grading. If more accurate shrinkage and subsidence factors are needed, it is recommended that field testing using the actual equipment and grading techniques should be conducted.

7.2 Temporary Excavations and Shoring Design

Temporary unsurcharged excavations less than 4 feet in height may be excavated at vertical inclinations. Excavations over 4 feet in height in the existing site materials may be trimmed at a 1 to 1 (horizontal to vertical) gradient for the entire height of the cut. In areas where soils with little or no binder are encountered, where adverse geological conditions are exposed, or where excavations are adjacent to existing structures, shoring, slot-cutting, or flatter excavations may be required.

The temporary cut slope gradients given above do not preclude local raveling and sloughing. All excavations shall be made in accordance with the requirements of the soils engineer, CAL-OSHA and other public agencies having jurisdiction.

Temporary shoring design may utilize an active earth pressure of 25 pcf without any surcharge due to adjacent traffic, equipment or structures. The passive fluid pressures of 250 pcf may be doubled to 500 pcf for temporary design.

7.3 Foundation Design

All foundations may be designed utilizing the following allowable soil bearing capacities for an embedded depth of 18 inches into approved compacted fill materials with the corresponding widths. Footings shall not traverse from compacted fill to native soils due to the potential for differential settlement of structures.

\Allowable Soil Bearing Capacity (psf)

Width (ft)	Continuous Foundation	Isolated Foundation
1.5	2000	2500
2.0	2100	2600
4.0	2400	2900
6.0	2800	3300

The bearing value may be increased by 500 psf for each additional foot of depth in excess of the 18-inch minimum depth, up to a maximum of 4500 psf. Property line screen wall foundations where proper overexcavation and recompaction is not possible due to property line restrictions may be designed using a reduced allowable soil bearing capacity of 1,500 psf for foundations a minimum of 18 inches in depth *and* at least 8 inches into the underlying competent native soils. A one-third increase may be used when considering short term loading from wind and seismic forces.

All continuous foundations shall be reinforced with a minimum of 2 #4 steel bars top and bottom. Additional reinforcement may be necessary due to soil expansion or proposed loadings and shall be further evaluated by the project engineers and/or architect. A representative of this firm shall observe foundation excavations prior placement of steel reinforcement and concrete.

7.4 Settlement Analysis

Resultant pressure curves for the consolidation tests are shown on Plates D-F. Computations utilizing these curves and the recommended allowable soil bearing capacities reveal that the foundations will experience normal settlements on the order of ¾ inch and differential settlements of less than ¼ inch.

7.5 Lateral Resistance

The following values may be utilized in resisting lateral loads imposed on the structure. Requirements of the California Building Code should be adhered to when the coefficient of friction and passive pressures are combined.

Coefficient of Friction - 0.40
Equivalent Passive Fluid Pressure = 250 lbs./cu.ft.
Maximum Passive Pressure = 2,500 lbs./cu.ft.

The passive pressure recommendations are valid only for approved compacted fill soils or competent native ground.

7.6 Retaining Wall Design Parameters

Active earth pressures against retaining walls will be equal to the pressures developed by the following fluid densities. These values are for **granular backfill material** placed behind the walls at various ground slopes above the walls.

Surface Slope of Retained Materials (Horizontal to Vertical)	Equivalent Fluid Density (lb./cu.ft.)
Level	30
5 to 1	35
4 to 1	38
3 to 1	40
2 to 1	45

Any applicable short-term construction surcharges and seismic forces should be added to the above lateral pressure values. All walls shall be waterproofed as needed and protected from hydrostatic pressure by a reliable permanent subdrain system.

During a local Magnitude 6.9 earthquake along the San Jacinto fault zone, additional lateral pressures will occur along the back of walls retaining6 feet or more of soil. The seismic-induced lateral soil pressure may be computed using a triangular pressure distribution with the maximum value at the top of the wall. The maximum lateral pressure of (20 pcf) H where H is the height of the retained soils above the wall footing should be used in final design of retaining walls.

Sliding resistance values and passive fluid pressure values given in our previous report may be increased by 1/3 during short-term wind and seismic loading conditions.

7.7 Floor Slab Design

Concrete floor slabs-on-grade shall be a minimum of 4 and 6 inches in thickness in office and warehouse areas, respectively, and may be placed upon fill soils compacted to a minimum of *95%* relative compaction. Additional reinforcement requirements and an increase in thickness of the slabs-on-grade may be necessary based upon soils expansion potential and proposed loading conditions in the structures and should be evaluated further by the project engineers and/or architect.

A vapor retarder should be utilized in areas which would be sensitive to the infiltration of moisture. This retarder shall meet requirements of ASTM E 96, *Water Vapor Transmission of Materials* and ASTM E 1745, *Standard Specification for Water Vapor Retarders used in Contact with Soil or Granular Fill Under Concrete Slabs.* The vapor retarder shall be installed in accordance with procedures stated in ASTM E 1643, *Standard practice for Installation of Water Vapor Retarders used in Contact with Earth or Granular Fill Under Concrete Slabs*.

The moisture retarder may be placed upon 4 inches of sand or gravel. The surface upon which the retarder is placed shall be smooth and free of rocks, gravel or other protrusions which may damage the retarder. Use of sand above the retarder is under the purview of the structural engineer; if sand is used over the retarder, it should be placed in a dry condition.

All concrete slab areas to receive floor coverings should be moisture tested to meet all manufacturer requirements prior to placement.

7.8 **Expansive Soil**

The upper soils at the site are low (Expansion Index = 21-50) in expansion potential. Sites with expansive soils (Expansion Index >20) require special attention during project design and maintenance. The attached *Expansive Soil Guidelines* should be reviewed by the engineers, architects, owner, maintenance personnel and other interested parties and considered during the design of the project and future property maintenance.

7.9 **Utility Trench and Excavation Backfill**

Trenches from installation of utility lines and other excavations may be backfilled with on-site soils or approved imported soils compacted to a minimum of 90% relative compaction. All utility lines shall be properly bedded and shaded with clean sand having a sand equivalency rating of 30 or more. This material shall be thoroughly water jetted around the pipe structure prior to placement of compacted backfill soils.

7.10 **Corrosion Design Criteria**

Representative samples of the surficial soils revealed negligible sulfate concentrations and no special concrete design recommendations are deemed necessary at this time. It is recommended that additional sulfate tests be performed at the completion of rough grading to assure that the as graded conditions are consistent with the recommendations stated in this design. Sulfate test results may be found on the attached Table III.

Tests were also conducted on a random representative sample of soils to determine the potential corrosive effects on buried metallic structures. Tests for pH, resistivity and chloride are included on Tables IV – VI. Soil pH indicates a slightly acidic condition. Resistivity is representative of mildly corrosive soils and metallic structures should be protected as necessary. Chloride content measured 218 ppm.

7.11 Preliminary Pavement Design

The table below provides a preliminary pavement design based upon a tested R-Value of 28 for the proposed pavement areas. Final pavement design should be based on R-Value testing of the subgrade soils near the conclusion of rough grading to assure that the as-graded conditions are consistent with those used in this preliminary design.

On-Site Flexible (Asphaltic) Pavement Section Design

Type of Traffic	Traffic Index	Inches Asphalt	Inches Base
Auto Parking/Circulation	5.0	3.5	5.0
Truck	7.0	5.0	9.0

Subgrade soils to receive base material shall be compacted to a minimum of 90% relative compaction; base material shall be compacted to at least 95%. Any concrete slab-on-grade in pavement areas shall be a minimum of 6 inches in thickness and may be placed on subgrade soils compacted to at least 95% relative compaction. An increase in slab thickness and placement of steel reinforcement due to loading conditions and soil expansion may be necessary and should be reviewed by the structural engineer.

The above recommendations are based upon estimated traffic loadings. Client should submit anticipated traffic loadings for the pavement areas to the soils engineer, when available, so that pavement sections may be reviewed to determine adequacy to support the proposed loadings.

8.0 CLOSURE

The recommendations and conclusions contained in this report are based upon the soil conditions uncovered in our test excavations. No warranty of the soil condition between our excavations is implied. NorCal Engineering should be notified for possible further recommendations if unexpected to unfavorable conditions are encountered during construction phase. It is the responsibility of the owner to ensure that all information within this report is submitted to the Architect and appropriate Engineers for the project.

This firm should have the opportunity to review the final plans (72 hours for review required) to verify that all our recommendations are incorporated. This report and all conclusions are subject to the review of the controlling authorities for the project.

A preconstruction conference should be held between the developer, general contractor, grading contractor, city inspector, architect, and soil engineer to clarify any questions relating to the grading operations and subsequent construction. Our representative should be present during the grading operations and construction phase to certify that such recommendations are complied within the field.

This geotechnical investigation has been conducted in a manner consistent with the level of care and skill exercised by members of our profession currently practicing under similar conditions in the Southern California area. No other warranty, expressed or implied is made.

We appreciate this opportunity to be of service to you. If you have any further questions, please do not hesitate to contact the undersigned.

Respectfully submitted,
NORCAL ENGINEERING

Keith D. Tucker
Project Engineer
R.G.E. 841

Mark A. Burkholder
Project Manager

SPECIFICATIONS FOR PLACEMENT OF COMPACTED FILL

Excavation
Any existing low density soils and/or saturated soils shall be removed to competent natural soil under the inspection of the Soils Engineering Firm. After the exposed surface has been cleansed of debris and/or vegetation, it shall be scarified until it is uniform in consistency, brought to the proper moisture content and compacted to a minimum of 90% relative compaction (in accordance with ASTM: D-1557-12).

In any area where a transition between fill and native soil or between bedrock and soil are encountered, additional excavation beneath foundations and slabs will be necessary in order to provide uniform support and avoid differential settlement of the structure. Verification of elevations during grading operations will be the responsibility of the owner or his designated representative.

Material For Fill
The on-site soils or approved import soils may be utilized for the compacted fill provided they are free of any deleterious materials and shall not contain any rocks, brick, asphaltic concrete, concrete or other hard materials greater than eight inches in maximum dimensions. Any import soil must be approved by the Soils Engineering firm a minimum of 72 hours prior to importation of site.

Placement of Compacted Fill Soils
The approved fill soils shall be placed in layers not excess of six inches in thickness. Each lift shall be uniform in thickness and thoroughly blended. The fill soils shall be brought to within 2% of the optimum moisture content, unless otherwise specified by the Soils Engineering firm. Each lift shall be compacted to a minimum of 90% relative compaction (in accordance with ASTM: D-1557-12) and approved prior to the placement of the next layer of soil. Compaction tests shall be obtained at the discretion of the Soils Engineering firm but to a minimum of one test for every 500 cubic yards placed and/or for every 2 feet of compacted fill placed.

The minimum relative compaction shall be obtained in accordance with accepted methods in the construction industry. The final grade of the structural areas shall be in a dense and smooth condition prior to placement of slabs-on-grade or pavement areas. No fill soils shall be placed, spread or compacted during unfavorable weather conditions. When the grading is interrupted by heavy rains, compaction operations shall not be resumed until approved by the Soils Engineering firm.

Grading Observations

The controlling governmental agencies should be notified prior to commencement of any grading operations. This firm recommends that the grading operations be conducted under the observation of a Soils Engineering firm as deemed necessary. A 24-hour notice must be provided to this firm prior to the time of our initial inspection.

Observation shall include the clearing and grubbing operations to assure that all unsuitable materials have been properly removed; approve the exposed subgrade in areas to receive fill and in areas where excavation has resulted in the desired finished grade and designate areas of overexcavation; and perform field compaction tests to determine relative compaction achieved during fill placement. In addition, all foundation excavations shall be observed by the Soils Engineering firm to confirm that appropriate bearing materials are present at the design grades and recommend any modifications to construct footings.

EXPANSIVE SOIL GUIDELINES

The following expansive soil guidelines are provided for your project. The intent of these guidelines is to inform you, the client, of the importance of proper design and maintenance of projects supported on expansive soils. ***You, as the owner or other interested party, should be warned that you have a duty to provide the information contained in the soil report including these guidelines to your design engineers, architects, landscapers and other design parties in order to enable them to provide a design that takes into consideration expansive soils.***

In addition, you should provide the soil report with these guidelines to any property manager, lessee, property purchaser or other interested party that will have or assume the responsibility of maintaining the development in the future.

Expansive soils are fine-grained silts and clays which are subject to swelling and contracting. The amount of this swelling and contracting is subject to the amount of fine-grained clay materials present in the soils and the amount of moisture either introduced or extracted from the soils. Expansive soils are divided into five categories ranging from "very low" to "very high". Expansion indices are assigned to each classification and are included in the laboratory testing section of this report. *If the expansion index of the soils on your site, as stated in this report, is 21 or higher, you have expansive soils.* The classifications of expansive soils are as follows:

Classification of Expansive Soil*

Expansion Index	Potential Expansion
0-20	Very Low
21-50	Low
51-90	Medium
91-130	High
Above 130	Very High

*From Table 18A-I-B of California Building Code (1988)

When expansive soils are compacted during site grading operations, care is taken to place the materials at or slightly above optimum moisture levels and perform proper compaction operations. Any subsequent excessive wetting and/or drying of expansive soils will cause the soil materials to expand and/or contract. These actions are likely to cause distress of foundations, structures, slabs-on-grade, sidewalks and pavement over the life of the structure. ***It is therefore imperative that even after construction of improvements, the moisture contents are maintained at relatively constant levels, allowing neither excessive wetting or drying of soils.***

Evidence of excessive wetting of expansive soils may be seen in concrete slabs, both interior and exterior. Slabs may lift at construction joints producing a trip hazard or may crack from the pressure of soil expansion. Wet clays in foundation areas may result in lifting of the structure causing difficulty in the opening and closing of doors and windows, as well as cracking in exterior and interior wall surfaces. In extreme wetting of soils to depth, settlement of the structure may eventually result. Excessive wetting of soils in landscape areas adjacent to concrete or asphaltic pavement areas may also result in expansion of soils beneath pavement and resultant distress to the pavement surface.

Excessive drying of expansive soils is initially evidenced by cracking in the surface of the soils due to contraction. Settlement of structures and on-grade slabs may also eventually result along with problems in the operation of doors and windows.

Projects located in areas of expansive clay soils will be subject to more movement and "hairline" cracking of walls and slabs than similar projects situated on non-expansive sandy soils. There are, however, measures that developers and property owners may take to reduce the amount of movement over the life the development. The following guidelines are provided to assist you in both design and maintenance of projects on expansive soils:

- Drainage away from structures and pavement is essential to prevent excessive wetting of expansive soils. Grades of at least 3% should be designed and maintained to allow flow of irrigation and rain water to approved drainage devices or to the street. Any "ponding" of water adjacent to buildings, slabs and pavement after rains is evidence of poor drainage; the installation of drainage devices or regrading of the area may be required to assure proper drainage. Installation of rain gutters is also recommended to control the introduction of moisture next to buildings. Gutters should discharge into a drainage device or onto pavement which drains to roadways.

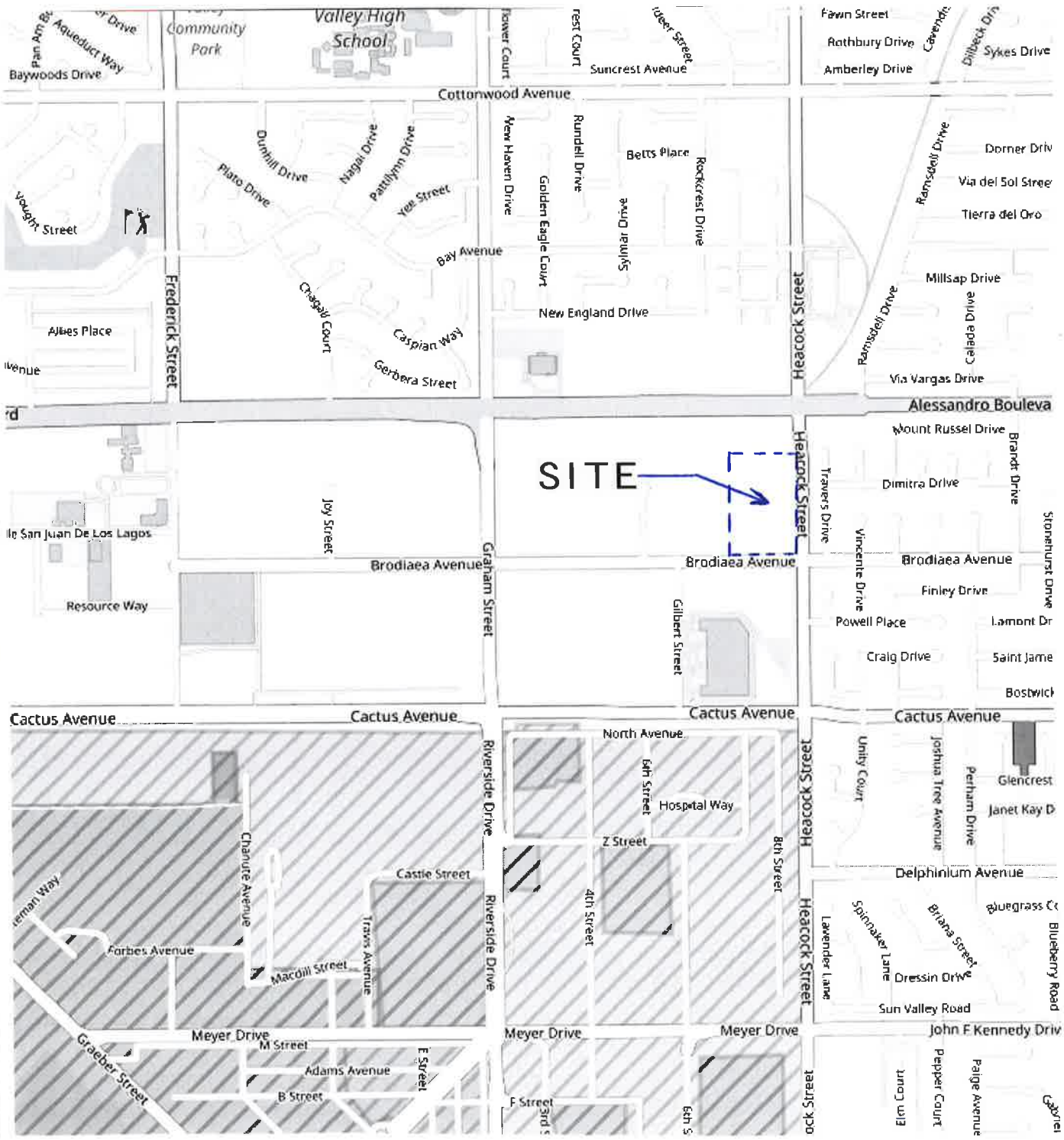
- Irrigation should be strictly controlled around building foundations, slabs and pavement and may need to be adjusted depending upon season. This control is essential to maintain a relatively uniform moisture content in the expansive soils and to prevent swelling and contracting. Over-watering adjacent to improvements may result in damage to those improvements. NorCal Engineering makes no specific recommendations regarding landscape irrigation schedules.

- Planting schemes for landscaping around structures and pavement should be analyzed carefully. Plants (including sod) requiring high amounts of water may result in excessive wetting of soils. Trees and large shrubs may actually extract moisture from the expansive soils, thus causing contraction of the fine-grained soils.

- Thickened edges on exterior slabs will assist in keeping excessive moisture from entering directly beneath the concrete. A six-inch thick or greater deepened edge on slabs may be considered. Underlying interior and exterior slabs with 6 to 12 inches or more of non-expansive soils and providing presaturation of the underlying clayey soils as recommended in the soil report will improve the overall performance of on-grade slabs.

- Increase the amount of steel reinforcing in concrete slabs, foundations and other structures to resist the forces of expansive soils. The precise amount of reinforcing should be determined by the appropriate design engineers and/or architects.

- Recommendations of the soil report should always be followed in the development of the project. Any recommendations regarding presaturation of the upper subgrade soils in slab areas should be performed in the field and verified by the Soil Engineer.



NorCal Engineering

SOILS AND GEOTECHNICAL CONSULTANTS

VICINITY MAP

PROJECT 19803-17	DATE 8/2017

FIG. 1

HEACOCK STREET

HEACOCK CHANNEL

169'

BIKE PATH EASEMENT

30'

16'

52

52

T-5

B-3

T-7

T-3

T-6

T-4

BUSINESS
PARK - MIXED-USE
GROSS AREA = 3.97 AC

BUILDING AREA

B-1

340'

T-9

T-13

30'

30'

T-8

T-2

385'

59'-4"

744'

72'

20

ALESSANDRO BLVD.

BRODIAEA STREET

250'

T-10

35 DOCK DOORS

T-12

B-2

T-1

86'-8"

184'-7"

130'

40'

40'

T-11

T-15

BIO RETENTION

145'-10"

T-14

north

0 50 100 150

Conceptual Site Plan

NorCal Engineering SOILS AND GEOTECHNICAL CONSULTANTS	APPROXIMATE LOCATIONS OF SOIL BORINGS
PROJECT 19803-17 DATE 8/2017	FIG. 2

APPENDICES

(In order of appearance)

Appendix A – Seismic Design

Appendix B - Logs of Test Explorations
- *Logs of Borings B-1 to B-3
- *Logs of Test Pits T-1 to T-15

Appendix C - Laboratory Analysis
- *Table I - Maximum Dry Density Tests
- *Table II - Expansion Index Tests
- *Table III - Sulfate Tests
- *Table IV - pH Tests
- *Table V - Resistivity Tests
- *Table VI - Chloride Tests
- *Table VII - Resistance 'R' Value Tests

- *Plates A - C - Direct Shear Tests
- *Plates D - F - Consolidation Tests

APPENDIX A

USGS Design Maps Summary Report

User–Specified Input

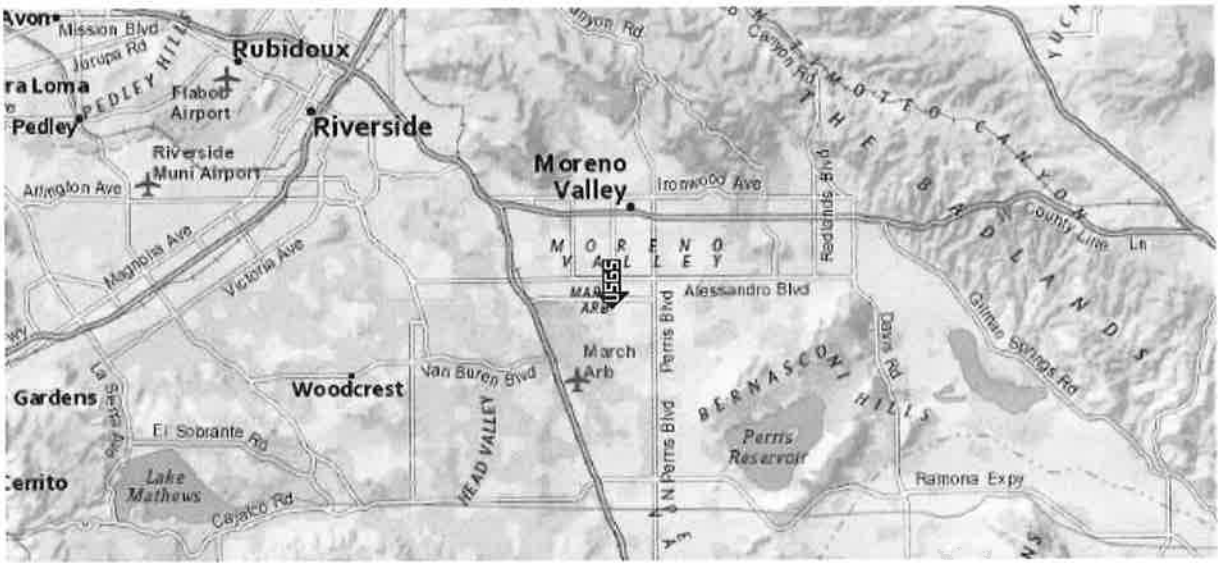
Report Title 19803-17
Wed August 16, 2017 21:25:01 UTC

Building Code Reference Document ASCE 7-10 Standard
(which utilizes USGS hazard data available in 2008)

Site Coordinates 33.9152°N, 117.245°W

Site Soil Classification Site Class D – "Stiff Soil"

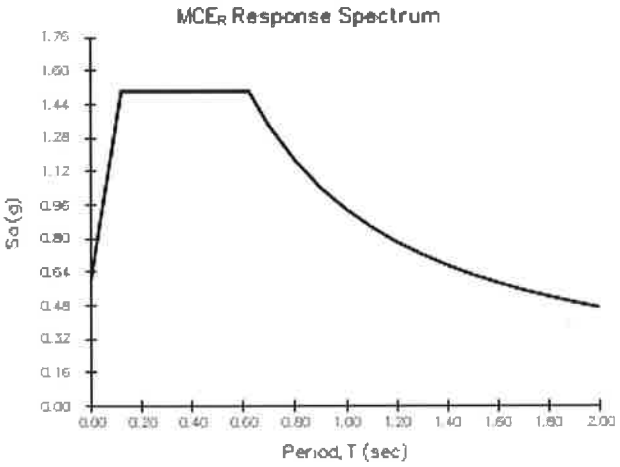
Risk Category I/II/III

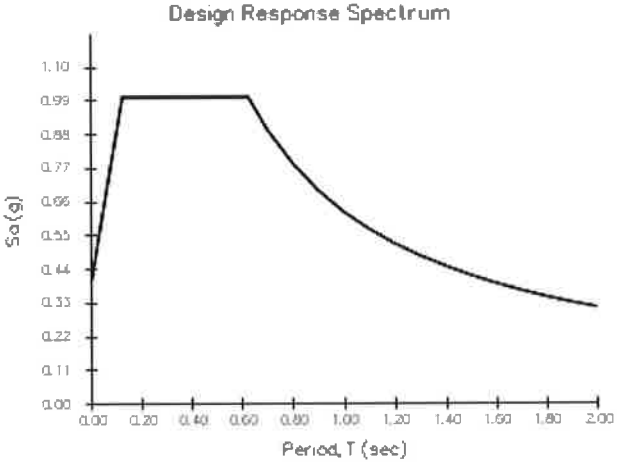


USGS–Provided Output

S_S =	1.504 g	S_{MS} =	1.504 g	S_{DS} =	1.003 g
S_1 =	0.627 g	S_{M1} =	0.941 g	S_{D1} =	0.627 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.





For PGA_M, T_L, C_{RS}, and C_{R1} values, please view the detailed report.

Although this information is a product of the U.S. Geological Survey, we provide no warranty, expressed or implied, as to the accuracy of the data contained therein. This tool is not a substitute for technical subject-matter knowledge.

USGS Design Maps Detailed Report

ASCE 7-10 Standard (33.9152°N, 117.245°W)

Site Class D – "Stiff Soil", Risk Category I/II/III

Section 11.4.1 — Mapped Acceleration Parameters

Note: Ground motion values provided below are for the direction of maximum horizontal spectral response acceleration. They have been converted from corresponding geometric mean ground motions computed by the USGS by applying factors of 1.1 (to obtain S_S) and 1.3 (to obtain S_1). Maps in the 2010 ASCE-7 Standard are provided for Site Class B. Adjustments for other Site Classes are made, as needed, in Section 11.4.3.

From Figure 22-1 [1] $S_S = 1.504$ g

From Figure 22-2 [2] $S_1 = 0.627$ g

Section 11.4.2 — Site Class

The authority having jurisdiction (not the USGS), site-specific geotechnical data, and/or the default has classified the site as Site Class D, based on the site soil properties in accordance with Chapter 20.

Table 20.3–1 Site Classification

Site Class	$\bar{v}_s$	$\bar{N}$ or $\bar{N}_{ch}$	$\bar{s}_u$
A. Hard Rock	>5,000 ft/s	N/A	N/A
B. Rock	2,500 to 5,000 ft/s	N/A	N/A
C. Very dense soil and soft rock	1,200 to 2,500 ft/s	>50	>2,000 psf
D. Stiff Soil	600 to 1,200 ft/s	15 to 50	1,000 to 2,000 psf
E. Soft clay soil	<600 ft/s	<15	<1,000 psf
	Any profile with more than 10 ft of soil having the characteristics: • Plasticity index $PI > 20$, • Moisture content $w \geq 40\%$, and • Undrained shear strength $\bar{s}_u < 500$ psf		
F. Soils requiring site response analysis in accordance with Section 21.1	See Section 20.3.1		

For SI: 1ft/s = 0.3048 m/s 1lb/ft² = 0.0479 kN/m²

Section 11.4.3 — Site Coefficients and Risk-Targeted Maximum Considered Earthquake (MCE_R) Spectral Response Acceleration Parameters

Table 11.4-1: Site Coefficient F_a

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at Short Period				
	$S_S \leq 0.25$	$S_S = 0.50$	$S_S = 0.75$	$S_S = 1.00$	$S_S \geq 1.25$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight-line interpolation for intermediate values of S_S

For Site Class = D and S_S = 1.504 g, F_a = 1.000

Table 11.4-2: Site Coefficient F_v

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at 1-s Period				
	$S_1 \leq 0.10$	$S_1 = 0.20$	$S_1 = 0.30$	$S_1 = 0.40$	$S_1 \geq 0.50$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.7	1.6	1.5	1.4	1.3
D	2.4	2.0	1.8	1.6	1.5
E	3.5	3.2	2.8	2.4	2.4
F	See Section 11.4.7 of ASCE 7				

Note: Use straight-line interpolation for intermediate values of S_1

For Site Class = D and S_1 = 0.627 g, F_v = 1.500

Equation (11.4–1): $S_{MS} = F_a S_S = 1.000 \times 1.504 = 1.504$ g

---

Equation (11.4–2): $S_{M1} = F_v S_1 = 1.500 \times 0.627 = 0.941$ g

---

Section 11.4.4 — Design Spectral Acceleration Parameters

Equation (11.4–3): $S_{DS} = \frac{2}{3} S_{MS} = \frac{2}{3} \times 1.504 = 1.003$ g

---

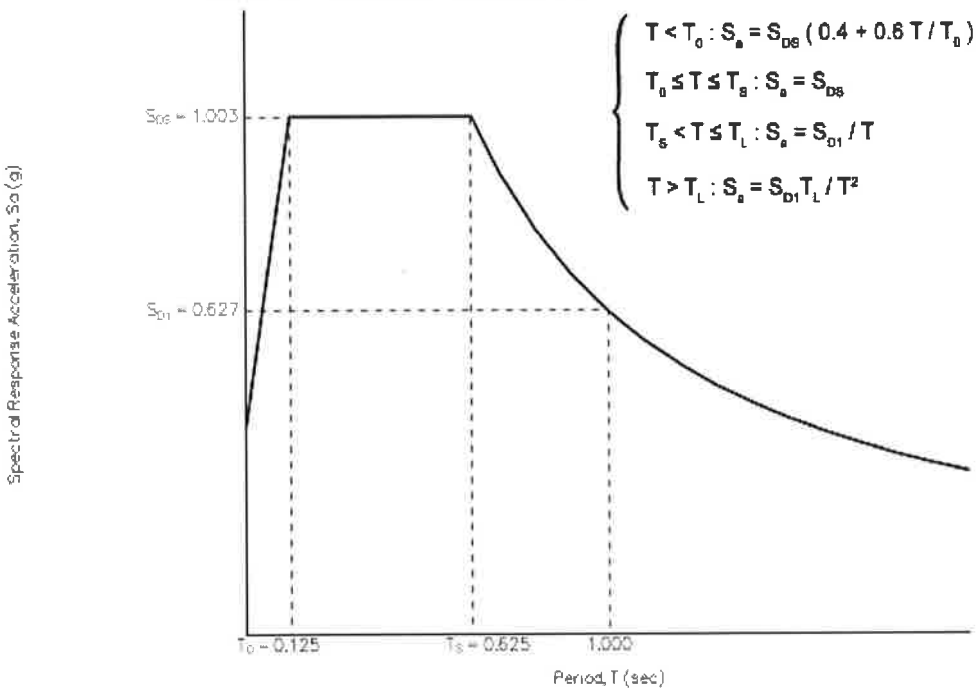
Equation (11.4–4): $S_{D1} = \frac{2}{3} S_{M1} = \frac{2}{3} \times 0.941 = 0.627$ g

---

Section 11.4.5 — Design Response Spectrum

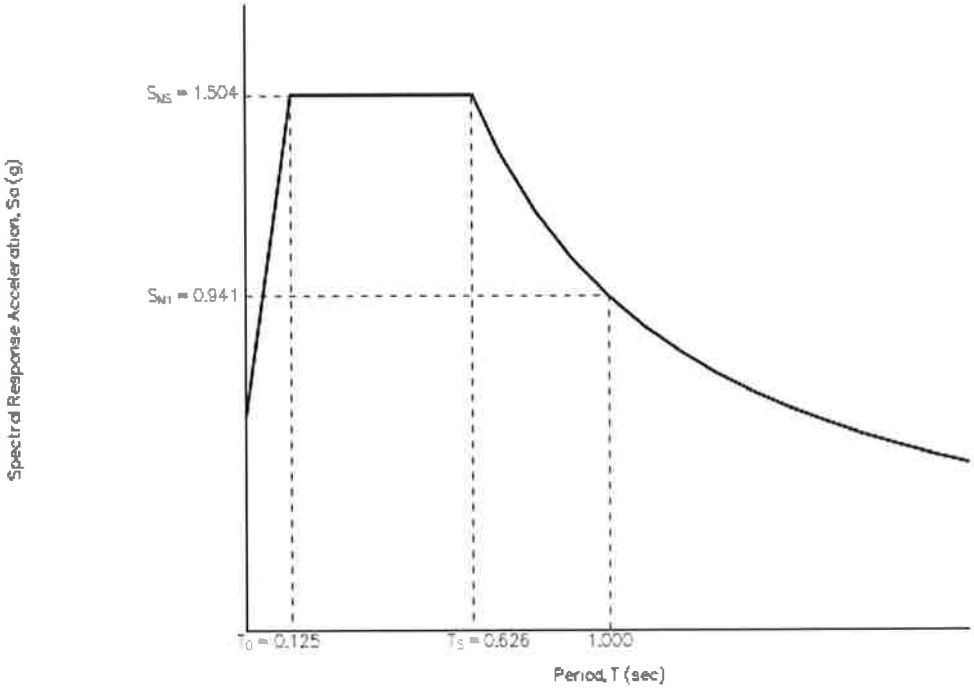
From Figure 22-12 [3] $T_L = 8$ seconds

Figure 11.4–1: Design Response Spectrum



Section 11.4.6 — Risk-Targeted Maximum Considered Earthquake (MCE_R) Response Spectrum

The MCE_R Response Spectrum is determined by multiplying the design response spectrum above by 1.5.



Section 11.8.3 — Additional Geotechnical Investigation Report Requirements for Seismic Design Categories D through F

From Figure 22-7 [4] PGA = 0.578

Equation (11.8–1): $PGA_M = F_{PGA}PGA = 1.000 \times 0.578 = 0.578$ g

Table 11.8–1: Site Coefficient F_{PGA}

Site Class	Mapped MCE Geometric Mean Peak Ground Acceleration, PGA				
	PGA ≤ 0.10	PGA = 0.20	PGA = 0.30	PGA = 0.40	PGA ≥ 0.50
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of PGA

For Site Class = D and PGA = 0.578 g, F_{PGA} = 1.000

Section 21.2.1.1 — Method 1 (from Chapter 21 – Site-Specific Ground Motion Procedures for Seismic Design)

From Figure 22-17 [5] C_{RS} = 1.044

From Figure 22-18 [6] C_{R1} = 1.013

Section 11.6 — Seismic Design Category

Table 11.6-1 Seismic Design Category Based on Short Period Response Acceleration Parameter

VALUE OF S_{DS}	RISK CATEGORY		
	I or II	III	IV
$S_{DS} < 0.167g$	A	A	A
$0.167g \le S_{DS} < 0.33g$	B	B	C
$0.33g \le S_{DS} < 0.50g$	C	C	D
$0.50g \le S_{DS}$	D	D	D

For Risk Category = I and S_{DS} = 1.003 g, Seismic Design Category = D

Table 11.6-2 Seismic Design Category Based on 1-S Period Response Acceleration Parameter

VALUE OF S_{D1}	RISK CATEGORY		
	I or II	III	IV
$S_{D1} < 0.067g$	A	A	A
$0.067g \le S_{D1} < 0.133g$	B	B	C
$0.133g \le S_{D1} < 0.20g$	C	C	D
$0.20g \le S_{D1}$	D	D	D

For Risk Category = I and S_{D1} = 0.627 g, Seismic Design Category = D

Note: When S_1 is greater than or equal to 0.75g, the Seismic Design Category is **E** for buildings in Risk Categories I, II, and III, and **F** for those in Risk Category IV, irrespective of the above.

Seismic Design Category ≡ "the more severe design category in accordance with Table 11.6-1 or 11.6-2" = D

Note: See Section 11.6 for alternative approaches to calculating Seismic Design Category.

References

1. *Figure 22-1*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-1.pdf
2. *Figure 22-2*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-2.pdf
3. *Figure 22-12*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-12.pdf
4. *Figure 22-7*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-7.pdf
5. *Figure 22-17*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-17.pdf
6. *Figure 22-18*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-18.pdf

APPENDIX B

MAJOR DIVISION			GRAPHIC SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL. SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	SAND AND SANDY SOILS	CLEAN SAND (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVEL-LY SANDS, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	SANDS WITH FINE (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND-SILT MIXTURES
				SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

UNIFIED SOIL CLASSIFICATION SYSTEM

KEY:

- ■ Indicates 2.5-inch Inside Diameter. Ring Sample.
- ☒ Indicates 2-inch OD Split Spoon Sample (SPT).
- ⧅ Indicates Shelby Tube Sample.
- ◫ Indicates No Recovery.
- ◧ Indicates SPT with 140# Hammer 30 in. Drop.
- ✉ Indicates Bulk Sample.
- ◩ Indicates Small Bag Sample.
- ◨ Indicates Non-Standard
- ⊠ Indicates Core Run.

COMPONENT PROPORTIONS

DESCRIPTIVE TERMS	RANGE OF PROPORTION
Trace	1 - 5%
Few	5 - 10%
Little	10 - 20%
Some	20 - 35%
And	35 - 50%

COMPONENT DEFINITIONS

COMPONENT	SIZE RANGE
Boulders	Larger than 12 in
Cobbles	3 in to 12 in
Gravel	3 in to No 4 (4.5mm)
Coarse gravel	3 in to 3/4 in
Fine gravel	3/4 in to No 4 (4.5mm)
Sand	No. 4 (4.5mm) to No. 200 (0.074mm)
Coarse sand	No. 4 (4.5 mm) to No. 10 (2.0 mm)
Medium sand	No. 10 (2.0 mm) to No. 40 (0.42 mm)
Fine sand	No. 40 (0.42 mm) to No. 200 (0.074 mm)
Silt and Clay	Smaller than No. 200 (0.074 mm)

MOISTURE CONTENT

DRY	Absence of moisture, dusty, dry to the touch.
DAMP	Some perceptible moisture; below optimum
MOIST	No visible water; near optimum moisture content
WET	Visible free water, usually soil is below water table.

RELATIVE DENSITY OR CONSISTENCY VERSUS SPT N -VALUE

COHESIONLESS SOILS		COHESIVE SOILS		
Density	N (blows/ft)	Consistency	N (blows/ft)	Approximate Undrained Shear Strength (psf)
Very Loose	0 to 4	Very Soft	0 to 2	< 250
Loose	4 to 10	Soft	2 to 4	250 - 500
Medium Dense	10 to 30	Medium Stiff	4 to 8	500 - 1000
Dense	30 to 50	Stiff	8 to 15	1000 - 2000
Very Dense	over 50	Very Stiff	15 to 30	2000 - 4000
		Hard	over 30	> 4000

Alere Property Group, LLC
19803-17

Log of Boring B-1

Boring Location: Heacock and Brodiaea, Moreno Valley	
Date of Drilling: 8/5/17	Groundwater Depth: 28'
Drilling Method: Hollowstem Auger	
Hammer Weight: 140 lbs	Drop: 30"
Surface Elevation: Not Measured	

Depth (feet)	Lith-ology	Material Description	Samples Type	Samples Blow Counts	Laboratory Moisture	Laboratory Dry Density	Laboratory Fines Content %
0		FILL SOILS Clayey SAND with organics Brown, loose, dry					
		NATURAL SOILS Clayey SAND Brown, medium dense to dense, damp to moist					
5				20/12/14	5.3		42
10				20/50+	9.5		52
15				17/30/29	8.5		43
20				10/12/15	18.0		42
25				15/19/22	19.3		51
30		Silty SAND Brown, dense, wet; some gravel		27/30/24	18.9		29
35							

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19803-17

Log of Boring B-1

Boring Location: Heacock and Brodiaea, Moreno Valley	
Date of Drilling: 8/5/17	Groundwater Depth: 28'
Drilling Method: Hollowstem Auger	
Hammer Weight: 140 lbs	Drop: 30"
Surface Elevation: Not Measured	

Depth (feet)	Lith-ology	Material Description	Samples Type	Samples Blow Counts	Laboratory Moisture	Laboratory Dry Density	Laboratory Fines Content %
35		Silty SAND Brown, dense, wet; some gravel	X	17/19/22	14.7		20
40		Sandy SILT with occasional gravel Brown, stiff, very moist	X	18/12/15	21.8		49
45		Silty SAND with occasional gravel Brown, dense, wet	X	20/27/22	17.6		20
50		slightly silty @ 50'	X	17/22/25	23.4		7
		Boring completed at depth of 51.5'					
55							
60							
65							
70							

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19803-17

Log of Boring B-2

Boring Location: Heacock and Brodiaea, Moreno Valley	
Date of Drilling: 8/5/17	Groundwater Depth: None Encountered
Drilling Method: Hollowstem Auger	
Hammer Weight: 140 lbs	Drop: 30"
Surface Elevation: Not Measured	

Depth (feet)	Lith-ology	Material Description	Samples Type	Samples Blow Counts	Laboratory Moisture	Laboratory Dry Density	Laboratory Relative Compaction
0		FILL SOILS Clayey sandy SILT to Clayey SAND with organics Brown, soft/loose, dry					
		NATURAL SOILS Clayey SAND Brown, medium dense to dense, damp to moist					
5			■	6/14	5.2	109.8	
10			■	44/50+	9.3	118.2	
15		Slightly silty SAND Brown, dense, moist	■	11/16	11.1	108.8	
		Clayey SAND Brown, dense, moist					
20			■	34/50+	12.9	115.2	
		Boring completed at depth of 21'					
25							
30							
35							

GWT not encountered

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Log of Boring B-3

Boring Location: Heacock and Brodiaea, Moreno Valley

Date of Drilling: 8/5/17 | Groundwater Depth: None Encountered

Drilling Method: Hollowstem Auger

Hammer Weight: 140 lbs | Drop: 30"

Surface Elevation: Not Measured

Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: Relative Compaction
0		FILL SOILS Clayey SAND with gravel, organics, roots Brown, loose, dry					
		NATURAL SOILS Clayey SAND Brown, medium dense to dense, damp Some variation in clay, silt content with depth					
5			■	18/28	6.6	109.5	
10			■	17/22	4.4	107.8	
		Sandy SILT with clay Brown, very stiff, moist					
15			■	32/50+	9.6	121.3	
20			■	20/31	9.4	131.6	
		Boring completed at depth of 21'					
25							
30							
35							

GWT not encountered

Date: 8/17/2017 File: C:\Superlog4\PROJECT\19803-17.log www.civiltech.com SuperLog CivilTech Software, USA

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19803-17

Log of Test Excavation T-1

Boring Location: Heacock and Brodiaea, Moreno Valley

Date of Drilling: 8/5/17

Groundwater Depth: None Encountered

Drilling Method: Backhoe

Hammer Weight:

Drop:

Surface Elevation: Not Measured

Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: Relative Compaction
0		FILL SOILS Clayey SAND with occasional gravel, roots Brown, loose, dry	■		5.2	114.7	
		NATURAL SOILS Clayey SAND Brown, medium dense to dense, damp					
5			■		3.9	117.1	
10		Clayey sandy SILT Brown, stiff, moist	■		11.6	105.1	
			■		12.6	116.3	
		Boring completed at depth of 12.5'					
15							
20							
25							
30							
35							

GWT not encountered

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19803-17

Log of Test Excavation T-2

Boring Location: Heacock and Brodiaea, Moreno Valley

Date of Drilling: 8/5/17

Groundwater Depth: None Encountered

Drilling Method: Backhoe

Hammer Weight:

Drop:

Surface Elevation: Not Measured

Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: Relative Compaction
0		FILL SOILS					
		Clayey SAND with occasional gravel, roots					
		Brown, loose, dry					
		NATURAL SOILS					
		Sandy CLAY					
		Brown, medium stiff, damp	■		6.2	105.2	
5		Clayey SAND					
		Brown, dense, damp	■		7.1	114.2	
		Boring completed at depth of 8'					
10							
15							
20							
25							
30							
35							

GWT not encountered

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Alere Property Group, LLC 19803-17	Log of Test Excavation T-3

Boring Location: Heacock and Brodiaea, Moreno Valley	
Date of Drilling: 8/5/17	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:
Surface Elevation: Not Measured	

Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: Relative Compaction
0		FILL SOILS Clayey SAND with occasional gravel, roots, concrete pieces Brown, loose, dry					
		NATURAL SOILS Clayey SAND Brown, medium dense to dense, damp					
5		Boring completed at depth of 4'					
10							
15							
20							
25							
30							
35							

GWT not encountered

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19803-17

Log of Test Excavation T-4

Boring Location: Heacock and Brodiaea, Moreno Valley

Date of Drilling: 8/5/17

Groundwater Depth: None Encountered

Drilling Method: Backhoe

Hammer Weight:

Drop:

Surface Elevation: Not Measured

Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: Relative Compaction
0		FILL SOILS Clayey SAND with occasional gravel, roots Brown, loose, dry					
		NATURAL SOILS Clayey SAND Brown, medium dense to dense, damp to moist	■		8.8	109.9	
5			■		9.3	115.7	
		Clayey sandy SILT Brown, stiff, moist	■		8.3	110.4	
10		Boring completed at depth of 10'					
15							
20							
25							
30							
35							

GWT not encountered

Date: 8/17/2017 File: C:\Superlog4\PROJECT\19803-17.log SuperLog CivilTech Software, USA www.civiltech.com

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Alere Property Group, LLC
19803-17

Log of Test Excavation T-5

Boring Location: Heacock and Brodiaea, Moreno Valley	
Date of Drilling: 8/5/17	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:
Surface Elevation: Not Measured	

Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: Relative Compaction
0		FILL SOILS Clayey SAND with occasional gravel, roots Brown, loose, dry					
		NATURAL SOILS Clayey SAND Brown, medium dense to dense, damp					
5		Boring completed at depth of 4'					
10							
15							
20							
25							
30							
35							

GWT not encountered

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19803-17

Log of Test Excavation T-6

Boring Location: Heacock and Brodiaea, Moreno Valley

Date of Drilling: 8/5/17

Groundwater Depth: None Encountered

Drilling Method: Backhoe

Hammer Weight:

Drop:

Surface Elevation: Not Measured

Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: Relative Compaction
0		FILL SOILS Clayey SAND with occasional gravel, roots Brown, loose, dry					
		NATURAL SOILS Clayey SAND Brown, medium dense to dense, damp					
5			■		5.5	109.8	
		Boring completed at depth of 8'					
10							
15							
20							
25							
30							
35							

GWT not encountered

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Alere Property Group, LLC 19803-17	Log of Test Excavation T-7

Boring Location: Heacock and Brodiaea, Moreno Valley	
Date of Drilling: 8/5/17	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:
Surface Elevation: Not Measured	

Depth (feet)	Lith-ology	Material Description	Samples Type	Samples Blow Counts	Laboratory Moisture	Laboratory Dry Density	Laboratory Relative Compaction
0		FILL SOILS					
		Clayey SAND with occasional gravel, roots					
		Brown, loose, dry	■		9.2	123.1	
		NATURAL SOILS					
		Clayey SAND					
		Brown, medium dense to dense, damp	■		2.9	111.3	
5		Silty SAND					
		Brown, medium dense to dense, damp					
		Clayey SAND					
		Brown, dense, damp to moist	■		10.5	120.6	
10		Boring completed at depth of 10'					
15							
20							
25							
30							
35							

GWT not encountered

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19803-17

Log of Test Excavation T-8

Boring Location: Heacock and Brodiaea, Moreno Valley	
Date of Drilling: 8/5/17	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:
Surface Elevation: Not Measured	

Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: Relative Compaction
0		FILL SOILS					
		Clayey SAND with occasional gravel, roots					
		Brown, loose, dry					
		NATURAL SOILS					
		Clayey SAND					
		Brown, medium dense to dense, damp					
5		Boring completed at depth of 5'					
10							
15							
20							
25							
30							
35							

GWT not encountered

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19803-17

Log of Test Excavation T-9

Boring Location: Heacock and Brodiaea, Moreno Valley

Date of Drilling: 8/5/17

Groundwater Depth: None Encountered

Drilling Method: Backhoe

Hammer Weight:

Drop:

Surface Elevation: Not Measured

Depth (feet)	Lith-ology	Material Description	Samples Type	Samples Blow Counts	Laboratory Moisture	Laboratory Dry Density	Laboratory Relative Compaction
0		FILL SOILS Clayey SAND with occasional gravel, roots Brown, loose, dry					
		NATURAL SOILS Clayey SAND Brown, medium dense to dense, damp					
5		Silty SAND Brown, dense, damp	■		6.6	111.0	
		Clayey SAND Brown, dense, damp					
10			■		7.7	120.1	
		Boring completed at depth of 10.5'					
15							
20							
25							
30							
35							

GWT not encountered

SuperLog CivilTech Software, USA www.civiltech.com File: C:\Superlog4\PROJECT\19803-17.log Date: 8/17/2017

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Alere Property Group, LLC
19803-17

Log of Test Excavation T-10

Boring Location: Heacock and Brodiaea, Moreno Valley	
Date of Drilling: 8/5/17	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:
Surface Elevation: Not Measured	

Depth (feet)	Lith-ology	Material Description	Samples Type	Samples Blow Counts	Laboratory Moisture	Laboratory Dry Density	Laboratory Relative Compaction
0		FILL SOILS Clayey SAND with occasional gravel, roots Brown, loose, dry	■		7.9	107.9	
		NATURAL SOILS Clayey sandy SILT Brown, medium stiff, damp	■		6.6	106.9	
5							
		Slightly silty SAND with small gravel Brown, medium dense, damp	■		2.1	105.9	
10		Clayey SAND with occasional gravel Brown, medium dense, moist	■		10.4	104.1	
		Boring completed at depth of 12.5'					
15							
20							
25							
30							
35							

GWT not encountered

SuperLog CivilTech Software, USA www.civiltech.com File: C:\Superlog4\PROJECT\19803-17.log Date: 8/17/2017

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Alere Property Group, LLC
19803-17

Log of Test Excavation T-11

Boring Location: Heacock and Brodiaea, Moreno Valley

Date of Drilling: 8/5/17

Groundwater Depth: None Encountered

Drilling Method: Backhoe

Hammer Weight:

Drop:

Surface Elevation: Not Measured

Depth (feet)	Lith-ology	Material Description	Samples Type	Samples Blow Counts	Laboratory Moisture	Laboratory Dry Density	Laboratory Relative Compaction
0		FILL SOILS					
		Clayey SAND with occasional gravel, roots					
		Brown, loose, dry			4.9	106.9	
		Sandy CLAY					
		Brown, medium stiff, damp					
5		Boring completed at depth of 5'					
10							
15							
20							
25							
30							
35							

GWT not encountered

SuperLog CivilTech Software, USA www.civiltech.com File: C:\Superlog4\PROJECT\19803-17.log Date: 8/17/2017

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19803-17

Log of Test Excavation T-12

Boring Location: Heacock and Brodiaea, Moreno Valley	
Date of Drilling: 8/5/17	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:
Surface Elevation: Not Measured	

Depth (feet)	Lith-ology	Material Description	Samples Type	Samples Blow Counts	Laboratory Moisture	Laboratory Dry Density	Laboratory Relative Compaction
0		FILL SOILS Clayey SAND with occasional gravel, roots Brown, loose, dry					
		NATURAL SOILS Clayey SAND Brown, medium dense to dense, damp	■		7.7	110.4	
5		Boring completed at depth of 6'					
10							
15							
20							
25							
30							
35							

GWT not encountered

SuperLog CivilTech Software, USA www.civiltech.com File: C:\Superlog4\PROJECT\19803-17.log Date: 8/17/2017

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19803-17

Log of Test Excavation T-13

Boring Location: Heacock and Brodiaea, Moreno Valley	
Date of Drilling: 8/5/17	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:
Surface Elevation: Not Measured	

Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: Relative Compaction
0		FILL SOILS Clayey SAND with occasional gravel, roots Brown, loose, dry					
		NATURAL SOILS Clayey SAND Brown, medium dense to dense, damp					
5		Boring completed at depth of 4'					
10							
15							
20							
25							
30							
35							

GWT not encountered

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Log of Test Excavation T-14

Boring Location: Heacock and Brodiaea, Moreno Valley	
Date of Drilling: 8/5/17	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:
Surface Elevation: Not Measured	

Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: Relative Compaction
0		FILL SOILS Clayey SAND with occasional gravel, roots Brown, loose, dry					
		NATURAL SOILS Clayey SAND Brown, medium dense to dense, damp					
5		GWT not encountered					
		Boring completed at depth of 6'					
10							
15							
20							
25							
30							
35							

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Alere Property Group, LLC
19803-17

Log of Test Excavation T-15

Boring Location: Heacock and Brodiaea, Moreno Valley	
Date of Drilling: 8/5/17	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:
Surface Elevation: Not Measured	

Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: Relative Compaction
0		FILL SOILS Clayey SAND with occasional gravel, roots Brown, loose, dry					
		NATURAL SOILS Clayey SAND Brown, medium dense to dense, damp					
5		Boring completed at depth of 4'					
10							
15							
20							
25							
30							
35							

GWT not encountered

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APPENDIX C

TABLE I
MAXIMUM DENSITY TESTS
(ASTM: D-1557-12)

Sample	Classification	Optimum Moisture	Maximum Dry Density (lbs./cu.ft.)
B-1 @ 2-4'	clayey SAND	9.5	126.0

TABLE II
EXPANSION INDEX TESTS
(ASTM: D-4829-11)

Sample	Classification	Expansion Index
B-1 @ 2-4'	clayey SAND	25

TABLE III
SOLUBLE SULFATE TESTS
(CT 417)

Sample	Sulfate Concentration (%)
B-1 @ 1-2'	.0013

TABLE IV
pH TESTS

Sample	pH
B-1 @ 1-2'	6.5

TABLE V
RESISTIVITY TESTS
(CT 643)

Sample	Resistivity (ohm-cm)
B-1 @ 1-2'	7693

TABLE VI
CHLORIDE TESTS
(CT 422))

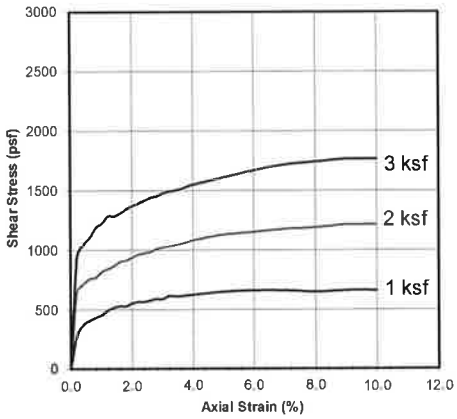
Sample	Concentration (ppm)
B-1 @ 1-2'	218

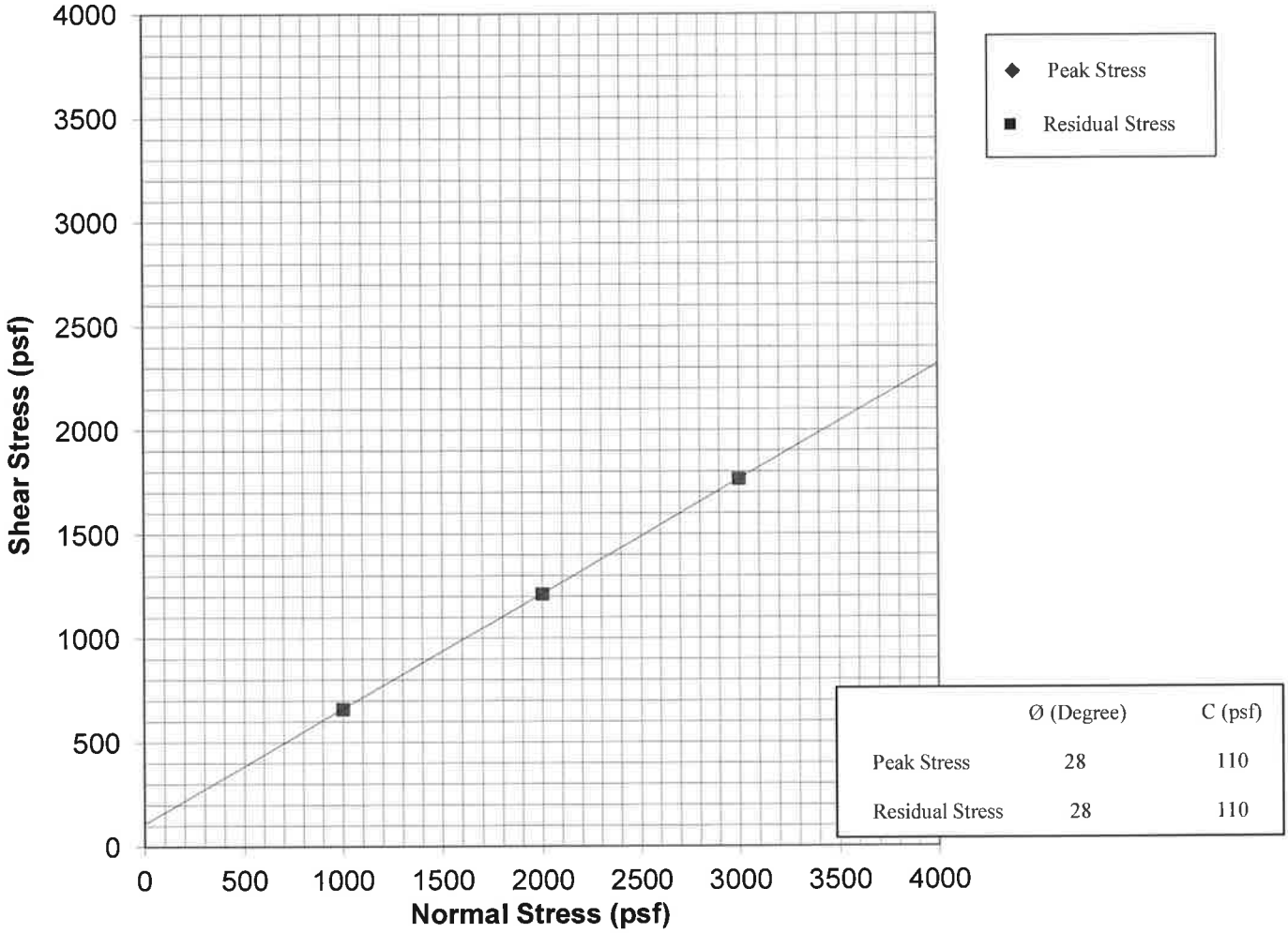
TABLE VII
RESISTANCE 'R' VALUE TESTS
(CA 301))

Sample	'R' Value
T-11 @ 1-2'	28

Sample No.	B1@2-5'
Sample Type:	Remolded/Saturated
Soil Description:	Silty Sand & Clay

		1	2	3
Normal Stress	(psf)	1000	2000	3000
Peak Stress	(psf)	660	1212	1764
Displacement	(in)	0.150	0.225	0.225
Residual Stress	(psf)	660	1212	1764
Displacement	(in.)	0.250	0.250	0.250
In Situ Dry Density	(pcf)	117.0	117.0	117.0
In Situ Water Content	(%)	9.0	9.0	9.0
Saturated Water Content	(%)	16.1	16.1	16.1
Strain Rate	(in/min)	0.020	0.020	0.020





	Ø (Degree)	C (psf)
Peak Stress	28	110
Residual Stress	28	110

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SOILS AND GEOTECHNICAL CONSULTANTS

Alere Property Group, LLC

PROJECT NUMBER: 19803-17 DATE: 8/16/2017

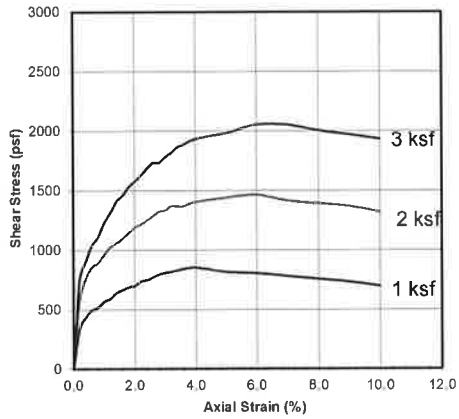
DIRECT SHEAR TEST

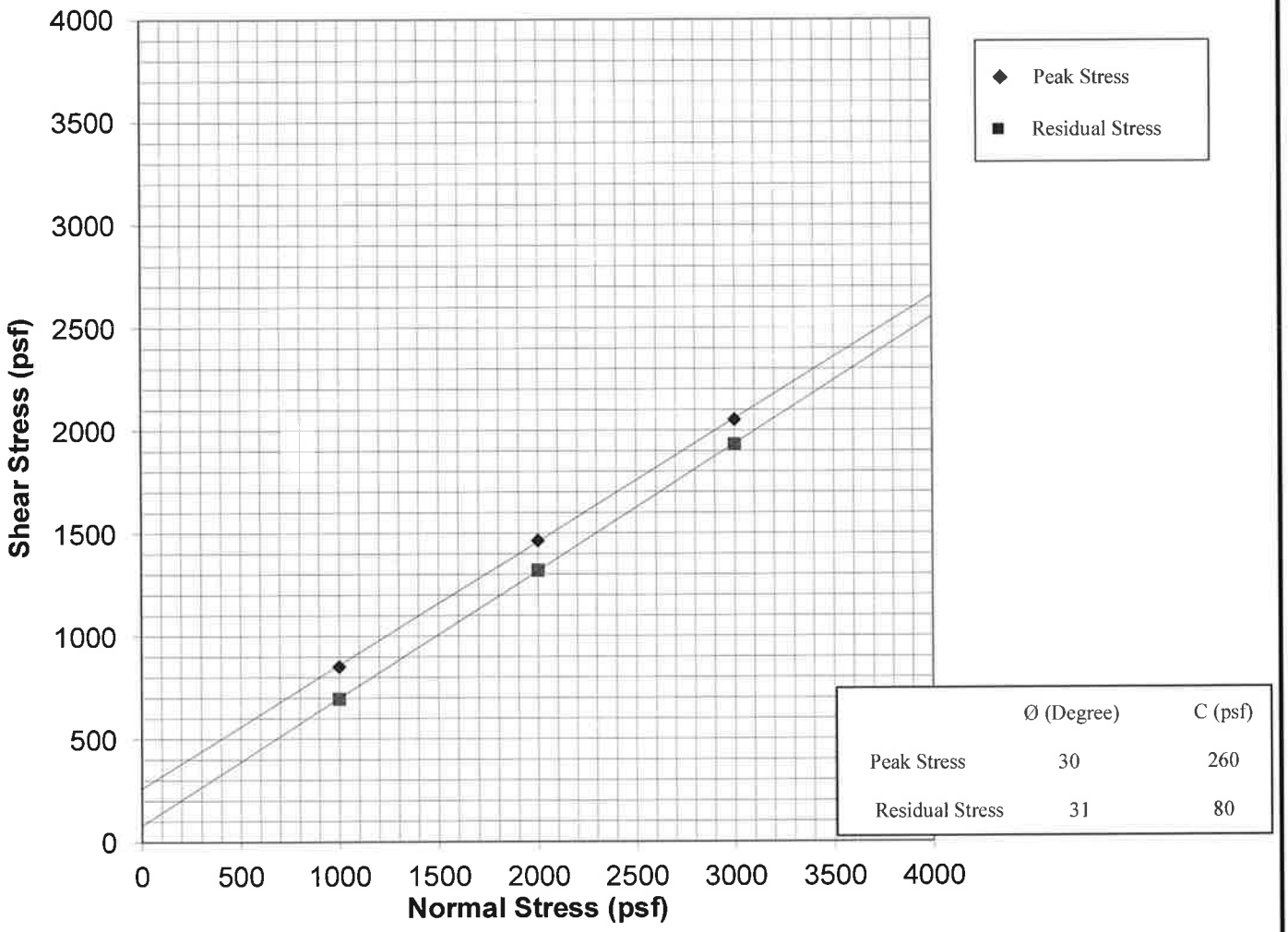
ASTM D3080

Plate A

Sample No.	T4@8'
Sample Type:	Undisturbed/Saturated
Soil Description:	Sandy Clay w/ Some Silt

		1	2	3
Normal Stress	(psf)	1000	2000	3000
Peak Stress	(psf)	852	1464	2052
Displacement	(in.)	0.100	0.150	0.150
Residual Stress	(psf)	696	1320	1932
Displacement	(in.)	0.250	0.250	0.250
In Situ Dry Density	(pcf)	110.4	110.4	110.4
In Situ Water Content	(%)	8.3	8.3	8.3
Saturated Water Content	(%)	19.3	19.3	19.3
Strain Rate	(in/min)	0.020	0.020	0.020





	Ø (Degree)	C (psf)
Peak Stress	30	260
Residual Stress	31	80

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SOILS AND GEOTECHNICAL CONSULTANTS

Alere Property Group, LLC

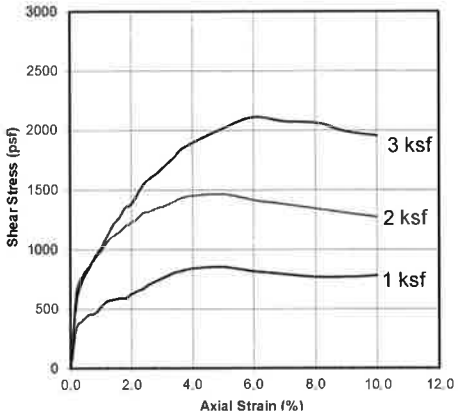
PROJECT NUMBER: 19803-17 DATE: 8/16/2017

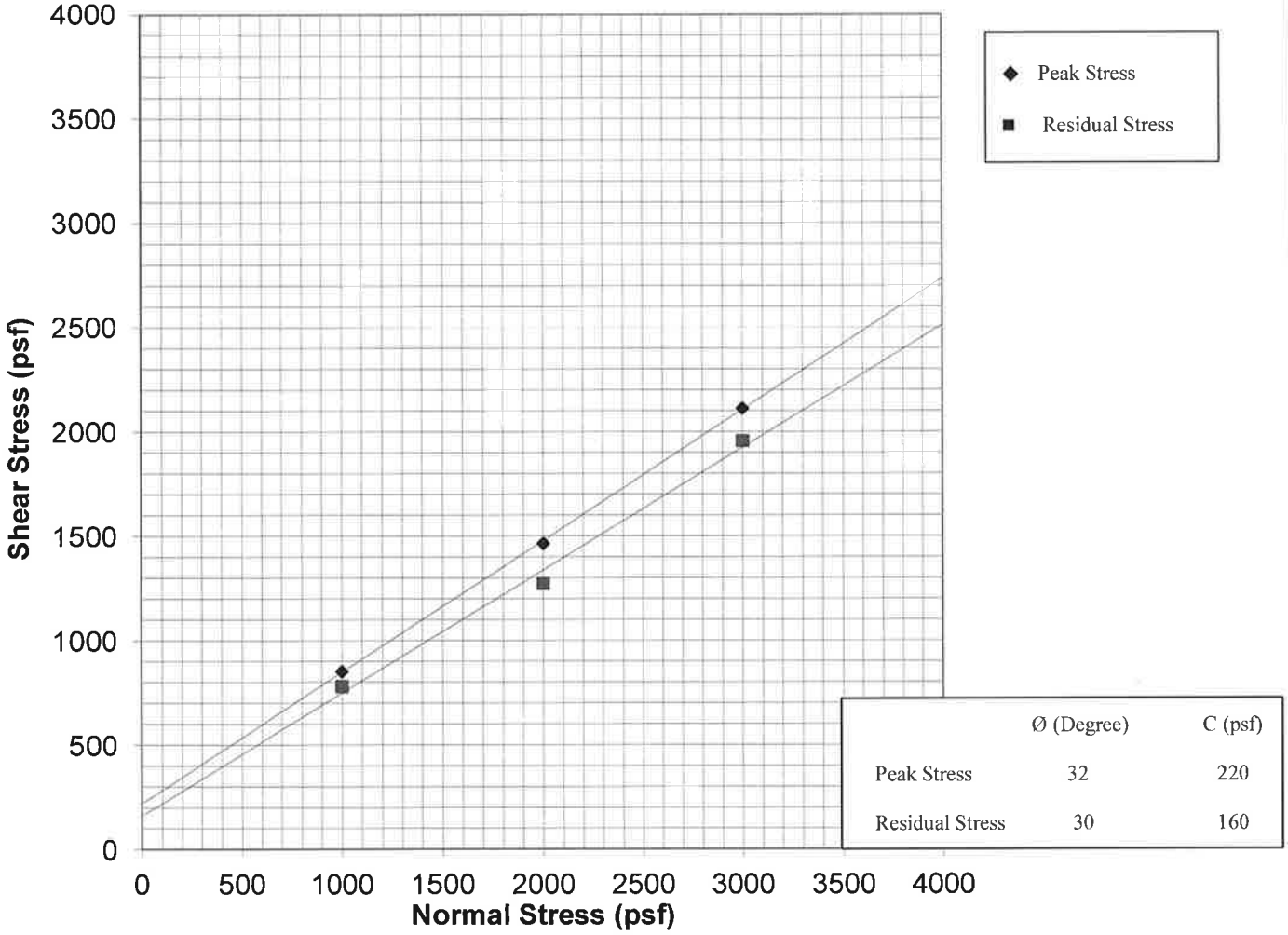
DIRECT SHEAR TEST

ASTM D3080

Plate B

Sample No.		T7@4'		
Sample Type:		Undisturbed/Saturated		
Soil Description:		Silty Fine-Very Coarse Grained Sand w/ Some Small Gravel		
		1	2	3
Normal Stress	(psf)	1000	2000	3000
Peak Stress	(psf)	852	1464	2112
Displacement	(in.)	0.125	0.125	0.150
Residual Stress	(psf)	780	1272	1956
Displacement	(in.)	0.250	0.250	0.250
In Situ Dry Density	(pcf)	111.3	111.3	111.3
In Situ Water Content	(%)	2.9	2.9	2.9
Saturated Water Content	(%)	19.0	19.0	19.0
Strain Rate	(in/min)	0.020	0.020	0.020





	Ø (Degree)	C (psf)
Peak Stress	32	220
Residual Stress	30	160

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SOILS AND GEOTECHNICAL CONSULTANTS

Alere Property Group, LLC

PROJECT NUMBER: 19803-17 DATE: 8/16/2017

DIRECT SHEAR TEST

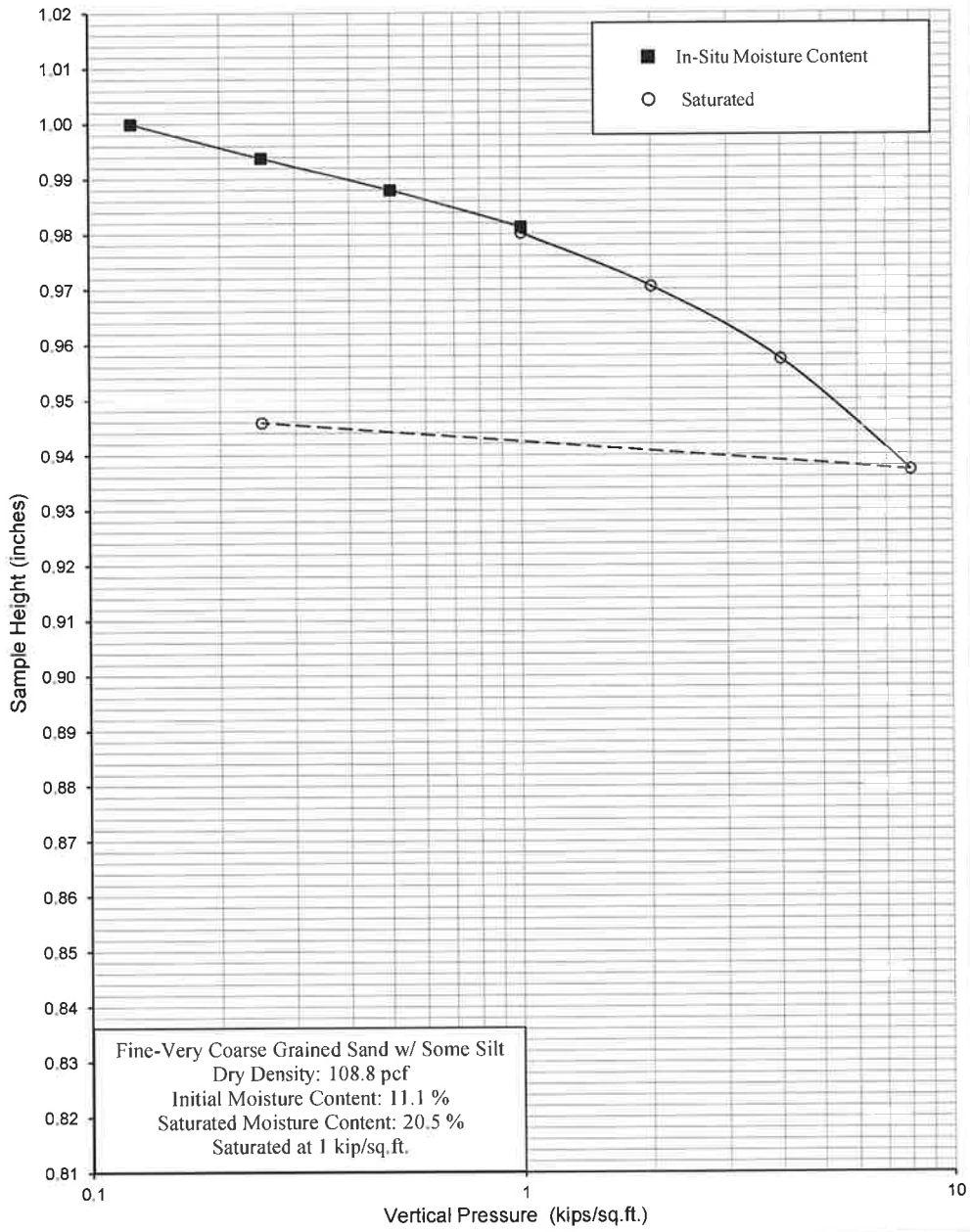
ASTM D3080

Plate C

Vertical Pressure (kips/sq.ft.)	Sample Height (inches)	Consolidation (percent)	
0.125	1.0000	0.0	
0.25	0.9938	0.6	
0.5	0.9880	1.2	
1	0.9813	1.9	
1	0.9802	2.0	Saturated
2	0.9705	3.0	
4	0.9573	4.3	
8	0.9372	6.3	
0.25	0.9459	5.4	

Sample No.	B2	Depth	15'	Date	8/16/2017

Date Tested: 8/14/2017
Sample: B2
Depth: 15'



NorCal Engineering

SOILS AND GEOTECHNICAL CONSULTANTS

Alere Property Group, LLC

PROJECT NUMBER: 19803-17 DATE: 8/16/2017

CONSOLIDATION TEST

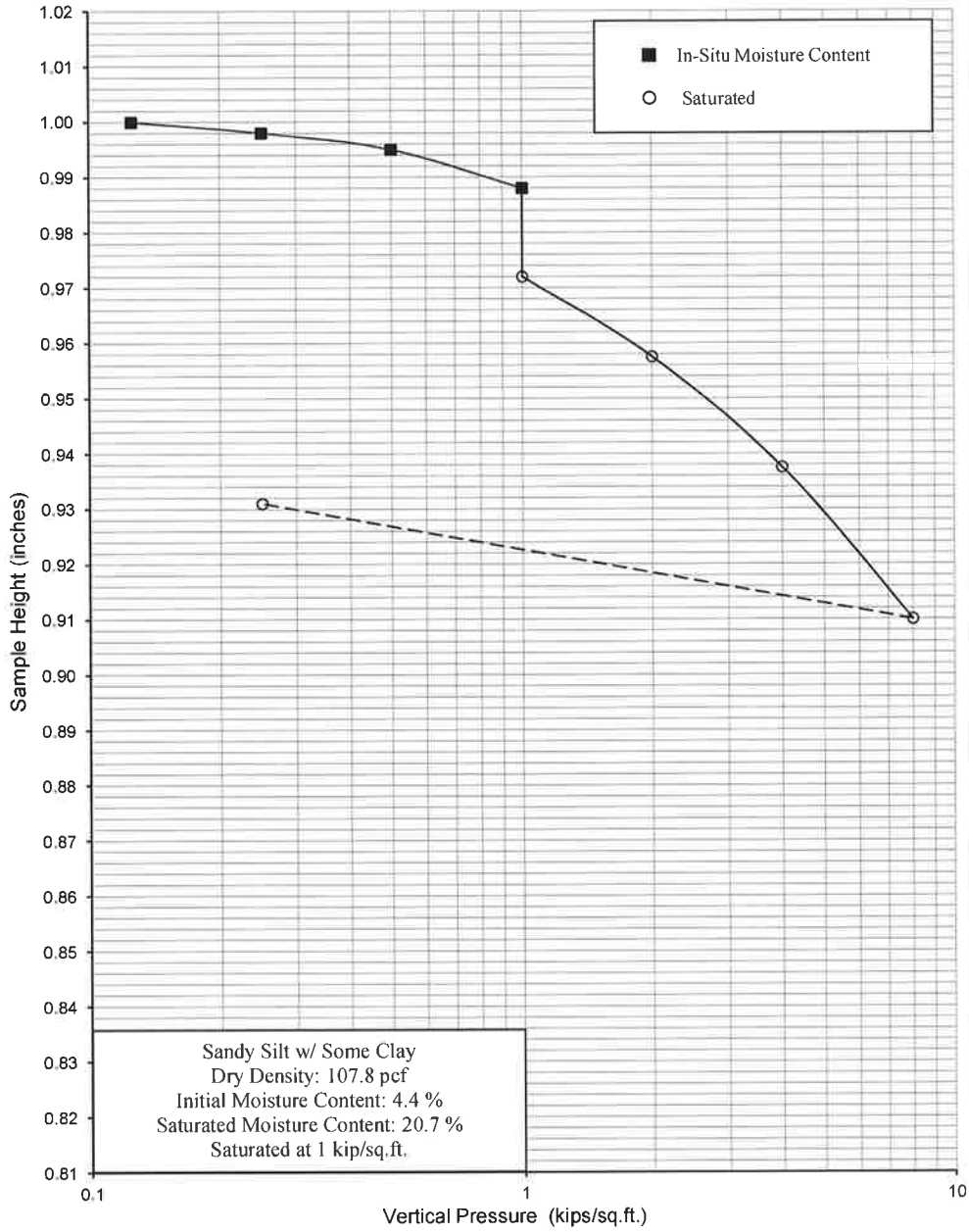
ASTM D2435

Plate D

Vertical Pressure (kips/sq.ft.)	Sample Height (inches)	Consolidation (percent)	
0.125	1.0000	0.0	
0.25	0.9980	0.2	
0.5	0.9950	0.5	
1	0.9880	1.2	
1	0.9720	2.8	Saturated
2	0.9575	4.3	
4	0.9375	6.3	
8	0.9100	9.0	
0.25	0.9310	6.9	

Sample No.	B3	Depth	10'	Date	8/16/2017

Date Tested: 8/15/2017
Sample: B3
Depth: 10'



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Alere Property Group, LLC

PROJECT NUMBER: 19803-17 DATE: 8/16/2017

CONSOLIDATION TEST

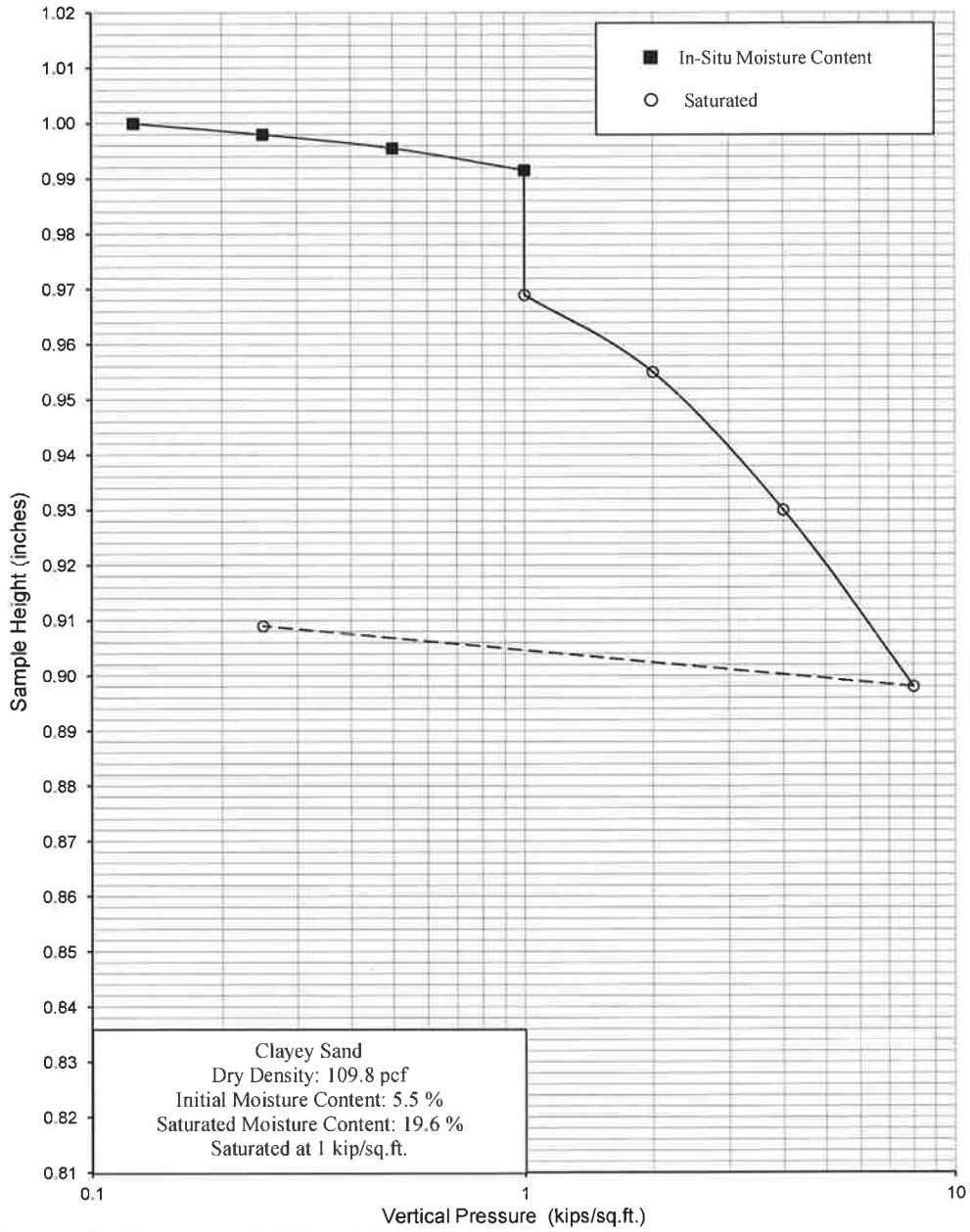
ASTM D2435

Plate E

Vertical Pressure (kips/sq.ft.)	Sample Height (inches)	Consolidation (percent)	
0.125	1.0000	0.0	
0.25	0.9980	0.2	
0.5	0.9955	0.4	
1	0.9915	0.8	
1	0.9690	3.1	
2	0.9550	4.5	
4	0.9300	7.0	Saturated
8	0.8980	10.2	
0.25	0.9090	9.1	

Sample No.	T6	Depth	5'	Date	8/16/2017

Date Tested: 8/15/2017
Sample: T6
Depth: 5'



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SOILS AND GEOTECHNICAL CONSULTANTS

Alere Property Group, LLC

PROJECT NUMBER: 19803-17 DATE: 8/16/2017

CONSOLIDATION TEST

ASTM D2435

Plate F

Appendix 4: Historical Site Conditions

Phase I Environmental Site Assessment or Other Information on Past Site Use (NOT APPLICABLE)

Appendix 5: LID Infeasibility

LID Technical Infeasibility Analysis (NOT APPLICABLE)

Appendix 6: BMP Design Details

BMP Sizing, Design Details and other Supporting Documentation

Section D: Implement LID BMPs

D.1 Infiltration Applicability

Is there an approved downstream 'Highest and Best Use' for stormwater runoff (see discussion in Chapter 2.4.4 of the WQMP Guidance Document for further details)? ☐ Y ☒ N

If yes has been checked, Infiltration BMPs shall not be used for the site. If no, continue working through this section to implement your LID BMPs. It is recommended that you contact your Co-Permittee to verify whether or not your project discharges to an approved downstream 'Highest and Best Use' feature.

Geotechnical Report

A Geotechnical Report or Phase I Environmental Site Assessment may be required by the Copermittee to confirm present and past site characteristics that may affect the use of Infiltration BMPs. In addition, the Co-Permittee, at their discretion, may not require a geotechnical report for small projects as described in Chapter 2 of the WQMP Guidance Document. If a geotechnical report has been prepared, include it in Appendix 3. In addition, if a Phase I Environmental Site Assessment has been prepared, include it in Appendix 4.

Is this project classified as a small project consistent with the requirements of Chapter 2 of the WQMP Guidance Document? ☐ Y ☒ N

Infiltration Feasibility

Table D.1 below is meant to provide a simple means of assessing which DMAs on your site support Infiltration BMPs and is discussed in the WQMP Guidance Document in Chapter 2.4.5. Check the appropriate box for each question and then list affected DMAs as applicable. If additional space is needed, add a row below the corresponding answer.

Table D.1 Infiltration Feasibility

Does the project site…	YES	NO
…have any DMAs with a seasonal high groundwater mark shallower than 10 feet?		X
If Yes, list affected DMAs:		
…have any DMAs located within 100 feet of a water supply well?		X
If Yes, list affected DMAs:		
…have any areas identified by the geotechnical report as posing a public safety risk where infiltration of stormwater could have a negative impact?		X
If Yes, list affected DMAs:		
…have measured in-situ infiltration rates of less than 1.6 inches / hour?	X	
If Yes, list affected DMAs: A-1, A-2, and B (entire site)		
…have significant cut and/or fill conditions that would preclude in-situ testing of infiltration rates at the final infiltration surface?		X
If Yes, list affected DMAs:		
…geotechnical report identifies other site-specific factors that would preclude effective and safe infiltration?		X
Describe here:		
…have areas of known soil or groundwater contamination (unless with written authorization from the Regional Board Executive Officer)		X
If yes, list affected DMAs:		

If you answered "Yes" to any of the questions above for any DMA, Infiltration BMPs should not be used for those DMAs and you should proceed to the assessment for Harvest and Use below.

3.5 Bioretention Facility

Type of BMP	LID – Bioretention
Treatment Mechanisms	Infiltration, Evapotranspiration, Evaporation, Biofiltration
Maximum Drainage Area	This BMP is intended to be integrated into a project's landscaped area in a distributed manner. Typically, contributing drainage areas to Bioretention Facilities range from less than 1 acre to a maximum of around 10 acres.
Other Names	Rain Garden, Bioretention Cell, Bioretention Basin, Biofiltration Basin, Landscaped Filter Basin, Porous Landscape Detention

Description

Bioretention Facilities are shallow, vegetated basins underlain by an engineered soil media. Healthy plant and biological activity in the root zone maintain and renew the macro-pore space in the soil and maximize plant uptake of pollutants and runoff. This keeps the Best Management Practice (BMP) from becoming clogged and allows more of the soil column to function as both a sponge (retaining water) and a highly effective and self-maintaining biofilter. In most cases, the bottom of a Bioretention Facility is unlined, which also provides an opportunity for infiltration to the extent the underlying onsite soil can accommodate. When the infiltration rate of the underlying soil is exceeded, fully biotreated flows are discharged via underdrains. Bioretention Facilities therefore will inherently achieve the maximum feasible level of infiltration and evapotranspiration and achieve the minimum feasible (but highly biotreated) discharge to the storm drain system.

Siting Considerations

These facilities work best when they are designed in a relatively level area. Unlike other BMPs, Bioretention Facilities can be used in smaller landscaped spaces on the site, such as:

- ✓ Parking islands
- ✓ Medians
- ✓ Site entrances

Landscaped areas on the site (such as may otherwise be required through minimum landscaping ordinances), can often be designed as Bioretention Facilities. This can be accomplished by:

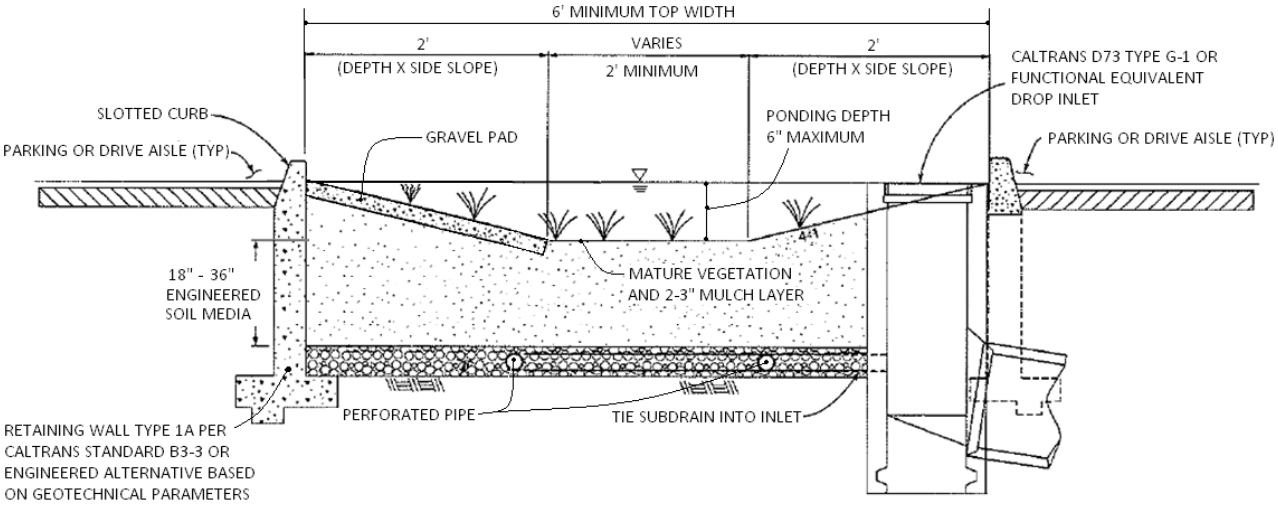
- *Depressing* landscaped areas below adjacent impervious surfaces, rather than elevating those areas
- Grading the site to direct runoff from those impervious surfaces *into* the Bioretention Facility, rather than away from the landscaping
- Sizing and designing the depressed landscaped area as a Bioretention Facility as described in this Fact Sheet

Bioretention Facilities should however not be used downstream of areas where large amounts of sediment can clog the system. Placing a Bioretention Facility at the toe of a steep slope should also be avoided due to the potential for clogging the engineered soil media with erosion from the slope, as well as the potential for damaging the vegetation.

Design and Sizing Criteria

The recommended cross section necessary for a Bioretention Facility includes:

- Vegetated area
- 18' minimum depth of engineered soil media
- 12' minimum gravel layer depth with 6' perforated pipes (added flow control features such as orifice plates may be required to mitigate for HCOC conditions)



While the 18-inch minimum engineered soil media depth can be used in some cases, it is recommended to use 24 inches or a preferred 36 inches to provide an adequate root zone for the chosen plant palate. Such a design also provides for improved removal effectiveness for nutrients. The recommended ponding depth inside of a Bioretention Facility is 6 inches; measured from the flat bottom surface to the top of the water surface as shown in Figure 1.

Because this BMP is filled with an engineered soil media, pore space in the soil and gravel layer is assumed to provide storage volume. However, several considerations must be noted:

- Surcharge storage above the soil surface (6 inches) is important to assure that design flows do not bypass the BMP when runoff exceeds the soil's absorption rate.
- In cases where the Bioretention Facility contains engineered soil media deeper than 36 inches, the pore space within the engineered soil media can only be counted to the 36-inch depth.
- A maximum of 30 percent pore space can be used for the soil media whereas a maximum of 40 percent pore space can be use for the gravel layer.

Figure 1: Standard Layout for a Bioretention Facility

Engineered Soil Media Requirements

The engineered soil media shall be comprised of 85 percent mineral component and 15 percent organic component, by volume, drum mixed prior to placement. The mineral component shall be a Class A sandy loam topsoil that meets the range specified in Table 1 below. The organic component shall be nitrogen stabilized compost[1], such that nitrogen does not leach from the media.

Table 1: Mineral Component Range Requirements

Percent Range	Component
70-80	Sand
15-20	Silt
5-10	Clay

The trip ticket, or certificate of compliance, shall be made available to the inspector to prove the engineered mix meets this specification.

Vegetation Requirements

Vegetative cover is important to minimize erosion and ensure that treatment occurs in the Bioretention Facility. The area should be designed for at least 70 percent mature coverage throughout the Bioretention Facility. To prevent the BMP from being used as walkways, Bioretention Facilities shall be planted with a combination of small trees, densely planted shrubs, and natural grasses. Grasses shall be native or ornamental; preferably ones that do not need to be mowed. The application of fertilizers and pesticides should be minimal. To maintain oxygen levels for the vegetation and promote biodegradation, it is important that vegetation not be completely submerged for any extended period of time. Therefore, a maximum of 6 inches of ponded water shall be used in the design to ensure that plants within the Bioretention Facility remain healthy.

A 2 to 3-inch layer of standard shredded aged hardwood mulch shall be placed as the top layer inside the Bioretention Facility. The 6-inch ponding depth shown in Figure 1 above shall be measured from the top surface of the 2 to 3-inch mulch layer.

Curb Cuts

To allow water to flow into the Bioretention Facility, 1-foot-wide (minimum) curb cuts should be placed approximately every 10 feet around the perimeter of the Bioretention Facility. Figure 2 shows a curb cut in a Bioretention Facility. Curb cut flow lines must be at or above the V_{BMP} water surface level.

[1] For more information on compost, visit the US Composting Council website at: http://compostingcouncil.org/

Figure 2: Curb Cut located in a Bioretention Facility

To reduce erosion, a gravel pad shall be placed at each inlet point to the Bioretention Facility. The gravel should be 1- to 1.5-inch diameter in size. The gravel should overlap the curb cut opening a minimum of 6 inches. The gravel pad inside the Bioretention Facility should be flush with the finished surface at the curb cut and extend to the bottom of the slope.

In addition, place an apron of stone or concrete, a foot square or larger, inside each inlet to prevent vegetation from growing up and blocking the inlet. See Figure 3.

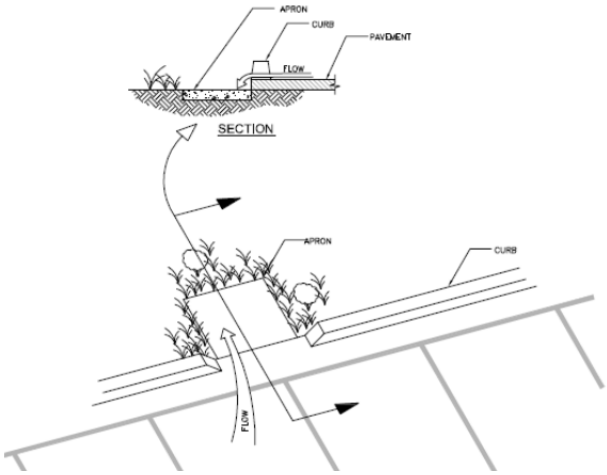


Figure 3: Apron located in a Bioretention Facility

Terracing the Landscaped Filter Basin

It is recommended that Bioretention Facilities be level. In the event the facility site slopes and lacks proper design, water would fill the lowest point of the BMP and then discharge from the basin without being treated. To ensure that the water will be held within the Bioretention Facility on sloped sites, the BMP must be terraced with nonporous check dams to provide the required storage and treatment capacity.

The terraced version of this BMP shall be used on non-flat sites with no more than a 3 percent slope. The surcharge depth cannot exceed 0.5 feet, and side slopes shall not exceed 4:1. Table 2 below shows the spacing of the check dams, and slopes shall be rounded up (i.e., 2.5 percent slope shall use 10' spacing for check dams).

Table 2: Check Dam Spacing

6” Check Dam Spacing	
Slope	**Spacing**
1%	*25'*
2%	*15'*
3%	*10'*

Roof Runoff

Roof downspouts may be directed towards Bioretention Facilities. However, the downspouts must discharge onto a concrete splash block to protect the Bioretention Facility from erosion.

Retaining Walls

It is recommended that Retaining Wall Type 1A, per Caltrans Standard B3-3 or equivalent, be constructed around the entire perimeter of the Bioretention Facility. This practice will protect the sides of the Bioretention Facility from collapsing during construction and maintenance or from high service loads adjacent to the BMP. Where such service loads would not exist adjacent to the BMP, an engineered alternative may be used if signed by a licensed civil engineer.

Side Slope Requirements

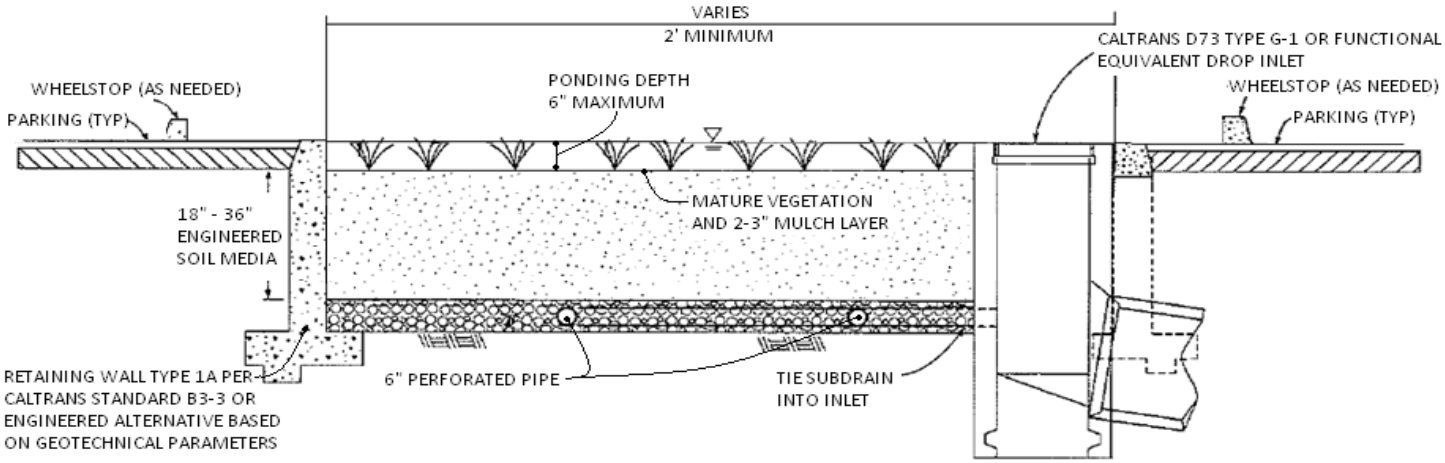
Bioretention Facilities Requiring Side Slopes

The design should assure that the Bioretention Facility does not present a tripping hazard. Bioretention Facilities proposed near pedestrian areas, such as areas parallel to parking spaces or along a walkway, must have a gentle slope to the bottom of the facility. Side slopes inside of a Bioretention Facility shall be 4:1. A typical cross section for the Bioretention Facility is shown in Figure 1.

Bioretention Facilities Not Requiring Side Slopes

Where cars park perpendicular to the Bioretention Facility, side slopes are not required. A 6-inch maximum drop may be used, and the Bioretention Facility must be planted with trees and shrubs to prevent pedestrian access. In this case, a curb is not placed around the Bioretention Facility,

but wheel stops shall be used to prevent vehicles from entering the Bioretention Facility, as shown in Figure 4.



Planter Boxes

Bioretention Facilities can also be placed above ground as planter boxes. Planter boxes must have a minimum width of 2 feet, a maximum surcharge depth of 6 inches, and no side slopes are necessary. Planter boxes must be constructed so as to ensure that the top surface of the engineered soil media will remain level. This option may be constructed of concrete, brick, stone or other stable materials that will not warp or bend. Chemically treated wood or galvanized steel, which has the ability to contaminate stormwater, should not be used. Planter boxes must be lined with an impermeable liner on all sides, including the bottom. Due to the impermeable liner, the inside bottom of the planter box shall be designed and constructed with a cross fall, directing treated flows within the subdrain layer toward the point where subdrain exits the planter box, and subdrains shall be oriented with drain holes oriented down. These provisions will help avoid excessive stagnant water within the gravel underdrain layer. Similar to the in-ground Bioretention Facility versions, this BMP benefits from healthy plants and biological activity in the root zone. Planter boxes should be planted with appropriately selected vegetation.

Figure 5: Planter Box
Source: LA Team Effort

Overflow

An overflow route is needed in the Bioretention Facility design to bypass stored runoff from storm events larger than V_{BMP} or in the event of facility or subdrain clogging. Overflow systems must connect to an acceptable discharge point, such as a downstream conveyance system as shown in Figure 1 and Figure 4. The inlet to the overflow structure shall be elevated inside the Bioretention Facility to be flush with the ponding surface for the design capture volume (V_{BMP}) as shown in Figure 4. This will allow the design capture volume to be fully treated by the Bioretention Facility, and for larger events to safely be conveyed to downstream systems. The overflow inlet shall **not** be located in the entrance of a Bioretention Facility, as shown in Figure 6.

Underdrain Gravel and Pipes

An underdrain gravel layer and pipes shall be provided in accordance with Appendix B – Underdrains.

Figure 6: Incorrect Placement of an Overflow Inlet.

Inspection and Maintenance Schedule

The Bioretention Facility area shall be inspected for erosion, dead vegetation, soggy soils, or standing water. The use of fertilizers and pesticides on the plants inside the Bioretention Facility should be minimized.

Schedule	Activity
Ongoing	• Keep adjacent landscape areas maintained. Remove clippings from landscape maintenance activities. • Remove trash and debris • Replace damaged grass and/or plants • Replace surface mulch layer as needed to maintain a 2-3 inch soil cover.
After storm events	• Inspect areas for ponding
Annually	• Inspect/clean inlets and outlets

Bioretention Facility Design Procedure

1) Enter the area tributary, A_T, to the Bioretention Facility.

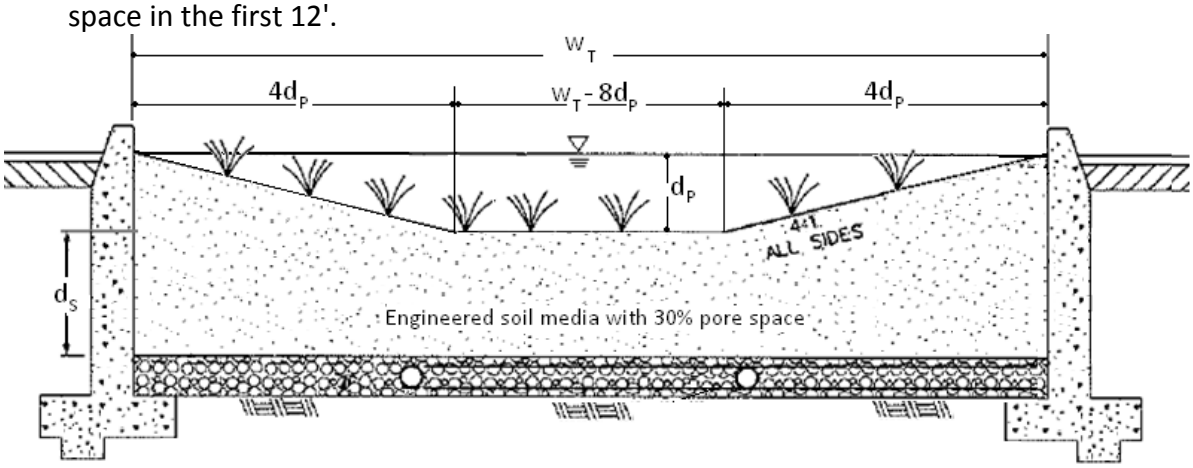
2) Enter the Design Volume, V_{BMP}, determined from Section 2.1 of this Handbook.

3) Select the type of design used. There are two types of Bioretention Facility designs: the standard design used for most project sites that include side slopes, and the modified design used when the BMP is located perpendicular to the parking spaces or with planter boxes that do not use side slopes.

4) Enter the depth of the engineered soil media, d_S. The minimum depth for the engineered soil media can be 18' in limited cases, but it is recommended to use 24' or a preferred 36' to provide an adequate root zone for the chosen plant palette. Engineered soil media deeper than 36' will only get credit for the pore space in the first 36'.

5) Enter the top width of the Bioretention Facility.

6) Calculate the total effective depth, d_E, within the Bioretention Facility. The maximum allowable pore space of the soil media is 30% while the maximum allowable pore space for the gravel layer is 40%. Gravel layer deeper than 12' will only get credit for the pore space in the first 12'.



a. For the design with side slopes the following equation shall be used to determine the total effective depth. Where, d_P is the depth of ponding within the basin.

$$d_E(\text{ft}) = \frac{0.3 \times \left[\left(w_T(\text{ft}) \times d_S(\text{ft})\right) + 4\left(d_P(\text{ft})\right)^2\right] + 0.4 \times 1(\text{ft}) + d_P(\text{ft})\left[4d_P(\text{ft}) + \left(w_T(\text{ft}) - 8d_P(\text{ft})\right)\right]}{w_T(\text{ft})}$$

This above equation can be simplified if the maximum ponding depth of 0.5' is used. The equation below is used on the worksheet to find the minimum area required for the Bioretention Facility:

$$d_E(\text{ft}) = (0.3 \times d_S(\text{ft}) + 0.4 \text{ x } 1(\text{ft})) - \left(\frac{0.7\ (\text{ft}^2)}{w_T(\text{ft})}\right) + 0.5(\text{ft})$$

b. For the design without side slopes the following equation shall be used to determine the total effective depth:

$$d_E(\text{ft}) = d_P(\text{ft}) + [(0.3) \times d_S(\text{ft}) + (0.4) \times 1(\text{ft})]$$

The equation below, using the maximum ponding depth of 0.5', is used on the worksheet to find the minimum area required for the Bioretention Facility:

$$d_E(\text{ft}) = 0.5\ (\text{ft}) + [(0.3) \times d_S(\text{ft}) + (0.4) \times 1(\text{ft})]$$

7) Calculate the minimum surface area, A_M, required for the Bioretention Facility. This does not include the curb surrounding the Bioretention Facility or side slopes.

$$A_M(\text{ft}^2) = \frac{V_{BMP}(\text{ft}^3)}{d_E\ (\text{ft})}$$

8) Enter the proposed surface area. This area shall not be less than the minimum required surface area.

9) Verify that side slopes are no steeper than 4:1 in the standard design, and are not required in the modified design.

10) Provide the diameter, minimum 6 inches, of the perforated underdrain used in the Bioretention Facility. See Appendix B for specific information regarding perforated pipes.

11) Provide the slope of the site around the Bioretention Facility, if used. The maximum slope is 3 percent for a standard design.

12) Provide the check dam spacing, if the site around the Bioretention Facility is sloped.

13) Describe the vegetation used within the Bioretention Facility.

References Used to Develop this Fact Sheet

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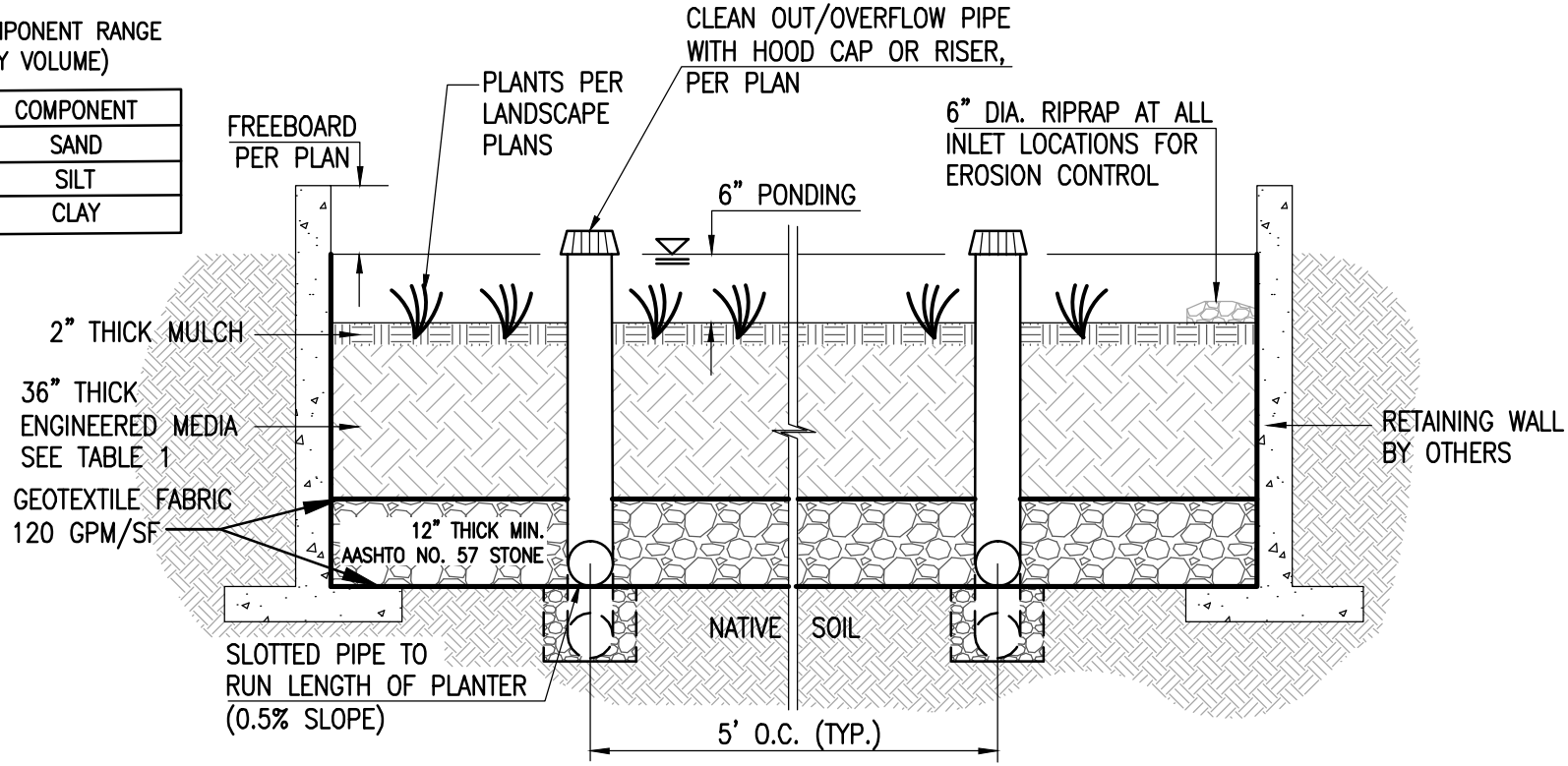
Urbonas, Ben R. Stormwater Sand Filter Sizing and Design: A Unit Operations Approach. Denver: Urban Drainage and Flood Control District, 2002.

TABLE 1: MINERAL COMPONENT RANGE REQUIREMENTS (BY VOLUME)

PERCENT RANGE	COMPONENT
70–80	SAND
15–20	SILT
5–10	CLAY



BIORETENTION DETAIL

N.T.S.

Santa Ana Watershed - BMP Design Volume, V_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	Thienes Engineering	Date	12/15/2017
Designed by	Vicky Li	Case No	
Company Project Number/Name	3566 - Bodiaea Business Park		

BMP Identification

BMP NAME / ID: Bioretention (entire site)

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85}= 0.65 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
A-1	*470448*	*Roofs*	*1*	*0.89*	*419639.6*			
A-2	*23958*	*Ornamental Landscaping*	*0.1*	*0.11*	*2646.4*			
	494406	***Total***			**422286**	**0.65**	***22873.8***	***23542***

Notes:

Bioretention Facility - Design Procedure	BMP ID BIORETENTIO	Legend:	Required Entries / Calculated Cells

Company Name:	Thienes Engineering, Inc.	Date:	15-Dec
Designed by:	Vicky Li	County/City Case No.:	

Design Volume

Enter the area tributary to this feature	A_T=	11.35	acres
Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	22,874	ft^3

Type of Bioretention Facility Design

- ○ Side slopes required (parallel to parking spaces or adjacent to walkways)
- ◉ No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer	d_S =	3.0	ft
Top Width of Bioretention Facility, excluding curb	w_T =	10.0	ft
Total Effective Depth, d_E			
$d_E = [(0.3) \times d_S + (0.4) \times 1] + 0.5$	d_E =	1.80	ft
Minimum Surface Area, A_m $A_M\ (ft^2) = \frac{V_{BMP}\ (ft^3)}{d_E\ (ft)}$	A_M =	12,708	ft^2
Proposed Surface Area	A=	13,079	ft^2
Minimum Required Length of Bioretention Facility, L	L =	1270.8	ft

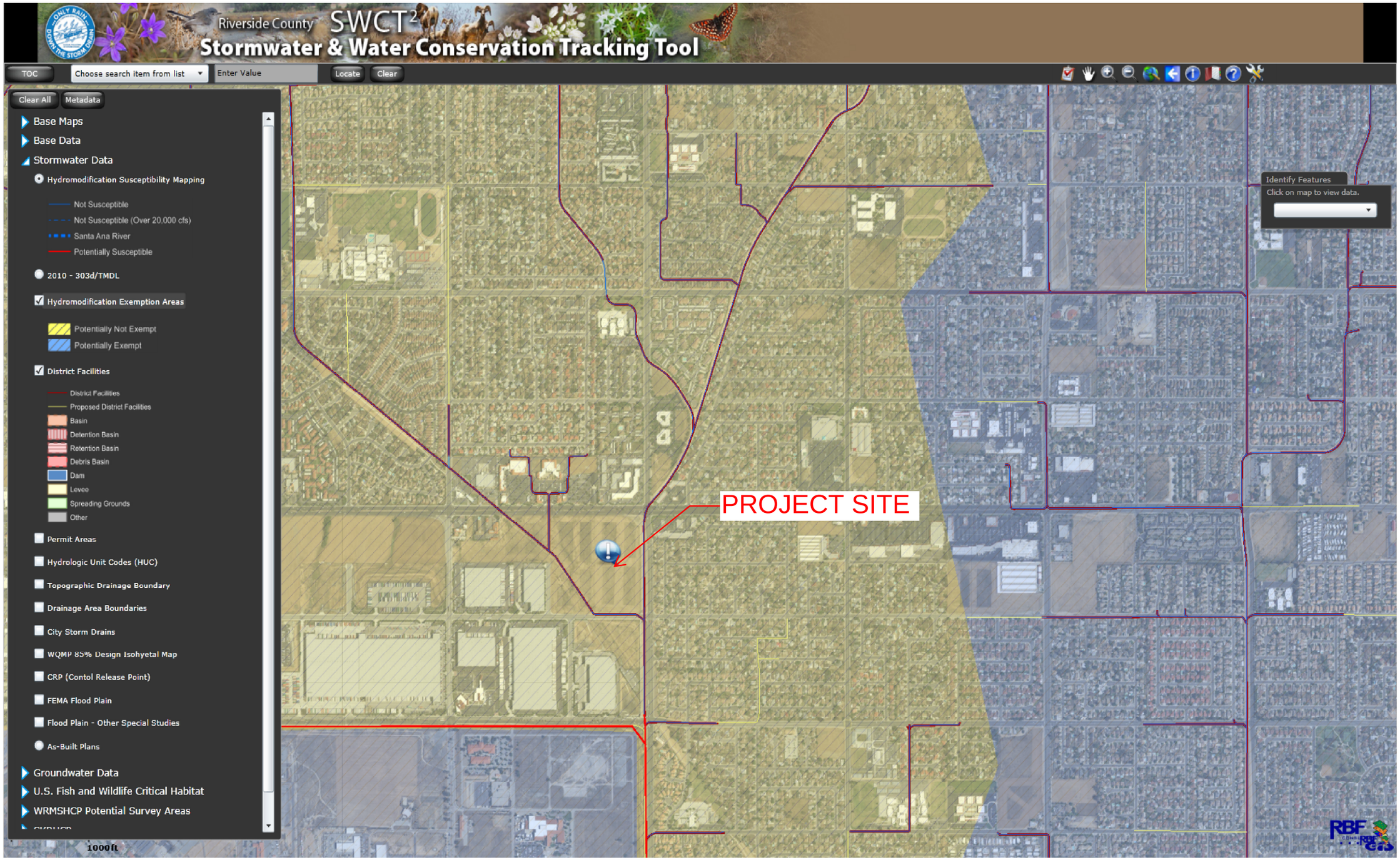
Bioretention Facility Properties

Side Slopes in Bioretention Facility	z =		:1
Diameter of Underdrain		6	inches
Longitudinal Slope of Site (3% maximum)		0	%
6" Check Dam Spacing		0	feet
Describe Vegetation:		Shrubs	

Notes: Volume Provided = 13,079 SF x 1.8 FT = 23,542 CF

Appendix 7: Hydromodification

Supporting Detail Relating to Hydrologic Conditions of Concern


Riverside County SWCT²
Stormwater & Water Conservation Tracking Tool
TOC
Choose search item from list
Enter Value
Locate
Clear
Clear All
Metadata
Base Maps
Base Data
Stormwater Data
Hydromodification Susceptibility Mapping
Not Susceptible
Not Susceptible (Over 20,000 cfs)
Santa Ana River
Potentially Susceptible
2010 - 303d/TMDL
Hydromodification Exemption Areas
Potentially Not Exempt
Potentially Exempt
District Facilities
District Facilities
Proposed District Facilities
Basin
Detention Basin
Retention Basin
Debris Basin
Dam
Levee
Spreading Grounds
Other
Permit Areas
Hydrologic Unit Codes (HUC)
Topographic Drainage Boundary
Drainage Area Boundaries
City Storm Drains
WQMP 85% Design Isohyetal Map
CRP (Contol Release Point)
FEMA Flood Plain
Flood Plain - Other Special Studies
As-Built Plans
Groundwater Data
U.S. Fish and Wildlife Critical Habitat
WRMSHCP Potential Survey Areas
Identify Features
Click on map to view data.
PROJECT SITE
1000ft
RBF

U n i t H y d r o g r a p h A n a l y s i s

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Study date 12/13/17 File: 3566EX242.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6400

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

TEI JOB NO 3566
2 YEAR 24 HOUR EXISTING CONDITION

Drainage Area = 12.00(Ac.) = 0.019 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 12.00(Ac.) = 0.019 Sq. Mi.
Length along longest watercourse = 790.00(Ft.)
Length along longest watercourse measured to centroid = 350.00(Ft.)
Length along longest watercourse = 0.150 Mi.
Length along longest watercourse measured to centroid = 0.066 Mi.
Difference in elevation = 8.00(Ft.)
Slope along watercourse = 53.4684 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.059 Hr.
Lag time = 3.51 Min.
25% of lag time = 0.88 Min.
40% of lag time = 1.41 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.00	1.60	19.20

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.00	4.00	48.00

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 1.600(In)
Area Averaged 100-Year Rainfall = 4.000(In)

Point rain (area averaged) = 1.600(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.600(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
12.000	76.00	0.000

Total Area Entered = 12.00(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
76.0	58.2	0.488	0.000	0.488	1.000	0.488
					Sum (F) =	0.488

Area averaged mean soil loss (F) (In/Hr) = 0.488
Minimum soil loss rate ((In/Hr)) = 0.244
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	142.293	31.264	3.781
2	0.167	284.585	47.554	5.751
3	0.250	426.878	11.654	1.409
4	0.333	569.170	5.126	0.620
5	0.417	711.463	2.701	0.327
6	0.500	853.756	1.702	0.206
			Sum = 100.000	Sum= 12.094

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.013	(0.866)	0.012	0.001
2	0.17	0.07	0.013	(0.862)	0.012	0.001
3	0.25	0.07	0.013	(0.859)	0.012	0.001
4	0.33	0.10	0.019	(0.856)	0.017	0.002
5	0.42	0.10	0.019	(0.852)	0.017	0.002
6	0.50	0.10	0.019	(0.849)	0.017	0.002
7	0.58	0.10	0.019	(0.846)	0.017	0.002
8	0.67	0.10	0.019	(0.842)	0.017	0.002
9	0.75	0.10	0.019	(0.839)	0.017	0.002
10	0.83	0.13	0.026	(0.836)	0.023	0.003
11	0.92	0.13	0.026	(0.833)	0.023	0.003
12	1.00	0.13	0.026	(0.829)	0.023	0.003
13	1.08	0.10	0.019	(0.826)	0.017	0.002
14	1.17	0.10	0.019	(0.823)	0.017	0.002
15	1.25	0.10	0.019	(0.819)	0.017	0.002
16	1.33	0.10	0.019	(0.816)	0.017	0.002
17	1.42	0.10	0.019	(0.813)	0.017	0.002
18	1.50	0.10	0.019	(0.810)	0.017	0.002
19	1.58	0.10	0.019	(0.806)	0.017	0.002
20	1.67	0.10	0.019	(0.803)	0.017	0.002
21	1.75	0.10	0.019	(0.800)	0.017	0.002
22	1.83	0.13	0.026	(0.797)	0.023	0.003
23	1.92	0.13	0.026	(0.794)	0.023	0.003
24	2.00	0.13	0.026	(0.790)	0.023	0.003
25	2.08	0.13	0.026	(0.787)	0.023	0.003
26	2.17	0.13	0.026	(0.784)	0.023	0.003
27	2.25	0.13	0.026	(0.781)	0.023	0.003
28	2.33	0.13	0.026	(0.778)	0.023	0.003
29	2.42	0.13	0.026	(0.774)	0.023	0.003
30	2.50	0.13	0.026	(0.771)	0.023	0.003
31	2.58	0.17	0.032	(0.768)	0.029	0.003
32	2.67	0.17	0.032	(0.765)	0.029	0.003
33	2.75	0.17	0.032	(0.762)	0.029	0.003
34	2.83	0.17	0.032	(0.759)	0.029	0.003
35	2.92	0.17	0.032	(0.756)	0.029	0.003
36	3.00	0.17	0.032	(0.752)	0.029	0.003
37	3.08	0.17	0.032	(0.749)	0.029	0.003
38	3.17	0.17	0.032	(0.746)	0.029	0.003
39	3.25	0.17	0.032	(0.743)	0.029	0.003
40	3.33	0.17	0.032	(0.740)	0.029	0.003
41	3.42	0.17	0.032	(0.737)	0.029	0.003
42	3.50	0.17	0.032	(0.734)	0.029	0.003
43	3.58	0.17	0.032	(0.731)	0.029	0.003
44	3.67	0.17	0.032	(0.728)	0.029	0.003
45	3.75	0.17	0.032	(0.725)	0.029	0.003
46	3.83	0.20	0.038	(0.722)	0.035	0.004
47	3.92	0.20	0.038	(0.719)	0.035	0.004
48	4.00	0.20	0.038	(0.715)	0.035	0.004
49	4.08	0.20	0.038	(0.712)	0.035	0.004
50	4.17	0.20	0.038	(0.709)	0.035	0.004
51	4.25	0.20	0.038	(0.706)	0.035	0.004
52	4.33	0.23	0.045	(0.703)	0.040	0.004
53	4.42	0.23	0.045	(0.700)	0.040	0.004
54	4.50	0.23	0.045	(0.697)	0.040	0.004
55	4.58	0.23	0.045	(0.694)	0.040	0.004
56	4.67	0.23	0.045	(0.691)	0.040	0.004
57	4.75	0.23	0.045	(0.688)	0.040	0.004
58	4.83	0.27	0.051	(0.685)	0.046	0.005
59	4.92	0.27	0.051	(0.683)	0.046	0.005
60	5.00	0.27	0.051	(0.680)	0.046	0.005
61	5.08	0.20	0.038	(0.677)	0.035	0.004
62	5.17	0.20	0.038	(0.674)	0.035	0.004
63	5.25	0.20	0.038	(0.671)	0.035	0.004
64	5.33	0.23	0.045	(0.668)	0.040	0.004
65	5.42	0.23	0.045	(0.665)	0.040	0.004
66	5.50	0.23	0.045	(0.662)	0.040	0.004
67	5.58	0.27	0.051	(0.659)	0.046	0.005
68	5.67	0.27	0.051	(0.656)	0.046	0.005
69	5.75	0.27	0.051	(0.653)	0.046	0.005
70	5.83	0.27	0.051	(0.650)	0.046	0.005
71	5.92	0.27	0.051	(0.647)	0.046	0.005
72	6.00	0.27	0.051	(0.645)	0.046	0.005
73	6.08	0.30	0.058	(0.642)	0.052	0.006
74	6.17	0.30	0.058	(0.639)	0.052	0.006
75	6.25	0.30	0.058	(0.636)	0.052	0.006
76	6.33	0.30	0.058	(0.633)	0.052	0.006
77	6.42	0.30	0.058	(0.630)	0.052	0.006
78	6.50	0.30	0.058	(0.628)	0.052	0.006
79	6.58	0.33	0.064	(0.625)	0.058	0.006
80	6.67	0.33	0.064	(0.622)	0.058	0.006
81	6.75	0.33	0.064	(0.619)	0.058	0.006
82	6.83	0.33	0.064	(0.616)	0.058	0.006
83	6.92	0.33	0.064	(0.614)	0.058	0.006
84	7.00	0.33	0.064	(0.611)	0.058	0.006
85	7.08	0.33	0.064	(0.608)	0.058	0.006
86	7.17	0.33	0.064	(0.605)	0.058	0.006
87	7.25	0.33	0.064	(0.602)	0.058	0.006
88	7.33	0.37	0.070	(0.600)	0.063	0.007
89	7.42	0.37	0.070	(0.597)	0.063	0.007
90	7.50	0.37	0.070	(0.594)	0.063	0.007
91	7.58	0.40	0.077	(0.591)	0.069	0.008
92	7.67	0.40	0.077	(0.589)	0.069	0.008

93	7.75	0.40	0.077	(0.586)	0.069	0.008
94	7.83	0.43	0.083	(0.583)	0.075	0.008
95	7.92	0.43	0.083	(0.581)	0.075	0.008
96	8.00	0.43	0.083	(0.578)	0.075	0.008
97	8.08	0.50	0.096	(0.575)	0.086	0.010
98	8.17	0.50	0.096	(0.573)	0.086	0.010
99	8.25	0.50	0.096	(0.570)	0.086	0.010
100	8.33	0.50	0.096	(0.567)	0.086	0.010
101	8.42	0.50	0.096	(0.565)	0.086	0.010
102	8.50	0.50	0.096	(0.562)	0.086	0.010
103	8.58	0.53	0.102	(0.559)	0.092	0.010
104	8.67	0.53	0.102	(0.557)	0.092	0.010
105	8.75	0.53	0.102	(0.554)	0.092	0.010
106	8.83	0.57	0.109	(0.551)	0.098	0.011
107	8.92	0.57	0.109	(0.549)	0.098	0.011
108	9.00	0.57	0.109	(0.546)	0.098	0.011
109	9.08	0.63	0.122	(0.544)	0.109	0.012
110	9.17	0.63	0.122	(0.541)	0.109	0.012
111	9.25	0.63	0.122	(0.539)	0.109	0.012
112	9.33	0.67	0.128	(0.536)	0.115	0.013
113	9.42	0.67	0.128	(0.533)	0.115	0.013
114	9.50	0.67	0.128	(0.531)	0.115	0.013
115	9.58	0.70	0.134	(0.528)	0.121	0.013
116	9.67	0.70	0.134	(0.526)	0.121	0.013
117	9.75	0.70	0.134	(0.523)	0.121	0.013
118	9.83	0.73	0.141	(0.521)	0.127	0.014
119	9.92	0.73	0.141	(0.518)	0.127	0.014
120	10.00	0.73	0.141	(0.516)	0.127	0.014
121	10.08	0.50	0.096	(0.513)	0.086	0.010
122	10.17	0.50	0.096	(0.511)	0.086	0.010
123	10.25	0.50	0.096	(0.508)	0.086	0.010
124	10.33	0.50	0.096	(0.506)	0.086	0.010
125	10.42	0.50	0.096	(0.503)	0.086	0.010
126	10.50	0.50	0.096	(0.501)	0.086	0.010
127	10.58	0.67	0.128	(0.498)	0.115	0.013
128	10.67	0.67	0.128	(0.496)	0.115	0.013
129	10.75	0.67	0.128	(0.494)	0.115	0.013
130	10.83	0.67	0.128	(0.491)	0.115	0.013
131	10.92	0.67	0.128	(0.489)	0.115	0.013
132	11.00	0.67	0.128	(0.486)	0.115	0.013
133	11.08	0.63	0.122	(0.484)	0.109	0.012
134	11.17	0.63	0.122	(0.482)	0.109	0.012
135	11.25	0.63	0.122	(0.479)	0.109	0.012
136	11.33	0.63	0.122	(0.477)	0.109	0.012
137	11.42	0.63	0.122	(0.474)	0.109	0.012
138	11.50	0.63	0.122	(0.472)	0.109	0.012
139	11.58	0.57	0.109	(0.470)	0.098	0.011
140	11.67	0.57	0.109	(0.467)	0.098	0.011
141	11.75	0.57	0.109	(0.465)	0.098	0.011
142	11.83	0.60	0.115	(0.463)	0.104	0.012
143	11.92	0.60	0.115	(0.460)	0.104	0.012
144	12.00	0.60	0.115	(0.458)	0.104	0.012
145	12.08	0.83	0.160	(0.456)	0.144	0.016
146	12.17	0.83	0.160	(0.454)	0.144	0.016
147	12.25	0.83	0.160	(0.451)	0.144	0.016
148	12.33	0.87	0.166	(0.449)	0.150	0.017
149	12.42	0.87	0.166	(0.447)	0.150	0.017
150	12.50	0.87	0.166	(0.445)	0.150	0.017
151	12.58	0.93	0.179	(0.442)	0.161	0.018
152	12.67	0.93	0.179	(0.440)	0.161	0.018
153	12.75	0.93	0.179	(0.438)	0.161	0.018
154	12.83	0.97	0.186	(0.436)	0.167	0.019
155	12.92	0.97	0.186	(0.433)	0.167	0.019
156	13.00	0.97	0.186	(0.431)	0.167	0.019
157	13.08	1.13	0.218	(0.429)	0.196	0.022
158	13.17	1.13	0.218	(0.427)	0.196	0.022
159	13.25	1.13	0.218	(0.425)	0.196	0.022
160	13.33	1.13	0.218	(0.423)	0.196	0.022
161	13.42	1.13	0.218	(0.420)	0.196	0.022
162	13.50	1.13	0.218	(0.418)	0.196	0.022
163	13.58	0.77	0.147	(0.416)	0.132	0.015
164	13.67	0.77	0.147	(0.414)	0.132	0.015
165	13.75	0.77	0.147	(0.412)	0.132	0.015
166	13.83	0.77	0.147	(0.410)	0.132	0.015
167	13.92	0.77	0.147	(0.408)	0.132	0.015
168	14.00	0.77	0.147	(0.406)	0.132	0.015
169	14.08	0.90	0.173	(0.404)	0.156	0.017
170	14.17	0.90	0.173	(0.402)	0.156	0.017
171	14.25	0.90	0.173	(0.399)	0.156	0.017
172	14.33	0.87	0.166	(0.397)	0.150	0.017
173	14.42	0.87	0.166	(0.395)	0.150	0.017
174	14.50	0.87	0.166	(0.393)	0.150	0.017
175	14.58	0.87	0.166	(0.391)	0.150	0.017
176	14.67	0.87	0.166	(0.389)	0.150	0.017
177	14.75	0.87	0.166	(0.387)	0.150	0.017
178	14.83	0.83	0.160	(0.385)	0.144	0.016
179	14.92	0.83	0.160	(0.383)	0.144	0.016
180	15.00	0.83	0.160	(0.381)	0.144	0.016
181	15.08	0.80	0.154	(0.379)	0.138	0.015
182	15.17	0.80	0.154	(0.378)	0.138	0.015
183	15.25	0.80	0.154	(0.376)	0.138	0.015
184	15.33	0.77	0.147	(0.374)	0.132	0.015
185	15.42	0.77	0.147	(0.372)	0.132	0.015
186	15.50	0.77	0.147	(0.370)	0.132	0.015
187	15.58	0.63	0.122	(0.368)	0.109	0.012
188	15.67	0.63	0.122	(0.366)	0.109	0.012
189	15.75	0.63	0.122	(0.364)	0.109	0.012
190	15.83	0.63	0.122	(0.362)	0.109	0.012
191	15.92	0.63	0.122	(0.360)	0.109	0.012

192	16.00	0.63	0.122	(0.359)	0.109	0.012
193	16.08	0.13	0.026	(0.357)	0.023	0.003
194	16.17	0.13	0.026	(0.355)	0.023	0.003
195	16.25	0.13	0.026	(0.353)	0.023	0.003
196	16.33	0.13	0.026	(0.351)	0.023	0.003
197	16.42	0.13	0.026	(0.350)	0.023	0.003
198	16.50	0.13	0.026	(0.348)	0.023	0.003
199	16.58	0.10	0.019	(0.346)	0.017	0.002
200	16.67	0.10	0.019	(0.344)	0.017	0.002
201	16.75	0.10	0.019	(0.343)	0.017	0.002
202	16.83	0.10	0.019	(0.341)	0.017	0.002
203	16.92	0.10	0.019	(0.339)	0.017	0.002
204	17.00	0.10	0.019	(0.337)	0.017	0.002
205	17.08	0.17	0.032	(0.336)	0.029	0.003
206	17.17	0.17	0.032	(0.334)	0.029	0.003
207	17.25	0.17	0.032	(0.332)	0.029	0.003
208	17.33	0.17	0.032	(0.331)	0.029	0.003
209	17.42	0.17	0.032	(0.329)	0.029	0.003
210	17.50	0.17	0.032	(0.327)	0.029	0.003
211	17.58	0.17	0.032	(0.326)	0.029	0.003
212	17.67	0.17	0.032	(0.324)	0.029	0.003
213	17.75	0.17	0.032	(0.322)	0.029	0.003
214	17.83	0.13	0.026	(0.321)	0.023	0.003
215	17.92	0.13	0.026	(0.319)	0.023	0.003
216	18.00	0.13	0.026	(0.318)	0.023	0.003
217	18.08	0.13	0.026	(0.316)	0.023	0.003
218	18.17	0.13	0.026	(0.315)	0.023	0.003
219	18.25	0.13	0.026	(0.313)	0.023	0.003
220	18.33	0.13	0.026	(0.311)	0.023	0.003
221	18.42	0.13	0.026	(0.310)	0.023	0.003
222	18.50	0.13	0.026	(0.308)	0.023	0.003
223	18.58	0.10	0.019	(0.307)	0.017	0.002
224	18.67	0.10	0.019	(0.305)	0.017	0.002
225	18.75	0.10	0.019	(0.304)	0.017	0.002
226	18.83	0.07	0.013	(0.303)	0.012	0.001
227	18.92	0.07	0.013	(0.301)	0.012	0.001
228	19.00	0.07	0.013	(0.300)	0.012	0.001
229	19.08	0.10	0.019	(0.298)	0.017	0.002
230	19.17	0.10	0.019	(0.297)	0.017	0.002
231	19.25	0.10	0.019	(0.295)	0.017	0.002
232	19.33	0.13	0.026	(0.294)	0.023	0.003
233	19.42	0.13	0.026	(0.293)	0.023	0.003
234	19.50	0.13	0.026	(0.291)	0.023	0.003
235	19.58	0.10	0.019	(0.290)	0.017	0.002
236	19.67	0.10	0.019	(0.289)	0.017	0.002
237	19.75	0.10	0.019	(0.287)	0.017	0.002
238	19.83	0.07	0.013	(0.286)	0.012	0.001
239	19.92	0.07	0.013	(0.285)	0.012	0.001
240	20.00	0.07	0.013	(0.284)	0.012	0.001
241	20.08	0.10	0.019	(0.282)	0.017	0.002
242	20.17	0.10	0.019	(0.281)	0.017	0.002
243	20.25	0.10	0.019	(0.280)	0.017	0.002
244	20.33	0.10	0.019	(0.279)	0.017	0.002
245	20.42	0.10	0.019	(0.277)	0.017	0.002
246	20.50	0.10	0.019	(0.276)	0.017	0.002
247	20.58	0.10	0.019	(0.275)	0.017	0.002
248	20.67	0.10	0.019	(0.274)	0.017	0.002
249	20.75	0.10	0.019	(0.273)	0.017	0.002
250	20.83	0.07	0.013	(0.272)	0.012	0.001
251	20.92	0.07	0.013	(0.271)	0.012	0.001
252	21.00	0.07	0.013	(0.270)	0.012	0.001
253	21.08	0.10	0.019	(0.268)	0.017	0.002
254	21.17	0.10	0.019	(0.267)	0.017	0.002
255	21.25	0.10	0.019	(0.266)	0.017	0.002
256	21.33	0.07	0.013	(0.265)	0.012	0.001
257	21.42	0.07	0.013	(0.264)	0.012	0.001
258	21.50	0.07	0.013	(0.263)	0.012	0.001
259	21.58	0.10	0.019	(0.262)	0.017	0.002
260	21.67	0.10	0.019	(0.261)	0.017	0.002
261	21.75	0.10	0.019	(0.261)	0.017	0.002
262	21.83	0.07	0.013	(0.260)	0.012	0.001
263	21.92	0.07	0.013	(0.259)	0.012	0.001
264	22.00	0.07	0.013	(0.258)	0.012	0.001
265	22.08	0.10	0.019	(0.257)	0.017	0.002
266	22.17	0.10	0.019	(0.256)	0.017	0.002
267	22.25	0.10	0.019	(0.255)	0.017	0.002
268	22.33	0.07	0.013	(0.255)	0.012	0.001
269	22.42	0.07	0.013	(0.254)	0.012	0.001
270	22.50	0.07	0.013	(0.253)	0.012	0.001
271	22.58	0.07	0.013	(0.252)	0.012	0.001
272	22.67	0.07	0.013	(0.252)	0.012	0.001
273	22.75	0.07	0.013	(0.251)	0.012	0.001
274	22.83	0.07	0.013	(0.250)	0.012	0.001
275	22.92	0.07	0.013	(0.250)	0.012	0.001
276	23.00	0.07	0.013	(0.249)	0.012	0.001
277	23.08	0.07	0.013	(0.248)	0.012	0.001
278	23.17	0.07	0.013	(0.248)	0.012	0.001
279	23.25	0.07	0.013	(0.247)	0.012	0.001
280	23.33	0.07	0.013	(0.247)	0.012	0.001
281	23.42	0.07	0.013	(0.246)	0.012	0.001
282	23.50	0.07	0.013	(0.246)	0.012	0.001
283	23.58	0.07	0.013	(0.246)	0.012	0.001
284	23.67	0.07	0.013	(0.245)	0.012	0.001
285	23.75	0.07	0.013	(0.245)	0.012	0.001
286	23.83	0.07	0.013	(0.245)	0.012	0.001
287	23.92	0.07	0.013	(0.244)	0.012	0.001
288	24.00	0.07	0.013	(0.244)	0.012	0.001
		(Loss Rate Not Used)				
	Sum =	100.0			Sum =	1.9

```
Flood volume = Effective rainfall      0.16(In)
 times area      12.0(Ac.)/[(In)/(Ft.)] =       0.2(Ac.Ft)
Total soil loss =      1.44(In)
Total soil loss =     1.440(Ac.Ft)
Total rainfall =      1.60(In)
Flood volume =        6969.4 Cubic Feet
Total soil loss =       62724.9 Cubic Feet
-------------------------------------------------------------------
 Peak flow rate of this hydrograph =      0.263(CFS)
-------------------------------------------------------------------
+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                     24 - H O U R    S T O R M
                R u n o f f      H y d r o g r a p h
-------------------------------------------------------------------
            Hydrograph in   5   Minute intervals ((CFS))

-------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
-------------------------------------------------------------------
  0+ 5       0.0000      0.00  Q         |         |         |         |
  0+10       0.0001      0.01  Q         |         |         |         |
  0+15       0.0002      0.01  Q         |         |         |         |
  0+20       0.0003      0.02  Q         |         |         |         |
  0+25       0.0005      0.02  Q         |         |         |         |
  0+30       0.0006      0.02  Q         |         |         |         |
  0+35       0.0008      0.02  Q         |         |         |         |
  0+40       0.0010      0.02  Q         |         |         |         |
  0+45       0.0011      0.02  Q         |         |         |         |
  0+50       0.0013      0.03  Q         |         |         |         |
  0+55       0.0015      0.03  Q         |         |         |         |
  1+ 0       0.0017      0.03  Q         |         |         |         |
  1+ 5       0.0019      0.03  Q         |         |         |         |
  1+10       0.0021      0.02  Q         |         |         |         |
  1+15       0.0022      0.02  Q         |         |         |         |
  1+20       0.0024      0.02  Q         |         |         |         |
  1+25       0.0026      0.02  Q         |         |         |         |
  1+30       0.0027      0.02  Q         |         |         |         |
  1+35       0.0029      0.02  Q         |         |         |         |
  1+40       0.0030      0.02  Q         |         |         |         |
  1+45       0.0032      0.02  Q         |         |         |         |
  1+50       0.0034      0.03  Q         |         |         |         |
  1+55       0.0036      0.03  Q         |         |         |         |
  2+ 0       0.0038      0.03  Q         |         |         |         |
  2+ 5       0.0040      0.03  Q         |         |         |         |
  2+10       0.0042      0.03  QV        |         |         |         |
  2+15       0.0044      0.03  QV        |         |         |         |
  2+20       0.0046      0.03  QV        |         |         |         |
  2+25       0.0048      0.03  QV        |         |         |         |
  2+30       0.0051      0.03  QV        |         |         |         |
  2+35       0.0053      0.03  QV        |         |         |         |
  2+40       0.0055      0.04  QV        |         |         |         |
  2+45       0.0058      0.04  QV        |         |         |         |
  2+50       0.0061      0.04  QV        |         |         |         |
  2+55       0.0063      0.04  QV        |         |         |         |
  3+ 0       0.0066      0.04  QV        |         |         |         |
  3+ 5       0.0069      0.04  QV        |         |         |         |
  3+10       0.0071      0.04  QV        |         |         |         |
  3+15       0.0074      0.04  QV        |         |         |         |
  3+20       0.0077      0.04  QV        |         |         |         |
  3+25       0.0079      0.04  QV        |         |         |         |
  3+30       0.0082      0.04  Q V       |         |         |         |
  3+35       0.0085      0.04  Q V       |         |         |         |
  3+40       0.0087      0.04  Q V       |         |         |         |
  3+45       0.0090      0.04  Q V       |         |         |         |
  3+50       0.0093      0.04  Q V       |         |         |         |
  3+55       0.0096      0.04  Q V       |         |         |         |
  4+ 0       0.0099      0.05  Q V       |         |         |         |
  4+ 5       0.0102      0.05  Q V       |         |         |         |
  4+10       0.0105      0.05  Q V       |         |         |         |
  4+15       0.0109      0.05  Q V       |         |         |         |
  4+20       0.0112      0.05  Q V       |         |         |         |
  4+25       0.0116      0.05  Q V       |         |         |         |
  4+30       0.0119      0.05  Q V       |         |         |         |
  4+35       0.0123      0.05  Q  V      |         |         |         |
  4+40       0.0127      0.05  Q  V      |         |         |         |
  4+45       0.0130      0.05  Q  V      |         |         |         |
  4+50       0.0134      0.06  Q  V      |         |         |         |
  4+55       0.0139      0.06  Q  V      |         |         |         |
  5+ 0       0.0143      0.06  Q  V      |         |         |         |
  5+ 5       0.0147      0.06  Q  V      |         |         |         |
  5+10       0.0150      0.05  Q  V      |         |         |         |
  5+15       0.0153      0.05  Q  V      |         |         |         |
  5+20       0.0157      0.05  Q  V      |         |         |         |
  5+25       0.0160      0.05  Q   V     |         |         |         |
  5+30       0.0164      0.05  Q   V     |         |         |         |
  5+35       0.0168      0.06  Q   V     |         |         |         |
  5+40       0.0172      0.06  Q   V     |         |         |         |
  5+45       0.0176      0.06  Q   V     |         |         |         |
  5+50       0.0181      0.06  Q   V     |         |         |         |
  5+55       0.0185      0.06  Q   V     |         |         |         |
  6+ 0       0.0189      0.06  Q   V     |         |         |         |
  6+ 5       0.0194      0.06  Q   V     |         |         |         |
  6+10       0.0198      0.07  Q   V     |         |         |         |
  6+15       0.0203      0.07  Q    V    |         |         |         |
  6+20       0.0208      0.07  Q    V    |         |         |         |
  6+25       0.0213      0.07  Q    V    |         |         |         |
  6+30       0.0217      0.07  Q    V    |         |         |         |
  6+35       0.0222      0.07  Q    V    |         |         |         |
  6+40       0.0228      0.08  Q    V    |         |         |         |
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 6+45       0.0233      0.08  Q    V    |         |         |         |
 6+50       0.0238      0.08  Q    V    |         |         |         |
 6+55       0.0243      0.08  Q     V   |         |         |         |
 7+ 0       0.0249      0.08  Q     V   |         |         |         |
 7+ 5       0.0254      0.08  Q     V   |         |         |         |
 7+10       0.0259      0.08  Q     V   |         |         |         |
 7+15       0.0265      0.08  Q     V   |         |         |         |
 7+20       0.0270      0.08  Q     V   |         |         |         |
 7+25       0.0276      0.08  Q     V   |         |         |         |
 7+30       0.0282      0.08  Q      V  |         |         |         |
 7+35       0.0288      0.09  Q      V  |         |         |         |
 7+40       0.0294      0.09  Q      V  |         |         |         |
 7+45       0.0300      0.09  Q      V  |         |         |         |
 7+50       0.0307      0.10  Q      V  |         |         |         |
 7+55       0.0314      0.10  Q      V  |         |         |         |
 8+ 0       0.0321      0.10  Q       V |         |         |         |
 8+ 5       0.0328      0.11  Q       V |         |         |         |
 8+10       0.0336      0.11  Q       V |         |         |         |
 8+15       0.0344      0.11  Q       V |         |         |         |
 8+20       0.0352      0.12  Q       V |         |         |         |
 8+25       0.0360      0.12  Q       V |         |         |         |
 8+30       0.0368      0.12  Q        V|         |         |         |
 8+35       0.0376      0.12  Q        V|         |         |         |
 8+40       0.0384      0.12  Q        V|         |         |         |
 8+45       0.0393      0.12  Q        V|         |         |         |
 8+50       0.0401      0.13  Q         V         |         |         |
 8+55       0.0410      0.13  Q         V         |         |         |
 9+ 0       0.0419      0.13  Q         V         |         |         |
 9+ 5       0.0429      0.14  Q         V         |         |         |
 9+10       0.0439      0.14  Q         V         |         |         |
 9+15       0.0449      0.15  Q         |V        |         |         |
 9+20       0.0459      0.15  Q         |V        |         |         |
 9+25       0.0469      0.15  Q         |V        |         |         |
 9+30       0.0480      0.15  Q         |V        |         |         |
 9+35       0.0491      0.16  Q         | V       |         |         |
 9+40       0.0502      0.16  Q         | V       |         |         |
 9+45       0.0513      0.16  Q         | V       |         |         |
 9+50       0.0524      0.16  Q         |  V      |         |         |
 9+55       0.0536      0.17  Q         |  V      |         |         |
10+ 0       0.0548      0.17  Q         |  V      |         |         |
10+ 5       0.0558      0.15  Q         |  V      |         |         |
10+10       0.0567      0.13  Q         |   V     |         |         |
10+15       0.0575      0.12  Q         |   V     |         |         |
10+20       0.0583      0.12  Q         |   V     |         |         |
10+25       0.0592      0.12  Q         |   V     |         |         |
10+30       0.0600      0.12  Q         |   V     |         |         |
10+35       0.0608      0.13  Q         |    V    |         |         |
10+40       0.0618      0.15  Q         |    V    |         |         |
10+45       0.0629      0.15  Q         |    V    |         |         |
10+50       0.0639      0.15  Q         |    V    |         |         |
10+55       0.0650      0.15  Q         |     V   |         |         |
11+ 0       0.0661      0.15  Q         |     V   |         |         |
11+ 5       0.0671      0.15  Q         |     V   |         |         |
11+10       0.0681      0.15  Q         |      V  |         |         |
11+15       0.0692      0.15  Q         |      V  |         |         |
11+20       0.0702      0.15  Q         |      V  |         |         |
11+25       0.0712      0.15  Q         |      V  |         |         |
11+30       0.0722      0.15  Q         |       V |         |         |
11+35       0.0732      0.14  Q         |       V |         |         |
11+40       0.0741      0.13  Q         |       V |         |         |
11+45       0.0750      0.13  Q         |       V |         |         |
11+50       0.0760      0.13  Q         |       V |         |         |
11+55       0.0769      0.14  Q         |        V|         |         |
12+ 0       0.0779      0.14  Q         |        V|         |         |
12+ 5       0.0789      0.16  Q         |        V|         |         |
12+10       0.0802      0.18  Q         |         V         |         |
12+15       0.0815      0.19  Q         |         V         |         |
12+20       0.0828      0.19  Q         |         V         |         |
12+25       0.0842      0.20  Q         |         |V        |         |
12+30       0.0856      0.20  Q         |         |V        |         |
12+35       0.0870      0.21  Q         |         |V        |         |
12+40       0.0885      0.21  Q         |         | V       |         |
12+45       0.0899      0.22  Q         |         | V       |         |
12+50       0.0915      0.22  Q         |         | V       |         |
12+55       0.0930      0.22  Q         |         |  V      |         |
13+ 0       0.0945      0.22  Q         |         |  V      |         |
13+ 5       0.0962      0.24  Q         |         |   V     |         |
13+10       0.0979      0.25  |Q        |         |   V     |         |
13+15       0.0997      0.26  |Q        |         |   V     |         |
13+20       0.1015      0.26  |Q        |         |    V    |         |
13+25       0.1033      0.26  |Q        |         |    V    |         |
13+30       0.1051      0.26  |Q        |         |     V   |         |
13+35       0.1068      0.24  Q         |         |     V   |         |
13+40       0.1081      0.20  Q         |         |      V  |         |
13+45       0.1094      0.19  Q         |         |      V  |         |
13+50       0.1106      0.18  Q         |         |      V  |         |
13+55       0.1119      0.18  Q         |         |      V  |         |
14+ 0       0.1131      0.18  Q         |         |       V |         |
14+ 5       0.1144      0.19  Q         |         |       V |         |
14+10       0.1158      0.20  Q         |         |       V |         |
14+15       0.1172      0.21  Q         |         |        V|         |
14+20       0.1186      0.21  Q         |         |        V|         |
14+25       0.1200      0.20  Q         |         |         V         |
14+30       0.1214      0.20  Q         |         |         V         |
14+35       0.1228      0.20  Q         |         |         V         |
14+40       0.1242      0.20  Q         |         |         |V        |
14+45       0.1256      0.20  Q         |         |         |V        |
14+50       0.1269      0.20  Q         |         |         |V        |
14+55       0.1283      0.20  Q         |         |         | V       |
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15+ 0       0.1296      0.19  Q         |         |         | V       |
15+ 5       0.1309      0.19  Q         |         |         | V       |
15+10       0.1322      0.19  Q         |         |         |  V      |
15+15       0.1335      0.19  Q         |         |         |  V      |
15+20       0.1348      0.18  Q         |         |         |  V      |
15+25       0.1360      0.18  Q         |         |         |   V     |
15+30       0.1373      0.18  Q         |         |         |   V     |
15+35       0.1384      0.17  Q         |         |         |   V     |
15+40       0.1395      0.15  Q         |         |         |   V     |
15+45       0.1405      0.15  Q         |         |         |    V    |
15+50       0.1415      0.15  Q         |         |         |    V    |
15+55       0.1426      0.15  Q         |         |         |    V    |
16+ 0       0.1436      0.15  Q         |         |         |    V    |
16+ 5       0.1443      0.11  Q         |         |         |     V   |
16+10       0.1447      0.06  Q         |         |         |     V   |
16+15       0.1450      0.04  Q         |         |         |     V   |
16+20       0.1453      0.04  Q         |         |         |     V   |
16+25       0.1455      0.03  Q         |         |         |     V   |
16+30       0.1457      0.03  Q         |         |         |     V   |
16+35       0.1459      0.03  Q         |         |         |     V   |
16+40       0.1461      0.02  Q         |         |         |     V   |
16+45       0.1462      0.02  Q         |         |         |     V   |
16+50       0.1464      0.02  Q         |         |         |     V   |
16+55       0.1465      0.02  Q         |         |         |     V   |
17+ 0       0.1467      0.02  Q         |         |         |     V   |
17+ 5       0.1469      0.03  Q         |         |         |     V   |
17+10       0.1471      0.04  Q         |         |         |     V   |
17+15       0.1474      0.04  Q         |         |         |     V   |
17+20       0.1477      0.04  Q         |         |         |     V   |
17+25       0.1479      0.04  Q         |         |         |     V   |
17+30       0.1482      0.04  Q         |         |         |      V  |
17+35       0.1485      0.04  Q         |         |         |      V  |
17+40       0.1487      0.04  Q         |         |         |      V  |
17+45       0.1490      0.04  Q         |         |         |      V  |
17+50       0.1492      0.04  Q         |         |         |      V  |
17+55       0.1495      0.03  Q         |         |         |      V  |
18+ 0       0.1497      0.03  Q         |         |         |      V  |
18+ 5       0.1499      0.03  Q         |         |         |      V  |
18+10       0.1501      0.03  Q         |         |         |      V  |
18+15       0.1503      0.03  Q         |         |         |      V  |
18+20       0.1505      0.03  Q         |         |         |      V  |
18+25       0.1508      0.03  Q         |         |         |      V  |
18+30       0.1510      0.03  Q         |         |         |      V  |
18+35       0.1512      0.03  Q         |         |         |      V  |
18+40       0.1513      0.02  Q         |         |         |      V  |
18+45       0.1515      0.02  Q         |         |         |      V  |
18+50       0.1516      0.02  Q         |         |         |      V  |
18+55       0.1518      0.02  Q         |         |         |      V  |
19+ 0       0.1519      0.02  Q         |         |         |      V  |
19+ 5       0.1520      0.02  Q         |         |         |       V |
19+10       0.1522      0.02  Q         |         |         |       V |
19+15       0.1523      0.02  Q         |         |         |       V |
19+20       0.1525      0.03  Q         |         |         |       V |
19+25       0.1527      0.03  Q         |         |         |       V |
19+30       0.1529      0.03  Q         |         |         |       V |
19+35       0.1531      0.03  Q         |         |         |       V |
19+40       0.1533      0.02  Q         |         |         |       V |
19+45       0.1534      0.02  Q         |         |         |       V |
19+50       0.1536      0.02  Q         |         |         |       V |
19+55       0.1537      0.02  Q         |         |         |       V |
20+ 0       0.1538      0.02  Q         |         |         |       V |
20+ 5       0.1539      0.02  Q         |         |         |       V |
20+10       0.1541      0.02  Q         |         |         |       V |
20+15       0.1542      0.02  Q         |         |         |       V |
20+20       0.1544      0.02  Q         |         |         |       V |
20+25       0.1545      0.02  Q         |         |         |       V |
20+30       0.1547      0.02  Q         |         |         |       V |
20+35       0.1549      0.02  Q         |         |         |       V |
20+40       0.1550      0.02  Q         |         |         |       V |
20+45       0.1552      0.02  Q         |         |         |       V |
20+50       0.1553      0.02  Q         |         |         |       V |
20+55       0.1554      0.02  Q         |         |         |       V |
21+ 0       0.1556      0.02  Q         |         |         |       V |
21+ 5       0.1557      0.02  Q         |         |         |       V |
21+10       0.1558      0.02  Q         |         |         |       V |
21+15       0.1560      0.02  Q         |         |         |       V |
21+20       0.1561      0.02  Q         |         |         |        V|
21+25       0.1562      0.02  Q         |         |         |        V|
21+30       0.1564      0.02  Q         |         |         |        V|
21+35       0.1565      0.02  Q         |         |         |        V|
21+40       0.1566      0.02  Q         |         |         |        V|
21+45       0.1568      0.02  Q         |         |         |        V|
21+50       0.1569      0.02  Q         |         |         |        V|
21+55       0.1570      0.02  Q         |         |         |        V|
22+ 0       0.1572      0.02  Q         |         |         |        V|
22+ 5       0.1573      0.02  Q         |         |         |        V|
22+10       0.1574      0.02  Q         |         |         |        V|
22+15       0.1576      0.02  Q         |         |         |        V|
22+20       0.1577      0.02  Q         |         |         |        V|
22+25       0.1578      0.02  Q         |         |         |        V|
22+30       0.1580      0.02  Q         |         |         |        V|
22+35       0.1581      0.02  Q         |         |         |        V|
22+40       0.1582      0.02  Q         |         |         |        V|
22+45       0.1583      0.02  Q         |         |         |        V|
22+50       0.1584      0.02  Q         |         |         |        V|
22+55       0.1585      0.02  Q         |         |         |        V|
23+ 0       0.1586      0.02  Q         |         |         |        V|
23+ 5       0.1587      0.02  Q         |         |         |        V|
23+10       0.1588      0.02  Q         |         |         |        V|
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   23+15       0.1589      0.02  Q         |         |         |        V|
   23+20       0.1590      0.02  Q         |         |         |        V|
   23+25       0.1591      0.02  Q         |         |         |        V|
   23+30       0.1592      0.02  Q         |         |         |        V|
   23+35       0.1594      0.02  Q         |         |         |        V|
   23+40       0.1595      0.02  Q         |         |         |        V|
   23+45       0.1596      0.02  Q         |         |         |        V|
   23+50       0.1597      0.02  Q         |         |         |        V|
   23+55       0.1598      0.02  Q         |         |         |        V|
   24+ 0       0.1599      0.02  Q         |         |         |        V|
   24+ 5       0.1600      0.01  Q         |         |         |        V|
   24+10       0.1600      0.00  Q         |         |         |        V|
   24+15       0.1600      0.00  Q         |         |         |        V|
   24+20       0.1600      0.00  Q         |         |         |        V|
   24+25       0.1600      0.00  Q         |         |         |         V
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U n i t H y d r o g r a p h A n a l y s i s

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Study date 12/13/17 File: 3566PR242.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6400

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

JOB NO. 3566
2-YEAR 24-HOUR PROPOSED CONDITION HYDROGRAPH

Drainage Area = 12.00(Ac.) = 0.019 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 12.00(Ac.) = 0.019 Sq. Mi.
Length along longest watercourse = 1133.00(Ft.)
Length along longest watercourse measured to centroid = 500.00(Ft.)
Length along longest watercourse = 0.215 Mi.
Length along longest watercourse measured to centroid = 0.095 Mi.
Difference in elevation = 3.00(Ft.)
Slope along watercourse = 13.9806 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.050 Hr.
Lag time = 2.98 Min.
25% of lag time = 0.74 Min.
40% of lag time = 1.19 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.00	1.60	19.20

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.00	4.00	48.00

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 1.600(In)
Area Averaged 100-Year Rainfall = 4.000(In)

Point rain (area averaged) = 1.600(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.600(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
12.000	56.00	0.900

Total Area Entered = 12.00(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
56.0	36.0	0.706	0.900	0.134	1.000	0.134
					Sum (F) =	0.134

Area averaged mean soil loss (F) (In/Hr) = 0.134
Minimum soil loss rate ((In/Hr)) = 0.067
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	167.939	37.252	4.505
2	0.167	335.878	45.670	5.523
3	0.250	503.817	10.239	1.238
4	0.333	671.756	4.327	0.523
5	0.417	839.696	2.512	0.304
			Sum = 100.000	Sum= 12.094

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.013	(0.238)	0.002	0.010
2	0.17	0.07	0.013	(0.237)	0.002	0.010
3	0.25	0.07	0.013	(0.236)	0.002	0.010
4	0.33	0.10	0.019	(0.235)	0.003	0.016
5	0.42	0.10	0.019	(0.234)	0.003	0.016
6	0.50	0.10	0.019	(0.233)	0.003	0.016
7	0.58	0.10	0.019	(0.232)	0.003	0.016
8	0.67	0.10	0.019	(0.231)	0.003	0.016
9	0.75	0.10	0.019	(0.230)	0.003	0.016
10	0.83	0.13	0.026	(0.230)	0.005	0.021
11	0.92	0.13	0.026	(0.229)	0.005	0.021
12	1.00	0.13	0.026	(0.228)	0.005	0.021
13	1.08	0.10	0.019	(0.227)	0.003	0.016
14	1.17	0.10	0.019	(0.226)	0.003	0.016
15	1.25	0.10	0.019	(0.225)	0.003	0.016
16	1.33	0.10	0.019	(0.224)	0.003	0.016
17	1.42	0.10	0.019	(0.223)	0.003	0.016
18	1.50	0.10	0.019	(0.222)	0.003	0.016
19	1.58	0.10	0.019	(0.222)	0.003	0.016
20	1.67	0.10	0.019	(0.221)	0.003	0.016
21	1.75	0.10	0.019	(0.220)	0.003	0.016
22	1.83	0.13	0.026	(0.219)	0.005	0.021
23	1.92	0.13	0.026	(0.218)	0.005	0.021
24	2.00	0.13	0.026	(0.217)	0.005	0.021
25	2.08	0.13	0.026	(0.216)	0.005	0.021
26	2.17	0.13	0.026	(0.215)	0.005	0.021
27	2.25	0.13	0.026	(0.214)	0.005	0.021
28	2.33	0.13	0.026	(0.214)	0.005	0.021
29	2.42	0.13	0.026	(0.213)	0.005	0.021
30	2.50	0.13	0.026	(0.212)	0.005	0.021
31	2.58	0.17	0.032	(0.211)	0.006	0.026
32	2.67	0.17	0.032	(0.210)	0.006	0.026
33	2.75	0.17	0.032	(0.209)	0.006	0.026
34	2.83	0.17	0.032	(0.208)	0.006	0.026
35	2.92	0.17	0.032	(0.208)	0.006	0.026
36	3.00	0.17	0.032	(0.207)	0.006	0.026
37	3.08	0.17	0.032	(0.206)	0.006	0.026
38	3.17	0.17	0.032	(0.205)	0.006	0.026
39	3.25	0.17	0.032	(0.204)	0.006	0.026
40	3.33	0.17	0.032	(0.203)	0.006	0.026
41	3.42	0.17	0.032	(0.202)	0.006	0.026
42	3.50	0.17	0.032	(0.202)	0.006	0.026
43	3.58	0.17	0.032	(0.201)	0.006	0.026
44	3.67	0.17	0.032	(0.200)	0.006	0.026
45	3.75	0.17	0.032	(0.199)	0.006	0.026
46	3.83	0.20	0.038	(0.198)	0.007	0.031
47	3.92	0.20	0.038	(0.197)	0.007	0.031
48	4.00	0.20	0.038	(0.197)	0.007	0.031
49	4.08	0.20	0.038	(0.196)	0.007	0.031
50	4.17	0.20	0.038	(0.195)	0.007	0.031
51	4.25	0.20	0.038	(0.194)	0.007	0.031
52	4.33	0.23	0.045	(0.193)	0.008	0.037
53	4.42	0.23	0.045	(0.192)	0.008	0.037
54	4.50	0.23	0.045	(0.192)	0.008	0.037
55	4.58	0.23	0.045	(0.191)	0.008	0.037
56	4.67	0.23	0.045	(0.190)	0.008	0.037
57	4.75	0.23	0.045	(0.189)	0.008	0.037
58	4.83	0.27	0.051	(0.188)	0.009	0.042
59	4.92	0.27	0.051	(0.187)	0.009	0.042
60	5.00	0.27	0.051	(0.187)	0.009	0.042
61	5.08	0.20	0.038	(0.186)	0.007	0.031
62	5.17	0.20	0.038	(0.185)	0.007	0.031
63	5.25	0.20	0.038	(0.184)	0.007	0.031
64	5.33	0.23	0.045	(0.183)	0.008	0.037
65	5.42	0.23	0.045	(0.183)	0.008	0.037
66	5.50	0.23	0.045	(0.182)	0.008	0.037
67	5.58	0.27	0.051	(0.181)	0.009	0.042
68	5.67	0.27	0.051	(0.180)	0.009	0.042
69	5.75	0.27	0.051	(0.179)	0.009	0.042
70	5.83	0.27	0.051	(0.179)	0.009	0.042
71	5.92	0.27	0.051	(0.178)	0.009	0.042
72	6.00	0.27	0.051	(0.177)	0.009	0.042
73	6.08	0.30	0.058	(0.176)	0.010	0.047
74	6.17	0.30	0.058	(0.175)	0.010	0.047
75	6.25	0.30	0.058	(0.175)	0.010	0.047
76	6.33	0.30	0.058	(0.174)	0.010	0.047
77	6.42	0.30	0.058	(0.173)	0.010	0.047
78	6.50	0.30	0.058	(0.172)	0.010	0.047
79	6.58	0.33	0.064	(0.172)	0.012	0.052
80	6.67	0.33	0.064	(0.171)	0.012	0.052
81	6.75	0.33	0.064	(0.170)	0.012	0.052
82	6.83	0.33	0.064	(0.169)	0.012	0.052
83	6.92	0.33	0.064	(0.169)	0.012	0.052
84	7.00	0.33	0.064	(0.168)	0.012	0.052
85	7.08	0.33	0.064	(0.167)	0.012	0.052
86	7.17	0.33	0.064	(0.166)	0.012	0.052
87	7.25	0.33	0.064	(0.165)	0.012	0.052
88	7.33	0.37	0.070	(0.165)	0.013	0.058
89	7.42	0.37	0.070	(0.164)	0.013	0.058
90	7.50	0.37	0.070	(0.163)	0.013	0.058
91	7.58	0.40	0.077	(0.162)	0.014	0.063
92	7.67	0.40	0.077	(0.162)	0.014	0.063
93	7.75	0.40	0.077	(0.161)	0.014	0.063

94	7.83	0.43	0.083	(0.160)	0.015	0.068
95	7.92	0.43	0.083	(0.159)	0.015	0.068
96	8.00	0.43	0.083	(0.159)	0.015	0.068
97	8.08	0.50	0.096	(0.158)	0.017	0.079
98	8.17	0.50	0.096	(0.157)	0.017	0.079
99	8.25	0.50	0.096	(0.157)	0.017	0.079
100	8.33	0.50	0.096	(0.156)	0.017	0.079
101	8.42	0.50	0.096	(0.155)	0.017	0.079
102	8.50	0.50	0.096	(0.154)	0.017	0.079
103	8.58	0.53	0.102	(0.154)	0.018	0.084
104	8.67	0.53	0.102	(0.153)	0.018	0.084
105	8.75	0.53	0.102	(0.152)	0.018	0.084
106	8.83	0.57	0.109	(0.151)	0.020	0.089
107	8.92	0.57	0.109	(0.151)	0.020	0.089
108	9.00	0.57	0.109	(0.150)	0.020	0.089
109	9.08	0.63	0.122	(0.149)	0.022	0.100
110	9.17	0.63	0.122	(0.149)	0.022	0.100
111	9.25	0.63	0.122	(0.148)	0.022	0.100
112	9.33	0.67	0.128	(0.147)	0.023	0.105
113	9.42	0.67	0.128	(0.147)	0.023	0.105
114	9.50	0.67	0.128	(0.146)	0.023	0.105
115	9.58	0.70	0.134	(0.145)	0.024	0.110
116	9.67	0.70	0.134	(0.144)	0.024	0.110
117	9.75	0.70	0.134	(0.144)	0.024	0.110
118	9.83	0.73	0.141	(0.143)	0.025	0.115
119	9.92	0.73	0.141	(0.142)	0.025	0.115
120	10.00	0.73	0.141	(0.142)	0.025	0.115
121	10.08	0.50	0.096	(0.141)	0.017	0.079
122	10.17	0.50	0.096	(0.140)	0.017	0.079
123	10.25	0.50	0.096	(0.140)	0.017	0.079
124	10.33	0.50	0.096	(0.139)	0.017	0.079
125	10.42	0.50	0.096	(0.138)	0.017	0.079
126	10.50	0.50	0.096	(0.138)	0.017	0.079
127	10.58	0.67	0.128	(0.137)	0.023	0.105
128	10.67	0.67	0.128	(0.136)	0.023	0.105
129	10.75	0.67	0.128	(0.136)	0.023	0.105
130	10.83	0.67	0.128	(0.135)	0.023	0.105
131	10.92	0.67	0.128	(0.134)	0.023	0.105
132	11.00	0.67	0.128	(0.134)	0.023	0.105
133	11.08	0.63	0.122	(0.133)	0.022	0.100
134	11.17	0.63	0.122	(0.132)	0.022	0.100
135	11.25	0.63	0.122	(0.132)	0.022	0.100
136	11.33	0.63	0.122	(0.131)	0.022	0.100
137	11.42	0.63	0.122	(0.130)	0.022	0.100
138	11.50	0.63	0.122	(0.130)	0.022	0.100
139	11.58	0.57	0.109	(0.129)	0.020	0.089
140	11.67	0.57	0.109	(0.128)	0.020	0.089
141	11.75	0.57	0.109	(0.128)	0.020	0.089
142	11.83	0.60	0.115	(0.127)	0.021	0.094
143	11.92	0.60	0.115	(0.126)	0.021	0.094
144	12.00	0.60	0.115	(0.126)	0.021	0.094
145	12.08	0.83	0.160	(0.125)	0.029	0.131
146	12.17	0.83	0.160	(0.125)	0.029	0.131
147	12.25	0.83	0.160	(0.124)	0.029	0.131
148	12.33	0.87	0.166	(0.123)	0.030	0.136
149	12.42	0.87	0.166	(0.123)	0.030	0.136
150	12.50	0.87	0.166	(0.122)	0.030	0.136
151	12.58	0.93	0.179	(0.121)	0.032	0.147
152	12.67	0.93	0.179	(0.121)	0.032	0.147
153	12.75	0.93	0.179	(0.120)	0.032	0.147
154	12.83	0.97	0.186	(0.120)	0.033	0.152
155	12.92	0.97	0.186	(0.119)	0.033	0.152
156	13.00	0.97	0.186	(0.118)	0.033	0.152
157	13.08	1.13	0.218	(0.118)	0.039	0.178
158	13.17	1.13	0.218	(0.117)	0.039	0.178
159	13.25	1.13	0.218	(0.117)	0.039	0.178
160	13.33	1.13	0.218	(0.116)	0.039	0.178
161	13.42	1.13	0.218	(0.115)	0.039	0.178
162	13.50	1.13	0.218	(0.115)	0.039	0.178
163	13.58	0.77	0.147	(0.114)	0.026	0.121
164	13.67	0.77	0.147	(0.114)	0.026	0.121
165	13.75	0.77	0.147	(0.113)	0.026	0.121
166	13.83	0.77	0.147	(0.113)	0.026	0.121
167	13.92	0.77	0.147	(0.112)	0.026	0.121
168	14.00	0.77	0.147	(0.111)	0.026	0.121
169	14.08	0.90	0.173	(0.111)	0.031	0.142
170	14.17	0.90	0.173	(0.110)	0.031	0.142
171	14.25	0.90	0.173	(0.110)	0.031	0.142
172	14.33	0.87	0.166	(0.109)	0.030	0.136
173	14.42	0.87	0.166	(0.109)	0.030	0.136
174	14.50	0.87	0.166	(0.108)	0.030	0.136
175	14.58	0.87	0.166	(0.107)	0.030	0.136
176	14.67	0.87	0.166	(0.107)	0.030	0.136
177	14.75	0.87	0.166	(0.106)	0.030	0.136
178	14.83	0.83	0.160	(0.106)	0.029	0.131
179	14.92	0.83	0.160	(0.105)	0.029	0.131
180	15.00	0.83	0.160	(0.105)	0.029	0.131
181	15.08	0.80	0.154	(0.104)	0.028	0.126
182	15.17	0.80	0.154	(0.104)	0.028	0.126
183	15.25	0.80	0.154	(0.103)	0.028	0.126
184	15.33	0.77	0.147	(0.103)	0.026	0.121
185	15.42	0.77	0.147	(0.102)	0.026	0.121
186	15.50	0.77	0.147	(0.102)	0.026	0.121
187	15.58	0.63	0.122	(0.101)	0.022	0.100
188	15.67	0.63	0.122	(0.101)	0.022	0.100
189	15.75	0.63	0.122	(0.100)	0.022	0.100
190	15.83	0.63	0.122	(0.100)	0.022	0.100
191	15.92	0.63	0.122	(0.099)	0.022	0.100
192	16.00	0.63	0.122	(0.099)	0.022	0.100

193	16.08	0.13	0.026	(0.098)	0.005	0.021
194	16.17	0.13	0.026	(0.098)	0.005	0.021
195	16.25	0.13	0.026	(0.097)	0.005	0.021
196	16.33	0.13	0.026	(0.097)	0.005	0.021
197	16.42	0.13	0.026	(0.096)	0.005	0.021
198	16.50	0.13	0.026	(0.096)	0.005	0.021
199	16.58	0.10	0.019	(0.095)	0.003	0.016
200	16.67	0.10	0.019	(0.095)	0.003	0.016
201	16.75	0.10	0.019	(0.094)	0.003	0.016
202	16.83	0.10	0.019	(0.094)	0.003	0.016
203	16.92	0.10	0.019	(0.093)	0.003	0.016
204	17.00	0.10	0.019	(0.093)	0.003	0.016
205	17.08	0.17	0.032	(0.092)	0.006	0.026
206	17.17	0.17	0.032	(0.092)	0.006	0.026
207	17.25	0.17	0.032	(0.091)	0.006	0.026
208	17.33	0.17	0.032	(0.091)	0.006	0.026
209	17.42	0.17	0.032	(0.090)	0.006	0.026
210	17.50	0.17	0.032	(0.090)	0.006	0.026
211	17.58	0.17	0.032	(0.089)	0.006	0.026
212	17.67	0.17	0.032	(0.089)	0.006	0.026
213	17.75	0.17	0.032	(0.089)	0.006	0.026
214	17.83	0.13	0.026	(0.088)	0.005	0.021
215	17.92	0.13	0.026	(0.088)	0.005	0.021
216	18.00	0.13	0.026	(0.087)	0.005	0.021
217	18.08	0.13	0.026	(0.087)	0.005	0.021
218	18.17	0.13	0.026	(0.086)	0.005	0.021
219	18.25	0.13	0.026	(0.086)	0.005	0.021
220	18.33	0.13	0.026	(0.086)	0.005	0.021
221	18.42	0.13	0.026	(0.085)	0.005	0.021
222	18.50	0.13	0.026	(0.085)	0.005	0.021
223	18.58	0.10	0.019	(0.084)	0.003	0.016
224	18.67	0.10	0.019	(0.084)	0.003	0.016
225	18.75	0.10	0.019	(0.084)	0.003	0.016
226	18.83	0.07	0.013	(0.083)	0.002	0.010
227	18.92	0.07	0.013	(0.083)	0.002	0.010
228	19.00	0.07	0.013	(0.082)	0.002	0.010
229	19.08	0.10	0.019	(0.082)	0.003	0.016
230	19.17	0.10	0.019	(0.082)	0.003	0.016
231	19.25	0.10	0.019	(0.081)	0.003	0.016
232	19.33	0.13	0.026	(0.081)	0.005	0.021
233	19.42	0.13	0.026	(0.080)	0.005	0.021
234	19.50	0.13	0.026	(0.080)	0.005	0.021
235	19.58	0.10	0.019	(0.080)	0.003	0.016
236	19.67	0.10	0.019	(0.079)	0.003	0.016
237	19.75	0.10	0.019	(0.079)	0.003	0.016
238	19.83	0.07	0.013	(0.079)	0.002	0.010
239	19.92	0.07	0.013	(0.078)	0.002	0.010
240	20.00	0.07	0.013	(0.078)	0.002	0.010
241	20.08	0.10	0.019	(0.078)	0.003	0.016
242	20.17	0.10	0.019	(0.077)	0.003	0.016
243	20.25	0.10	0.019	(0.077)	0.003	0.016
244	20.33	0.10	0.019	(0.077)	0.003	0.016
245	20.42	0.10	0.019	(0.076)	0.003	0.016
246	20.50	0.10	0.019	(0.076)	0.003	0.016
247	20.58	0.10	0.019	(0.076)	0.003	0.016
248	20.67	0.10	0.019	(0.075)	0.003	0.016
249	20.75	0.10	0.019	(0.075)	0.003	0.016
250	20.83	0.07	0.013	(0.075)	0.002	0.010
251	20.92	0.07	0.013	(0.074)	0.002	0.010
252	21.00	0.07	0.013	(0.074)	0.002	0.010
253	21.08	0.10	0.019	(0.074)	0.003	0.016
254	21.17	0.10	0.019	(0.073)	0.003	0.016
255	21.25	0.10	0.019	(0.073)	0.003	0.016
256	21.33	0.07	0.013	(0.073)	0.002	0.010
257	21.42	0.07	0.013	(0.073)	0.002	0.010
258	21.50	0.07	0.013	(0.072)	0.002	0.010
259	21.58	0.10	0.019	(0.072)	0.003	0.016
260	21.67	0.10	0.019	(0.072)	0.003	0.016
261	21.75	0.10	0.019	(0.072)	0.003	0.016
262	21.83	0.07	0.013	(0.071)	0.002	0.010
263	21.92	0.07	0.013	(0.071)	0.002	0.010
264	22.00	0.07	0.013	(0.071)	0.002	0.010
265	22.08	0.10	0.019	(0.071)	0.003	0.016
266	22.17	0.10	0.019	(0.070)	0.003	0.016
267	22.25	0.10	0.019	(0.070)	0.003	0.016
268	22.33	0.07	0.013	(0.070)	0.002	0.010
269	22.42	0.07	0.013	(0.070)	0.002	0.010
270	22.50	0.07	0.013	(0.069)	0.002	0.010
271	22.58	0.07	0.013	(0.069)	0.002	0.010
272	22.67	0.07	0.013	(0.069)	0.002	0.010
273	22.75	0.07	0.013	(0.069)	0.002	0.010
274	22.83	0.07	0.013	(0.069)	0.002	0.010
275	22.92	0.07	0.013	(0.069)	0.002	0.010
276	23.00	0.07	0.013	(0.068)	0.002	0.010
277	23.08	0.07	0.013	(0.068)	0.002	0.010
278	23.17	0.07	0.013	(0.068)	0.002	0.010
279	23.25	0.07	0.013	(0.068)	0.002	0.010
280	23.33	0.07	0.013	(0.068)	0.002	0.010
281	23.42	0.07	0.013	(0.068)	0.002	0.010
282	23.50	0.07	0.013	(0.068)	0.002	0.010
283	23.58	0.07	0.013	(0.067)	0.002	0.010
284	23.67	0.07	0.013	(0.067)	0.002	0.010
285	23.75	0.07	0.013	(0.067)	0.002	0.010
286	23.83	0.07	0.013	(0.067)	0.002	0.010
287	23.92	0.07	0.013	(0.067)	0.002	0.010
288	24.00	0.07	0.013	(0.067)	0.002	0.010

(Loss Rate Not Used)

Sum = 100.0 Sum = 15.7

Flood volume = Effective rainfall 1.31(In)

```
 times area      12.0(Ac.)/[(In)/(Ft.)] =       1.3(Ac.Ft)
Total soil loss =      0.29(In)
Total soil loss =     0.288(Ac.Ft)
Total rainfall =      1.60(In)
Flood volume =       57149.4 Cubic Feet
Total soil loss =       12545.0 Cubic Feet
---------------------------------------------------------------------
 Peak flow rate of this hydrograph =      2.159(CFS)
---------------------------------------------------------------------
+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                    24 - H O U R    S T O R M
                R u n o f f      H y d r o g r a p h
---------------------------------------------------------------------
            Hydrograph in   5   Minute intervals ((CFS))

---------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
-----------------------------------------------------------------------
  0+ 5       0.0003      0.05  Q         |         |         |         |
  0+10       0.0011      0.11  Q         |         |         |         |
  0+15       0.0019      0.12  Q         |         |         |         |
  0+20       0.0029      0.15  Q         |         |         |         |
  0+25       0.0041      0.18  Q         |         |         |         |
  0+30       0.0054      0.19  Q         |         |         |         |
  0+35       0.0067      0.19  Q         |         |         |         |
  0+40       0.0080      0.19  Q         |         |         |         |
  0+45       0.0093      0.19  Q         |         |         |         |
  0+50       0.0108      0.21  Q         |         |         |         |
  0+55       0.0125      0.24  Q         |         |         |         |
  1+ 0       0.0142      0.25  Q         |         |         |         |
  1+ 5       0.0158      0.23  Q         |         |         |         |
  1+10       0.0172      0.20  Q         |         |         |         |
  1+15       0.0185      0.19  Q         |         |         |         |
  1+20       0.0198      0.19  Q         |         |         |         |
  1+25       0.0211      0.19  Q         |         |         |         |
  1+30       0.0224      0.19  Q         |         |         |         |
  1+35       0.0238      0.19  Q         |         |         |         |
  1+40       0.0251      0.19  Q         |         |         |         |
  1+45       0.0264      0.19  Q         |         |         |         |
  1+50       0.0279      0.21  Q         |         |         |         |
  1+55       0.0295      0.24  Q         |         |         |         |
  2+ 0       0.0313      0.25  Q         |         |         |         |
  2+ 5       0.0330      0.25  |Q        |         |         |         |
  2+10       0.0347      0.25  |Q        |         |         |         |
  2+15       0.0365      0.25  |Q        |         |         |         |
  2+20       0.0382      0.25  |Q        |         |         |         |
  2+25       0.0400      0.25  |Q        |         |         |         |
  2+30       0.0417      0.25  |Q        |         |         |         |
  2+35       0.0436      0.28  |Q        |         |         |         |
  2+40       0.0458      0.31  |Q        |         |         |         |
  2+45       0.0479      0.31  |Q        |         |         |         |
  2+50       0.0501      0.32  |Q        |         |         |         |
  2+55       0.0523      0.32  |Q        |         |         |         |
  3+ 0       0.0545      0.32  |Q        |         |         |         |
  3+ 5       0.0567      0.32  |Q        |         |         |         |
  3+10       0.0588      0.32  |Q        |         |         |         |
  3+15       0.0610      0.32  |Q        |         |         |         |
  3+20       0.0632      0.32  |Q        |         |         |         |
  3+25       0.0654      0.32  |Q        |         |         |         |
  3+30       0.0676      0.32  |QV       |         |         |         |
  3+35       0.0698      0.32  |QV       |         |         |         |
  3+40       0.0720      0.32  |QV       |         |         |         |
  3+45       0.0741      0.32  |QV       |         |         |         |
  3+50       0.0765      0.34  |QV       |         |         |         |
  3+55       0.0790      0.37  |QV       |         |         |         |
  4+ 0       0.0816      0.38  |QV       |         |         |         |
  4+ 5       0.0843      0.38  |QV       |         |         |         |
  4+10       0.0869      0.38  |QV       |         |         |         |
  4+15       0.0895      0.38  |QV       |         |         |         |
  4+20       0.0923      0.40  |QV       |         |         |         |
  4+25       0.0953      0.43  |QV       |         |         |         |
  4+30       0.0983      0.44  |QV       |         |         |         |
  4+35       0.1014      0.44  |Q V      |         |         |         |
  4+40       0.1044      0.44  |Q V      |         |         |         |
  4+45       0.1075      0.44  |Q V      |         |         |         |
  4+50       0.1107      0.47  |Q V      |         |         |         |
  4+55       0.1141      0.50  |Q V      |         |         |         |
  5+ 0       0.1176      0.50  | QV      |         |         |         |
  5+ 5       0.1208      0.46  |Q V      |         |         |         |
  5+10       0.1235      0.40  |Q V      |         |         |         |
  5+15       0.1262      0.39  |Q V      |         |         |         |
  5+20       0.1290      0.41  |Q V      |         |         |         |
  5+25       0.1320      0.43  |Q  V     |         |         |         |
  5+30       0.1350      0.44  |Q  V     |         |         |         |
  5+35       0.1383      0.47  |Q  V     |         |         |         |
  5+40       0.1417      0.50  |Q  V     |         |         |         |
  5+45       0.1451      0.50  | Q V     |         |         |         |
  5+50       0.1486      0.51  | Q V     |         |         |         |
  5+55       0.1521      0.51  | Q V     |         |         |         |
  6+ 0       0.1556      0.51  | Q V     |         |         |         |
  6+ 5       0.1593      0.53  | Q V     |         |         |         |
  6+10       0.1632      0.56  | Q V     |         |         |         |
  6+15       0.1671      0.57  | Q  V    |         |         |         |
  6+20       0.1710      0.57  | Q  V    |         |         |         |
  6+25       0.1749      0.57  | Q  V    |         |         |         |
  6+30       0.1789      0.57  | Q  V    |         |         |         |
  6+35       0.1830      0.60  | Q  V    |         |         |         |
  6+40       0.1873      0.62  | Q  V    |         |         |         |
  6+45       0.1916      0.63  | Q  V    |         |         |         |
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 6+50       0.1960      0.63  | Q  V    |         |         |         |
 6+55       0.2003      0.63  | Q   V   |         |         |         |
 7+ 0       0.2047      0.63  | Q   V   |         |         |         |
 7+ 5       0.2091      0.63  | Q   V   |         |         |         |
 7+10       0.2134      0.63  | Q   V   |         |         |         |
 7+15       0.2178      0.63  | Q   V   |         |         |         |
 7+20       0.2224      0.66  | Q   V   |         |         |         |
 7+25       0.2271      0.69  | Q   V   |         |         |         |
 7+30       0.2319      0.69  | Q    V  |         |         |         |
 7+35       0.2368      0.72  | Q    V  |         |         |         |
 7+40       0.2420      0.75  |  Q   V  |         |         |         |
 7+45       0.2472      0.76  |  Q   V  |         |         |         |
 7+50       0.2526      0.78  |  Q   V  |         |         |         |
 7+55       0.2582      0.81  |  Q   V  |         |         |         |
 8+ 0       0.2639      0.82  |  Q    V |         |         |         |
 8+ 5       0.2699      0.87  |  Q    V |         |         |         |
 8+10       0.2763      0.93  |  Q    V |         |         |         |
 8+15       0.2828      0.94  |  Q    V |         |         |         |
 8+20       0.2893      0.95  |  Q    V |         |         |         |
 8+25       0.2959      0.95  |  Q     V|         |         |         |
 8+30       0.3025      0.95  |  Q     V|         |         |         |
 8+35       0.3092      0.98  |  Q     V|         |         |         |
 8+40       0.3161      1.01  |   Q    V|         |         |         |
 8+45       0.3231      1.01  |   Q    V|         |         |         |
 8+50       0.3302      1.04  |   Q     V         |         |         |
 8+55       0.3376      1.07  |   Q     V         |         |         |
 9+ 0       0.3450      1.08  |   Q     V         |         |         |
 9+ 5       0.3527      1.13  |   Q     V         |         |         |
 9+10       0.3609      1.18  |   Q     |V        |         |         |
 9+15       0.3691      1.20  |   Q     |V        |         |         |
 9+20       0.3776      1.23  |   Q     |V        |         |         |
 9+25       0.3863      1.26  |    Q    |V        |         |         |
 9+30       0.3950      1.27  |    Q    | V       |         |         |
 9+35       0.4039      1.29  |    Q    | V       |         |         |
 9+40       0.4130      1.32  |    Q    | V       |         |         |
 9+45       0.4221      1.33  |    Q    | V       |         |         |
 9+50       0.4315      1.36  |    Q    |  V      |         |         |
 9+55       0.4410      1.39  |    Q    |  V      |         |         |
10+ 0       0.4506      1.39  |    Q    |  V      |         |         |
10+ 5       0.4591      1.23  |   Q     |  V      |         |         |
10+10       0.4662      1.03  |   Q     |   V     |         |         |
10+15       0.4729      0.98  |  Q      |   V     |         |         |
10+20       0.4796      0.96  |  Q      |   V     |         |         |
10+25       0.4861      0.95  |  Q      |   V     |         |         |
10+30       0.4927      0.95  |  Q      |    V    |         |         |
10+35       0.5001      1.07  |   Q     |    V    |         |         |
10+40       0.5084      1.22  |   Q     |    V    |         |         |
10+45       0.5170      1.25  |   Q     |    V    |         |         |
10+50       0.5257      1.26  |    Q    |     V   |         |         |
10+55       0.5345      1.27  |    Q    |     V   |         |         |
11+ 0       0.5432      1.27  |    Q    |     V   |         |         |
11+ 5       0.5518      1.25  |   Q     |     V   |         |         |
11+10       0.5602      1.22  |   Q     |      V  |         |         |
11+15       0.5685      1.21  |   Q     |      V  |         |         |
11+20       0.5769      1.21  |   Q     |      V  |         |         |
11+25       0.5852      1.21  |   Q     |      V  |         |         |
11+30       0.5935      1.21  |   Q     |       V |         |         |
11+35       0.6015      1.16  |   Q     |       V |         |         |
11+40       0.6090      1.10  |   Q     |       V |         |         |
11+45       0.6165      1.09  |   Q     |       V |         |         |
11+50       0.6242      1.11  |   Q     |        V|         |         |
11+55       0.6320      1.13  |   Q     |        V|         |         |
12+ 0       0.6398      1.14  |   Q     |        V|         |         |
12+ 5       0.6488      1.31  |    Q    |        V|         |         |
12+10       0.6592      1.51  |     Q   |         V         |         |
12+15       0.6699      1.56  |     Q   |         V         |         |
12+20       0.6809      1.60  |     Q   |         V         |         |
12+25       0.6922      1.64  |     Q   |         |V        |         |
12+30       0.7036      1.65  |     Q   |         |V        |         |
12+35       0.7153      1.70  |     Q   |         |V        |         |
12+40       0.7274      1.76  |      Q  |         | V       |         |
12+45       0.7395      1.77  |      Q  |         | V       |         |
12+50       0.7519      1.80  |      Q  |         | V       |         |
12+55       0.7645      1.83  |      Q  |         |  V      |         |
13+ 0       0.7772      1.84  |      Q  |         |  V      |         |
13+ 5       0.7907      1.96  |      Q  |         |   V     |         |
13+10       0.8052      2.10  |       Q |         |   V     |         |
13+15       0.8199      2.14  |       Q |         |   V     |         |
13+20       0.8347      2.15  |       Q |         |    V    |         |
13+25       0.8496      2.16  |       Q |         |    V    |         |
13+30       0.8644      2.16  |       Q |         |     V   |         |
13+35       0.8775      1.90  |      Q  |         |     V   |         |
13+40       0.8884      1.58  |     Q   |         |      V  |         |
13+45       0.8988      1.51  |     Q   |         |      V  |         |
13+50       0.9090      1.48  |    Q    |         |      V  |         |
13+55       0.9190      1.46  |    Q    |         |       V |         |
14+ 0       0.9291      1.46  |    Q    |         |       V |         |
14+ 5       0.9398      1.56  |     Q   |         |       V |         |
14+10       0.9513      1.67  |     Q   |         |        V|         |
14+15       0.9630      1.70  |     Q   |         |        V|         |
14+20       0.9746      1.68  |     Q   |         |        V|         |
14+25       0.9860      1.66  |     Q   |         |         V         |
14+30       0.9974      1.66  |     Q   |         |         V         |
14+35       1.0088      1.65  |     Q   |         |         V         |
14+40       1.0202      1.65  |     Q   |         |         |V        |
14+45       1.0316      1.65  |     Q   |         |         |V        |
14+50       1.0428      1.63  |     Q   |         |         |V        |
14+55       1.0538      1.60  |     Q   |         |         | V       |
15+ 0       1.0647      1.59  |     Q   |         |         | V       |
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15+ 5       1.0755      1.57  |     Q   |         |         | V       |
15+10       1.0861      1.53  |     Q   |         |         |  V      |
15+15       1.0966      1.53  |     Q   |         |         |  V      |
15+20       1.1070      1.50  |     Q   |         |         |  V      |
15+25       1.1171      1.47  |    Q    |         |         |   V     |
15+30       1.1272      1.46  |    Q    |         |         |   V     |
15+35       1.1366      1.37  |    Q    |         |         |   V     |
15+40       1.1452      1.25  |   Q     |         |         |   V     |
15+45       1.1536      1.22  |   Q     |         |         |    V    |
15+50       1.1620      1.21  |   Q     |         |         |    V    |
15+55       1.1703      1.21  |   Q     |         |         |    V    |
16+ 0       1.1786      1.21  |   Q     |         |         |    V    |
16+ 5       1.1845      0.85  |  Q      |         |         |     V   |
16+10       1.1873      0.42  |Q        |         |         |     V   |
16+15       1.1895      0.32  |Q        |         |         |     V   |
16+20       1.1915      0.28  |Q        |         |         |     V   |
16+25       1.1932      0.25  |Q        |         |         |     V   |
16+30       1.1950      0.25  |Q        |         |         |     V   |
16+35       1.1965      0.23  Q         |         |         |     V   |
16+40       1.1979      0.20  Q         |         |         |     V   |
16+45       1.1993      0.19  Q         |         |         |     V   |
16+50       1.2006      0.19  Q         |         |         |     V   |
16+55       1.2019      0.19  Q         |         |         |     V   |
17+ 0       1.2032      0.19  Q         |         |         |     V   |
17+ 5       1.2049      0.24  Q         |         |         |     V   |
17+10       1.2069      0.30  |Q        |         |         |     V   |
17+15       1.2090      0.31  |Q        |         |         |     V   |
17+20       1.2112      0.31  |Q        |         |         |     V   |
17+25       1.2134      0.32  |Q        |         |         |     V   |
17+30       1.2156      0.32  |Q        |         |         |      V  |
17+35       1.2177      0.32  |Q        |         |         |      V  |
17+40       1.2199      0.32  |Q        |         |         |      V  |
17+45       1.2221      0.32  |Q        |         |         |      V  |
17+50       1.2241      0.29  |Q        |         |         |      V  |
17+55       1.2260      0.26  |Q        |         |         |      V  |
18+ 0       1.2277      0.26  |Q        |         |         |      V  |
18+ 5       1.2295      0.26  |Q        |         |         |      V  |
18+10       1.2313      0.25  |Q        |         |         |      V  |
18+15       1.2330      0.25  |Q        |         |         |      V  |
18+20       1.2348      0.25  |Q        |         |         |      V  |
18+25       1.2365      0.25  |Q        |         |         |      V  |
18+30       1.2383      0.25  |Q        |         |         |      V  |
18+35       1.2398      0.23  Q         |         |         |      V  |
18+40       1.2412      0.20  Q         |         |         |      V  |
18+45       1.2426      0.19  Q         |         |         |      V  |
18+50       1.2437      0.17  Q         |         |         |      V  |
18+55       1.2447      0.14  Q         |         |         |      V  |
19+ 0       1.2456      0.13  Q         |         |         |      V  |
19+ 5       1.2466      0.15  Q         |         |         |       V |
19+10       1.2479      0.18  Q         |         |         |       V |
19+15       1.2491      0.19  Q         |         |         |       V |
19+20       1.2506      0.21  Q         |         |         |       V |
19+25       1.2523      0.24  Q         |         |         |       V |
19+30       1.2540      0.25  Q         |         |         |       V |
19+35       1.2556      0.23  Q         |         |         |       V |
19+40       1.2570      0.20  Q         |         |         |       V |
19+45       1.2583      0.19  Q         |         |         |       V |
19+50       1.2595      0.17  Q         |         |         |       V |
19+55       1.2604      0.14  Q         |         |         |       V |
20+ 0       1.2613      0.13  Q         |         |         |       V |
20+ 5       1.2624      0.15  Q         |         |         |       V |
20+10       1.2636      0.18  Q         |         |         |       V |
20+15       1.2649      0.19  Q         |         |         |       V |
20+20       1.2662      0.19  Q         |         |         |       V |
20+25       1.2675      0.19  Q         |         |         |       V |
20+30       1.2688      0.19  Q         |         |         |       V |
20+35       1.2701      0.19  Q         |         |         |       V |
20+40       1.2714      0.19  Q         |         |         |       V |
20+45       1.2728      0.19  Q         |         |         |       V |
20+50       1.2739      0.17  Q         |         |         |       V |
20+55       1.2749      0.14  Q         |         |         |       V |
21+ 0       1.2758      0.13  Q         |         |         |       V |
21+ 5       1.2768      0.15  Q         |         |         |       V |
21+10       1.2780      0.18  Q         |         |         |       V |
21+15       1.2793      0.19  Q         |         |         |        V|
21+20       1.2805      0.17  Q         |         |         |        V|
21+25       1.2814      0.14  Q         |         |         |        V|
21+30       1.2823      0.13  Q         |         |         |        V|
21+35       1.2834      0.15  Q         |         |         |        V|
21+40       1.2846      0.18  Q         |         |         |        V|
21+45       1.2859      0.19  Q         |         |         |        V|
21+50       1.2870      0.17  Q         |         |         |        V|
21+55       1.2880      0.14  Q         |         |         |        V|
22+ 0       1.2889      0.13  Q         |         |         |        V|
22+ 5       1.2899      0.15  Q         |         |         |        V|
22+10       1.2912      0.18  Q         |         |         |        V|
22+15       1.2924      0.19  Q         |         |         |        V|
22+20       1.2936      0.17  Q         |         |         |        V|
22+25       1.2945      0.14  Q         |         |         |        V|
22+30       1.2954      0.13  Q         |         |         |        V|
22+35       1.2963      0.13  Q         |         |         |        V|
22+40       1.2972      0.13  Q         |         |         |        V|
22+45       1.2981      0.13  Q         |         |         |        V|
22+50       1.2989      0.13  Q         |         |         |        V|
22+55       1.2998      0.13  Q         |         |         |        V|
23+ 0       1.3007      0.13  Q         |         |         |        V|
23+ 5       1.3016      0.13  Q         |         |         |        V|
23+10       1.3024      0.13  Q         |         |         |        V|
23+15       1.3033      0.13  Q         |         |         |        V|
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   23+20       1.3042      0.13  Q         |         |         |        V|
   23+25       1.3051      0.13  Q         |         |         |        V|
   23+30       1.3059      0.13  Q         |         |         |        V|
   23+35       1.3068      0.13  Q         |         |         |        V|
   23+40       1.3077      0.13  Q         |         |         |        V|
   23+45       1.3086      0.13  Q         |         |         |        V|
   23+50       1.3094      0.13  Q         |         |         |        V|
   23+55       1.3103      0.13  Q         |         |         |        V|
   24+ 0       1.3112      0.13  Q         |         |         |        V|
   24+ 5       1.3117      0.08  Q         |         |         |        V|
   24+10       1.3119      0.02  Q         |         |         |        V|
   24+15       1.3119      0.01  Q         |         |         |        V|
   24+20       1.3120      0.00  Q         |         |         |         V
-----------------------------------------------------------------------
```

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****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                      (RCFC&WCD)  1978 HYDROLOGY MANUAL
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                      (Rational Tabling Version 23.0)
                  Release Date: 07/01/2016  License ID 1435

                         Analysis prepared by:



 ************************* DESCRIPTION OF STUDY *************************
* TEI JOB NO 3566                                                        *
* 2 YEAR EVENT                                                           *
* EXISTING CONDITION                                                     *
 ************************************************************************

  FILE NAME: W:\3566\EX2.DAT
  TIME/DATE OF STUDY: 15:53 11/13/2017
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  2-YEAR, 1-HOUR PRECIPITATION(INCH) =  0.455
  100-YEAR, 1-HOUR PRECIPITATION(INCH) =  1.150
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =    2.00   1-HOUR INTENSITY(INCH/HOUR) =   0.455
  SLOPE OF INTENSITY DURATION CURVE = 0.5000
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH FAIR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   840.00
  UPSTREAM ELEVATION(FEET) =   1570.10
  DOWNSTREAM ELEVATION(FEET) =   1561.00
  ELEVATION DIFFERENCE(FEET) =      9.10
  TC = 0.709*[(  840.00**3)/(     9.10)]**.2 =   25.921
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  0.692
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .3581
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      2.01
  TOTAL AREA(ACRES) =      8.10   TOTAL RUNOFF(CFS) =      2.01

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1561.00  DOWNSTREAM(FEET) =   1558.60
  CHANNEL LENGTH THRU SUBAREA(FEET) =   440.00   CHANNEL SLOPE =  0.0055
  CHANNEL FLOW THRU SUBAREA(CFS) =       2.01
  FLOW VELOCITY(FEET/SEC) =   1.27 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   5.76   Tc(MIN.) =   31.69
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =    1280.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  0.626
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .3367
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    7.70   SUBAREA RUNOFF(CFS) =    1.62
  TOTAL AREA(ACRES) =       15.8   TOTAL RUNOFF(CFS) =       3.63
  TC(MIN.) =   31.69
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       15.8  TC(MIN.) =     31.69
  PEAK FLOW RATE(CFS)   =       3.63
```

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END OF RATIONAL METHOD ANALYSIS

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****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                      (RCFC&WCD)  1978 HYDROLOGY MANUAL
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                      (Rational Tabling Version 23.0)
                  Release Date: 07/01/2016  License ID 1435

                           Analysis prepared by:




 ************************** DESCRIPTION OF STUDY **************************
* TEI 33566                                                                *
* PROPOSED CONDITION - 2 YEAR EVENT                                        *
*                                                                          *
 ****************************************************************************

  FILE NAME: W:\3566\PR100-2.DAT
  TIME/DATE OF STUDY: 08:50 12/08/2017
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  2-YEAR, 1-HOUR PRECIPITATION(INCH) =  0.455
  100-YEAR, 1-HOUR PRECIPITATION(INCH) =  1.150
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =    2.00   1-HOUR INTENSITY(INCH/HOUR) =   0.455
  SLOPE OF INTENSITY DURATION CURVE = 0.5000
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1000.00
  UPSTREAM ELEVATION(FEET) =   1565.60
  DOWNSTREAM ELEVATION(FEET) =   1558.48
  ELEVATION DIFFERENCE(FEET) =      7.12
  TC = 0.303*[( 1000.00**3)/(     7.12)]**.2 =   12.915
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  0.981
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8535
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      5.23
  TOTAL AREA(ACRES) =      6.25   TOTAL RUNOFF(CFS) =      5.23

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1555.00  DOWNSTREAM(FEET) =  1552.00
  FLOW LENGTH(FEET) =   225.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.87
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.23
  PIPE TRAVEL TIME(MIN.) =   0.55    Tc(MIN.) =   13.46
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =    1225.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  0.961
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8531
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    0.35   SUBAREA RUNOFF(CFS) =    0.29
  TOTAL AREA(ACRES) =        6.6   TOTAL RUNOFF(CFS) =       5.52
  TC(MIN.) =   13.46

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  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1552.02  DOWNSTREAM(FEET) =  1551.82
  FLOW LENGTH(FEET) =    33.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.18
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.52
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =   13.57
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    103.00 =    1258.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        6.6  TC(MIN.) =     13.57
  PEAK FLOW RATE(CFS)   =       5.52
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
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****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
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                      (Rational Tabling Version 23.0)
                  Release Date: 07/01/2016  License ID 1435

                           Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* TEI 3566                                                               *
* PROPOSED CONDITION - 2 YEAR EVENT                                      *
*                                                                        *
 ************************************************************************

  FILE NAME: W:\3566\PR200-2.DAT
  TIME/DATE OF STUDY: 10:01 12/14/2017
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  2-YEAR, 1-HOUR PRECIPITATION(INCH) =  0.455
  100-YEAR, 1-HOUR PRECIPITATION(INCH) =  1.150
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =    2.00   1-HOUR INTENSITY(INCH/HOUR) =   0.455
  SLOPE OF INTENSITY DURATION CURVE = 0.5000
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   880.00
  UPSTREAM ELEVATION(FEET) =   1565.42
  DOWNSTREAM ELEVATION(FEET) =   1557.77
  ELEVATION DIFFERENCE(FEET) =      7.65
  TC = 0.303*[(  880.00**3)/(     7.65)]**.2 =   11.791
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.026
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8545
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      4.25
  TOTAL AREA(ACRES) =      4.85   TOTAL RUNOFF(CFS) =      4.25

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1553.77  DOWNSTREAM(FEET) =  1552.22
  FLOW LENGTH(FEET) =    86.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.20
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.25
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =   11.99
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    202.00 =     966.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        4.8  TC(MIN.) =     11.99
  PEAK FLOW RATE(CFS)   =       4.25
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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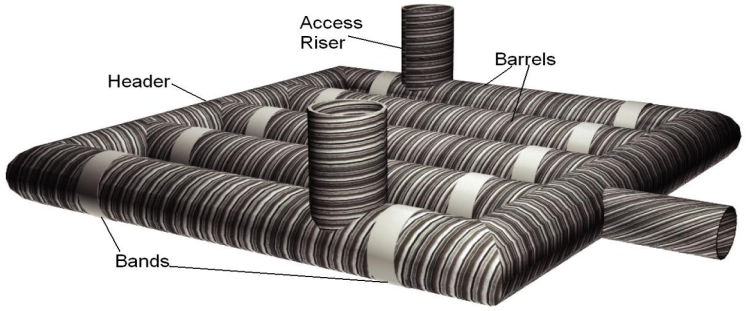
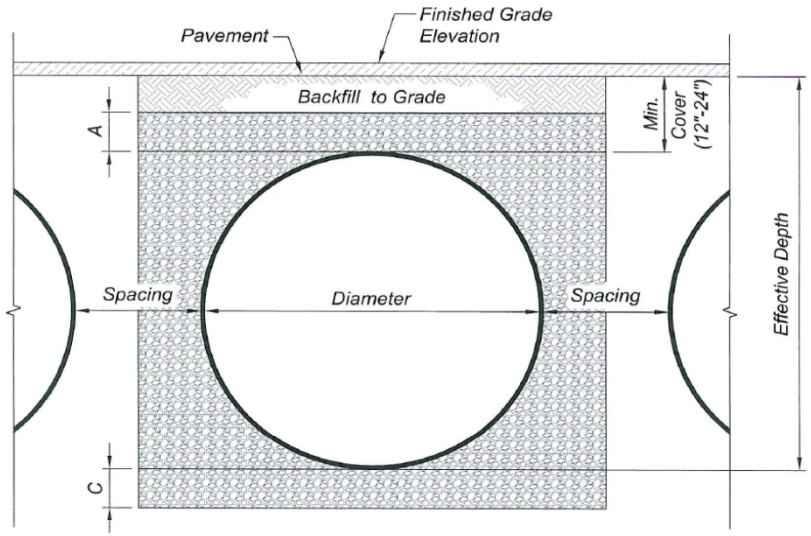


Project Summary

Date:	12/12/2017	
Project Name:	Brodiaea Business Park (HCOC)	
City / County:	Moreno Valley	
State:	California	
Designed By:	Luis Prado	
Company:	Thienes Engineering, Inc.	**Enter Information in Blue Cells**
Telephone:	(714) 521-4811	

Corrugated Metal Pipe Calculator

Storage Volume Required (cf):	26,223	
Limiting Width (ft):	40.00	
Invert Depth Below Asphalt (ft):	7.00	
Solid or Perforated Pipe:	Solid	
Shape Or Diameter (in):	60	19.63 ft^2 Pipe Area
Number Of Headers:	1	
Spacing between Barrels (ft):	2.50	
Stone Width Around Perimeter of System (ft):	1	
Depth A: Porous Stone Above Pipe (in):	6	
Depth C: Porous Stone Below Pipe (in):	6	
Stone Porosity (0 to 40%):	40	



System Sizing

Pipe Storage:	26,311	cf	
Porous Stone Storage:	0	cf	
Total Storage Provided:	26,311	cf	100.3% Of Required Storage
Number of Barrels:	5	barrels	
Length per Barrel:	261.0	ft	
Length Per Header:	35.0	ft	
Rectangular Footprint (W x L):	37. ft x 268. ft		

CONTECH Materials

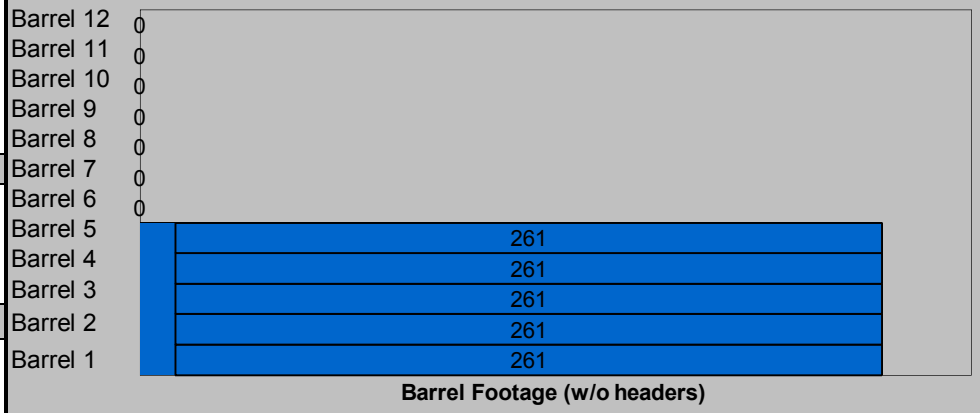
Total CMP Footage:	1,340	ft
Approximate Total Pieces:	57	pcs
Approximate Coupling Bands:	56	bands
Approximate Truckloads:	15	trucks

Construction Quantities**

Total Excavation:	2571	cy
Porous Stone Backfill For Storage:	0	cy stone
Backfill to Grade Excluding Stone:	1597	cy fill

***Construction quantities are approximate and should be verified upon final design*

System Layout



© 2007 CONTECH Stormwater Solutions

Appendix 8: Source Control

Pollutant Sources/Source Control Checklist

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

How to use this worksheet (also see instructions in Section G of the WQMP Template):

1. Review Column 1 and identify which of these potential sources of stormwater pollutants apply to your site. Check each box that applies.
2. Review Column 2 and incorporate all of the corresponding applicable BMPs in your WQMP Exhibit.
3. Review Columns 3 and 4 and incorporate all of the corresponding applicable permanent controls and operational BMPs in your WQMP. Use the format shown in Table G.1on page 23 of this WQMP Template. Describe your specific BMPs in an accompanying narrative, and explain any special conditions or situations that required omitting BMPs or substituting alternative BMPs for those shown here.

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☒ A. **On-site storm drain inlets**	☒ **Locations of inlets.**	☒ **Mark all inlets with the words "Only Rain Down the Storm Drain" or similar. Catch Basin Markers may be available from the Riverside County Flood Control and Water Conservation District, call 951.955.1200 to verify.**	☒ **Maintain and periodically repaint or replace inlet markings.** ☒ **Provide stormwater pollution prevention information to new site owners, lessees, or operators.** ☒ **See applicable operational BMPs in Fact Sheet SC-44, "Drainage System Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com** ☒ **Include the following in lease agreements: "Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains."**
☒ B. **Interior floor drains and elevator shaft sump pumps**		☒ **State that interior floor drains and elevator shaft sump pumps will be plumbed to sanitary sewer.**	☒ **Inspect and maintain drains to prevent blockages and overflow.**
☐ C. **Interior parking garages**		☐ **State that parking garage floor drains will be plumbed to the sanitary sewer.**	☐ **Inspect and maintain drains to prevent blockages and overflow.**

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☐ D1. **Need for future indoor & structural pest control**		☐ **Note building design features that discourage entry of pests.**	☐ **Provide Integrated Pest Management information to owners, lessees, and operators.**
☒ D2. **Landscape/ Outdoor Pesticide Use**	☐ **Show locations of native trees or areas of shrubs and ground cover to be undisturbed and retained.** ☒ **Show self-retaining landscape areas, if any.** ☐ **Show stormwater treatment and hydrograph modification management BMPs. (See instructions in Chapter 3, Step 5 and guidance in Chapter 5.)**	**State that final landscape plans will accomplish all of the following.** ☐ **Preserve existing native trees, shrubs, and ground cover to the maximum extent possible.** ☒ **Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution.** ☐ **Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions.** ☒ **Consider using pest-resistant plants, especially adjacent to hardscape.** ☒ **To insure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.**	☒ **Maintain landscaping using minimum or no pesticides.** ☒ **See applicable operational BMPs in "What you should know for…..Landscape and Gardening"** at http://rcflood.org/stormwater/**Error! Hyperlink reference not valid.** ☒ **Provide IPM information to new owners, lessees and operators.**

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ E. **Pools, spas, ponds, decorative fountains, and other water features.**	❑ **Show location of water feature and a sanitary sewer cleanout in an accessible area within 10 feet. (Exception: Public pools must be plumbed according to County Department of Environmental Health Guidelines.)**	**If the Co-Permittee requires pools to be plumbed to the sanitary sewer, place a note on the plans and state in the narrative that this connection will be made according to local requirements.**	❑ **See applicable operational BMPs in** "Guidelines for Maintaining Your Swimming Pool, Jacuzzi and Garden Fountain" at http://rcflood.org/stormwater/
❑ F. **Food service**	❑ **For restaurants, grocery stores, and other food service operations, show location (indoors or in a covered area outdoors) of a floor sink or other area for cleaning floor mats, containers, and equipment.** ❑ **On the drawing, show a note that this drain will be connected to a grease interceptor before discharging to the sanitary sewer.**	❑ **Describe the location and features of the designated cleaning area.** ❑ **Describe the items to be cleaned in this facility and how it has been sized to insure that the largest items can be accommodated.**	❑ **See the brochure, "**The Food Service Industry Best Management Practices for: Restaurants, Grocery Stores, Delicatessens and Bakeries" at http://rcflood.org/stormwater/ **Provide this brochure to new site owners, lessees, and operators.**
☒ G. **Refuse areas**	☒ **Show where site refuse and recycled materials will be handled and stored for pickup. See local municipal requirements for sizes and other details of refuse areas.** ☒ **If dumpsters or other receptacles are outdoors, show how the designated area will be covered, graded, and paved to prevent run-on and show locations of berms to prevent runoff from the area.** ❑ **Any drains from dumpsters, compactors, and tallow bin areas shall be connected to a grease removal device before discharge to sanitary sewer.**	☒ **State how site refuse will be handled and provide supporting detail to what is shown on plans.** ☒ **State that signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar.**	☒ **State how the following will be implemented:** **Provide adequate number of receptacles. Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered. Prohibit/prevent dumping of liquid or hazardous wastes. Post "no hazardous materials" signs. Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available on-site. See Fact Sheet SC-34, "Waste Handling and Disposal" in the CASQA Stormwater Quality Handbooks at** www.cabmphandbooks.com

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☒ H. **Industrial processes.**	☐ **Show process area.**	☒ **If industrial processes are to be located on site, state: "All process activities to be performed indoors. No processes to drain to exterior or to storm drain system."**	☒ **See Fact Sheet SC-10, "Non-Stormwater Discharges" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com** See the brochure "Industrial & Commercial Facilities Best Management Practices for: Industrial, Commercial Facilities" at http://rcflood.org/stormwater/

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ I. **Outdoor storage of equipment or materials. (See rows J and K for source control measures for vehicle cleaning, repair, and maintenance.)**	❑ **Show any outdoor storage areas, including how materials will be covered. Show how areas will be graded and bermed to prevent run-on or run-off from area.** ❑ **Storage of non-hazardous liquids shall be covered by a roof and/or drain to the sanitary sewer system, and be contained by berms, dikes, liners, or vaults.** ❑ **Storage of hazardous materials and wastes must be in compliance with the local hazardous materials ordinance and a Hazardous Materials Management Plan for the site.**	**Include a detailed description of materials to be stored, storage areas, and structural features to prevent pollutants from entering storm drains.** **Where appropriate, reference documentation of compliance with the requirements of Hazardous Materials Programs for:** ▪ **Hazardous Waste Generation** ▪ **Hazardous Materials Release Response and Inventory** ▪ **California Accidental Release (CalARP)** ▪ **Aboveground Storage Tank** ▪ **Uniform Fire Code Article 80 Section 103(b) & (c) 1991** ▪ **Underground Storage Tank** **www.cchealth.org/groups/hazmat/**	❑ **See the Fact Sheets SC-31, "Outdoor Liquid Container Storage" and SC-33, "Outdoor Storage of Raw Materials " in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ J. **Vehicle and Equipment Cleaning**	❑ **Show on drawings as appropriate:** **(1) Commercial/industrial facilities having vehicle/equipment cleaning needs shall either provide a covered, bermed area for washing activities or discourage vehicle/equipment washing by removing hose bibs and installing signs prohibiting such uses.** **(2) Multi-dwelling complexes shall have a paved, bermed, and covered car wash area (unless car washing is prohibited on-site and hoses are provided with an automatic shut-off to discourage such use).** **(3) Washing areas for cars, vehicles, and equipment shall be paved, designed to prevent run-on to or runoff from the area, and plumbed to drain to the sanitary sewer.** **(4) Commercial car wash facilities shall be designed such that no runoff from the facility is discharged to the storm drain system. Wastewater from the facility shall discharge to the sanitary sewer, or a wastewater reclamation system shall be installed.**	❑ **If a car wash area is not provided, describe any measures taken to discourage on-site car washing and explain how these will be enforced.**	**Describe operational measures to implement the following (if applicable):** ❑ **Washwater from vehicle and equipment washing operations shall not be discharged to the storm drain system.** Refer to "Outdoor Cleaning Activities and Professional Mobile Service Providers" for many of the Potential Sources of Runoff Pollutants categories below. Brochure can be found at http://rcflood.org/stormwater/ ❑ **Car dealerships and similar may rinse cars with water only.**

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ K. **Vehicle/Equipment Repair and Maintenance**	❑ **Accommodate all vehicle equipment repair and maintenance indoors. Or designate an outdoor work area and design the area to prevent run-on and runoff of stormwater.** ❑ **Show secondary containment for exterior work areas where motor oil, brake fluid, gasoline, diesel fuel, radiator fluid, acid-containing batteries or other hazardous materials or hazardous wastes are used or stored. Drains shall not be installed within the secondary containment areas.** ❑ **Add a note on the plans that states either (1) there are no floor drains, or (2) floor drains are connected to wastewater pretreatment systems prior to discharge to the sanitary sewer and an industrial waste discharge permit will be obtained.**	❑ **State that no vehicle repair or maintenance will be done outdoors, or else describe the required features of the outdoor work area.** ❑ **State that there are no floor drains or if there are floor drains, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements.** ❑ **State that there are no tanks, containers or sinks to be used for parts cleaning or rinsing or, if there are, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements.**	**In the Stormwater Control Plan, note that all of the following restrictions apply to use the site:** ❑ **No person shall dispose of, nor permit the disposal, directly or indirectly of vehicle fluids, hazardous materials, or rinsewater from parts cleaning into storm drains.** ❑ **No vehicle fluid removal shall be performed outside a building, nor on asphalt or ground surfaces, whether inside or outside a building, except in such a manner as to ensure that any spilled fluid will be in an area of secondary containment. Leaking vehicle fluids shall be contained or drained from the vehicle immediately.** ❑ **No person shall leave unattended drip parts or other open containers containing vehicle fluid, unless such containers are in use or in an area of secondary containment.** Refer to "Automotive Maintenance & Car Care Best Management Practices for Auto Body Shops, Auto Repair Shops, Car Dealerships, Gas Stations and Fleet Service Operations". Brochure can be found at http://rcflood.org/stormwater/ Refer to Outdoor Cleaning Activities and Professional Mobile Service Providers for many of the Potential Sources of Runoff Pollutants categories below. Brochure can be found at http://rcflood.org/stormwater/

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ L. **Fuel Dispensing Areas**	❑ **Fueling areas[6] shall have impermeable floors (i.e., portland cement concrete or equivalent smooth impervious surface) that are: a) graded at the minimum slope necessary to prevent ponding; and b) separated from the rest of the site by a grade break that prevents run-on of stormwater to the maximum extent practicable.** ❑ **Fueling areas shall be covered by a canopy that extends a minimum of ten feet in each direction from each pump. [Alternative: The fueling area must be covered and the cover's minimum dimensions must be equal to or greater than the area within the grade break or fuel dispensing area[1].] The canopy [or cover] shall not drain onto the fueling area.**		❑ **The property owner shall dry sweep the fueling area routinely.** ❑ **See the Fact Sheet SD-30 , "Fueling Areas" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**

[6] **The fueling area shall be defined as the area extending a minimum of 6.5 feet from the corner of each fuel dispenser or the length at which the hose and nozzle assembly may be operated plus a minimum of one foot, whichever is greater.**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☒ M. **Loading Docks**	☒ **Show a preliminary design for the loading dock area, including roofing and drainage. Loading docks shall be covered and/or graded to minimize run-on to and runoff from the loading area. Roof downspouts shall be positioned to direct stormwater away from the loading area. Water from loading dock areas shall be drained to the sanitary sewer, or diverted and collected for ultimate discharge to the sanitary sewer.** ☐ **Loading dock areas draining directly to the sanitary sewer shall be equipped with a spill control valve or equivalent device, which shall be kept closed during periods of operation.** ☐ **Provide a roof overhang over the loading area or install door skirts (cowling) at each bay that enclose the end of the trailer.**		☒ **Move loaded and unloaded items indoors as soon as possible.** ☒ **See Fact Sheet SC-30, "Outdoor Loading and Unloading," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☐ N. **Fire Sprinkler Test Water**		☐ **Provide a means to drain fire sprinkler test water to the sanitary sewer.**	☐ **See the note in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**
O. **Miscellaneous Drain or Wash Water or Other Sources** ☐ **Boiler drain lines** ☐ **Condensate drain lines** ☐ **Rooftop equipment** ☒ **Drainage sumps** ☐ **Roofing, gutters, and trim.** ☐ **Other sources**		☐ **Boiler drain lines shall be directly or indirectly connected to the sanitary sewer system and may not discharge to the storm drain system.** ☐ **Condensate drain lines may discharge to landscaped areas if the flow is small enough that runoff will not occur. Condensate drain lines may not discharge to the storm drain system.** ☐ **Rooftop equipment with potential to produce pollutants shall be roofed and/or have secondary containment.** ☒ **Any drainage sumps on-site shall feature a sediment sump to reduce the quantity of sediment in pumped water.** ☐ **Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff.** **Include controls for other sources as specified by local reviewer.**	

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☒ P. **Plazas, sidewalks, and parking lots.**			☒ **Sweep plazas, sidewalks, and parking lots regularly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into the storm drain system. Collect washwater containing any cleaning agent or degreaser and discharge to the sanitary sewer not to a storm drain.**

Appendix 9: O&M

Operation and Maintenance Plan and Documentation of Finance, Maintenance and Recording Mechanisms

Operation and Maintenance Plan

Project Title: Brodiaea Business Park

Original Date Prepared: November 16, 2017

Revision Date(s): _____

Revision Date(s): _____

Revision Date(s): _____

Revision Date(s): _____

Contact Information:

Prepared for:
Alere Property Group, LLC
100 Bayview Circle, Suite 310
Newport Beach, CA 92660
(949) 509-5000
Contact: Daniel Webb

Prepared by:
Thienes Engineering, Inc.
14349 Firestone Boulevard
La Mirada, CA 90638
(714) 521-4811
Contact: Luis Prado
(luisp@thieneseng.com)
Job No. 3566

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Appendix 2: Updates, Revisions, and Errata
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Appendix 4: Training Records
Appendix 5: Site Plan and Details
Appendix 6: "As-Built" Drawings
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Appendix 8: Service Agreement Information

I. Inspection and Maintenance Log

Date	Observations/Actions	Inspector

Additional inspection and maintenance logs to be included in Appendix 1 of this O&M Plan.

II. Updates, Revisions, and Errata

Revision Number	Date	Brief Description of Update/Revision/Errata, include section and page number	Prepared and Approved By

Additional updates, revisions, and errata to be include in Appendix 2 of this O&M Plan.

III. Introduction

Proposed improvements to the site consist of the construction of one warehouse type building with an area of 261,807 square feet.

The overall project property encompasses approximately 12.0 acres of improvements. There will be a truck yard on the west side of the building and vehicle parking lot along the north and south side of the building. A bioretention BMP servicing the entire site is located at the southwest corner of the property. The remainder of the site will be reserved for landscaping.

Existing Conditions

A majority of the project site is currently an undeveloped dirt lot. Runoff from the site generally surface drains from north to south towards Brodiaea Avenue.

Proposed Conditions

Runoff from the westerly portion of the building, the northerly vehicle parking lot, and the westerly truck yard will drain to catch basins in the truck yard. Runoff is then conveyed southerly into an existing 10'x7.5' RCB along Brodiaea Avenue. Prior to that, the water quality volume is directed to a sump pump which discharges into the proposed bioretention facility located at the southwest corner of the site.

The easterly half of the proposed building, the easterly drive aisle and the southerly vehicle parking lot drain southeasterly to catch basins near the parking lot. A storm drain will then convey high flows into an existing stub within Brodiaea Avenue and low flows will be routed westerly towards the sump pump for discharge into the bioretention facility.

The southerly and easterly landscape areas (and driveway approaches) fronting Brodiaea Avenue and the easterly property line (0.65 acres) will surface drain offsite. The landscape areas are considered self-treating areas.

IV. Responsibility for Maintenance

IV.A General

Funding will be provided by the owner:

Alere Property Group, LLC
100 Bayview Circle, Suite 310
Newport Beach, CA 92660
(949) 509-5000
Contact: Daniel Webb, Vice President

A copy of the Covenant Agreement will be attached in Appendix 3 of this O&M Plan.

IV.B Staff Training Program

Staff training records and descriptions will be inserted in Appendix 4 of this O&M Plan.

IV.C Records

Maintenance records are to be inserted chronologically in Appendix 1 of this O&M Plan.

IV.D Safety

All maintenance procedures shall comply with the latest OSHA standards.

V. Summary of Drainage Management Areas and Stormwater BMPs

V.A Drainage Areas

See Appendix 5 of this O&M Plan for WQMP site map.

DMA Name or ID	Surface Type(s)[1]	Area (Sq. Ft.)	Area (Acres)	DMA Type
A-1	Roofs/Conc/Asphalt	470,448	10.80	Type D
A-2	Ornamental Landscaping	23,958	0.55	Type D
B	Ornamental Landscaping	28,314	0.65	Type A

Geo-location of the BMPs using latitude and longitude coordinates

BMP No. or ID	BMP Identifier and Description	Corresponding Plan Sheet(s)	Latitude	Longitude
A	On-site storm drain inlets	WQMP Site Map	---	---
B	Interior floor drains and elevator shaft sump pumps	N/A	---	---
D2	Landscape / Outdoor Pesticide Use	On-site Landscape Improvement Plans	---	---
G	Refuse Areas	WQMP Site Map	---	---
H	Industrial processes	WQMP Site Map (indoors, if any)	---	---
M	Loading Docks	WQMP Site Map	---	---
O	Drainage Sumps	WQMP Site Map	33.914611	-117.245565
P	Plazas, sidewalks, and parking lots	N/A	---	---
BIORETENTION	Bioretention	WQMP Site Map	33.914139	-117.245726

V.B Structural Post-Construction BMPs

See Appendix 5 of this O&M Plan for WQMP site map.

Additional BMP details are available in Appendix 10 of the WQMP.

V.C Self-Retaining Areas or Other

DMA B is considered self-treating areas which will be maintained with normal landscape maintenance.

DMA Name or ID	Area (Sq. Ft.)	Stabilization Type	Irrigation Type (if any)
B	28,314	California Native Vegetation	Timed Sprinklers

VI. Stormwater BMP Design Documentation

VI.A "As-Built" Drawings of each Stormwater BMP

See Appendix 6 of this O&M Plan for "as-built" drawings.

VI.B Manufacturer's Data, Manuals, and Maintenance Requirements

Not applicable, there are no manufactured stormwater BMPs.

VI.C Specific Operation and Maintenance Concerns and Troubleshooting

Not applicable.

VII. Maintenance Schedule or Matrix

VII.A Maintenance Schedule

Schedule (Bioretention)	Inspection and Maintenance Activity (Bioretention)
Ongoing including just before the annual storm season and following rainfall events.	• Keep adjacent landscape areas maintained. Remove clipping from landscape maintenance activities. • Remove trash and debris. • Replace damaged grass and/or plants. • Replace surface mulch layer as needed to maintain a 2-3 inch soil cover.
After storm events	• Inspect areas for ponding.
Annually. Schedule these inspections within 72 hours after a significant rainfall and prior to the rainy season (October 1st). "Significant rainfall" is defined as 0.5 inches or greater of rainfall: http://www.wrh.noaa.gov/forecast/wxtables/	• Inspect/clean inlets and outlets.

Source Control BMPs

Potential Sources of Runoff pollutants	Permanent Structural Source Control BMPs	Operational Source Control BMPs
A. On-site storm drain inlets	• Mark all inlets with the words "Only Rain Down the Storm Drain" or similar.	• Maintain and periodically repaint or replace inlet markings annually. • Provide stormwater pollution prevention information to new site owners, lessees, or operators upon occupancy and annually thereafter. • See CASQA fact sheet SC-44 for "Drainage System Maintenance," included in Appendix of this document. • Include the following lease agreements: "Tenant shall not allow anyone to discharge anything to storm drain or to store or deposit materials so as to create a potential discharge to storm drains."
B. Interior floor drains and elevator shaft sump pumps	• Interior floor drains and elevator shaft sump pumps will be plumbed to sanitary sewer.	• Inspect and maintain drains semi-annually to prevent blockages and overflow.

Potential Sources of Runoff pollutants	Permanent Structural Source Control BMPs	Operational Source Control BMPs
D2. Landscape / Outdoor Pesticide Use	• Landscape plans will minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution. • Pest-resistant plans will be used adjacent to hardscape. • The landscape plans will consider plants appropriate to the site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.	• Maintain landscaping only using minimum pesticides, when needed. • See Appendix 10 for "Landscape and Gardening" brochure by RCFlood. • Provide Integrated Pest Management (IPM) information to new owners, lessees and operators upon occupancy and annually thereafter. IPM is an effective and environmentally sensitive approach to pest management.
G. Refuse Areas	• Site refuse will be handled by contractor on a weekly basis. • Signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar.	• A minimum of two receptacles will be provided and locate dindoors. Receptacles are to be inspected daily and repairs or replacements to leaky receptacles will be completed immediately. Receptacles are to remain covered with not in use. Dumping of liquid or hazardous wastes is prohibited. A "no hazardous materials" sign will be posted. Spills will be cleaned immediately upon discovery. Spill control materials will be available onsite. See Appendix 10 for CASQA fact sheet SC-34 for "Waste Handling and Disposal."
H. Industrial processes	• All process activities to be performed indoors. No processes to drain to exterior or to storm drain system.	• See Appendix 10 for CASQA fact sheet SC-10 for "Non-Stormwater Discharges"
M. Loading Docks	• Spills will be cleaned up immediately and disposed of properly.	• Move loaded and unloaded items indoors as soon as possible. • See Appendix 10 for CASQA fact sheet SC-30 for "Outdoor Loading and Unloading"
O. Miscellaneous Drain or Wash Water or Other Sources	• Any drainage sumps on-site shall feature a sediment sump to reduce the quantity of sediment in pumped water.	
P. Plazas, sidewalks, and parking lots		• Sweep plazas, sidewalks, and parking lots monthly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into the storm drain system. Collect washwater containing any cleaning agent or degreaser and discharge to the sanitary sewer not to a storm drain.

VII.B Service Agreement Information

See Appendix 8 of this O&M Plan for service agreement information with any contractors regarding the O&M of BMPs at the site, if any.

Appendix 1: Inspection and Maintenance Logs

Insert Additional Inspection or Maintenance Logs Here

Date	Observations/Actions	Inspector

Appendix 2: Updates, Revisions, and Errata

Insert Additional Updates, Revisions, and Errata Logs Here

Revision Number	Date	Brief Description of Update/Revision/Errata, include section and page number	Prepared and Approved By

Appendix 3: Maintenance Mechanism

Copy of Covenant Agreement
Establishing Notification Process And Responsibility
For Water Quality Management Plan Implementation And Maintenance

Notification Process and Responsibility

1. **Name:** _____
   Title: _____
   Phone: _____

   WQMP Responsibilities:
   (1) Routine inspections to evaluate BMP effectiveness.
   (2) Identifying when BMPs require maintenance.
   (3) Working with qualified contractors to maintain the BMP.
   (4) Recordkeeping of inspections and maintenance activities.

2. **Name:** _____
   Title: _____
   Phone: _____

   WQMP Responsibilities:
   (1) Cleaning, repairing, servicing, and maintenance of BMP.

3. **Name:** _____
   Title: _____
   Phone: _____

   WQMP Responsibilities:
   (1) In event of failure, and with City Engineer's authorization, modify or replace with an upgraded BMP to prevent future failure.
   (2) Notify successors of BMPs and maintenance requirements.

RECORDING REQUESTED BY
AND WHEN RECORDED MAIL TO:

LAND DEVELOPMENT
CITY OF MORENO VALLEY
PO BOX 88005
14177 FREDERICK STREET
MORENO VALLEY, CA 92552-0805

EXEMPT FROM FEE PER G.C. Section 6103

SPACE ABOVE THIS LINE FOR RECORDER'S USE

STORMWATER TREATMENT DEVICE AND CONTROL MEASURE ACCESS AND MAINTENANCE COVENANT

Assessor's Parcel Number(s) 297-170-36 and 297-170-38

THIS INSTRUMENT is made and entered into this _____ day of _____2018, by and between **Alere Property Group, LLC** hereinafter referred to as "Owner," and the City of Moreno Valley, a municipal corporation, hereinafter referred to as "City."

RECITALS

WHEREAS, the Owner owns real property ("Property") in the City specifically described in Exhibit "A," which is attached hereto and incorporated herein by this reference; and

WHEREAS, at the time of approval of the development project known as **Brodiaea Business Park** (the "Project") for the Property, the City required the Project to employ on-site storm water and non-storm water control measures to mitigate the Project impacts to water quality and minimize pollutants in urban storm water runoff; and

WHEREAS, the City and Owner, its successors, and assigns, agree that the health, safety and welfare of the residents of the City, require that on-site storm water and non-storm water management control measures be constructed and implemented and adequately maintained on the Property; and

WHEREAS, the Owner has chosen to install **a bioretention facility**, hereinafter referred to as the "Device" and other control measures all as described in the Final Water Quality Management Plan (WQMP) to minimize pollutants in urban storm water and non-storm water runoff; and

WHEREAS, the Device and other control measures have been installed and/or implemented in accordance with the WQMP, project plans and specifications approved by the City; and

WHEREAS, the Device and other control measures, being installed on private property and draining only private property are private facilities with all maintenance or replacement therefore being the sole responsibility of the Owner; and

WHEREAS, the Owner is aware that periodic and continuous maintenance including, but not necessarily limited to, filter material replacement and sediment removal is required to assure discharges from the Device, other control measures and the Project are in compliance with the City's Municipal Code for storm water and non-storm water discharges and that such maintenance activity will require compliance with all Federal, State and local laws and

regulations, including those pertaining to confined space and waste disposal methods in effect at the time such maintenance occurs;

NOW, THEREFORE, in consideration of City's approval of the Project and the foregoing premises, the mutual covenants contained herein, and the following terms and conditions, the City and Owner agree as follows:

1. The Owner hereby provides the City and its designees with full right of access to the Device and other control measures and the immediate vicinity of the property at any time, upon reasonable notice; or in the event of emergency, as determined by City's Public Works Director/City Engineer or designees, no advance notice; for the purpose of inspection, sampling and testing of the Device and other control measures, and in cases of emergency, where the public health, safety, or welfare is compromised, such emergency shall be declared a "nuisance" as defined in the Municipal Code. Such conditions that created the emergency shall be abated as provided for in the Municipal Code and at the Owner's expense as provided for in Section 3, below.

2. The Owner shall diligently maintain the Device and other control measures in a manner assuring all discharges from the Device, other control measures and the Project are in compliance with the Municipal Code for storm water and non-storm water discharges at all times. All reasonable precautions shall be exercised by the Owner and the Owner's representatives in the removal and extraction of materials from the Device and other control measures, and the ultimate disposal of the

materials in a manner consistent with all applicable laws. As may be requested from time to time by the City, the Owner shall provide the City with documentation identifying the materials removed, the quantity and the recycle of disposal destinations, as appropriate.

3. In the event the Owner fails to perform the necessary maintenance contemplated by this Instrument, within five (5) days of being given written notice by the City, the lack of maintenance shall be considered a public health and safety concern and declared a "nuisance", the City shall take all necessary actions as provided in the Municipal Code, to abate the nuisance and charge the entire cost and expense to the Owner, including administrative costs, attorneys' fees and interest thereon at the maximum rate authorized by law from the date of the notice of expense until paid in full. Additionally, any discharge as a result from the lack of maintenance prescribed herein from the Device to the City's maintained Municipal Separate Storm Sewer System shall be considered an illegal discharge and considered a violation of the Municipal Code and shall cease immediately. Such cessation may include a yellow or red tag issued to the Project.

4. This Instrument shall be recorded in the Official Records of the County of Riverside at the expense of the Owner and shall constitute notice to all successors and assigns to the title to the Property of the obligations herein set forth. This Instrument shall also constitute the right for the City of Moreno Valley to file a lien against the Property in such amount as will fully reimburse the City, including interest as herein above set forth, subject to foreclosure in event of

default in payment.

5. It is the intent of the Owner that the burdens and benefits herein undertaken shall constitute covenants that run with the Property and shall constitute the right for the City of Moreno Valley to file a lien against the Property.

6. This covenant imposes no liability of any kind whatsoever on the City and the Owner agrees to hold the City harmless from any liability in the event the Device and other control measures fail to operate in accordance with the plans and specification submitted to the City.

7. The obligations herein undertaken shall be binding upon the heirs, successors, executors, administrators and assigns of the Owner hereto. The term "Owner" shall include not only the Owner, but also its heirs, successors, executors, administrators, lessees and assigns. The Owner shall notify any successor to title of all or part of the Property about the existence of this Instrument. The Owner shall provide such notice prior to such successor obtaining an interest in all or part of the Property. The Owner shall provide a copy of such notice to the City at the same time such notice is provided to the successor.

8. Time is of the essence in the performance of this Instrument.

9. Any notice to a party required or called for in this Instrument shall be served in person, or by deposit in the U.S. Mail, first class postage prepaid, to the address

set forth below. Notice(s) shall be deemed effective upon receipt, or seventy-two (72) hours after deposit in the U.S. Mail, whichever is earlier. A party may change notice address only by providing written notice thereof to the other party.

CITY:	OWNER:
Public Works Director/City Engineer	Name: Daniel Webb
City of Moreno Valley	Company: Alere Property Group, LLC
PO Box 88005	Address: 100 Bayview Circle
14177 Frederick Street	Suite 310
Moreno Valley, CA 92552-0805	City/State/ZIP: Newport Beach, CA 92660

10. This Instrument represents the entire Covenant of the parties hereto as to the matters contained herein and supersedes any and all prior written or verbal agreements between the parties as to the subject matter hereof.

11. This Instrument shall be governed by and construed in accordance with the laws of the State of California.

12. No amendment to this Instrument shall be made without prior written approval by the City.

OWNER:

_____
Daniel Webb, Vice President

Alere Property Group, LLC
(Name of company/partnership/corp./entity)

CITY:

CITY OF MORENO VALLEY

APPROVED AS TO FORM:

_____
City Attorney

By: _____ Date: _____
City Manager

Attest:

By: _____ Date: _____
City Clerk

Appendix 4: Training Records

Insert Training Records with Brief Discussion Here

Appendix 5: Site Plan and Details

WQMP Site Map and BMP Details

Appendix 6: "As-Built" Drawings

Insert "As-Builts" Here When Available

Appendix 7: Manufacturer Information

Brochures, Manuals, and Maintenance Requirements

Appendix 8: Service Agreement Information

Insert Contractor Information (if any)

Appendix 10: Educational Materials

BMP Fact Sheets, Maintenance Guidelines and Other End-User BMP Information

3.5 Bioretention Facility

Type of BMP	LID – Bioretention
Treatment Mechanisms	Infiltration, Evapotranspiration, Evaporation, Biofiltration
Maximum Drainage Area	This BMP is intended to be integrated into a project's landscaped area in a distributed manner. Typically, contributing drainage areas to Bioretention Facilities range from less than 1 acre to a maximum of around 10 acres.
Other Names	Rain Garden, Bioretention Cell, Bioretention Basin, Biofiltration Basin, Landscaped Filter Basin, Porous Landscape Detention

Description

Bioretention Facilities are shallow, vegetated basins underlain by an engineered soil media. Healthy plant and biological activity in the root zone maintain and renew the macro-pore space in the soil and maximize plant uptake of pollutants and runoff. This keeps the Best Management Practice (BMP) from becoming clogged and allows more of the soil column to function as both a sponge (retaining water) and a highly effective and self-maintaining biofilter. In most cases, the bottom of a Bioretention Facility is unlined, which also provides an opportunity for infiltration to the extent the underlying onsite soil can accommodate. When the infiltration rate of the underlying soil is exceeded, fully biotreated flows are discharged via underdrains. Bioretention Facilities therefore will inherently achieve the maximum feasible level of infiltration and evapotranspiration and achieve the minimum feasible (but highly biotreated) discharge to the storm drain system.

Siting Considerations

These facilities work best when they are designed in a relatively level area. Unlike other BMPs, Bioretention Facilities can be used in smaller landscaped spaces on the site, such as:

- ✓ Parking islands
- ✓ Medians
- ✓ Site entrances

Landscaped areas on the site (such as may otherwise be required through minimum landscaping ordinances), can often be designed as Bioretention Facilities. This can be accomplished by:

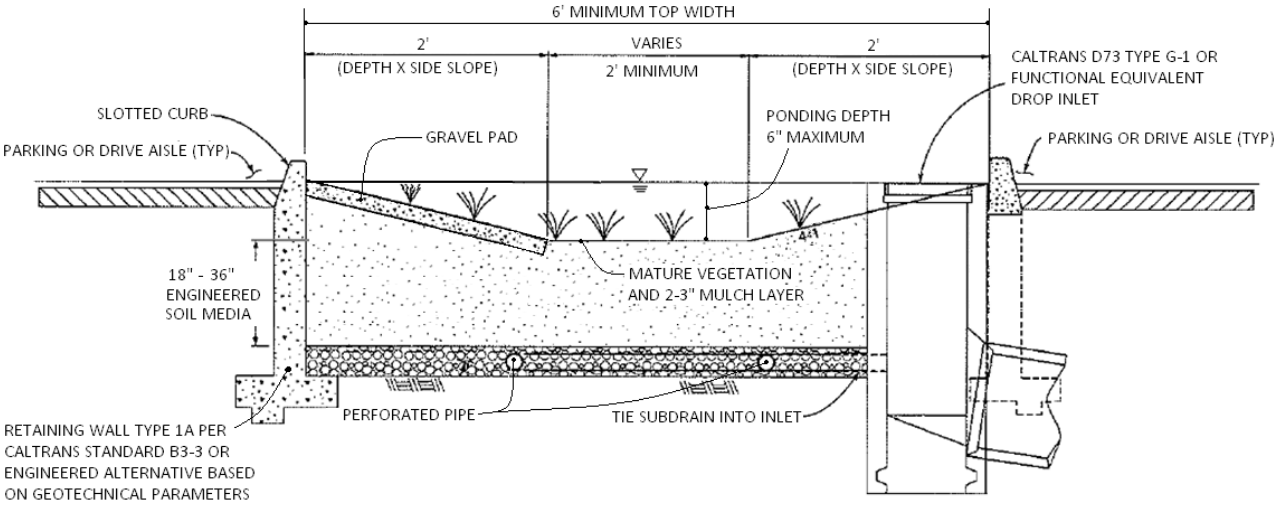
- *Depressing* landscaped areas below adjacent impervious surfaces, rather than elevating those areas
- Grading the site to direct runoff from those impervious surfaces *into* the Bioretention Facility, rather than away from the landscaping
- Sizing and designing the depressed landscaped area as a Bioretention Facility as described in this Fact Sheet

Bioretention Facilities should however not be used downstream of areas where large amounts of sediment can clog the system. Placing a Bioretention Facility at the toe of a steep slope should also be avoided due to the potential for clogging the engineered soil media with erosion from the slope, as well as the potential for damaging the vegetation.

Design and Sizing Criteria

The recommended cross section necessary for a Bioretention Facility includes:

- Vegetated area
- 18' minimum depth of engineered soil media
- 12' minimum gravel layer depth with 6' perforated pipes (added flow control features such as orifice plates may be required to mitigate for HCOC conditions)



While the 18-inch minimum engineered soil media depth can be used in some cases, it is recommended to use 24 inches or a preferred 36 inches to provide an adequate root zone for the chosen plant palate. Such a design also provides for improved removal effectiveness for nutrients. The recommended ponding depth inside of a Bioretention Facility is 6 inches; measured from the flat bottom surface to the top of the water surface as shown in Figure 1.

Because this BMP is filled with an engineered soil media, pore space in the soil and gravel layer is assumed to provide storage volume. However, several considerations must be noted:

- Surcharge storage above the soil surface (6 inches) is important to assure that design flows do not bypass the BMP when runoff exceeds the soil's absorption rate.
- In cases where the Bioretention Facility contains engineered soil media deeper than 36 inches, the pore space within the engineered soil media can only be counted to the 36-inch depth.
- A maximum of 30 percent pore space can be used for the soil media whereas a maximum of 40 percent pore space can be use for the gravel layer.

Figure 1: Standard Layout for a Bioretention Facility

Engineered Soil Media Requirements

The engineered soil media shall be comprised of 85 percent mineral component and 15 percent organic component, by volume, drum mixed prior to placement. The mineral component shall be a Class A sandy loam topsoil that meets the range specified in Table 1 below. The organic component shall be nitrogen stabilized compost[1], such that nitrogen does not leach from the media.

Table 1: Mineral Component Range Requirements

Percent Range	Component
70-80	Sand
15-20	Silt
5-10	Clay

The trip ticket, or certificate of compliance, shall be made available to the inspector to prove the engineered mix meets this specification.

Vegetation Requirements

Vegetative cover is important to minimize erosion and ensure that treatment occurs in the Bioretention Facility. The area should be designed for at least 70 percent mature coverage throughout the Bioretention Facility. To prevent the BMP from being used as walkways, Bioretention Facilities shall be planted with a combination of small trees, densely planted shrubs, and natural grasses. Grasses shall be native or ornamental; preferably ones that do not need to be mowed. The application of fertilizers and pesticides should be minimal. To maintain oxygen levels for the vegetation and promote biodegradation, it is important that vegetation not be completely submerged for any extended period of time. Therefore, a maximum of 6 inches of ponded water shall be used in the design to ensure that plants within the Bioretention Facility remain healthy.

A 2 to 3-inch layer of standard shredded aged hardwood mulch shall be placed as the top layer inside the Bioretention Facility. The 6-inch ponding depth shown in Figure 1 above shall be measured from the top surface of the 2 to 3-inch mulch layer.

Curb Cuts

To allow water to flow into the Bioretention Facility, 1-foot-wide (minimum) curb cuts should be placed approximately every 10 feet around the perimeter of the Bioretention Facility. Figure 2 shows a curb cut in a Bioretention Facility. Curb cut flow lines must be at or above the V_{BMP} water surface level.

[1] For more information on compost, visit the US Composting Council website at: http://compostingcouncil.org/

Figure 2: Curb Cut located in a Bioretention Facility

To reduce erosion, a gravel pad shall be placed at each inlet point to the Bioretention Facility. The gravel should be 1- to 1.5-inch diameter in size. The gravel should overlap the curb cut opening a minimum of 6 inches. The gravel pad inside the Bioretention Facility should be flush with the finished surface at the curb cut and extend to the bottom of the slope.

In addition, place an apron of stone or concrete, a foot square or larger, inside each inlet to prevent vegetation from growing up and blocking the inlet. See Figure 3.

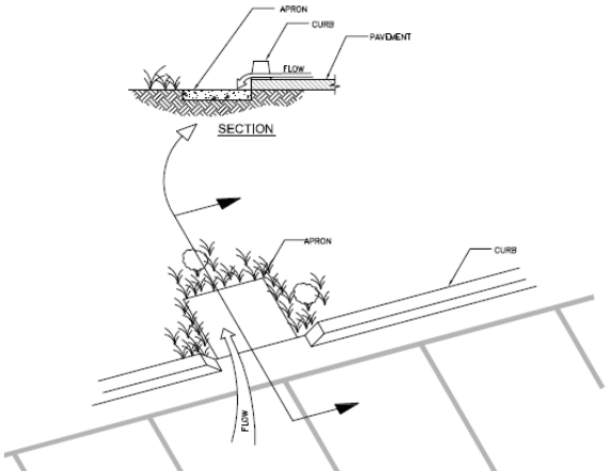


Figure 3: Apron located in a Bioretention Facility

Terracing the Landscaped Filter Basin

It is recommended that Bioretention Facilities be level. In the event the facility site slopes and lacks proper design, water would fill the lowest point of the BMP and then discharge from the basin without being treated. To ensure that the water will be held within the Bioretention Facility on sloped sites, the BMP must be terraced with nonporous check dams to provide the required storage and treatment capacity.

The terraced version of this BMP shall be used on non-flat sites with no more than a 3 percent slope. The surcharge depth cannot exceed 0.5 feet, and side slopes shall not exceed 4:1. Table 2 below shows the spacing of the check dams, and slopes shall be rounded up (i.e., 2.5 percent slope shall use 10' spacing for check dams).

Table 2: Check Dam Spacing

6” Check Dam Spacing	
Slope	**Spacing**
1%	*25'*
2%	*15'*
3%	*10'*

Roof Runoff

Roof downspouts may be directed towards Bioretention Facilities. However, the downspouts must discharge onto a concrete splash block to protect the Bioretention Facility from erosion.

Retaining Walls

It is recommended that Retaining Wall Type 1A, per Caltrans Standard B3-3 or equivalent, be constructed around the entire perimeter of the Bioretention Facility. This practice will protect the sides of the Bioretention Facility from collapsing during construction and maintenance or from high service loads adjacent to the BMP. Where such service loads would not exist adjacent to the BMP, an engineered alternative may be used if signed by a licensed civil engineer.

Side Slope Requirements

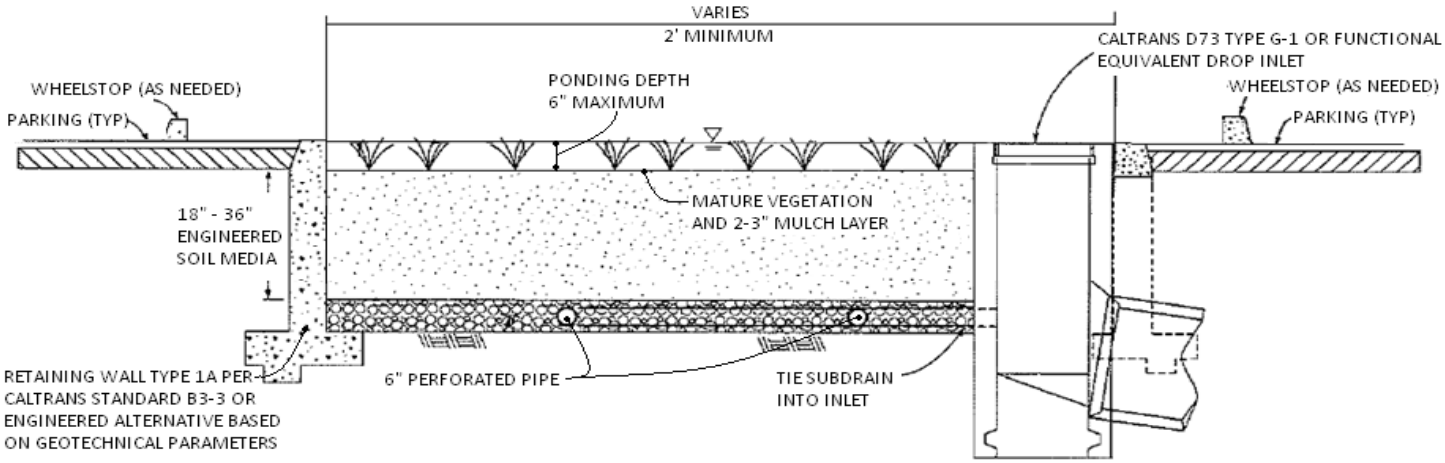
Bioretention Facilities Requiring Side Slopes

The design should assure that the Bioretention Facility does not present a tripping hazard. Bioretention Facilities proposed near pedestrian areas, such as areas parallel to parking spaces or along a walkway, must have a gentle slope to the bottom of the facility. Side slopes inside of a Bioretention Facility shall be 4:1. A typical cross section for the Bioretention Facility is shown in Figure 1.

Bioretention Facilities Not Requiring Side Slopes

Where cars park perpendicular to the Bioretention Facility, side slopes are not required. A 6-inch maximum drop may be used, and the Bioretention Facility must be planted with trees and shrubs to prevent pedestrian access. In this case, a curb is not placed around the Bioretention Facility,

but wheel stops shall be used to prevent vehicles from entering the Bioretention Facility, as shown in Figure 4.



Planter Boxes

Bioretention Facilities can also be placed above ground as planter boxes. Planter boxes must have a minimum width of 2 feet, a maximum surcharge depth of 6 inches, and no side slopes are necessary. Planter boxes must be constructed so as to ensure that the top surface of the engineered soil media will remain level. This option may be constructed of concrete, brick, stone or other stable materials that will not warp or bend. Chemically treated wood or galvanized steel, which has the ability to contaminate stormwater, should not be used. Planter boxes must be lined with an impermeable liner on all sides, including the bottom. Due to the impermeable liner, the inside bottom of the planter box shall be designed and constructed with a cross fall, directing treated flows within the subdrain layer toward the point where subdrain exits the planter box, and subdrains shall be oriented with drain holes oriented down. These provisions will help avoid excessive stagnant water within the gravel underdrain layer. Similar to the in-ground Bioretention Facility versions, this BMP benefits from healthy plants and biological activity in the root zone. Planter boxes should be planted with appropriately selected vegetation.

Figure 5: Planter Box
Source: LA Team Effort

Overflow

An overflow route is needed in the Bioretention Facility design to bypass stored runoff from storm events larger than V_{BMP} or in the event of facility or subdrain clogging. Overflow systems must connect to an acceptable discharge point, such as a downstream conveyance system as shown in Figure 1 and Figure 4. The inlet to the overflow structure shall be elevated inside the Bioretention Facility to be flush with the ponding surface for the design capture volume (V_{BMP}) as shown in Figure 4. This will allow the design capture volume to be fully treated by the Bioretention Facility, and for larger events to safely be conveyed to downstream systems. The overflow inlet shall **not** be located in the entrance of a Bioretention Facility, as shown in Figure 6.

Underdrain Gravel and Pipes

An underdrain gravel layer and pipes shall be provided in accordance with Appendix B – Underdrains.

Figure 6: Incorrect Placement of an Overflow Inlet.

Inspection and Maintenance Schedule

The Bioretention Facility area shall be inspected for erosion, dead vegetation, soggy soils, or standing water. The use of fertilizers and pesticides on the plants inside the Bioretention Facility should be minimized.

Schedule	Activity
Ongoing	• Keep adjacent landscape areas maintained. Remove clippings from landscape maintenance activities. • Remove trash and debris • Replace damaged grass and/or plants • Replace surface mulch layer as needed to maintain a 2-3 inch soil cover.
After storm events	• Inspect areas for ponding
Annually	• Inspect/clean inlets and outlets

Bioretention Facility Design Procedure

1) Enter the area tributary, A_T, to the Bioretention Facility.

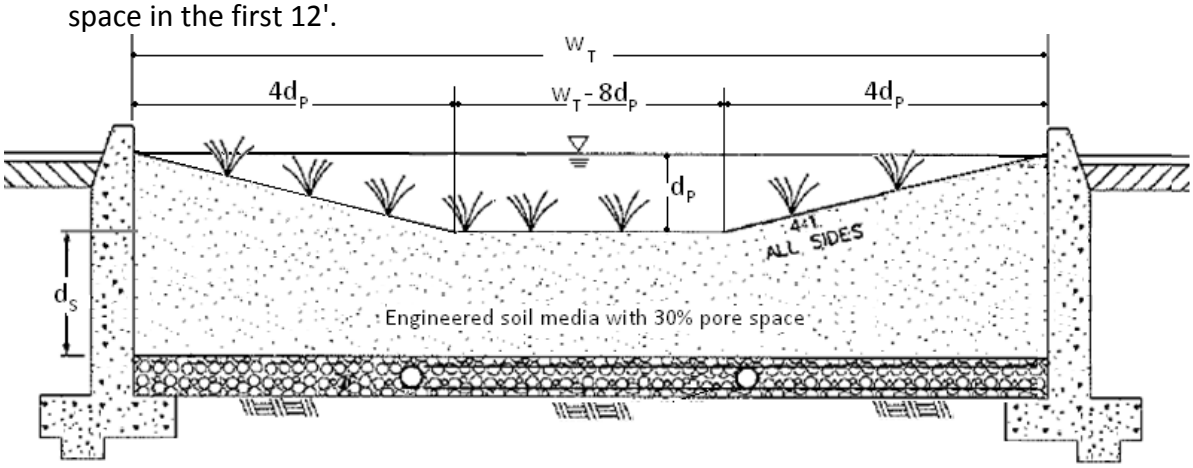
2) Enter the Design Volume, V_{BMP}, determined from Section 2.1 of this Handbook.

3) Select the type of design used. There are two types of Bioretention Facility designs: the standard design used for most project sites that include side slopes, and the modified design used when the BMP is located perpendicular to the parking spaces or with planter boxes that do not use side slopes.

4) Enter the depth of the engineered soil media, d_S. The minimum depth for the engineered soil media can be 18' in limited cases, but it is recommended to use 24' or a preferred 36' to provide an adequate root zone for the chosen plant palette. Engineered soil media deeper than 36' will only get credit for the pore space in the first 36'.

5) Enter the top width of the Bioretention Facility.

6) Calculate the total effective depth, d_E, within the Bioretention Facility. The maximum allowable pore space of the soil media is 30% while the maximum allowable pore space for the gravel layer is 40%. Gravel layer deeper than 12' will only get credit for the pore space in the first 12'.



a. For the design with side slopes the following equation shall be used to determine the total effective depth. Where, d_P is the depth of ponding within the basin.

$$d_E(\text{ft}) = \frac{0.3 \times \left[\left(w_T(\text{ft}) \times d_S(\text{ft})\right) + 4\left(d_P(\text{ft})\right)^2\right] + 0.4 \times 1(\text{ft}) + d_P(\text{ft})\left[4d_P(\text{ft}) + \left(w_T(\text{ft}) - 8d_P(\text{ft})\right)\right]}{w_T(\text{ft})}$$

This above equation can be simplified if the maximum ponding depth of 0.5' is used. The equation below is used on the worksheet to find the minimum area required for the Bioretention Facility:

$$d_E(\text{ft}) = (0.3 \times d_S(\text{ft}) + 0.4 \text{ x } 1(\text{ft})) - \left(\frac{0.7\ (\text{ft}^2)}{w_T(\text{ft})}\right) + 0.5(\text{ft})$$

b. For the design without side slopes the following equation shall be used to determine the total effective depth:

$$d_E(\text{ft}) = d_P(\text{ft}) + [(0.3) \times d_S(\text{ft}) + (0.4) \times 1(\text{ft})]$$

The equation below, using the maximum ponding depth of 0.5', is used on the worksheet to find the minimum area required for the Bioretention Facility:

$$d_E(\text{ft}) = 0.5\ (\text{ft}) + [(0.3) \times d_S(\text{ft}) + (0.4) \times 1(\text{ft})]$$

7) Calculate the minimum surface area, A_M, required for the Bioretention Facility. This does not include the curb surrounding the Bioretention Facility or side slopes.

$$A_M(\text{ft}^2) = \frac{V_{BMP}(\text{ft}^3)}{d_E\ (\text{ft})}$$

8) Enter the proposed surface area. This area shall not be less than the minimum required surface area.

9) Verify that side slopes are no steeper than 4:1 in the standard design, and are not required in the modified design.

10) Provide the diameter, minimum 6 inches, of the perforated underdrain used in the Bioretention Facility. See Appendix B for specific information regarding perforated pipes.

11) Provide the slope of the site around the Bioretention Facility, if used. The maximum slope is 3 percent for a standard design.

12) Provide the check dam spacing, if the site around the Bioretention Facility is sloped.

13) Describe the vegetation used within the Bioretention Facility.

References Used to Develop this Fact Sheet

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Montgomery County Maryland Department of Permitting Services Water Resources Section. Biofiltration (BF). Montgomery County, 2005.

Program, Ventura Countywide Stormwater Quality Management. Technical Guidance Manual for Stormwater Quality Control Measures. Ventura, 2002.

United States Environmental Protection Agency. Storm Water Technology Fact Sheet Bioretention. Washington D.C, 1999.

Urban Drainage and Flood Control District. Urban Storm Drainage Criteria Manual Volume 3 - Best Management Practices. Vol. 3. Denver, 2008. 3 vols.

Urbonas, Ben R. Stormwater Sand Filter Sizing and Design: A Unit Operations Approach. Denver: Urban Drainage and Flood Control District, 2002.

Landscaping and garden maintenance activities can be major contributors to water pollution. Soils, yard wastes, over-watering and garden chemicals become part of the urban runoff mix that winds its way through streets, gutters and storm drains before entering lakes, rivers, streams, etc. Urban runoff pollution contaminates water and harms aquatic life!

In Riverside County, report illegal discharges into the storm drain, call
1-800-506-2555
"Only Rain Down the Storm Drain"

Important Links:

Riverside County Household Hazardous Waste Collection Information
1-800-304-2226 or www.rivcowm.org

Riverside County Backyard Composting Program
1-800-366-SAVE

Integrated Pest Management (IPM) Solutions
www.ipm.ucdavis.edu

California Master Gardener Programs
www.mastergardeners.org
www.camastergardeners.ucdavis.edu

California Native Plant Society
www.cnps.org

The Riverside County "Only Rain Down the Storm Drain" Pollution Prevention Program gratefully acknowledges Orange County's Storm Water Program for their contribution to this brochure.

...Only Rain Down ...the Storm Drain

What you should know for... Landscape and Gardening

Best Management tips for:

- Professionals
- Novices
- Landscapers
- Gardeners
- Cultivators

Tips for Landscape & Gardening

This brochure will help you to get the most of your lawn and gardening efforts and keep our waterways clean. Clean waterways provide recreation, establish thriving fish habitats, secure safe sanctuaries for wildlife, and add beauty to our communities. NEVER allow gardening products or waste water to enter the street, gutter or storm drain.

General Landscaping Tips

- Protect stockpiles and materials from wind and rain by storing them under tarps or secured plastic sheeting.
- Prevent erosion of slopes by planting fast-growing, dense ground covering plants. These will shield and bind the soil.

- Plant native vegetation to reduce the amount of water, fertilizers and pesticides applied to the landscape.
- Never apply pesticides or fertilizers when rain is predicted within the next 48 hours.

Garden & Lawn Maintenance

- Do not overwater. Use irrigation practices such as drip irrigation, soaker hoses or micro-spray systems. Periodically inspect and fix leaks and misdirected sprinklers.
- Do not rake or blow leaves, clippings or pruning waste into the street, gutter or storm drain. Instead, dispose of green waste by composting, hauling it to a permitted landfill, or recycling it through your city's program.

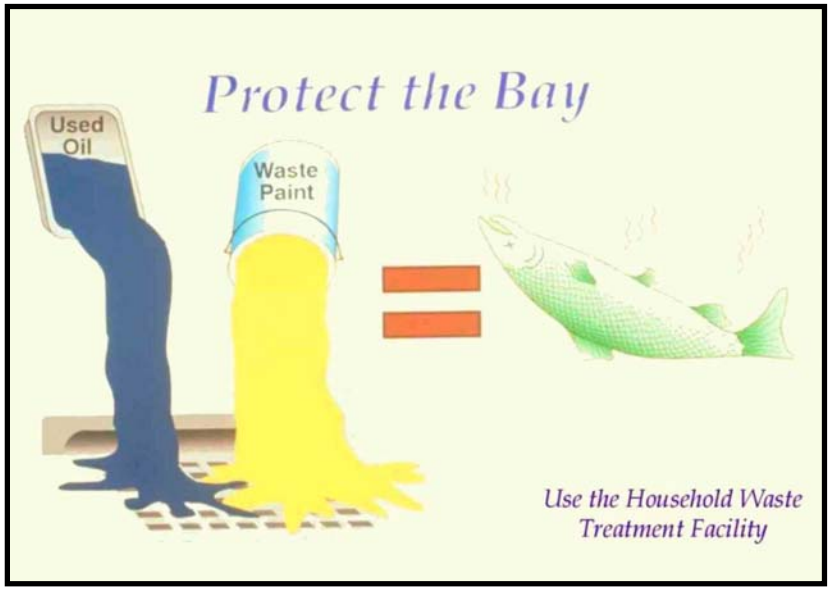
- Consider recycling your green waste and adding "nature's own fertilizer" to your lawn or garden.
- Read labels and use only as directed. Do not over-apply pesticides or fertilizers. Apply to spots as needed, rather than blanketing an entire area.
- Store pesticides, fertilizers and other chemicals in a dry covered area to prevent exposure that may result in the deterioration of containers and packaging.
- Rinse empty pesticide containers and re-use rinse water as you would use the product. Do not dump rinse water down storm drains or sewers. Dispose of empty containers in the trash.
- When available, use non-toxic alternatives to traditional pesticides, and use pesticides specifically designed to control the pest you are targeting.
- Try natural long-term common sense solutions first. Integrated Pest Management (IPM) can provide landscaping guidance and solutions, such as:
  - **Physical Controls** - Try hand picking, barriers, traps or caulking holes to control weeds and pests.
  - **Biological Controls** - Use predatory insects to control harmful pests.
  - **Chemical Controls** - Check out www.ipm.ucdavis.edu before using chemicals. Remember, all chemicals should be used cautiously and in moderation.
- If fertilizer is spilled, sweep up the spill before irrigating. If the spill is liquid, apply an absorbent material such as cat litter, and then sweep it up and dispose of it in the trash.
- Take unwanted pesticides to a Household Waste Collection Center to be recycled.
- *Dumping toxics into the street, gutter or storm drain is illegal!*

www.bewaterwise.com Great water conservation tips and drought tolerant garden designs.

www.ourwaterourworld.com Learn how to safely manage home and garden pests.

Additional information can also be found on the back of this brochure.

Non-Stormwater Discharges SC-10



Art Credit: Margie Winter

Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents

Sediment	
Nutrients	✓
Trash	
Metals	✓
Bacteria	✓
Oil and Grease	✓
Organics	✓

Description

Non-stormwater discharges are those flows that do not consist entirely of stormwater. Some non-stormwater discharges do not include pollutants and may be discharged to the storm drain. These include uncontaminated groundwater and natural springs. There are also some non-stormwater discharges that typically do not contain pollutants and may be discharged to the storm drain with conditions. These include car washing, air conditioner condensate, etc. However there are certain non-stormwater discharges that pose environmental concern. These discharges may originate from illegal dumping or from internal floor drains, appliances, industrial processes, sinks, and toilets that are connected to the nearby storm drainage system. These discharges (which may include: process waste waters, cooling waters, wash waters, and sanitary wastewater) can carry substances such as paint, oil, fuel and other automotive fluids, chemicals and other pollutants into storm drains. They can generally be detected through a combination of detection and elimination. The ultimate goal is to effectively eliminate non-stormwater discharges to the stormwater drainage system through implementation of measures to detect, correct, and enforce against illicit connections and illegal discharges of pollutants on streets and into the storm drain system and creeks.

Approach

Initially the industry must make an assessment of non-stormwater discharges to determine which types must be eliminated or addressed through BMPs. The focus of the following approach is in the elimination of non-stormwater discharges.

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Pollution Prevention

- Ensure that used oil, used antifreeze, and hazardous chemical recycling programs are being implemented. Encourage litter control.

Suggested Protocols

Recommended Complaint Investigation Equipment

- Field Screening Analysis
  - pH paper or meter
  - Commercial stormwater pollutant screening kit that can detect for reactive phosphorus, nitrate nitrogen, ammonium nitrogen, specific conductance, and turbidity
  - Sample jars
  - Sample collection pole
  - A tool to remove access hole covers
- Laboratory Analysis
  - Sample cooler
  - Ice
  - Sample jars and labels
  - Chain of custody forms
- Documentation
  - Camera
  - Notebook
  - Pens
  - Notice of Violation forms
  - Educational materials

General

- Develop clear protocols and lines of communication for effectively prohibiting non-stormwater discharges, especially those that are not classified as hazardous. These are often not responded to as effectively as they need to be.
- Stencil or demarcate storm drains, where applicable, to prevent illegal disposal of pollutants. Storm drain inlets should have messages such as “Dump No Waste Drains to Stream” stenciled or demarcated next to them to warn against ignorant or intentional dumping of pollutants into the storm drainage system.

- See SC44 Stormwater Drainage System Maintenance for additional information.

Illicit Connections

- Locate discharges from the industrial storm drainage system to the municipal storm drain system through review of "as-built" piping schematics.
- Isolate problem areas and plug illicit discharge points.
- Locate and evaluate all discharges to the industrial storm drain system.

Visual Inspection and Inventory

- Inventory and inspect each discharge point during dry weather.
- Keep in mind that drainage from a storm event can continue for a day or two following the end of a storm and groundwater may infiltrate the underground stormwater collection system. Also, non-stormwater discharges are often intermittent and may require periodic inspections.

Review Infield Piping

- A review of the "as-built" piping schematic is a way to determine if there are any connections to the stormwater collection system.
- Inspect the path of floor drains in older buildings.

Smoke Testing

- Smoke testing of wastewater and stormwater collection systems is used to detect connections between the two systems.
- During dry weather the stormwater collection system is filled with smoke and then traced to sources. The appearance of smoke at the base of a toilet indicates that there may be a connection between the sanitary and the stormwater system.

Dye Testing

- A dye test can be performed by simply releasing a dye into either your sanitary or process wastewater system and examining the discharge points from the stormwater collection system for discoloration.

TV Inspection of Drainage System

- TV Cameras can be employed to visually identify illicit connections to the industrial storm drainage system.

Illegal Dumping

- Regularly inspect and clean up hot spots and other storm drainage areas where illegal dumping and disposal occurs.
- On paved surfaces, clean up spills with as little water as possible. Use a rag for small spills, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be sent to a certified laundry (rags) or disposed of as hazardous waste.

- Never hose down or bury dry material spills. Sweep up the material and dispose of properly.
- Use adsorbent materials on small spills rather than hosing down the spill. Remove the adsorbent materials promptly and dispose of properly.
- For larger spills, a private spill cleanup company or Hazmat team may be necessary.

Once a site has been cleaned:

- Post "No Dumping" signs with a phone number for reporting dumping and disposal.
- Landscaping and beautification efforts of hot spots may also discourage future dumping, as well as provide open space and increase property values.
- Lighting or barriers may also be needed to discourage future dumping.
- See fact sheet SC11 Spill Prevention, Control, and Cleanup.

Inspection

- Regularly inspect and clean up hot spots and other storm drainage areas where illegal dumping and disposal occurs.
- Conduct field investigations of the industrial storm drain system for potential sources of non-stormwater discharges.
- Pro-actively conduct investigations of high priority areas. Based on historical data, prioritize specific geographic areas and/or incident type for pro-active investigations.

Reporting

- A database is useful for defining and tracking the magnitude and location of the problem.
- Report prohibited non-stormwater discharges observed during the course of normal daily activities so they can be investigated, contained, and cleaned up or eliminated.
- Document that non-stormwater discharges have been eliminated by recording tests performed, methods used, dates of testing, and any on-site drainage points observed.
- Document and report annually the results of the program.
- Maintain documentation of illicit connection and illegal dumping incidents, including significant conditionally exempt discharges that are not properly managed.

Training

- Training of technical staff in identifying and documenting illegal dumping incidents is required.
- Consider posting the quick reference table near storm drains to reinforce training.
- Train employees to identify non-stormwater discharges and report discharges to the appropriate departments.

- Educate employees about spill prevention and cleanup.
- Well-trained employees can reduce human errors that lead to accidental releases or spills. The employee should have the tools and knowledge to immediately begin cleaning up a spill should one occur. Employees should be familiar with the Spill Prevention Control and Countermeasure Plan.
- Determine and implement appropriate outreach efforts to reduce non-permissible non-stormwater discharges.
- Conduct spill response drills annually (if no events occurred to evaluate your plan) in cooperation with other industries.
- When a responsible party is identified, educate the party on the impacts of his or her actions.

Spill Response and Prevention

- See SC11 Spill Prevention Control and Cleanup.

Other Considerations

- Many facilities do not have accurate, up-to-date schematic drawings.

Requirements

Costs (including capital and operation & maintenance)

- The primary cost is for staff time and depends on how aggressively a program is implemented.
- Cost for containment and disposal is borne by the discharger.
- Illicit connections can be difficult to locate especially if there is groundwater infiltration.
- Indoor floor drains may require re-plumbing if cross-connections to storm drains are detected.

Maintenance (including administrative and staffing)

- Illegal dumping and illicit connection violations requires technical staff to detect and investigate them.

Supplemental Information

Further Detail of the BMP

Illegal Dumping

- Substances illegally dumped on streets and into the storm drain systems and creeks include paints, used oil and other automotive fluids, construction debris, chemicals, fresh concrete, leaves, grass clippings, and pet wastes. All of these wastes cause stormwater and receiving water quality problems as well as clog the storm drain system itself.
- Establish a system for tracking incidents. The system should be designed to identify the following:
  - Illegal dumping hot spots

- Types and quantities (in some cases) of wastes
- Patterns in time of occurrence (time of day/night, month, or year)
- Mode of dumping (abandoned containers, "midnight dumping" from moving vehicles, direct dumping of materials, accidents/spills)
- Responsible parties

One of the keys to success of reducing or eliminating illegal dumping is increasing the number of people at the facility who are aware of the problem and who have the tools to at least identify the incident, if not correct it. Therefore, train field staff to recognize and report the incidents.

What constitutes a "non-stormwater" discharge?

- Non-stormwater discharges to the stormwater collection system may include any water used directly in the manufacturing process (process wastewater), air conditioning condensate and coolant, non-contact cooling water, cooling equipment condensate, outdoor secondary containment water, vehicle and equipment wash water, sink and drinking fountain wastewater, sanitary wastes, or other wastewaters.

Permit Requirements

- Facilities subject to stormwater permit requirements must include a certification that the stormwater collection system has been tested or evaluated for the presence of non-stormwater discharges. The State's General Industrial Stormwater Permit requires that non-stormwater discharges be eliminated prior to implementation of the facility's SWPPP.

Performance Evaluation

- Review annually internal investigation results; assess whether goals were met and what changes or improvements are necessary.
- Obtain feedback from personnel assigned to respond to, or inspect for, illicit connections and illegal dumping incidents.

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Storm Water Managers Resource Center http://www.stormwatercenter.net/

Spill Prevention, Control & Cleanup SC-11

Photo Credit: Geoff Brosseau

Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents

Sediment	
Nutrients	
Trash	
Metals	✓
Bacteria	
Oil and Grease	✓
Organics	✓

Description

Many activities that occur at an industrial or commercial site have the potential to cause accidental or illegal spills. Preparation for accidental or illegal spills, with proper training and reporting systems implemented, can minimize the discharge of pollutants to the environment.

Spills and leaks are one of the largest contributors of stormwater pollutants. Spill prevention and control plans are applicable to any site at which hazardous materials are stored or used. An effective plan should have spill prevention and response procedures that identify potential spill areas, specify material handling procedures, describe spill response procedures, and provide spill clean-up equipment. The plan should take steps to identify and characterize potential spills, eliminate and reduce spill potential, respond to spills when they occur in an effort to prevent pollutants from entering the stormwater drainage system, and train personnel to prevent and control future spills.

Approach

Pollution Prevention

- Develop procedures to prevent/mitigate spills to storm drain systems. Develop and standardize reporting procedures, containment, storage, and disposal activities, documentation, and follow-up procedures.

- Develop a Spill Prevention Control and Countermeasure (SPCC) Plan. The plan should include:

- Description of the facility, owner and address, activities and chemicals present
- Facility map
- Notification and evacuation procedures
- Cleanup instructions
- Identification of responsible departments
- Identify key spill response personnel

- Recycle, reclaim, or reuse materials whenever possible. This will reduce the amount of process materials that are brought into the facility.

Suggested Protocols (including equipment needs)

Spill Prevention

- Develop procedures to prevent/mitigate spills to storm drain systems. Develop and standardize reporting procedures, containment, storage, and disposal activities, documentation, and follow-up procedures.

- If consistent illegal dumping is observed at the facility:
  - Post "No Dumping" signs with a phone number for reporting illegal dumping and disposal. Signs should also indicate fines and penalties applicable for illegal dumping.
  - Landscaping and beautification efforts may also discourage illegal dumping.
  - Bright lighting and/or entrance barriers may also be needed to discourage illegal dumping.

- Store and contain liquid materials in such a manner that if the tank is ruptured, the contents will not discharge, flow, or be washed into the storm drainage system, surface waters, or groundwater.

- If the liquid is oil, gas, or other material that separates from and floats on water, install a spill control device (such as a tee section) in the catch basins that collects runoff from the storage tank area.

- Routine maintenance:
  - Place drip pans or absorbent materials beneath all mounted taps, and at all potential drip and spill locations during filling and unloading of tanks. Any collected liquids or soiled absorbent materials must be reused/recycled or properly disposed.
  - Store and maintain appropriate spill cleanup materials in a location known to all near the tank storage area; and ensure that employees are familiar with the site's spill control plan and/or proper spill cleanup procedures.
  - Sweep and clean the storage area monthly if it is paved, *do not hose down the area to a storm drain*.

- Check tanks (and any containment sumps) daily for leaks and spills. Replace tanks that are leaking, corroded, or otherwise deteriorating with tanks in good condition. Collect all spilled liquids and properly dispose of them.

- Label all containers according to their contents (e.g., solvent, gasoline).
- Label hazardous substances regarding the potential hazard (corrosive, radioactive, flammable, explosive, poisonous).
- Prominently display required labels on transported hazardous and toxic materials (per US DOT regulations).
- Identify key spill response personnel.

Spill Control and Cleanup Activities

- Follow the Spill Prevention Control and Countermeasure Plan.
- Clean up leaks and spills immediately.
- Place a stockpile of spill cleanup materials where it will be readily accessible (e.g., near storage and maintenance areas).
- On paved surfaces, clean up spills with as little water as possible. Use a rag for small spills, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be sent to a certified laundry (rags) or disposed of as hazardous waste. Physical methods for the cleanup of dry chemicals include the use of brooms, shovels, sweepers, or plows.
- Never hose down or bury dry material spills. Sweep up the material and dispose of properly.
- Chemical cleanups of material can be achieved with the use of adsorbents, gels, and foams. Use adsorbent materials on small spills rather than hosing down the spill. Remove the adsorbent materials promptly and dispose of properly.
- For larger spills, a private spill cleanup company or Hazmat team may be necessary.

Reporting

- Report spills that pose an immediate threat to human health or the environment to the Regional Water Quality Control Board.
- Federal regulations require that any oil spill into a water body or onto an adjoining shoreline be reported to the National Response Center (NRC) at 800-424-8802 (24 hour).
- Report spills to local agencies, such as the fire department; they can assist in cleanup.
- Establish a system for tracking incidents. The system should be designed to identify the following:

  - Types and quantities (in some cases) of wastes

  - Patterns in time of occurrence (time of day/night, month, or year)

- Mode of dumping (abandoned containers, "midnight dumping" from moving vehicles, direct dumping of materials, accidents/spills)
- Responsible parties

Training

- Educate employees about spill prevention and cleanup.
- Well-trained employees can reduce human errors that lead to accidental releases or spills:
  - The employee should have the tools and knowledge to immediately begin cleaning up a spill should one occur.
  - Employees should be familiar with the Spill Prevention Control and Countermeasure Plan.
- Employees should be educated about aboveground storage tank requirements. Employees responsible for aboveground storage tanks and liquid transfers should be thoroughly familiar with the Spill Prevention Control and Countermeasure Plan and the plan should be readily available.
- Train employees to recognize and report illegal dumping incidents.

Other Considerations (Limitations and Regulations)

- State regulations exist for facilities with a storage capacity of 10,000 gallons or more of petroleum to prepare a Spill Prevention Control and Countermeasure (SPCC) Plan (Health & Safety Code Chapter 6.67).
- State regulations also exist for storage of hazardous materials (Health & Safety Code Chapter 6.95), including the preparation of area and business plans for emergency response to the releases or threatened releases.
- Consider requiring smaller secondary containment areas (less than 200 sq. ft.) to be connected to the sanitary sewer, prohibiting any hard connections to the storm drain.

Requirements

Costs (including capital and operation & maintenance)

- Will vary depending on the size of the facility and the necessary controls.
- Prevention of leaks and spills is inexpensive. Treatment and/or disposal of contaminated soil or water can be quite expensive.

Maintenance (including administrative and staffing)

- This BMP has no major administrative or staffing requirements. However, extra time is needed to properly handle and dispose of spills, which results in increased labor costs.

Supplemental Information

Further Detail of the BMP

Reporting

Record keeping and internal reporting represent good operating practices because they can increase the efficiency of the facility and the effectiveness of BMPs. A good record keeping system helps the facility minimize incident recurrence, correctly respond with appropriate cleanup activities, and comply with legal requirements. A record keeping and reporting system should be set up for documenting spills, leaks, and other discharges, including discharges of hazardous substances in reportable quantities. Incident records describe the quality and quantity of non-stormwater discharges to the storm sewer. These records should contain the following information:

- Date and time of the incident
- Weather conditions
- Duration of the spill/leak/discharge
- Cause of the spill/leak/discharge
- Response procedures implemented
- Persons notified
- Environmental problems associated with the spill/leak/discharge

Separate record keeping systems should be established to document housekeeping and preventive maintenance inspections, and training activities. All housekeeping and preventive maintenance inspections should be documented. Inspection documentation should contain the following information:

- The date and time the inspection was performed
- Name of the inspector
- Items inspected
- Problems noted
- Corrective action required
- Date corrective action was taken

Other means to document and record inspection results are field notes, timed and dated photographs, videotapes, and drawings and maps.

Aboveground Tank Leak and Spill Control

Accidental releases of materials from aboveground liquid storage tanks present the potential for contaminating stormwater with many different pollutants. Materials spilled, leaked, or lost from

tanks may accumulate in soils or on impervious surfaces and be carried away by stormwater runoff.

The most common causes of unintentional releases are:

- Installation problems
- Failure of piping systems (pipes, pumps, flanges, couplings, hoses, and valves)
- External corrosion and structural failure
- Spills and overfills due to operator error
- Leaks during pumping of liquids or gases from truck or rail car to a storage tank or vice versa

Storage of reactive, ignitable, or flammable liquids should comply with the Uniform Fire Code and the National Electric Code. Practices listed below should be employed to enhance the code requirements:

- Tanks should be placed in a designated area.
- Tanks located in areas where firearms are discharged should be encapsulated in concrete or the equivalent.
- Designated areas should be impervious and paved with Portland cement concrete, free of cracks and gaps, in order to contain leaks and spills.
- Liquid materials should be stored in UL approved double walled tanks or surrounded by a curb or dike to provide the volume to contain 10 percent of the volume of all of the containers or 110 percent of the volume of the largest container, whichever is greater. The area inside the curb should slope to a drain.
- For used oil or dangerous waste, a dead-end sump should be installed in the drain.
- All other liquids should be drained to the sanitary sewer if available. The drain must have a positive control such as a lock, valve, or plug to prevent release of contaminated liquids.
- Accumulated stormwater in petroleum storage areas should be passed through an oil/water separator.

Maintenance is critical to preventing leaks and spills. Conduct routine inspections and:

- Check for external corrosion and structural failure.
- Check for spills and overfills due to operator error.
- Check for failure of piping system (pipes, pumps, flanger, coupling, hoses, and valves).
- Check for leaks or spills during pumping of liquids or gases from truck or rail car to a storage facility or vice versa.

- Visually inspect new tank or container installation for loose fittings, poor welding, and improper or poorly fitted gaskets.
- Inspect tank foundations, connections, coatings, and tank walls and piping system. Look for corrosion, leaks, cracks, scratches, and other physical damage that may weaken the tank or container system.
- Frequently relocate accumulated stormwater during the wet season.
- Periodically conduct integrity testing by a qualified professional.

Vehicle Leak and Spill Control

Major spills on roadways and other public areas are generally handled by highly trained Hazmat teams from local fire departments or environmental health departments. The measures listed below pertain to leaks and smaller spills at vehicle maintenance shops.

In addition to implementing the spill prevention, control, and clean up practices above, use the following measures related to specific activities:

Vehicle and Equipment Maintenance

- Perform all vehicle fluid removal or changing inside or under cover to prevent the run-on of stormwater and the runoff of spills.
- Regularly inspect vehicles and equipment for leaks, and repair immediately.
- Check incoming vehicles and equipment (including delivery trucks, and employee and subcontractor vehicles) for leaking oil and fluids. Do not allow leaking vehicles or equipment onsite.
- Always use secondary containment, such as a drain pan or drop cloth, to catch spills or leaks when removing or changing fluids.
- Immediately drain all fluids from wrecked vehicles.
- Store wrecked vehicles or damaged equipment under cover.
- Place drip pans or absorbent materials under heavy equipment when not in use.
- Use adsorbent materials on small spills rather than hosing down the spill.
- Remove the adsorbent materials promptly and dispose of properly.
- Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around.
- Oil filters disposed of in trashcans or dumpsters can leak oil and contaminate stormwater. Place the oil filter in a funnel over a waste oil recycling drum to drain excess oil before disposal. Oil filters can also be recycled. Ask your oil supplier or recycler about recycling oil filters.

- Store cracked batteries in a non-leaking secondary container. Do this with all cracked batteries, even if you think all the acid has drained out. If you drop a battery, treat it as if it is cracked. Put it into the containment area until you are sure it is not leaking.

Vehicle and Equipment Fueling

- Design the fueling area to prevent the run-on of stormwater and the runoff of spills:
  - Cover fueling area if possible.
  - Use a perimeter drain or slope pavement inward with drainage to a sump.
  - Pave fueling area with concrete rather than asphalt.
- If dead-end sump is not used to collect spills, install an oil/water separator.
- Install vapor recovery nozzles to help control drips as well as air pollution.
- Discourage "topping-off' of fuel tanks.
- Use secondary containment when transferring fuel from the tank truck to the fuel tank.
- Use adsorbent materials on small spills and general cleaning rather than hosing down the area. Remove the adsorbent materials promptly.
- Carry out all Federal and State requirements regarding underground storage tanks, or install above ground tanks.
- Do not use mobile fueling of mobile industrial equipment around the facility; rather, transport the equipment to designated fueling areas.
- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- Train employees in proper fueling and cleanup procedures.

Industrial Spill Prevention Response

For the purposes of developing a spill prevention and response program to meet the stormwater regulations, facility managers should use information provided in this fact sheet and the spill prevention/response portions of the fact sheets in this handbook, for specific activities. The program should:

- Integrate with existing emergency response/hazardous materials programs (e.g., Fire Department)
- Develop procedures to prevent/mitigate spills to storm drain systems
- Identify responsible departments
- Develop and standardize reporting procedures, containment, storage, and disposal activities, documentation, and follow-up procedures
- Address spills at municipal facilities, as well as public areas

- Provide training concerning spill prevention, response and cleanup to all appropriate personnel

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Stormwater Managers Resource Center http://www.stormwatercenter.net/

Outdoor Loading/Unloading SC-30

Photo Credit: Geoff Brosseau

Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents

Sediment	✓
Nutrients	✓
Trash	
Metals	✓
Bacteria	
Oil and Grease	✓
Organics	✓

Description

The loading/unloading of materials usually takes place outside on docks or terminals; therefore, materials spilled, leaked, or lost during loading/unloading may collect in the soil or on other surfaces and have the potential to be carried away by stormwater runoff or when the area is cleaned. Additionally, rainfall may wash pollutants from machinery used to unload or move materials. Implementation of the following protocols will prevent or reduce the discharge of pollutants to stormwater from outdoor loading/unloading of materials.

Approach

Reduce potential for pollutant discharge through source control pollution prevention and BMP implementation. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

Pollution Prevention

- Keep accurate maintenance logs to evaluate materials removed and improvements made.
- Park tank trucks or delivery vehicles in designated areas so that spills or leaks can be contained.
- Limit exposure of material to rainfall whenever possible.
- Prevent stormwater run-on.
- Check equipment regularly for leaks.

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Suggested Protocols

Loading and Unloading – General Guidelines

- Develop an operations plan that describes procedures for loading and/or unloading.
- Conduct loading and unloading in dry weather if possible.
- Cover designated loading/unloading areas to reduce exposure of materials to rain.
- Consider placing a seal or door skirt between delivery vehicles and building to prevent exposure to rain.
- Design loading/unloading area to prevent stormwater run-on, which would include grading or berming the area, and position roof downspouts so they direct stormwater away from the loading/unloading areas.
- Have employees load and unload all materials and equipment in covered areas such as building overhangs at loading docks if feasible.
- Load/unload only at designated loading areas.
- Use drip pans underneath hose and pipe connections and other leak-prone spots during liquid transfer operations, and when making and breaking connections. Several drip pans should be stored in a covered location near the liquid transfer area so that they are always available, yet protected from precipitation when not in use. Drip pans can be made specifically for railroad tracks. Drip pans must be cleaned periodically, and drip collected materials must be disposed of properly.
- Pave loading areas with concrete instead of asphalt.
- Avoid placing storm drains in the area.
- Grade and/or berm the loading/unloading area to a drain that is connected to a deadend.

Inspection

- Check loading and unloading equipment regularly for leaks, including valves, pumps, flanges and connections.
- Look for dust or fumes during loading or unloading operations.

Training

- Train employees (e.g., fork lift operators) and contractors on proper spill containment and cleanup.
- Have employees trained in spill containment and cleanup present during loading/unloading.
- Train employees in proper handling techniques during liquid transfers to avoid spills.
- Make sure forklift operators are properly trained on loading and unloading procedures.

Spill Response and Prevention

- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- Contain leaks during transfer.
- Store and maintain appropriate spill cleanup materials in a location that is readily accessible and known to all and ensure that employees are familiar with the site's spill control plan and proper spill cleanup procedures.
- Have an emergency spill cleanup plan readily available.
- Use drip pans or comparable devices when transferring oils, solvents, and paints.

Other Considerations (Limitations and Regulations)

- Space and time limitations may preclude all transfers from being performed indoors or under cover.
- It may not be possible to conduct transfers only during dry weather.

Requirements

Costs

Costs should be low except when covering a large loading/unloading area.

Maintenance

- Conduct regular inspections and make repairs as necessary. The frequency of repairs will depend on the age of the facility.
- Check loading and unloading equipment regularly for leaks.
- Conduct regular broom dry-sweeping of area.

Supplemental Information

Further Detail of the BMP

Special Circumstances for Indoor Loading/Unloading of Materials

Loading or unloading of liquids should occur in the manufacturing building so that any spills that are not completely retained can be discharged to the sanitary sewer, treatment plant, or treated in a manner consistent with local sewer authorities and permit requirements.

- For loading and unloading tank trucks to above and below ground storage tanks, the following procedures should be used:
  - The area where the transfer takes place should be paved. If the liquid is reactive with the asphalt, Portland cement should be used to pave the area.
  - The transfer area should be designed to prevent run-on of stormwater from adjacent areas. Sloping the pad and using a curb, like a speed bump, around the uphill side of the transfer area should reduce run-on.

- The transfer area should be designed to prevent runoff of spilled liquids from the area. Sloping the area to a drain should prevent runoff. The drain should be connected to a dead-end sump or to the sanitary sewer. A positive control valve should be installed on the drain.

- For transfer from rail cars to storage tanks that must occur outside, use the following procedures:

  - Drip pans should be placed at locations where spillage may occur, such as hose connections, hose reels, and filler nozzles. Use drip pans when making and breaking connections.

  - Drip pan systems should be installed between the rails to collect spillage from tank cars.

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Storm Water Managers Resource Center http://www.stormwatercenter.net/

Outdoor Equipment Operations SC-32

Description

Outside process equipment operations and maintenance can contaminate stormwater runoff. Activities, such as grinding, painting, coating, sanding, degreasing or parts cleaning, landfills and waste piles, solid waste treatment and disposal, are examples of process operations that can lead to contamination of stormwater runoff. Source controls for outdoor process equipment operations and maintenance include reducing the amount of waste created, enclosing or covering all or some of the equipment, installing secondary containment, and training employees.

Approach

Pollution Prevention

- Perform the activity during dry periods.
- Use non-toxic chemicals for maintenance and minimize or eliminate the use of solvents.

Suggested Protocols

- Consider enclosing the activity in a building and connecting the floor drains to the sanitary sewer.
- Cover the work area with a permanent roof if possible.
- Minimize contact of stormwater with outside process equipment operations through berming and drainage routing (run-on prevention). If possible, connect process equipment area to public sewer or facility wastewater treatment system. Some municipalities require that secondary containment areas be connected to the sanitary sewer, prohibiting any hard connections to the storm drain.
- Dry clean the work area regularly.

Training

- Train employees to perform the activity during dry periods only or substituting benign materials for more toxic ones.
- Train employee and contractors in proper techniques for spill containment and cleanup. Employees should have the tools and knowledge to immediately begin cleaning up a spill should one occur.

Spill Response and Prevention

- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.

Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize

Targeted Constituents

Sediment	✓
Nutrients	
Trash	
Metals	✓
Bacteria	
Oil and Grease	✓
Organics	✓

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- Have employees trained in emergency spill cleanup procedures present when dangerous waste, liquid chemicals, or other wastes are delivered.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- Prevent operator errors by using engineering safe guards and thus reducing accidental releases of pollutant.
- Inspect storage areas regularly for leaks or spills. Also check for structural failure, spills and overfills due to operator error, and/or failure of piping system.

Other Considerations

- Providing cover may be expensive.
- Space limitations may preclude enclosing some equipment.
- Storage sheds often must meet building and fire code requirements.

Requirements

Costs

Costs vary depending on the complexity of the operation and the amount of control necessary for stormwater pollution control.

Maintenance

- Conduct routine preventive maintenance, including checking process equipment for leaks.
- Clean the storm drain system regularly.

Supplemental Information

Further Detail of the BMP

Hydraulic/Treatment Modifications

If stormwater becomes polluted, it should be captured and treated. If you do not have your own process wastewater treatment system, consider discharging to the public sewer system. Use of the public sewer might be allowed under the following conditions:

- If the activity area is very small (less than a few hundred square feet), the local sewer authority may be willing to allow the area to remain uncovered with the drain connected to the public sewer.
- It may be possible under unusual circumstances to connect a much larger area to the public sewer, as long as the rate of stormwater discharges does not exceed the capacity of the wastewater treatment plant. The stormwater could be stored during the storm and then transferred to the public sewer when the normal flow is low, such as at night.

Industries that generate large volumes of process wastewater typically have their own treatment system and corresponding permit. These industries have the discretion to use their wastewater treatment system to treat stormwater within the constraints of their permit requirements for process treatment. It may also be possible for the industry to discharge the stormwater directly to an effluent outfall without treatment as long as the total loading of the discharged process

water and stormwater does not exceed the loading had a stormwater treatment device been used. This could be achieved by reducing the loading from the process wastewater treatment system. Check with your Regional Water Quality Control Board or local sewering agency, as this option would be subject to permit constraints and potentially regular monitoring.

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Stormwater Managers Resource Center http://www.stormwatercenter.net

Waste Handling & Disposal SC-34

Photo Credit: Geoff Brosseau

Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Description

Improper storage and handling of solid wastes can allow toxic compounds, oils and greases, heavy metals, nutrients, suspended solids, and other pollutants to enter stormwater runoff. The discharge of pollutants to stormwater from waste handling and disposal can be prevented and reduced by tracking waste generation, storage, and disposal; reducing waste generation and disposal through source reduction, reuse, and recycling; and preventing run-on and runoff.

Targeted Constituents

Sediment	
Nutrients	
Trash	
Metals	✓
Bacteria	✓
Oil and Grease	✓
Organics	✓

Approach

Pollution Prevention

- Accomplish reduction in the amount of waste generated using the following source controls:
  - Production planning and sequencing
  - Process or equipment modification
  - Raw material substitution or elimination
  - Loss prevention and housekeeping
  - Waste segregation and separation
  - Close loop recycling
- Establish a material tracking system to increase awareness about material usage. This may reduce spills and minimize contamination, thus reducing the amount of waste produced.
- Recycle materials whenever possible.

Suggested Protocols

General

- Cover storage containers with leak proof lids or some other means. If waste is not in containers, cover all waste piles (plastic tarps are acceptable coverage) and prevent stormwater run-on and runoff with a berm. The waste containers or piles must be covered except when in use.
- Use drip pans or absorbent materials whenever grease containers are emptied by vacuum trucks or other means. Grease cannot be left on the ground. Collected grease must be properly disposed of as garbage.
- Check storage containers weekly for leaks and to ensure that lids are on tightly. Replace any that are leaking, corroded, or otherwise deteriorating.
- Sweep and clean the storage area regularly. If it is paved, do not hose down the area to a storm drain.
- Dispose of rinse and wash water from cleaning waste containers into a sanitary sewer if allowed by the local sewer authority. Do not discharge wash water to the street or storm drain.
- Transfer waste from damaged containers into safe containers.
- Take special care when loading or unloading wastes to minimize losses. Loading systems can be used to minimize spills and fugitive emission losses such as dust or mist. Vacuum transfer systems can minimize waste loss.

Controlling Litter

- Post "No Littering" signs and enforce anti-litter laws.
- Provide a sufficient number of litter receptacles for the facility.
- Clean out and cover litter receptacles frequently to prevent spillage.

Waste Collection

- Keep waste collection areas clean.
- Inspect solid waste containers for structural damage regularly. Repair or replace damaged containers as necessary.
- Secure solid waste containers; containers must be closed tightly when not in use.
- Do not fill waste containers with washout water or any other liquid.
- Ensure that only appropriate solid wastes are added to the solid waste container. Certain wastes such as hazardous wastes, appliances, fluorescent lamps, pesticides, etc., may not be disposed of in solid waste containers (see chemical/ hazardous waste collection section below).

- Do not mix wastes; this can cause chemical reactions, make recycling impossible, and complicate disposal.

Good Housekeeping

- Use all of the product before disposing of the container.
- Keep the waste management area clean at all times by sweeping and cleaning up spills immediately.
- Use dry methods when possible (e.g., sweeping, use of absorbents) when cleaning around restaurant/food handling dumpster areas. If water must be used after sweeping/using absorbents, collect water and discharge through grease interceptor to the sewer.

Chemical/Hazardous Wastes

- Select designated hazardous waste collection areas on-site.
- Store hazardous materials and wastes in covered containers and protect them from vandalism.
- Place hazardous waste containers in secondary containment.
- Make sure that hazardous waste is collected, removed, and disposed of only at authorized disposal areas.
- Stencil or demarcate storm drains on the facility's property with prohibitive message regarding waste disposal.

Run-on/Runoff Prevention

- Prevent stormwater run-on from entering the waste management area by enclosing the area or building a berm around the area.
- Prevent waste materials from directly contacting rain.
- Cover waste piles with temporary covering material such as reinforced tarpaulin, polyethylene, polyurethane, polypropyleneor hypalon.
- Cover the area with a permanent roof if feasible.
- Cover dumpsters to prevent rain from washing waste out of holes or cracks in the bottom of the dumpster.
- Move the activity indoor after ensuring all safety concerns such as fire hazard and ventilation are addressed.

Inspection

- Inspect and replace faulty pumps or hoses regularly to minimize the potential of releases and spills.
- Check waste management areas for leaking containers or spills.

- Repair leaking equipment including valves, lines, seals, or pumps promptly.

Training

- Train staff in pollution prevention measures and proper disposal methods.
- Train employees and contractors in proper spill containment and cleanup. The employee should have the tools and knowledge to immediately begin cleaning up a spill should one occur.
- Train employees and subcontractors in proper hazardous waste management.

Spill Response and Prevention

- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- Have an emergency plan, equipment and trained personnel ready at all times to deal immediately with major spills
- Collect all spilled liquids and properly dispose of them.
- Store and maintain appropriate spill cleanup materials in a location known to all near the designated wash area.
- Ensure that vehicles transporting waste have spill prevention equipment that can prevent spills during transport. Spill prevention equipment includes:
  - Vehicles equipped with baffles for liquid waste
  - Trucks with sealed gates and spill guards for solid waste

Other Considerations (Limitations and Regulations)

Hazardous waste cannot be reused or recycled; it must be disposed of by a licensed hazardous waste hauler.

Requirements

Costs

Capital and O&M costs for these programs will vary substantially depending on the size of the facility and the types of waste handled. Costs should be low if there is an inventory program in place.

Maintenance

- None except for maintaining equipment for material tracking program.

Supplemental Information

Further Detail of the BMP

Land Treatment System

Minimize runoff of polluted stormwater from land application by:

- Choosing a site where slopes are under 6%, the soil is permeable, there is a low water table, it is located away from wetlands or marshes, and there is a closed drainage system

- Avoiding application of waste to the site when it is raining or when the ground is saturated with water
- Growing vegetation on land disposal areas to stabilize soils and reduce the volume of surface water runoff from the site
- Maintaining adequate barriers between the land application site and the receiving waters (planted strips are particularly good)
- Using erosion control techniques such as mulching and matting, filter fences, straw bales, diversion terracing, and sediment basins
- Performing routine maintenance to ensure the erosion control or site stabilization measures are working

Examples

The port of Long Beach has a state-of-the-art database for identifying potential pollutant sources, documenting facility management practices, and tracking pollutants.

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

Solid Waste Container Best Management Practices – Fact Sheet On-Line Resources – Environmental Health and Safety. Harvard University. 2002.

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

Pollution from Surface Cleaning Folder. 1996. Bay Area Stormwater Management Agencies Association (BASMAA). http://www.basmaa.org

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Storm Water Managers Resource Center http://www.stormwatercenter.net/

Safer Alternative Products SC-35

Description

Promote the use of less harmful products and products that contain little or no TMDL pollutants. Alternatives exist for most product classes including chemical fertilizers, pesticides, cleaning solutions, janitorial chemicals, automotive and paint products, and consumables (batteries, fluorescent lamps).

Approach

Pattern a new program after the many established programs around the state and country. Integrate this best management practice as much as possible with existing programs at your facility.

Develop a comprehensive program based on:

- The "Precautionary Principle," which is an alternative to the "Risk Assessment" model that says it's acceptable to use a potentially harmful product until physical evidence of its harmful effects are established and deemed too costly from an environmental or public health perspective. For instance, a risk assessment approach might say it's acceptable to use a pesticide until there is direct proof of an environmental impact. The Precautionary Principle approach is used to evaluate whether a given product is safe, whether it is really necessary, and whether alternative products would perform just as well.
- Environmentally Preferable Purchasing Program to minimize the purchase of products containing hazardous ingredients used in the facility's custodial services, fleet maintenance, and facility maintenance in favor of using alternate products that pose less risk to employees and to the environment.
- Integrated Pest Management (IPM) or Less-Toxic Pesticide Program, which uses a pest management approach that minimizes the use of toxic chemicals and gets rid of pests by methods that pose a lower risk to employees, the public, and the environment.
- Energy Efficiency Program including no-cost and low-cost energy conservation and efficiency actions that can reduce both energy consumption and electricity bills, along with long-term energy efficiency investments.

Consider the following mechanisms for developing and implementing a comprehensive program:

- Policies

Objectives

- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents

Sediment	
Nutrients	✓
Trash	
Metals	✓
Bacteria	
Oil and Grease	✓
Organics	✓

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- Procedures
  - Standard operating procedures (SOPs)
  - Purchasing guidelines and procedures
  - Bid packages (services and supplies)
- Materials
  - Preferred or approved product and supplier lists
  - Product and supplier evaluation criteria
  - Training sessions and manuals
  - Fact sheets for employees

Implement this BMP in conjunction with the Vehicle and Equipment Management fact sheets (SC20 – SC22) and SC41, Building and Grounds Maintenance.

Training

- Employees who handle potentially harmful materials in the use of safer alternatives.
- Purchasing departments should be encouraged to procure less hazardous materials and products that contain little or no harmful substances or TMDL pollutants.

Regulations

This BMP has no regulatory requirements. Existing regulations already encourage facilities to reduce the use of hazardous materials through incentives such as reduced:

- Specialized equipment storage and handling requirements,
- Storm water runoff sampling requirements,
- Training and licensing requirements, and
- Record keeping and reporting requirements.

Equipment

- There are no major equipment requirements to this BMP.

Limitations

- Alternative products may not be available, suitable, or effective in every case.

Requirements

Cost Considerations

- The primary cost is for staff time to: 1) develop new policies and procedures and 2) educate purchasing departments and employees who handle potentially harmful materials about the availability, procurement, and use of safer alternatives.

- Some alternative products may be slightly more expensive than conventional products.

Supplemental Information

Employees and contractors / service providers can both be educated about safer alternatives by using information developed by a number of organizations including the references and resources listed below.

The following discussion provides some general information on safer alternatives. More specific information on particular hazardous materials and the available alternatives may be found in the references and resources listed below.

- Automotive products – Less toxic alternatives are not available for many automotive products, especially engine fluids. But there are alternatives to grease lubricants, car polishes, degreasers, and windshield washer solution. Rerefined motor oil is also available.
- Vehicle/Trailer lubrication – Fifth wheel bearings on trucks require routine lubrication. Adhesive lubricants are available to replace typical chassis grease.
- Cleaners – Vegetables-based or citrus-based soaps are available to replace petroleum-based soaps/detergents.
- Paint products – Water-based paints, wood preservatives, stains, and finishes are available.
- Pesticides – Specific alternative products or methods exist to control most insects, fungi, and weeds.
- Chemical Fertilizers – Compost and soil amendments are natural alternatives.
- Consumables – Manufacturers have either reduced or are in the process of reducing the amount of heavy metals in consumables such as batteries and fluorescent lamps. All fluorescent lamps contain mercury, however low-mercury containing lamps are now available from most hardware and lighting stores. Fluorescent lamps are also more energy efficient than the average incandescent lamp.
- Janitorial chemicals – Even biodegradable soap can harm fish and wildlife before it biodegrades. Biodegradable does not mean non-toxic. Safer products and procedures are available for floor stripping and cleaning, as well as carpet, glass, metal, and restroom cleaning and disinfecting.

Examples

There are a number of business and trade associations, and communities with effective programs. Some of the more prominent are listed below in the references and resources section.

References and Resources

Note: Many of these references provide alternative products for materials that typically are used inside and disposed to the sanitary sewer as well as alternatives to products that usually end up in the storm drain.

General Sustainable Practices and Pollution Prevention Including Pollutant-Specific Information

California Department of Toxic Substances Control (www.dtsc.ca.gov)

California Integrated Waste Management Board (www.ciwmb.ca.gov)

City of Santa Monica (www.santa-monica.org/environment)

City of Palo Alto (www.city.palo-alto.ca.us/cleanbay)

City and County of San Francisco, Department of the Environment (www.ci.sf.ca.us/sfenvironment)

Earth 911 (www.earth911.org/master.asp)

Environmental Finance Center Region IX (www.greenstart.org/efc9)

Flex Your Power (www.flexyourpower.ca.gov)

GreenBiz.com (www.greenbiz.com)

Green Business Program (www.abag.org/bayarea/enviro/gbus/gb.html)

Pacific Industrial and Business Association (www.piba.org)

Sacramento Clean Water Business Partners (www.sacstormwater.org)

USEPA BMP fact sheet – Alternative products (http://cfpub.epa.gov/npdes/stormwater/menuofbmps/poll_2.cfm)

USEPA Region IX Pollution Prevention Program (www.epa.gov/region09/p2)

Western Regional Pollution Prevention Network (www.westp2net.org)

Metals (mercury, copper)

National Electrical Manufacturers Association - Environment, Health and Safety (www.nema.org)

Sustainable Conservation (www.suscon.org)

- Auto Recycling Project
- Brake Pad Partnership

Pesticides and Chemical Fertilizers

Bio-Integral Resource Center (www.birc.org)

California Department of Pesticide Regulation (www.cdpr.ca.gov)

University of California Statewide IPM Program (www.ipm.ucdavis.edu/default.html)

Dioxins

Bay Area Dioxins Project (http://dioxin.abag.ca.gov/)

Building & Grounds Maintenance SC-41

Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents

Sediment	✓
Nutrients	✓
Trash	
Metals	✓
Bacteria	✓
Oil and Grease	
Organics	

Description

Stormwater runoff from building and grounds maintenance activities can be contaminated with toxic hydrocarbons in solvents, fertilizers and pesticides, suspended solids, heavy metals, abnormal pH, and oils and greases. Utilizing the protocols in this fact sheet will prevent or reduce the discharge of pollutants to stormwater from building and grounds maintenance activities by washing and cleaning up with as little water as possible, following good landscape management practices, preventing and cleaning up spills immediately, keeping debris from entering the storm drains, and maintaining the stormwater collection system.

Approach

Reduce potential for pollutant discharge through source control pollution prevention and BMP implementation. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

Pollution Prevention

- Switch to non-toxic chemicals for maintenance when possible.
- Choose cleaning agents that can be recycled.
- Encourage proper lawn management and landscaping, including use of native vegetation.

CASQA
California Stormwater Quality Association

- Encourage use of Integrated Pest Management techniques for pest control.
- Encourage proper onsite recycling of yard trimmings.
- Recycle residual paints, solvents, lumber, and other material as much as possible.

Suggested Protocols

Pressure Washing of Buildings, Rooftops, and Other Large Objects

- In situations where soaps or detergents are used and the surrounding area is paved, pressure washers must use a water collection device that enables collection of wash water and associated solids. A sump pump, wet vacuum or similarly effective device must be used to collect the runoff and loose materials. The collected runoff and solids must be disposed of properly.
- If soaps or detergents are not used, and the surrounding area is paved, wash runoff does not have to be collected but must be screened. Pressure washers must use filter fabric or some other type of screen on the ground and/or in the catch basin to trap the particles in wash water runoff.
- If you are pressure washing on a grassed area (with or without soap), runoff must be dispersed as sheet flow as much as possible, rather than as a concentrated stream. The wash runoff must remain on the grass and not drain to pavement.

Landscaping Activities

- Dispose of grass clippings, leaves, sticks, or other collected vegetation as garbage, or by composting. Do not dispose of collected vegetation into waterways or storm drainage systems.
- Use mulch or other erosion control measures on exposed soils.

Building Repair, Remodeling, and Construction

- Do not dump any toxic substance or liquid waste on the pavement, the ground, or toward a storm drain.
- Use ground or drop cloths underneath outdoor painting, scraping, and sandblasting work, and properly dispose of collected material daily.
- Use a ground cloth or oversized tub for activities such as paint mixing and tool cleaning.
- Clean paintbrushes and tools covered with water-based paints in sinks connected to sanitary sewers or in portable containers that can be dumped into a sanitary sewer drain. Brushes and tools covered with non-water-based paints, finishes, or other materials must be cleaned in a manner that enables collection of used solvents (e.g., paint thinner, turpentine, etc.) for recycling or proper disposal.
- Use a storm drain cover, filter fabric, or similarly effective runoff control mechanism if dust, grit, wash water, or other pollutants may escape the work area and enter a catch basin. This is particularly necessary on rainy days. The containment device(s) must be in place at the beginning of the work day, and accumulated dirty runoff and solids must be collected and disposed of before removing the containment device(s) at the end of the work day.

- If you need to de-water an excavation site, you may need to filter the water before discharging to a catch basin or off-site. If directed off-site, you should direct the water through hay bales and filter fabric or use other sediment filters or traps.
- Store toxic material under cover during precipitation events and when not in use. A cover would include tarps or other temporary cover material.

Mowing, Trimming, and Planting

- Dispose of leaves, sticks, or other collected vegetation as garbage, by composting or at a permitted landfill. Do not dispose of collected vegetation into waterways or storm drainage systems.
- Use mulch or other erosion control measures when soils are exposed.
- Place temporarily stockpiled material away from watercourses and drain inlets, and berm or cover stockpiles to prevent material releases to the storm drain system.
- Consider an alternative approach when bailing out muddy water: do not put it in the storm drain; pour over landscaped areas.
- Use hand weeding where practical.

Fertilizer and Pesticide Management

- Follow all federal, state, and local laws and regulations governing the use, storage, and disposal of fertilizers and pesticides and training of applicators and pest control advisors.
- Use less toxic pesticides that will do the job when applicable. Avoid use of copper-based pesticides if possible.
- Do not use pesticides if rain is expected.
- Do not mix or prepare pesticides for application near storm drains.
- Use the minimum amount needed for the job.
- Calibrate fertilizer distributors to avoid excessive application.
- Employ techniques to minimize off-target application (e.g., spray drift) of pesticides, including consideration of alternative application techniques.
- Apply pesticides only when wind speeds are low.
- Fertilizers should be worked into the soil rather than dumped or broadcast onto the surface.
- Irrigate slowly to prevent runoff and then only as much as is needed.
- Clean pavement and sidewalk if fertilizer is spilled on these surfaces before applying irrigation water.
- Dispose of empty pesticide containers according to the instructions on the container label.

- Use up the pesticides. Rinse containers, and use rinse water as product. Dispose of unused pesticide as hazardous waste.
- Implement storage requirements for pesticide products with guidance from the local fire department and County Agricultural Commissioner. Provide secondary containment for pesticides.

Inspection

- Inspect irrigation system periodically to ensure that the right amount of water is being applied and that excessive runoff is not occurring. Minimize excess watering and repair leaks in the irrigation system as soon as they are observed.

Training

- Educate and train employees on pesticide use and in pesticide application techniques to prevent pollution.
- Train employees and contractors in proper techniques for spill containment and cleanup.
- Be sure the frequency of training takes into account the complexity of the operations and the nature of the staff.

Spill Response and Prevention

- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- Place a stockpile of spill cleanup materials, such as brooms, dustpans, and vacuum sweepers (if desired) near the storage area where it will be readily accessible.
- Have employees trained in spill containment and cleanup present during the loading/unloading of dangerous wastes, liquid chemicals, or other materials.
- Familiarize employees with the Spill Prevention Control and Countermeasure Plan.
- Clean up spills immediately.

Other Considerations

Alternative pest/weed controls may not be available, suitable, or effective in many cases.

Requirements

Costs

- Cost will vary depending on the type and size of facility.
- Overall costs should be low in comparison to other BMPs.

Maintenance

Sweep paved areas regularly to collect loose particles. Wipe up spills with rags and other absorbent material immediately, do not hose down the area to a storm drain.

Supplemental Information

Further Detail of the BMP

Fire Sprinkler Line Flushing

Building fire sprinkler line flushing may be a source of non-stormwater runoff pollution. The water entering the system is usually potable water, though in some areas it may be non-potable reclaimed wastewater. There are subsequent factors that may drastically reduce the quality of the water in such systems. Black iron pipe is usually used since it is cheaper than potable piping, but it is subject to rusting and results in lower quality water. Initially, the black iron pipe has an oil coating to protect it from rusting between manufacture and installation; this will contaminate the water from the first flush but not from subsequent flushes. Nitrates, poly-phosphates and other corrosion inhibitors, as well as fire suppressants and antifreeze may be added to the sprinkler water system. Water generally remains in the sprinkler system a long time (typically a year) and between flushes may accumulate iron, manganese, lead, copper, nickel, and zinc. The water generally becomes anoxic and contains living and dead bacteria and breakdown products from chlorination. This may result in a significant BOD problem and the water often smells. Consequently dispose fire sprinkler line flush water into the sanitary sewer. Do not allow discharge to storm drain or infiltration due to potential high levels of pollutants in fire sprinkler line water.

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

Mobile Cleaners Pilot Program: Final Report. 1997. Bay Area Stormwater Management Agencies Association (BASMAA). http://www.basmaa.org/

Pollution from Surface Cleaning Folder. 1996. Bay Area Stormwater Management Agencies Association (BASMAA). http://www.basmaa.org/

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Storm Water Managers Resource Center http://www.stormwatercenter.net/

Building Repair and Construction SC-42

Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Recycle

Targeted Constituents

Sediment	✓
Nutrients	
Trash	✓
Metals	✓
Bacteria	
Oil and Grease	✓
Organics	✓

Description

Modifications are common particularly at large industrial sites. The activity may vary from minor and normal building repair to major remodeling, or the construction of new facilities. These activities can generate pollutants including solvents, paints, paint and varnish removers, finishing residues, spent thinners, soap cleaners, kerosene, asphalt and concrete materials, adhesive residues, and old asbestos installation. Protocols in this fact sheet are intended to prevent or reduce the discharge of pollutants to stormwater from building repair, remodeling, and construction by using soil erosion controls, enclosing or covering building material storage areas, using good housekeeping practices, using safer alternative products, and training employees.

Approach

Pollution Prevention

- Recycle residual paints, solvents, lumber, and other materials to the maximum extent practical.
- Buy recycled products to the maximum extent practical.
- Inform on-site contractors of company policy on these matters and include appropriate provisions in their contract to ensure certain proper housekeeping and disposal practices are implemented.

- Make sure that nearby storm drains are well marked to minimize the chance of inadvertent disposal of residual paints and other liquids.

Suggested Protocols

Repair & Remodeling

- Follow BMPs identified in Construction BMP Handbook.
- Maintain good housekeeping practices while work is underway.
- Keep the work site clean and orderly. Remove debris in a timely fashion. Sweep the area.
- Cover materials of particular concern that must be left outside, particularly during the rainy season.
- Do not dump waste liquids down the storm drain.
- Dispose of wash water, sweepings, and sediments properly.
- Store materials properly that are normally used in repair and remodeling such as paints and solvents.
- Sweep out the gutter or wash the gutter and trap the particles at the outlet of the downspout if when repairing roofs, small particles have accumulated in the gutter. A sock or geofabric placed over the outlet may effectively trap the materials. If the downspout is tight lined, place a temporary plug at the first convenient point in the storm drain and pump out the water with a vactor truck, and clean the catch basin sump where you placed the plug.
- Properly store and dispose waste materials generated from construction activities. See Construction BMP Handbook.
- Clean the storm drain system in the immediate vicinity of the construction activity after it is completed.

Painting

- Enclose painting operations consistent with local air quality regulations and OSHA.
- Local air pollution regulations may, in many areas of the state, specify painting procedures which if properly carried out are usually sufficient to protect water quality.
- Develop paint handling procedures for proper use, storage, and disposal of paints.
- Transport paint and materials to and from job sites in containers with secure lids and tied down to the transport vehicle.
- Test and inspect spray equipment prior to starting to paint. Tighten all hoses and connections and do not overfill paint containers.
- Mix paint indoors before using so that any spill will not be exposed to rain. Do so even during dry weather because cleanup of a spill will never be 100% effective.
- Transfer and load paint and hot thermoplastic away from storm drain inlets.

- Do not transfer or load paint near storm drain inlets.
- Plug nearby storm drain inlets prior to starting painting and remove plugs when job is complete when there is significant risk of a spill reaching storm drains.
- Cover nearby storm drain inlets prior to starting work if sand blasting is used to remove paint.
- Use a ground cloth to collect the chips if painting requires scraping or sand blasting of the existing surface. Dispose the residue properly.
- Cover or enclose painting operations properly to avoid drift.
- Clean the application equipment in a sink that is connected to the sanitary sewer if using water based paints.
- Capture all cleanup-water and dispose of properly.
- Dispose of paints containing lead or tributyl tin and considered a hazardous waste properly.
- Store leftover paints if they are to be kept for the next job properly, or dispose properly.
- Recycle paint when possible. Dispose of paint at an appropriate household hazardous waste facility.

Training

Proper education of off-site contractors is often overlooked. The conscientious efforts of well trained employees can be lost by unknowing off-site contractors, so make sure they are well informed about what they are expected to do.

Spill Response and Prevention

- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- Clean up spills immediately.
- Excavate and remove the contaminated (stained) soil if a spill occurs on dirt.

Limitations

- This BMP is for minor construction only. The State's General Construction Activity Stormwater Permit has more requirements for larger projects. The companion "Construction Best Management Practice Handbook" contains specific guidance and best management practices for larger-scale projects.
- Hazardous waste that cannot be reused or recycled must be disposed of by a licensed hazardous waste hauler.
- Be certain that actions to help stormwater quality are consistent with Cal- and Fed-OSHA and air quality regulations.

Requirements

Costs

These BMPs are generally low to modest in cost.

Maintenance

N/A

Supplemental Information

Further Detail of the BMP

Soil/Erosion Control

If the work involves exposing large areas of soil, employ the appropriate soil erosion and control techniques. See the Construction Best Management Practice Handbook. If old buildings are being torn down and not replaced in the near future, stabilize the site using measures described in SC-40 Contaminated or Erodible Areas.

If a building is to be placed over an open area with a storm drainage system, make sure the storm inlets within the building are covered or removed, or the storm line is connected to the sanitary sewer. If because of the remodeling a new drainage system is to be installed or the existing system is to be modified, consider installing catch basins as they serve as effective "in-line" treatment devices. See Treatment Control Fact Sheet TC-20 Wet Pond/Basin in Section 5 of the New Development and Redevelopment Handbook regarding design criteria. Include in the catch basin a "turn-down" elbow or similar device to trap floatables.

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Storm Water Managers Resource Center http://www.stormwatercenter.net/

Parking/Storage Area Maintenance SC-43

Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents

Sediment	✓
Nutrients	
Trash	✓
Metals	✓
Bacteria	
Oil and Grease	✓
Organics	✓

Description

Parking lots and storage areas can contribute a number of substances, such as trash, suspended solids, hydrocarbons, oil and grease, and heavy metals that can enter receiving waters through stormwater runoff or non-stormwater discharges. The protocols in this fact sheet are intended to prevent or reduce the discharge of pollutants from parking/storage areas and include using good housekeeping practices, following appropriate cleaning BMPs, and training employees.

Approach

The goal of this program is to ensure stormwater pollution prevention practices are considered when conducting activities on or around parking areas and storage areas to reduce potential for pollutant discharge to receiving waters. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

Pollution Prevention

- Encourage alternative designs and maintenance strategies for impervious parking lots. (See New Development and Redevelopment BMP Handbook)
- Keep accurate maintenance logs to evaluate BMP implementation.

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SC-43 Parking/Storage Area Maintenance

Suggested Protocols

General

- Keep the parking and storage areas clean and orderly. Remove debris in a timely fashion.
- Allow sheet runoff to flow into biofilters (vegetated strip and swale) and/or infiltration devices.
- Utilize sand filters or oleophilic collectors for oily waste in low quantities.
- Arrange rooftop drains to prevent drainage directly onto paved surfaces.
- Design lot to include semi-permeable hardscape.
- Discharge soapy water remaining in mop or wash buckets to the sanitary sewer through a sink, toilet, clean-out, or wash area with drain.

Controlling Litter

- Post "No Littering" signs and enforce anti-litter laws.
- Provide an adequate number of litter receptacles.
- Clean out and cover litter receptacles frequently to prevent spillage.
- Provide trash receptacles in parking lots to discourage litter.
- Routinely sweep, shovel, and dispose of litter in the trash.

Surface Cleaning

- Use dry cleaning methods (e.g., sweeping, vacuuming) to prevent the discharge of pollutants into the stormwater conveyance system if possible.
- Establish frequency of public parking lot sweeping based on usage and field observations of waste accumulation.
- Sweep all parking lots at least once before the onset of the wet season.
- Follow the procedures below if water is used to clean surfaces:
  - Block the storm drain or contain runoff.
  - Collect and pump wash water to the sanitary sewer or discharge to a pervious surface. Do not allow wash water to enter storm drains.
  - Dispose of parking lot sweeping debris and dirt at a landfill.
- Follow the procedures below when cleaning heavy oily deposits:
  - Clean oily spots with absorbent materials.
  - Use a screen or filter fabric over inlet, then wash surfaces.

- Do not allow discharges to the storm drain.
- Vacuum/pump discharges to a tank or discharge to sanitary sewer.
- Appropriately dispose of spilled materials and absorbents.

Surface Repair

- Preheat, transfer or load hot bituminous material away from storm drain inlets.
- Apply concrete, asphalt, and seal coat during dry weather to prevent contamination from contacting stormwater runoff.
- Cover and seal nearby storm drain inlets where applicable (with waterproof material or mesh) and manholes before applying seal coat, slurry seal, etc. Leave covers in place until job is complete and all water from emulsified oil sealants has drained or evaporated. Clean any debris from these covered manholes and drains for proper disposal.
- Use only as much water as necessary for dust control, to avoid runoff.
- Catch drips from paving equipment that is not in use with pans or absorbent material placed under the machines. Dispose of collected material and absorbents properly.

Inspection

- Have designated personnel conduct inspections of parking facilities and stormwater conveyance systems associated with parking facilities on a regular basis.
- Inspect cleaning equipment/sweepers for leaks on a regular basis.

Training

- Provide regular training to field employees and/or contractors regarding cleaning of paved areas and proper operation of equipment.
- Train employees and contractors in proper techniques for spill containment and cleanup.

Spill Response and Prevention

- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- Place a stockpile of spill cleanup materials where it will be readily accessible or at a central location.
- Clean up fluid spills immediately with absorbent rags or material.
- Dispose of spilled material and absorbents properly.

Other Considerations

Limitations related to sweeping activities at large parking facilities may include high equipment costs, the need for sweeper operator training, and the inability of current sweeper technology to remove oil and grease.

SC-43 Parking/Storage Area Maintenance

Requirements

Costs

Cleaning/sweeping costs can be quite large. Construction and maintenance of stormwater structural controls can be quite expensive as well.

Maintenance

- Sweep parking lot regularly to minimize cleaning with water.
- Clean out oil/water/sand separators regularly, especially after heavy storms.
- Clean parking facilities regularly to prevent accumulated wastes and pollutants from being discharged into conveyance systems during rainy conditions.

Supplemental Information

Further Detail of the BMP

Surface Repair

Apply concrete, asphalt, and seal coat during dry weather to prevent contamination from contacting stormwater runoff. Where applicable, cover and seal nearby storm drain inlets (with waterproof material or mesh) and manholes before applying seal coat, slurry seal, etc. Leave covers in place until job is complete and all water from emulsified oil sealants has drained or evaporated. Clean any debris from these covered manholes and drains for proper disposal. Only use only as much water as is necessary for dust control to avoid runoff.

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

Pollution from Surface Cleaning Folder. 1996. Bay Area Stormwater Management Agencies Association (BASMAA). http://www.basmaa.org/

Oregon Association of Clean Water Agencies. Oregon Municipal Stormwater Toolbox for Maintenance Practices. June 1998.

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Storm Water Managers Resource Center http://www.stormwatercenter.net/

Drainage System Maintenance SC-44

Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize

Targeted Constituents

Sediment	✓
Nutrients	
Trash	✓
Metals	
Bacteria	✓
Oil and Grease	
Organics	

Description

As a consequence of its function, the stormwater conveyance system collects and transports urban runoff and stormwater that may contain certain pollutants. The protocols in this fact sheet are intended to reduce pollutants reaching receiving waters through proper conveyance system operation and maintenance.

Approach

Pollution Prevention

Maintain catch basins, stormwater inlets, and other stormwater conveyance structures on a regular basis to remove pollutants, reduce high pollutant concentrations during the first flush of storms, prevent clogging of the downstream conveyance system, restore catch basins' sediment trapping capacity, and ensure the system functions properly hydraulically to avoid flooding.

Suggested Protocols

Catch Basins/Inlet Structures

- Staff should regularly inspect facilities to ensure compliance with the following:
  - Immediate repair of any deterioration threatening structural integrity.
  - Cleaning before the sump is 40% full. Catch basins should be cleaned as frequently as needed to meet this standard.
  - Stenciling of catch basins and inlets (see SC34 Waste Handling and Disposal).

- Clean catch basins, storm drain inlets, and other conveyance structures before the wet season to remove sediments and debris accumulated during the summer.
- Conduct inspections more frequently during the wet season for problem areas where sediment or trash accumulates more often. Clean and repair as needed.
- Keep accurate logs of the number of catch basins cleaned.
- Store wastes collected from cleaning activities of the drainage system in appropriate containers or temporary storage sites in a manner that prevents discharge to the storm drain.
- Dewater the wastes if necessary with outflow into the sanitary sewer if permitted. Water should be treated with an appropriate filtering device prior to discharge to the sanitary sewer. If discharge to the sanitary sewer is not allowed, water should be pumped or vacuumed to a tank and properly disposed. Do not dewater near a storm drain or stream.

Storm Drain Conveyance System

- Locate reaches of storm drain with deposit problems and develop a flushing schedule that keeps the pipe clear of excessive buildup.
- Collect and pump flushed effluent to the sanitary sewer for treatment whenever possible.

Pump Stations

- Clean all storm drain pump stations prior to the wet season to remove silt and trash.
- Do not allow discharge to reach the storm drain system when cleaning a storm drain pump station or other facility.
- Conduct routine maintenance at each pump station.
- Inspect, clean, and repair as necessary all outlet structures prior to the wet season.

Open Channel

- Modify storm channel characteristics to improve channel hydraulics, increase pollutant removals, and enhance channel/creek aesthetic and habitat value.
- Conduct channel modification/improvement in accordance with existing laws. Any person, government agency, or public utility proposing an activity that will change the natural (emphasis added) state of any river, stream, or lake in California, must enter into a Steam or Lake Alteration Agreement with the Department of Fish and Game. The developer-applicant should also contact local governments (city, county, special districts), other state agencies (SWRCB, RWQCB, Department of Forestry, Department of Water Resources), and Federal Corps of Engineers and USFWS.

Illicit Connections and Discharges

- Look for evidence of illegal discharges or illicit connections during routine maintenance of conveyance system and drainage structures:
  - Is there evidence of spills such as paints, discoloring, etc?

- Are there any odors associated with the drainage system?
- Record locations of apparent illegal discharges/illicit connections?
- Track flows back to potential dischargers and conduct aboveground inspections. This can be done through visual inspection of upgradient manholes or alternate techniques including zinc chloride smoke testing, fluorometric dye testing, physical inspection testing, or television camera inspection.
- Eliminate the discharge once the origin of flow is established.

- Stencil or demarcate storm drains, where applicable, to prevent illegal disposal of pollutants. Storm drain inlets should have messages such as "Dump No Waste Drains to Stream" stenciled next to them to warn against ignorant or intentional dumping of pollutants into the storm drainage system.
- Refer to fact sheet SC-10 Non-Stormwater Discharges.

Illegal Dumping

- Inspect and clean up hot spots and other storm drainage areas regularly where illegal dumping and disposal occurs.
- Establish a system for tracking incidents. The system should be designed to identify the following:
  - Illegal dumping hot spots
  - Types and quantities (in some cases) of wastes
  - Patterns in time of occurrence (time of day/night, month, or year)
  - Mode of dumping (abandoned containers, "midnight dumping" from moving vehicles, direct dumping of materials, accidents/spills)
  - Responsible parties
- Post "No Dumping" signs in problem areas with a phone number for reporting dumping and disposal. Signs should also indicate fines and penalties for illegal dumping.
- Refer to fact sheet SC-10 Non-Stormwater Discharges.

Training

- Train crews in proper maintenance activities, including record keeping and disposal.
- Allow only properly trained individuals to handle hazardous materials/wastes.
- Have staff involved in detection and removal of illicit connections trained in the following:
  - OSHA-required Health and Safety Training (29 CFR 1910.120) plus annual refresher training (as needed).

- OSHA Confined Space Entry training (Cal-OSHA Confined Space, Title 8 and Federal OSHA 29 CFR 1910.146).
- Procedural training (field screening, sampling, smoke/dye testing, TV inspection).

Spill Response and Prevention

- Investigate all reports of spills, leaks, and/or illegal dumping promptly.
- Clean up all spills and leaks using "dry" methods (with absorbent materials and/or rags) or dig up, remove, and properly dispose of contaminated soil.
- Refer to fact sheet SC-11 Spill Prevention, Control, and Cleanup.

Other Considerations (Limitations and Regulations)

- Clean-up activities may create a slight disturbance for local aquatic species. Access to items and material on private property may be limited. Trade-offs may exist between channel hydraulics and water quality/riparian habitat. If storm channels or basins are recognized as wetlands, many activities, including maintenance, may be subject to regulation and permitting.
- Storm drain flushing is most effective in small diameter pipes (36-inch diameter pipe or less, depending on water supply and sediment collection capacity). Other considerations associated with storm drain flushing may include the availability of a water source, finding a downstream area to collect sediments, liquid/sediment disposal, and prohibition against disposal of flushed effluent to sanitary sewer in some areas.
- Regulations may include adoption of substantial penalties for illegal dumping and disposal.
- Local municipal codes may include sections prohibiting discharge of soil, debris, refuse, hazardous wastes, and other pollutants into the storm drain system.

Requirements

Costs

- An aggressive catch basin cleaning program could require a significant capital and O&M budget.
- The elimination of illegal dumping is dependent on the availability, convenience, and cost of alternative means of disposal. The primary cost is for staff time. Cost depends on how aggressively a program is implemented. Other cost considerations for an illegal dumping program include:
  - Purchase and installation of signs.
  - Rental of vehicle(s) to haul illegally-disposed items and material to landfills.
  - Rental of heavy equipment to remove larger items (e.g., car bodies) from channels.
  - Purchase of landfill space to dispose of illegally-dumped items and material.

- Methods used for illicit connection detection (smoke testing, dye testing, visual inspection, and flow monitoring) can be costly and time-consuming. Site-specific factors, such as the level of impervious area, the density and ages of buildings, and type of land use will determine the level of investigation necessary.

Maintenance

- Two-person teams may be required to clean catch basins with vactor trucks.
- Teams of at least two people plus administrative personnel are required to identify illicit discharges, depending on the complexity of the storm sewer system.
- Arrangements must be made for proper disposal of collected wastes.
- Technical staff are required to detect and investigate illegal dumping violations.

Supplemental Information

Further Detail of the BMP

Storm Drain Flushing

Flushing is a common maintenance activity used to improve pipe hydraulics and to remove pollutants in storm drainage systems. Flushing may be designed to hydraulically convey accumulated material to strategic locations, such as an open channel, another point where flushing will be initiated, or the sanitary sewer and the treatment facilities, thus preventing resuspension and overflow of a portion of the solids during storm events. Flushing prevents "plug flow" discharges of concentrated pollutant loadings and sediments. Deposits can hinder the designed conveyance capacity of the storm drain system and potentially cause backwater conditions in severe cases of clogging.

Storm drain flushing usually takes place along segments of pipe with grades that are too flat to maintain adequate velocity to keep particles in suspension. An upstream manhole is selected to place an inflatable device that temporarily plugs the pipe. Further upstream, water is pumped into the line to create a flushing wave. When the upstream reach of pipe is sufficiently full to cause a flushing wave, the inflated device is rapidly deflated with the assistance of a vacuum pump, thereby releasing the backed up water and resulting in the cleaning of the storm drain segment.

To further reduce impacts of stormwater pollution, a second inflatable device placed well downstream may be used to recollect the water after the force of the flushing wave has dissipated. A pump may then be used to transfer the water and accumulated material to the sanitary sewer for treatment. In some cases, an interceptor structure may be more practical or required to recollect the flushed waters.

It has been found that cleansing efficiency of periodic flush waves is dependent upon flush volume, flush discharge rate, sewer slope, sewer length, sewer flow rate, sewer diameter, and population density. As a rule of thumb, the length of line to be flushed should not exceed 700 feet. At this maximum recommended length, the percent removal efficiency ranges between 65-75% for organics and 55-65% for dry weather grit/inorganic material. The percent removal efficiency drops rapidly beyond that. Water is commonly supplied by a water truck, but fire hydrants can also supply water. To make the best use of water, it is recommended that reclaimed water be used or that fire hydrant line flushing coincide with storm sewer flushing.

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

Ferguson, B.K. 1991. Urban Stream Reclamation, p. 324-322, Journal of Soil and Water Conservation.

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

Oregon Association of Clean Water Agencies. Oregon Municipal Stormwater Toolbox for Maintenance Practices. June 1998.

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Storm Water Managers Resource Center http://www.stormwatercenter.net

United States Environmental Protection Agency (USEPA). 2002. Pollution Prevention/Good Housekeeping for Municipal Operations Storm Drain System Cleaning. On line:
http://www.epa.gov/npdes/menuofbmps/poll_16.htm

Drain Insert MP-52

General Description

Drain inserts are manufactured filters or fabric placed in a drop inlet to remove sediment and debris. There are a multitude of inserts of various shapes and configurations, typically falling into one of three different groups: socks, boxes, and trays. The sock consists of a fabric, usually constructed of polypropylene. The fabric may be attached to a frame or the grate of the inlet holds the sock. Socks are meant for vertical (drop) inlets. Boxes are constructed of plastic or wire mesh. Typically a polypropylene "bag" is placed in the wire mesh box. The bag takes the form of the box. Most box products are one box; that is, the setting area and filtration through media occur in the same box. Some products consist of one or more trays or mesh grates. The trays may hold different types of media. Filtration media vary by manufacturer. Types include polypropylene, porous polymer, treated cellulose, and activated carbon.

Inspection/Maintenance Considerations

Washout problems increase with rain intensity. Susceptibility of accumulated sediments to be re-suspended at low flow rates, can be corrected with an energy dissipater between gate and treatment areas.

Inspection Activities	Suggested Frequency
■ Inspect for sediment buildup and proper functioning.	At the beginning of the wet season and after significant storms
■ Verify that stormwater enters the unit and does not leak around the perimeter.	After construction.
Maintenance Activities	**Suggested Frequency**
■ Remove sediment as needed.	At the beginning of the wet season and as necessary

Maintenance Concerns, Objectives, and Goals

■ Sediment Removal

Targeted Constituents

✓ Sediment
✓ Nutrients
✓ Trash
✓ Metals
Bacteria
✓ Oil and Grease
✓ Organics

Removal Effectiveness

See New Development and Redevelopment Handbook-Section 5.

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Efficient Irrigation SD-12

Design Objectives

- ☑ Maximize Infiltration
- ☑ Provide Retention
- ☑ Slow Runoff
- Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- Contain Pollutants
- Collect and Convey

Description

Irrigation water provided to landscaped areas may result in excess irrigation water being conveyed into stormwater drainage systems.

Approach

Project plan designs for development and redevelopment should include application methods of irrigation water that minimize runoff of excess irrigation water into the stormwater conveyance system.

Suitable Applications

Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment. (Detached residential single-family homes are typically excluded from this requirement.)

Design Considerations

Designing New Installations

The following methods to reduce excessive irrigation runoff should be considered, and incorporated and implemented where determined applicable and feasible by the Permittee:

- Employ rain-triggered shutoff devices to prevent irrigation after precipitation.
- Design irrigation systems to each landscape area's specific water requirements.
- Include design featuring flow reducers or shutoff valves triggered by a pressure drop to control water loss in the event of broken sprinkler heads or lines.
- Implement landscape plans consistent with County or City water conservation resolutions, which may include provision of water sensors, programmable irrigation times (for short cycles), etc.

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- Design timing and application methods of irrigation water to minimize the runoff of excess irrigation water into the storm water drainage system.
- Group plants with similar water requirements in order to reduce excess irrigation runoff and promote surface filtration. Choose plants with low irrigation requirements (for example, native or drought tolerant species). Consider design features such as:
  - Using mulches (such as wood chips or bar) in planter areas without ground cover to minimize sediment in runoff
  - Installing appropriate plant materials for the location, in accordance with amount of sunlight and climate, and use native plant materials where possible and/or as recommended by the landscape architect
  - Leaving a vegetative barrier along the property boundary and interior watercourses, to act as a pollutant filter, where appropriate and feasible
  - Choosing plants that minimize or eliminate the use of fertilizer or pesticides to sustain growth
- Employ other comparable, equally effective methods to reduce irrigation water runoff.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of " redevelopment" must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under "designing new installations" above should be followed.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

Storm Drain Signage SD-13

Design Objectives

- Maximize Infiltration
- Provide Retention
- Slow Runoff
- Minimize Impervious Land Coverage
- ☑ Prohibit Dumping of Improper Materials
- Contain Pollutants
- Collect and Convey

Description

Waste materials dumped into storm drain inlets can have severe impacts on receiving and ground waters. Posting notices regarding discharge prohibitions at storm drain inlets can prevent waste dumping. Storm drain signs and stencils are highly visible source controls that are typically placed directly adjacent to storm drain inlets.

Approach

The stencil or affixed sign contains a brief statement that prohibits dumping of improper materials into the urban runoff conveyance system. Storm drain messages have become a popular method of alerting the public about the effects of and the prohibitions against waste disposal.

Suitable Applications

Stencils and signs alert the public to the destination of pollutants discharged to the storm drain. Signs are appropriate in residential, commercial, and industrial areas, as well as any other area where contributions or dumping to storm drains is likely.

Design Considerations

Storm drain message markers or placards are recommended at all storm drain inlets within the boundary of a development project. The marker should be placed in clear sight facing toward anyone approaching the inlet from either side. All storm drain inlet locations should be identified on the development site map.

Designing New Installations

The following methods should be considered for inclusion in the project design and show on project plans:

- Provide stenciling or labeling of all storm drain inlets and catch basins, constructed or modified, within the project area with prohibitive language. Examples include “NO DUMPING

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– DRAINS TO OCEAN" and/or other graphical icons to discourage illegal dumping.

- Post signs with prohibitive language and/or graphical icons, which prohibit illegal dumping at public access points along channels and creeks within the project area.

Note - Some local agencies have approved specific signage and/or storm drain message placards for use. Consult local agency stormwater staff to determine specific requirements for placard types and methods of application.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. If the project meets the definition of "redevelopment", then the requirements stated under " designing new installations" above should be included in all project design plans.

Additional Information

Maintenance Considerations

- Legibility of markers and signs should be maintained. If required by the agency with jurisdiction over the project, the owner/operator or homeowner's association should enter into a maintenance agreement with the agency or record a deed restriction upon the property title to maintain the legibility of placards or signs.

Placement

- Signage on top of curbs tends to weather and fade.

- Signage on face of curbs tends to be worn by contact with vehicle tires and sweeper brooms.

Supplemental Information

Examples

- Most MS4 programs have storm drain signage programs. Some MS4 programs will provide stencils, or arrange for volunteers to stencil storm drains as part of their outreach program.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

Maintenance Bays & Docks SD-31

Design Objectives

- Maximize Infiltration
- Provide Retention
- Slow Runoff
- Minimize Impervious Land Coverage
- ☑ Prohibit Dumping of Improper Materials
- ☑ Contain Pollutants
- Collect and Convey

Description

Several measures can be taken to prevent operations at maintenance bays and loading docks from contributing a variety of toxic compounds, oil and grease, heavy metals, nutrients, suspended solids, and other pollutants to the stormwater conveyance system.

Approach

In designs for maintenance bays and loading docks, containment is encouraged. Preventative measures include overflow containment structures and dead-end sumps. However, in the case of loading docks from grocery stores and warehouse/distribution centers, engineered infiltration systems may be considered.

Suitable Applications

Appropriate applications include commercial and industrial areas planned for development or redevelopment.

Design Considerations

Design requirements for vehicle maintenance and repair are governed by Building and Fire Codes, and by current local agency ordinances, and zoning requirements. The design criteria described in this fact sheet are meant to enhance and be consistent with these code requirements.

Designing New Installations

Designs of maintenance bays should consider the following:

- Repair/maintenance bays and vehicle parts with fluids should be indoors; or designed to preclude urban run-on and runoff.
- Repair/maintenance floor areas should be paved with Portland cement concrete (or equivalent smooth impervious surface).

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- Repair/maintenance bays should be designed to capture all wash water leaks and spills. Provide impermeable berms, drop inlets, trench catch basins, or overflow containment structures around repair bays to prevent spilled materials and wash-down waters form entering the storm drain system. Connect drains to a sump for collection and disposal. Direct connection of the repair/maintenance bays to the storm drain system is prohibited. If required by local jurisdiction, obtain an Industrial Waste Discharge Permit.

- Other features may be comparable and equally effective.

The following designs of loading/unloading dock areas should be considered:

- Loading dock areas should be covered, or drainage should be designed to preclude urban run-on and runoff.

- Direct connections into storm drains from depressed loading docks (truck wells) are prohibited.

- Below-grade loading docks from grocery stores and warehouse/distribution centers of fresh food items should drain through water quality inlets, or to an engineered infiltration system, or an equally effective alternative. Pre-treatment may also be required.

- Other features may be comparable and equally effective.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of " redevelopment" must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under "designing new installations" above should be followed.

Additional Information

Stormwater and non-stormwater will accumulate in containment areas and sumps with impervious surfaces. Contaminated accumulated water must be disposed of in accordance with applicable laws and cannot be discharged directly to the storm drain or sanitary sewer system without the appropriate permit.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

Trash Storage Areas SD-32

Design Objectives

- Maximize Infiltration
- Provide Retention
- Slow Runoff
- Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- ☑ Contain Pollutants
- Collect and Convey

Description

Trash storage areas are areas where a trash receptacle (s) are located for use as a repository for solid wastes. Stormwater runoff from areas where trash is stored or disposed of can be polluted. In addition, loose trash and debris can be easily transported by water or wind into nearby storm drain inlets, channels, and/or creeks. Waste handling operations that may be sources of stormwater pollution include dumpsters, litter control, and waste piles.

Approach

This fact sheet contains details on the specific measures required to prevent or reduce pollutants in stormwater runoff associated with trash storage and handling. Preventative measures including enclosures, containment structures, and impervious pavements to mitigate spills, should be used to reduce the likelihood of contamination.

Suitable Applications

Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment. (Detached residential single-family homes are typically excluded from this requirement.)

Design Considerations

Design requirements for waste handling areas are governed by Building and Fire Codes, and by current local agency ordinances and zoning requirements. The design criteria described in this fact sheet are meant to enhance and be consistent with these code and ordinance requirements. Hazardous waste should be handled in accordance with legal requirements established in Title 22, California Code of Regulation.

Wastes from commercial and industrial sites are typically hauled by either public or commercial carriers that may have design or access requirements for waste storage areas. The design criteria in this fact sheet are recommendations and are not intended to be in conflict with requirements established by the waste hauler. The waste hauler should be contacted prior to the design of your site trash collection areas. Conflicts or issues should be discussed with the local agency.

Designing New Installations

Trash storage areas should be designed to consider the following structural or treatment control BMPs:

- Design trash container areas so that drainage from adjoining roofs and pavement is diverted around the area(s) to avoid run-on. This might include berming or grading the waste handling area to prevent run-on of stormwater.
- Make sure trash container areas are screened or walled to prevent off-site transport of trash.

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

- Use lined bins or dumpsters to reduce leaking of liquid waste.
- Provide roofs, awnings, or attached lids on all trash containers to minimize direct precipitation and prevent rainfall from entering containers.
- Pave trash storage areas with an impervious surface to mitigate spills.
- Do not locate storm drains in immediate vicinity of the trash storage area.
- Post signs on all dumpsters informing users that hazardous materials are not to be disposed of therein.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of " redevelopment" must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under "designing new installations" above should be followed.

Additional Information

Maintenance Considerations

The integrity of structural elements that are subject to damage (i.e., screens, covers, and signs) must be maintained by the owner/operator. Maintenance agreements between the local agency and the owner/operator may be required. Some agencies will require maintenance deed restrictions to be recorded of the property title. If required by the local agency, maintenance agreements or deed restrictions must be executed by the owner/operator before improvement plans are approved.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

PRELIMINARY HYDROLOGY CALCULATIONS

FOR

BRODIAEA BUSINESS PARK
SOUTHWEST CORNER OF ALESSANDRO BLVD. AND HEACOCK STREET
MORENO VALLEY, CALIFORNIA
PEN17-0143
LST17-0030

PREPARED FOR

ALERE PROPERTY GROUP LLC
100 BAYVIEW CIRCLE, SUITE 310
NEWPORT BEACH, CALIFORNIA 92660
PHONE: (949) 509-5000
FAX: (949) 509-5001

SEPTEMBER 21, 2017
REVISED DECEMBER 14, 2017

JOB NO. 3566

PREPARED BY

THIENES ENGINEERING
14349 FIRESTONE BOULEVARD
LA MIRADA, CALIFORNIA 90638
PHONE: (714) 521-4811
FAX: (714) 521-4173

PRELIMINARY HYDROLOGY CALCULATIONS

FOR

BRODIAEA BUSINESS PARK

PREPARED UNDER THE SUPERVISION OF

REINHARD STENZEL DATE:
R.C.E. 56155
EXP. 12/31/18

INTRODUCTION

A: PROJECT LOCATION

The project site is located at the northwest corner of Brodiaea Avenue and Heacock Street in the City of Moreno Valley. Please see next page for vicinity map.

B: STUDY PURPOSE

The purpose of this study is to determine the proposed condition 100-year peak flow rate from the site that ultimately drains to Heacock Channel.

C: PROJECT STAFF:

Thienes Engineering staff involved in this study include:

Reinhard Stenzel
Brian Weil

Last Update: 9/19/17
O:\3500-3599\3566\3566VICINITYMAP.dwg

Thienes Engineering, Inc.
CIVIL ENGINEERING • LAND SURVEYING
14349 FIRESTONE BOULEVARD
LA MIRADA, CALIFORNIA 90638
PH.(714)521-4811 FAX(714)521-4173

"VICINITY MAP"

FOR

BRODIAEA BUSINESS PARK

DISCUSSION

The proposed project site is 12.0 acres. There is one proposed warehouse type building of approximately 261,807 square feet. A truckyard will be located westerly adjacent to the building, while vehicle parking areas will be located throughout the site. There will be a bioretention area in the southwesterly portion of the site. The northerly adjacent offsite will remain undeveloped with a proposed offsite earthen swale that runs along the northerly property line to intercept runoff from the area.

Master Plan of Drainage

The project site is part of a larger undeveloped plot of land located between Alessandro Blvd. and Brodiaea Avenue. Based on the existing topography, runoff from the project site is tributary to a 36" grate at the southeast corner of the site. Based on storm drain plans by Huitt-Zollars Drawing No. 4-888, the 36" grate is Lateral "N-2", which ties into Line "M". Line "M" ties into Heacock Channel at Heacock Street and Brodiaea Avenue. Based on older plans, such as Dwg. 4-439 Sunnymead Line "F" Stage 4, Line "M" is an updated connection of Line "F" into Heacock Channel.

Per the storm drain plans, the Q100 conveyed by Line "M" is approximately 1145 cfs. Lateral "N-2" is tabled to receive Q100 = 70.5 cfs.

Please see Appendix "A" for Preliminary Hydrology Map, calculations, as-built storm drain plans and other pertinent reference materials.

Existing Condition

In the existing condition, the site is undeveloped. Runoff from the site and the northerly adjacent offsite sheet flows southerly (15.85 acres). Runoff is intercepted by a valley gutter that runs along Brodiaea Avenue, which conveys runoff easterly to a 36" grate located at the southeasterly portion of the site. Runoff discharges to the Line "F" storm drain located in Brodiaea Avenue. The 2-year peak flow rate is approximately 3.6 cfs and the 100-year peak flow rate is approximately 14.8 cfs.

Please see Appendix "B" for the Existing Condition Hydrology Calculations and Appendix "C" for the Proposed Condition Hydrology Map.

Proposed Condition

Runoff from the westerly portion of the building, the northerly vehicle parking lot, and the westerly truckyard will drain to a catch basin in the aforementioned truckyard. Runoff from the bioretention area at the southwest portion of the site will drain to the private storm drain. Runoff will discharge to Line “F” within Brodiaea Avenue via proposed onsite storm drain. The 2-year peak flow rate is approximately 5.5 cfs and the 100-year peak flow rate is approximately 14.3 cfs.

Runoff from the easterly portion of the building, the easterly and southerly vehicle parking lots, and the landscaped area fronting Brodiaea Avenue all drain southwesterly to catch basins within the vehicle parking lot area. Runoff will discharge to the Line “F” within Brodiaea Avenue, which ties into Heacock Channel, easterly adjacent to the project. The 2-year peak flow rate is approximately 4.2 cfs and the 100-year peak flow rate is approximately 10.8 cfs.

Please see Appendix "B" for the Proposed Condition Hydrology Calculations and Appendix “C” for the Proposed Condition Hydrology Map.

Offsite

Runoff from the northerly offsite will be intercepted southerly to a proposed swale that runs along the northerly property line. Runoff will be conveyed easterly and drain into the easterly adjacent Heacock Channel via a proposed CMP riser. The 100-year peak flow rate is approximately 3.8 cfs, however the commercial build-out of this area yields a 100- year peak flow rate of approximately 9.1 cfs.

Please see Appendix "B" for the Proposed Condition Hydrology Calculations and Appendix “C” for the Proposed Condition Hydrology Map.

Water Quality

To meet Hydrologic Conditions of Concerns (HCOC) requirements, runoff in the proposed condition will be limited to 105% of the existing condition 2-year storm event. The mitigation volume will be temporarily stored onsite using underground CMP.

The mitigation volume required is approximately 0.602 ac-ft. [1.31 ac-ft – (1.05 x .16 ac-ft) – 0.54 ac-ft]. The proposed underground CMP will hold the remaining 0.604 ac-ft storm water volume.

Please see Appendix “D” for the HCOC Detention Calculations.

Conclusion

In the existing condition, runoff from the site drains southerly to a 10'x7.5' RCB within Brodiaea Avenue. This includes run on from the northerly adjacent lot. The 2-year peak flow rate is approximately 3.6 cfs and the 100-year peak flow rate is approximately 14.8 cfs.

In the proposed condition, runoff from the site will continue to drain to the RCB within Brodiaea Avenue. In general, runoff from the westerly portion of the site (Nodes 100-102) will drain to a proposed connection located in the southwest portion of the site. Runoff from the easterly portion of the site (Node 200-202) will drain to the existing 24" connection located in the southeast portion of the site. Runoff from the northerly adjacent offsite (Node 300-302) will drain southeasterly to a proposed CMP riser, which will convey flows to the easterly adjacent open channel that runs along Heacock Street. See table below for summary of peak flow rates.

Q (cfs)	EXISTING	PROPOSED		
		NODE 100-102	NODE 200-202	NODE 300-302
Q (2-YEAR)	3.6	5.5	4.2	3.5
Q (100-YEAR)	14.8	14.3	10.8	9.1

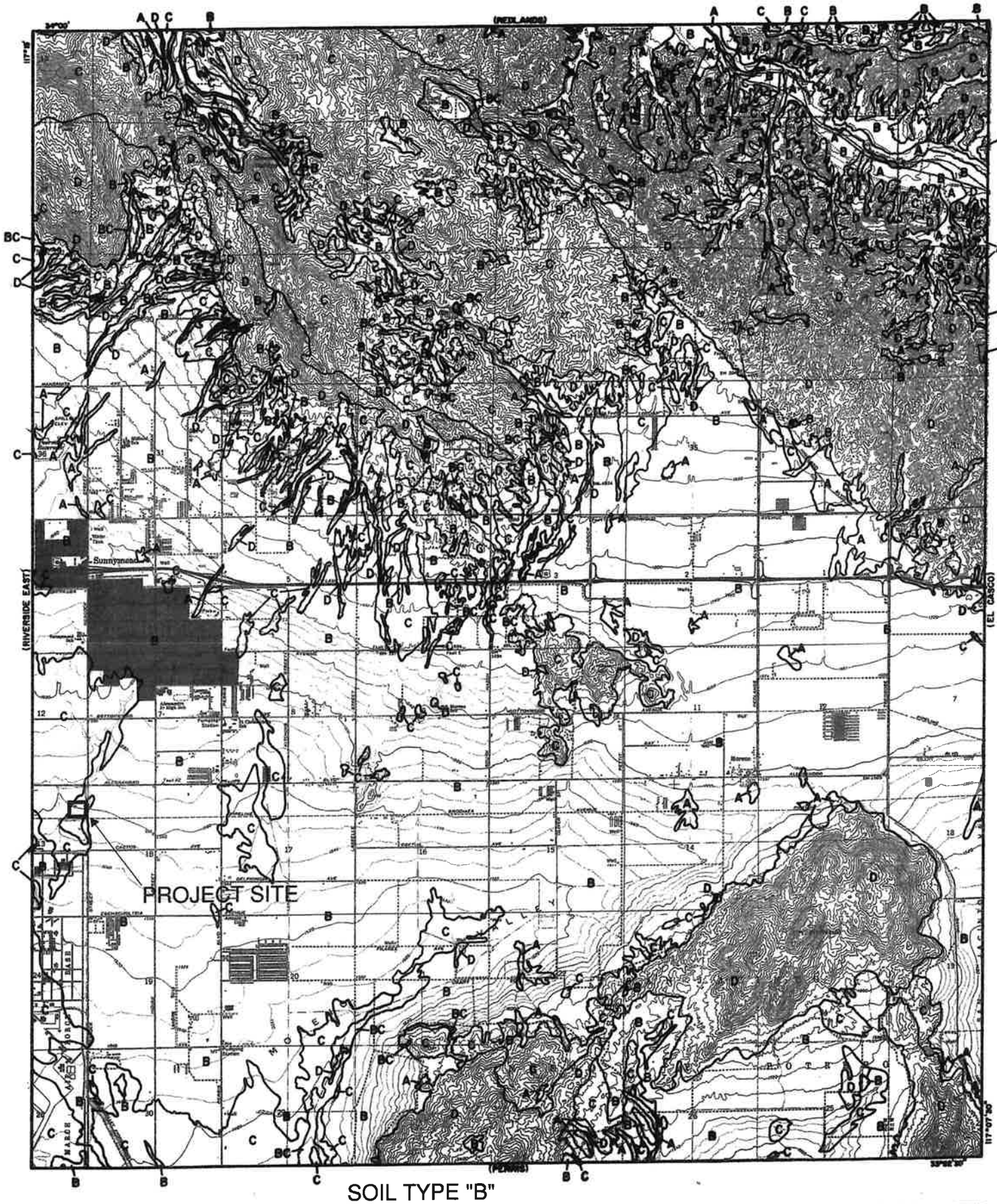
Methodology

Hydrology calculations were computed using Riverside County rational method program (by AES software). The soil type is "B" per Riverside County Hydrology Manual.

APPENDIX	DESCRIPTION
A	REFERENCE MATERIALS
B	HYDROLOGY CALCULATIONS
C	HYDRAULIC CALCULATIONS
D	HCOC DETENTION CALCULATIONS
E	HYDROLOGY MAP

APPENDIX A

REFERENCE MATERIALS



SOIL TYPE "B"

LEGEND

—— SOILS GROUP BOUNDARY

A SOILS GROUP DESIGNATION

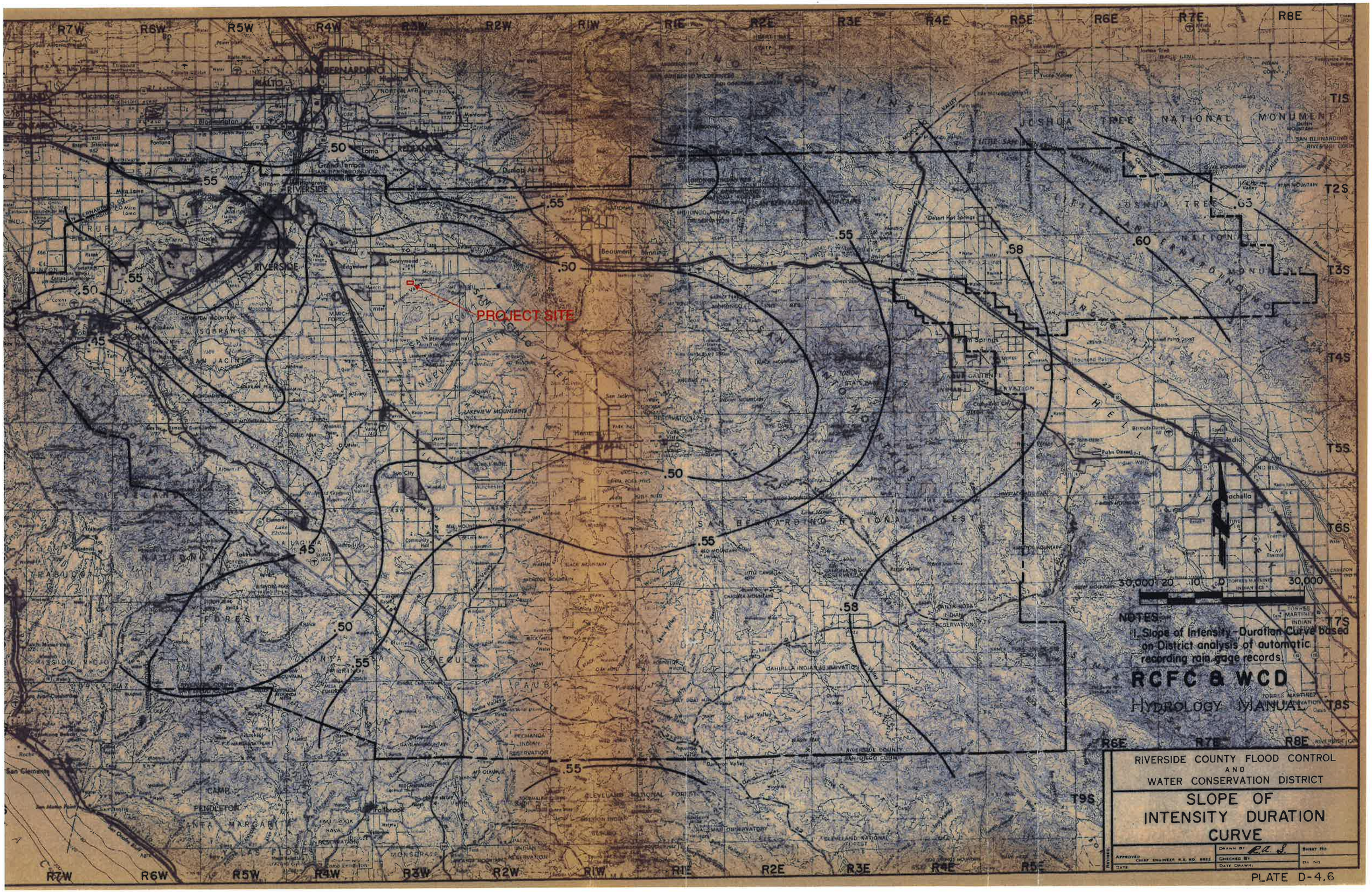
RCFC & WCD

HYDROLOGY MANUAL

N

0 FEET 5000

HYDROLOGIC SOILS GROUP MAP FOR SUNNYMEAD


PROJECT SITE
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.45
.58
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R7W
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R4W
R3W
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RIVERSIDE
JOSHUA TREE NATIONAL MONUMENT
SAN BERNARDINO NATIONAL FOREST
CLEVELAND NATIONAL FOREST
30,000 20 10 0 30,000
NOTES:
1. Slope of Intensity-Duration Curve based on District analysis of automatic recording rain gage records.
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT
SLOPE OF
INTENSITY DURATION
CURVE
DRAWN BY
CHECKED BY
DATE DRAWN
SHEET NO
DR NO
APPROVED
CHIEF ENGINEER R.E. NO. 8882
DATE
REVISED

PLATE D-4.6

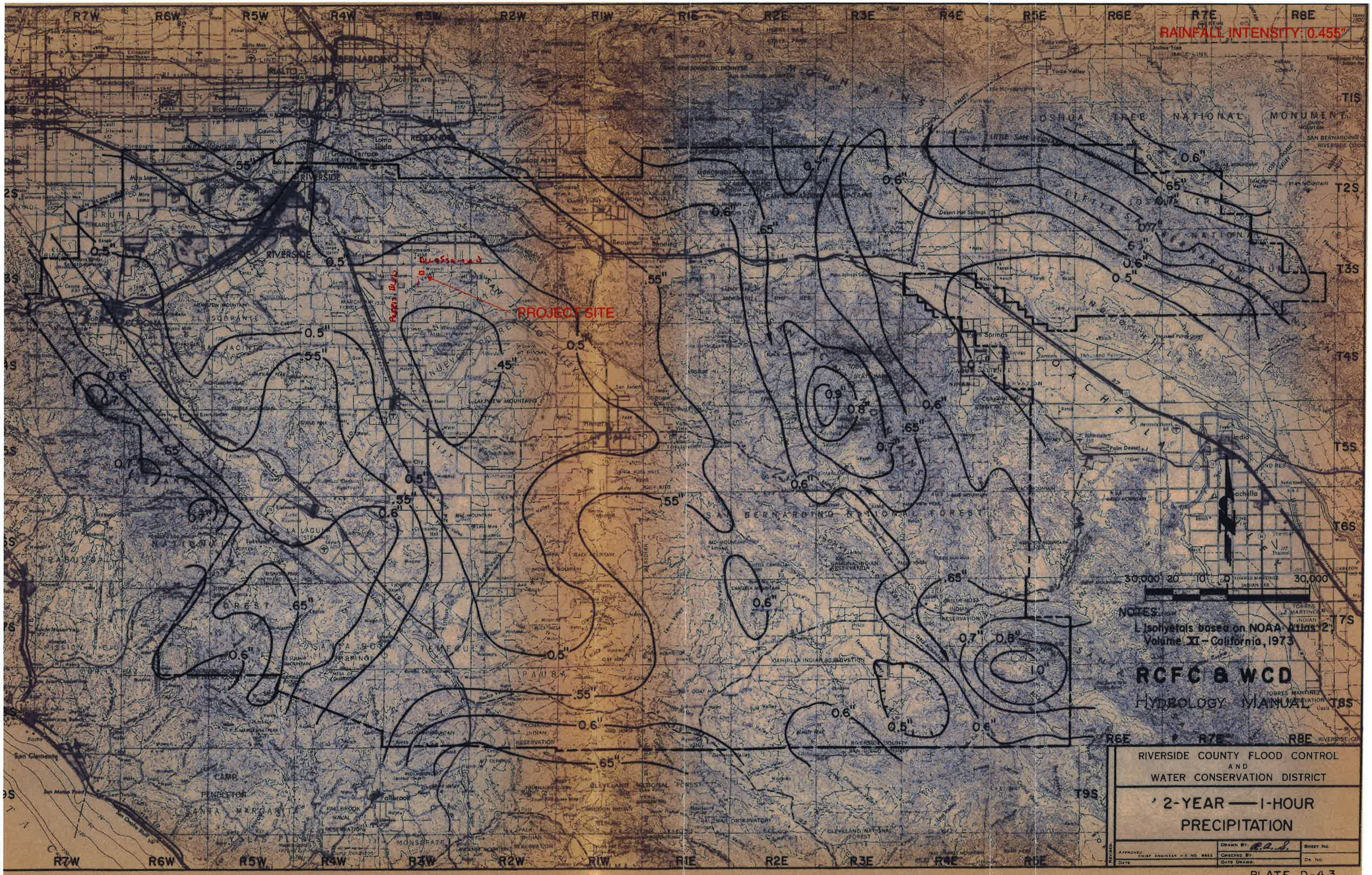
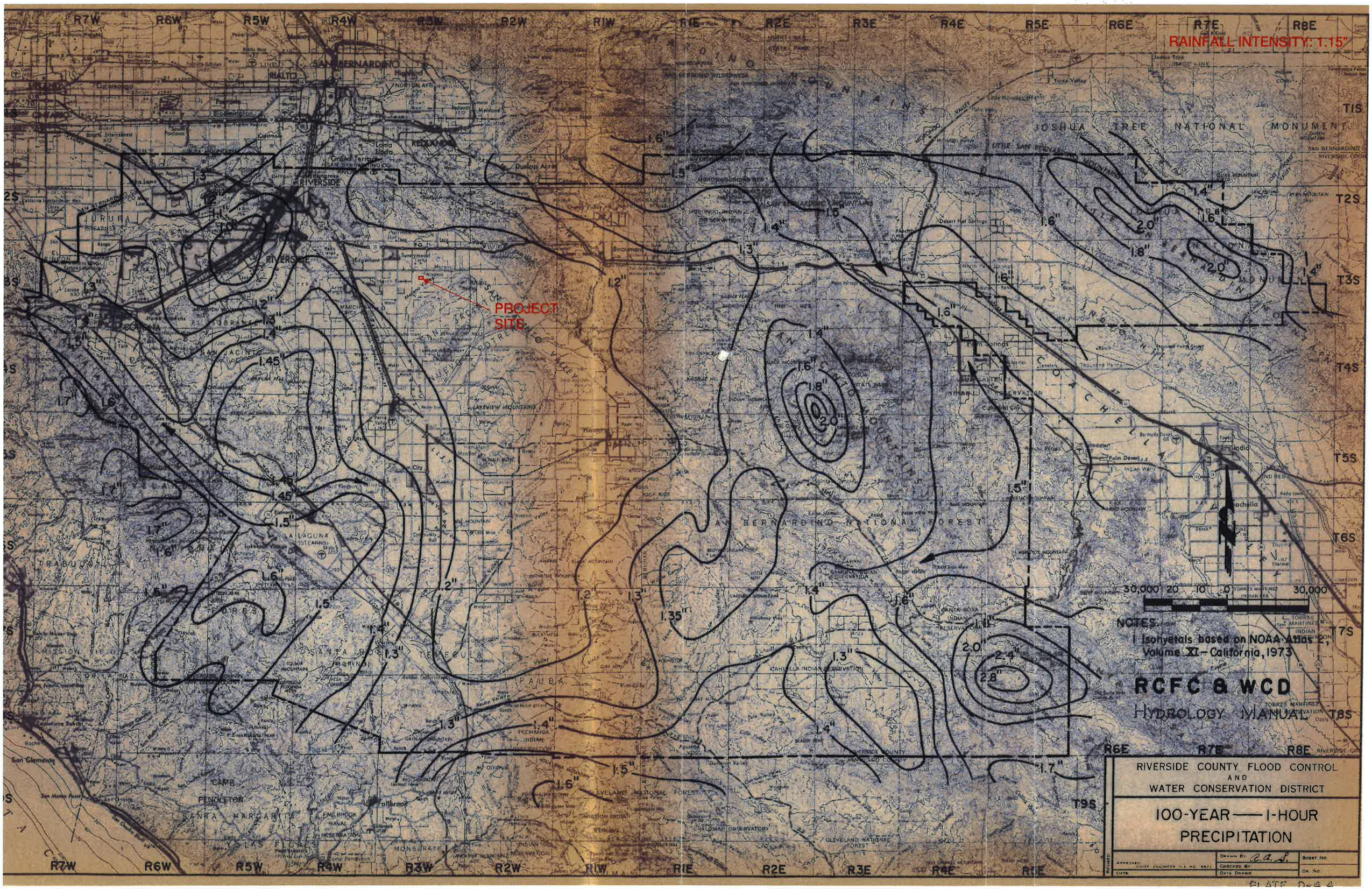

RAINFALL INTENSITY: 0.455"
PROJECT SITE
Quessamed
Purpose Bldg
NOTES:
1. Isohyetals based on NOAA Atlas 2, Volume XI - California, 1973
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
2-YEAR — 1-HOUR PRECIPITATION
DRAWN BY: R.A.S.
CHECKED BY:
DATE DRAWN:
SHEET NO:
DR NO
APPROVED: CHIEF ENGINEER
DATE
REVISED
30,000 20 10 0 30,000
R7W R6W R5W R4W R3W R2W R1W R1E R2E R3E R4E R5E R6E R7E R8E
T1S T2S T3S T4S T5S T6S T7S T8S T9S

PLATE D-4,3


RAINFALL INTENSITY: 1.15"
PROJECT SITE
R7W
R6W
R5W
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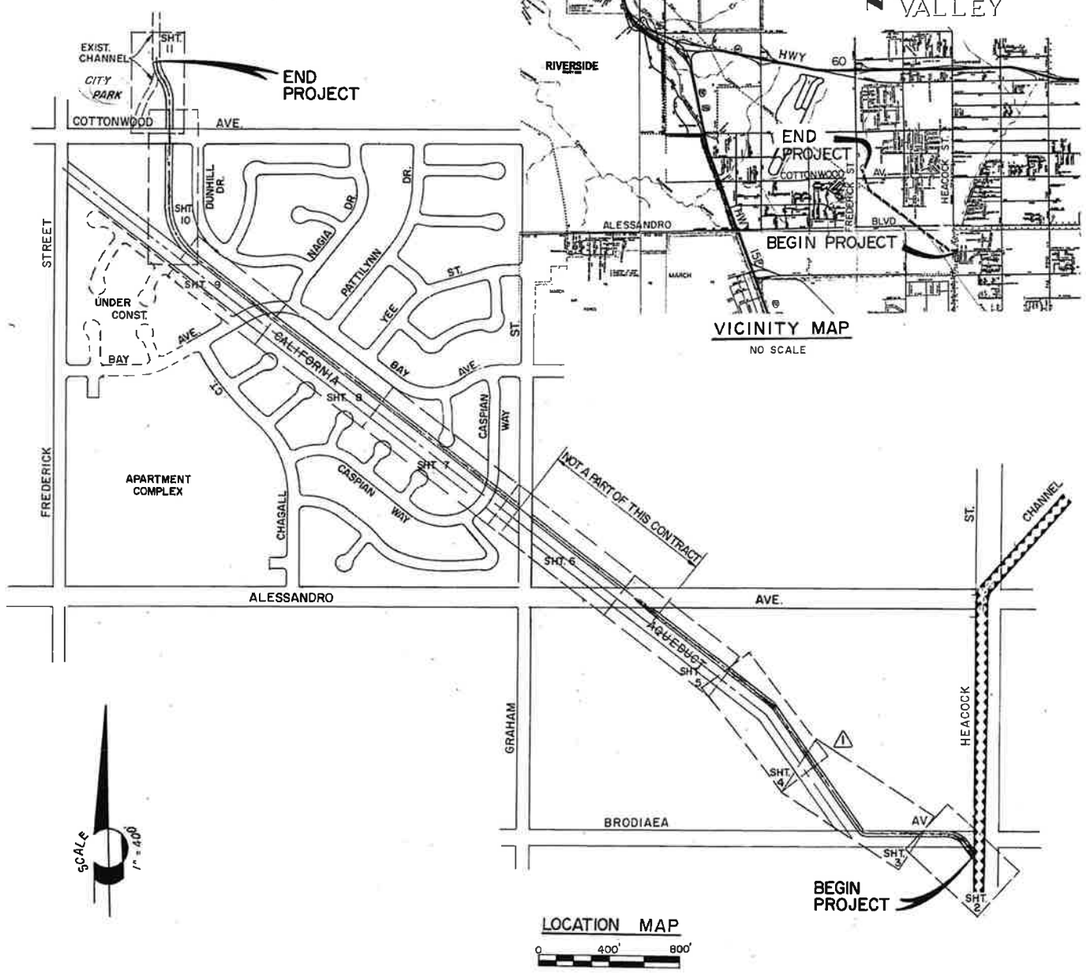
RIVERSIDE
SAN BERNARDINO
RIALTO
JOSHUA TREE NATIONAL MONUMENT
SAN BERNARDINO NATIONAL FOREST
CAHUILLA INDIAN RESERVATION
30,000 20 10 0 30,000
NOTES:
1. Isohyetals based on NOAA Atlas 2, Volume XI – California, 1973
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT
100-YEAR — 1-HOUR
PRECIPITATION
APPROVED
CHIEF ENGINEER R.E. NO. 8821
DATE
DRAWN BY
CHECKED BY
DATE DRAWN
SHEET NO.
DR. NO.
REVISED

PLATE D-4.4

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT



GENERAL NOTES

1. ALL ELEVATIONS ARE IN FEET BASED ON USC&GS DATUM.
2. OPENINGS RESULTING FROM THE CUTTING OR PARTIAL REMOVAL OF EXISTING CULVERTS, PIPES OR SIMILAR STRUCTURES TO BE ABANDONED SHALL BE SEALED WITH 6" OF CLASS "B" CONCRETE.
3. ALL RESURFACING, CURBS, GUTTERS, SIDEWALKS AND OTHER EXISTING IMPROVEMENTS SHALL BE RECONSTRUCTED AT THE SAME ELEVATION AND LOCATION UNLESS OTHERWISE NOTED.
4. ALL CROSSECTIONS ARE TAKEN LOOKING DOWNSTREAM.
5. ELEVATIONS OF UTILITIES ARE APPROXIMATE UNLESS OTHERWISE NOTED.
6. ALL STATIONING REFERS TO CENTERLINE OF CONSTRUCTION.
7. 48 HOURS BEFORE EXCAVATION, CALL UNDERGROUND SERVICE ALERT 1-800-422-4133.
8. STANDARD DRAWINGS CALLED FOR ON THE PLAN AND PROFILE SHALL CONFORM TO RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT STANDARD DRAWINGS LISTED ON THIS SHEET.
9. JUNCTION STRUCTURE NO. 3 (RCB) OR JUNCTION STRUCTURE NO. 4 (RCP) SHALL BE CONSTRUCTED FOR JUNCTIONS NOT OTHERWISE SPECIFIED ON THE PLAN OR PROFILE.
10. TIES TO CATCH BASIN ARE FROM THE CURB RETURN TO THE CENTERLINE OF THE BASIN UNLESS OTHERWISE SHOWN.
11. PAVEMENT REPLACEMENT SHALL BE 3" OF ASPHALTIC CONCRETE & 6" OF CLASS 2 BASE.
12. CURB AND GUTTER SHALL BE REPLACED PER RIVERSIDE COUNTY FLOOD CONTROL STANDARD DRAWING M 813.
13. THE CONTRACTOR SHALL NOTIFY THE FOLLOWING A MINIMUM OF SEVEN DAYS PRIOR TO CONSTRUCTION:

    DEPARTMENT OF WATER RESOURCES
    ENCROACHMENT PERMIT SECTION
    DIVISION OF LAND & R/W
    1416 NINTH STREET
    SACRAMENTO, CA. 94236-0001
    (916) 445-9310

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R.C.F.C. & W.C.D. STANDARD DRAWINGS

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CALTRANS STANDARD PLANS

T12	TRAFFIC CONTROL SYSTEM FOR LANE CLOSURE ON MULTILANE CONVENTIONAL HIGHWAYS.	43

REGISTERED PROFESSIONAL ENGINEER WILLIAM DAVID GABEL No. 21740 Exp. 6-30-89 CIVIL STATE OF CALIFORNIA

GABEL, COOK & BECKLUND
Environmental • Hydrology • Planning
Civil Engineering • Surveying • Structures
647 North Main Street, Suite 1-B, Riverside, Calif. 92501
Telephone (714) 788-8092

APPROVED BY: 19 Jan 87 DATE R.C.E. 21740

BENCH MARK

REVISIONS			
1	REVISED LOCATION	4-86	K.L.S.
REF.	DESCRIPTION	APPR.	DATE

AS BUILT

REGISTERED PROFESSIONAL ENGINEER No. 16757 Exp. 6-30-87

REGISTERED PROFESSIONAL ENGINEER KENNETH L. EDWARDS No. 12400 Exp. 3-31-89 CIVIL STATE OF CALIFORNIA

RIVERSIDE COUNTY FLOOD CONTROL WATER CONSERVATION DISTRICT

DESIGNED BY:
DRAWN BY: SLM
DATE DRAWN: OCT 86
CHECKED BY: CJ & AFA

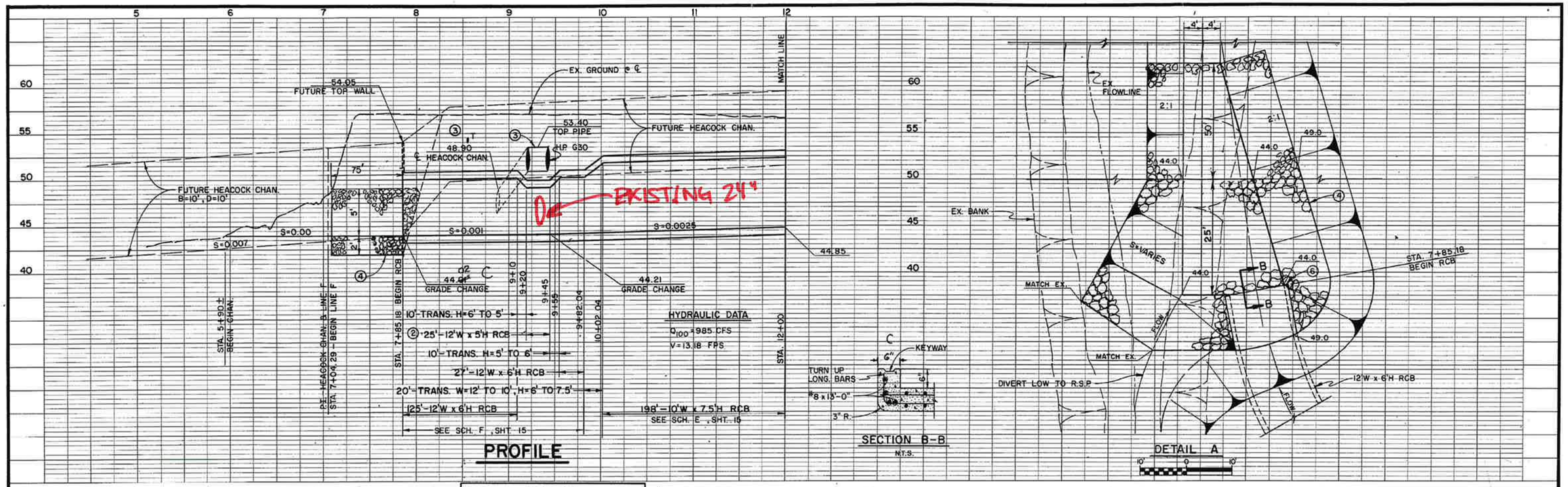
RECOMMENDED FOR APPROVAL BY: DESIGN ENGINEER R.E. NO. 16757 DATE: 2/11/87

APPROVED BY: CHIEF ENGINEER R.E. NO. 12400 DATE: 2-11-87

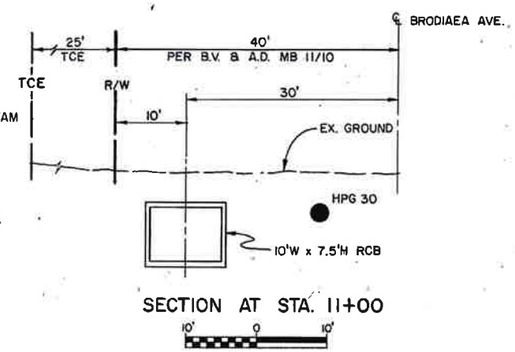
SUNNYMEAD LINE F STAGE 4

TITLE SHEET

PROJECT NO. 4-0-290
DRAWING NO. 4-439
SHEET NO. 1 OF 43



① INTERIM DITCH, B=8', SS=2:1, EXTEND DOWNSTREAM AT LEVEL GRADE TO DAYLIGHT.
② USE STEEL SCHEDULE FOR 12'W x 6'H RCB.
③ PROTECT IN PLACE, SEE SPECIFICATIONS.
④ ROCK SLOPE PROTECTION, LIGHT CLASS.
⑤ LIMITS OF PERMITTED CONSTRUCTION ACTIVITY.
⑥ PROVIDE KEYWAY ON END FACE OF WALL. THIS SIDE ONLY.



BENCH MARK Z3239
TOP OF 5/8" STL. ROD WITH TRI STA. CAP OPPOSITE STA. 6+30±
ELEV. 1554.976

REVISIONS			
C	Elev. And 6" Added		
REF.	DESCRIPTION	APPR.	DATE

AS BUILT

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

DESIGNED BY: A.F.A.
DRAWN BY: R.A.S.
DATE DRAWN: 12/86
CHECKED BY: C.J.

RECOMMENDED FOR APPROVAL BY: DESIGN ENGINEER R.E. NO. 16757 DATE: 2/11/87

APPROVED BY: CHIEF ENGINEER R.E. NO. 12400 DATE: 2-11-87

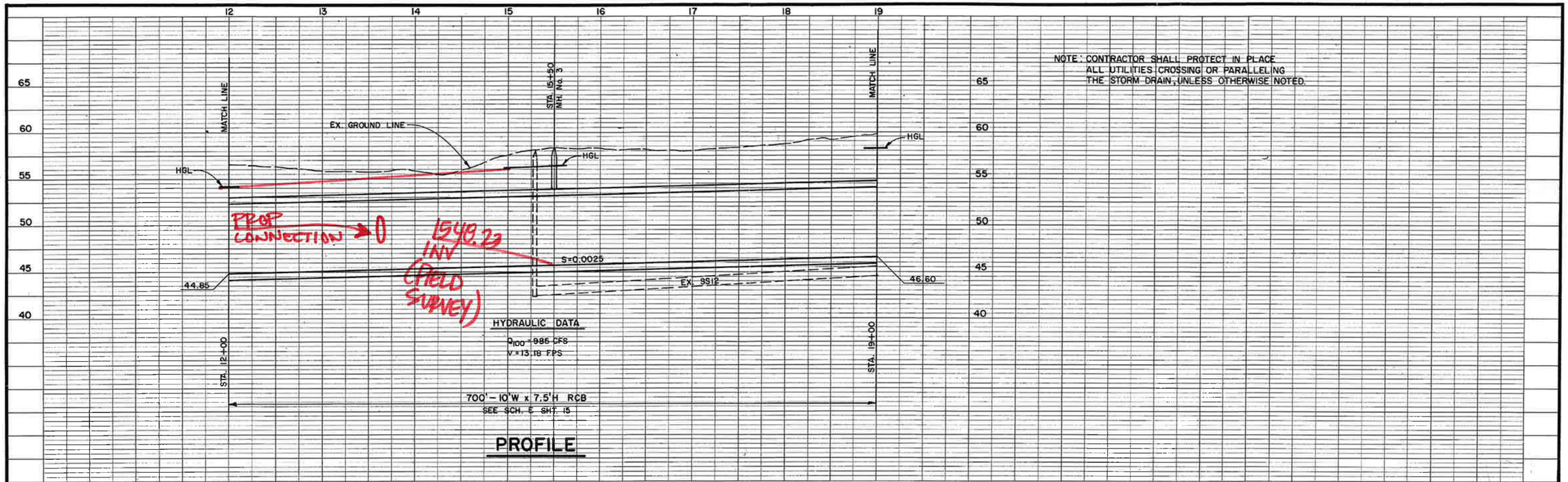
REGISTERED PROFESSIONAL ENGINEER NEAL SMITHHAMMER No. 16757 Exp. 6-30-89 CIVIL STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER KENNETH L. EDWARDS NO. 12400 CIVIL STATE OF CALIFORNIA

SUNNYMEAD LINE F STAGE 4

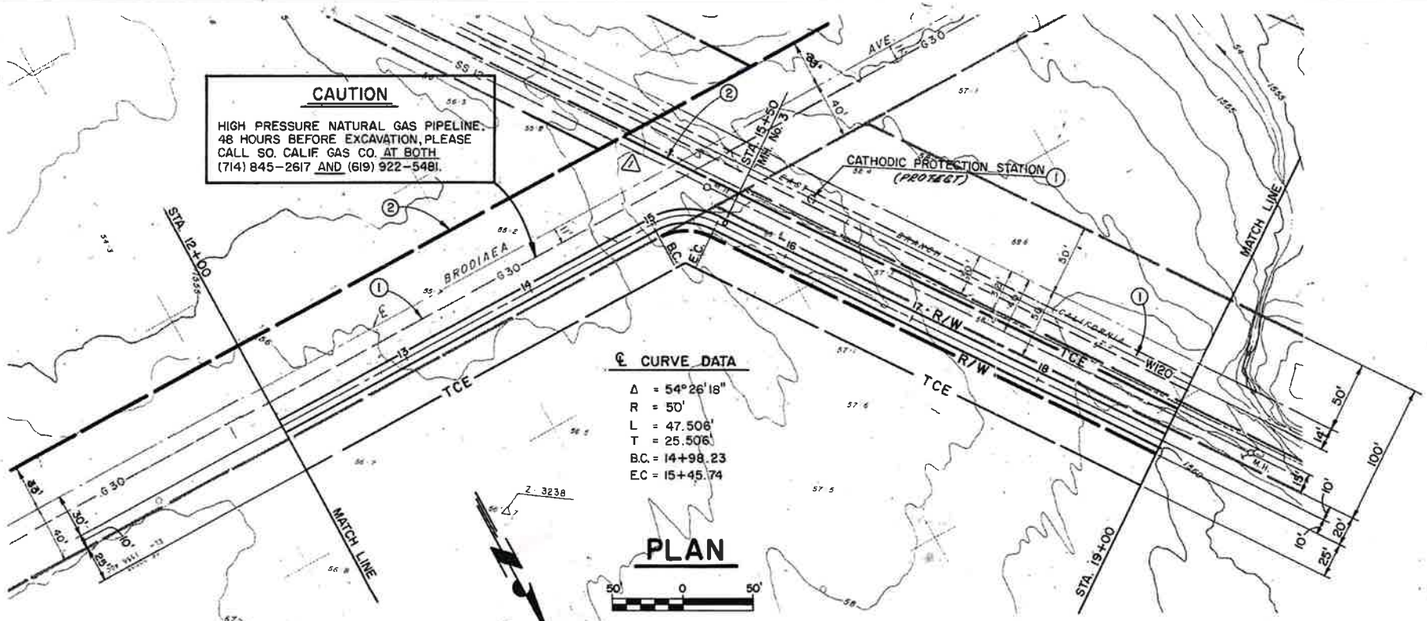
STA. 7+04.29 TO STA. 12+00

PROJECT NO. 4-0-290
DRAWING NO. 4-439
SHEET NO. 2 OF 43

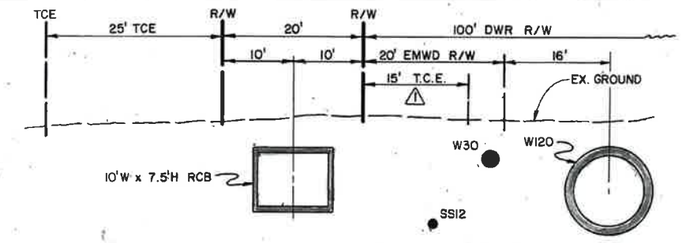


NOTE: CONTRACTOR SHALL PROTECT IN PLACE ALL UTILITIES CROSSING OR PARALLELING THE STORM DRAIN, UNLESS OTHERWISE NOTED.

PROFILE



PLAN



SECTION AT STA. 16+00

① PROTECT IN PLACE.
△② LIMIT OF PERMITTED CONSTRUCTION ACTIVITY.

BENCH MARK Z 3238
TOP OF 5/8" STL. ROD WITH STA. CAP OPPOSITE STA. 13+05, DN. 0.40'
ELEV. 1556.245

REVISIONS			
△1	REVISED T.C.E.	3/87	N.L.S.
REF.	DESCRIPTION	APPR.	DATE
	No Change		

AS BUILT

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

DESIGNED BY: A.F.A.
DRAWN BY: R.O.L.
DATE DRAWN: 12-86
CHECKED BY: C.J.

RECOMMENDED FOR APPROVAL BY: DESIGN ENGINEER, R.E. NO. 16757
DATE: 2/11/87

APPROVED BY: CHIEF ENGINEER R.E. NO. 12400
DATE: 2-11-87

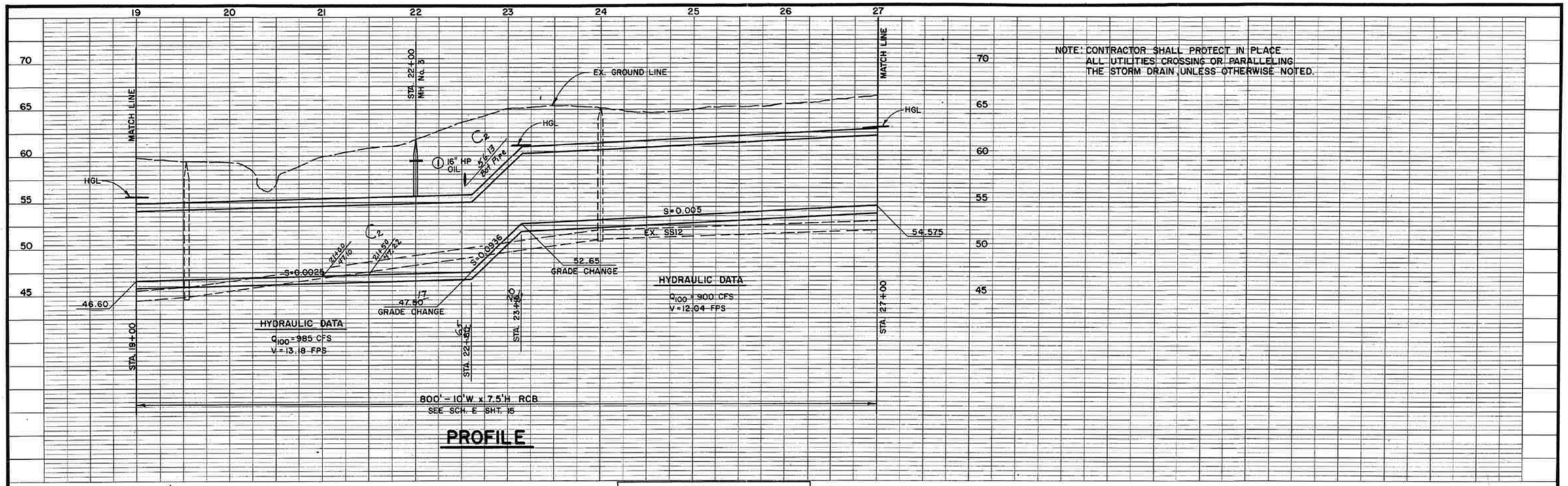
REGISTERED PROFESSIONAL ENGINEER REAL SMITH HAMMER No. 16757 Exp. 6-30-89 CIVIL STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER KENNETH L. EDWARDS NO. 12400 EXP. 3-31-89 CIVIL STATE OF CALIFORNIA

SUNNYMEAD LINE F STAGE 4

STA. 12+00 TO STA. 19+00

PROJECT NO. 4-0-290
DRAWING NO. 4-439
SHEET NO. 3 OF 43



BENCH MARK Z 3237
TOP OF 5/8" STL. ROD WITH TRI STA. CAP OPPOSITE STA. 20+95 ±, DN. 0.40'
ELEV. 1557.619

REVISIONS			
1	Relocated T.C.E.	3/87	N.L.S.
C.2	Elev. & Sta. Changes As Shown		
REF.	DESCRIPTION	APPR.	DATE

AS BUILT

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

DESIGNED BY: A.F.A.
DRAWN BY: R.A.S.
DATE DRAWN: 12-86
CHECKED BY: C.J.

RECOMMENDED FOR APPROVAL BY: DESIGN ENGINEER R.E. NO. 16757 DATE: 2/11/87

APPROVED BY: CHIEF ENGINEER R.E. NO. 12400 DATE: 2-11-87

REGISTERED PROFESSIONAL ENGINEER NEAL SMITHHAMMER No. 16757 Exp. 6-30-89 CIVIL STATE OF CALIFORNIA

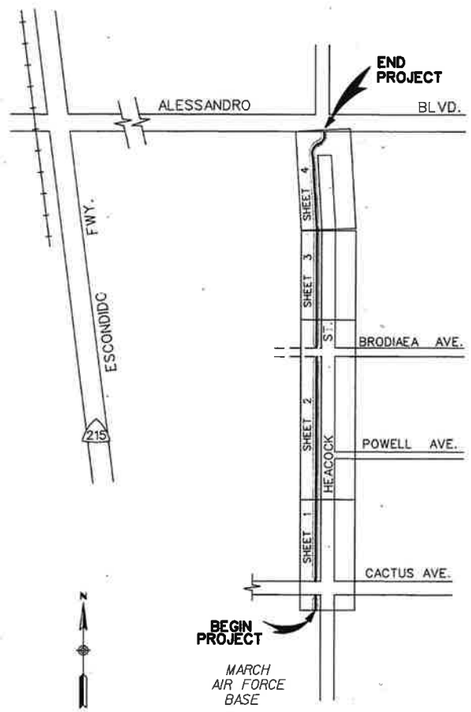
REGISTERED PROFESSIONAL ENGINEER KENNETH L. EDWARDS NO. 12400 CIVIL STATE OF CALIFORNIA

SUNNYMEAD LINE F STAGE 4

STA. 19+00 TO STA. 27+00

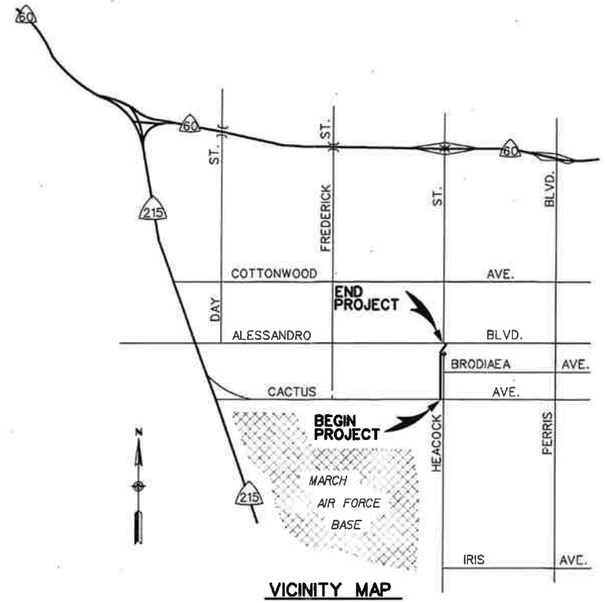
PROJECT NO. 4-0-290
DRAWING NO. 4-439
SHEET NO. 4 OF 43

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT



LOCATION MAP

400' 0 400'



VICINITY MAP

N.T.S.

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GENERAL NOTES

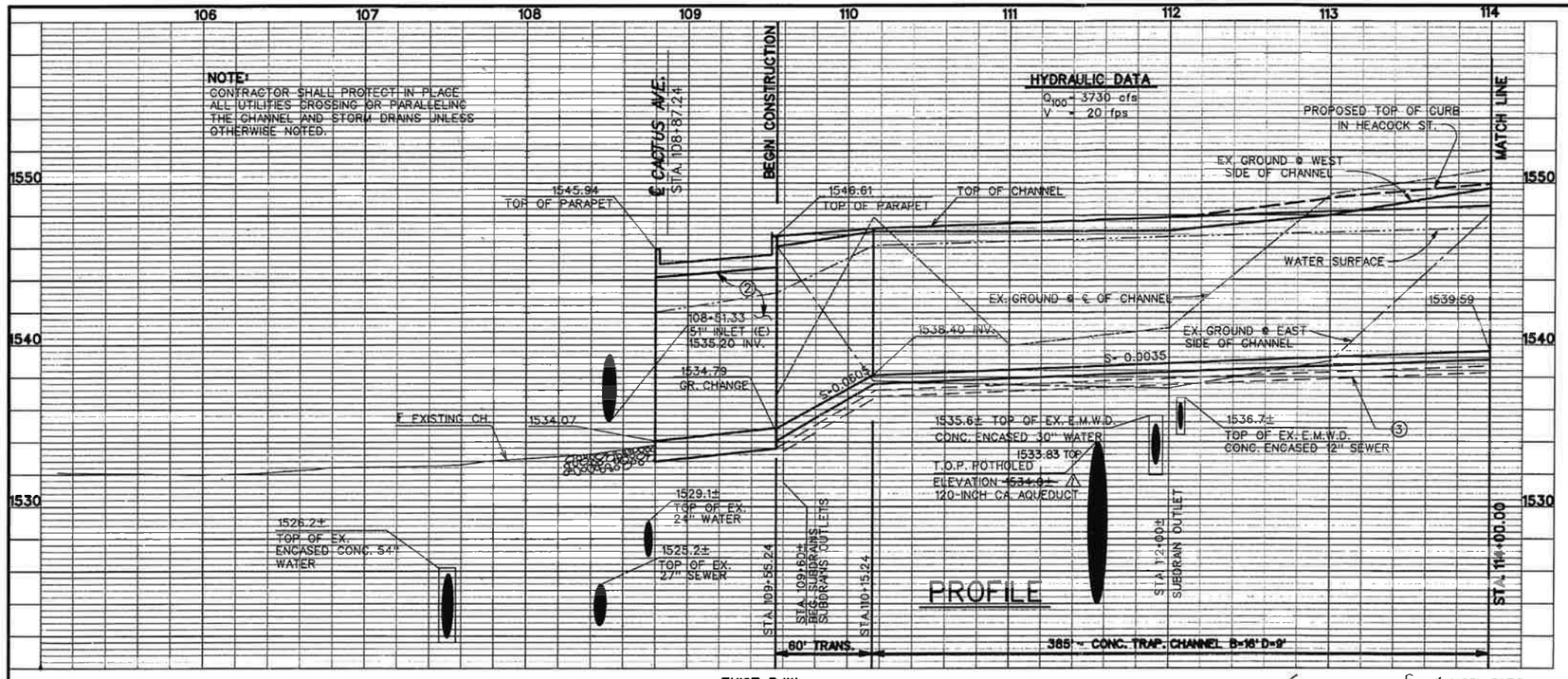
1. ALL STATIONING REFERS TO CENTERLINE OF CONSTRUCTION.
2. ALL ELEVATIONS ARE IN FEET, BASED ON U.S.C. & G. S. DATUM.
3. STANDARD DRAWINGS CALLED FOR ON THE PLAN & PROFILE SHALL CONFORM TO RIVERSIDE COUNTY FLOOD CONTROL DISTRICT STANDARD DRAWINGS LISTED ON THIS SHEET.
4. ALL CROSS SECTIONS ARE TAKEN LOOKING DOWNSTREAM.
5. ELEVATIONS OF UTILITIES ARE APPROXIMATE UNLESS NOTED OTHERWISE.
6. 48 HOURS BEFORE EXCAVATION, CALL UNDERGROUND SERVICE ALERT 1-800-422-4144.
7. ALL CURBS, GUTTERS, SIDEWALKS, DRIVEWAYS, AND OTHER EXISTING IMPROVEMENTS ARE TO BE RECONSTRUCTED IN KIND AND AT THE SAME ELEVATION AND LOCATION AS THE EXISTING IMPROVEMENTS, UNLESS OTHERWISE NOTED.

REGISTERED PROFESSIONAL ENGINEER NEAL L. SMITHHAMMER No. 16757 Exp. 6-30-97 CIVIL STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER KENNETH L. EDWARDS NO. 12400 EXP. 3-31-97 CIVIL STATE OF CALIFORNIA

AS BUILT
APPROVED BY: C.C.
DATE: 6/5/96

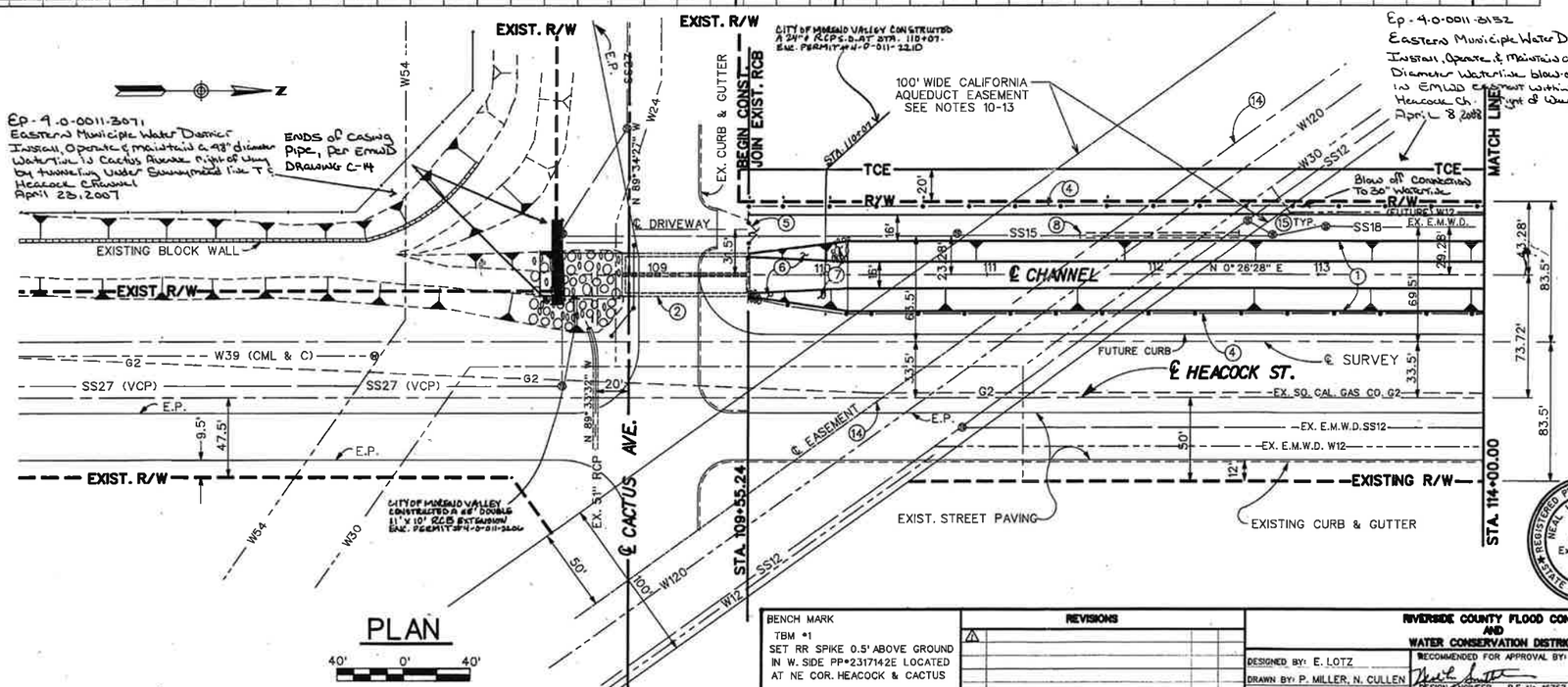
CITY OF MORENO VALLEY	BENCH MARK	REVISIONS	RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT	HEACOCK CHANNEL (SUNNYMEAD LINE B) STAGE 2	PROJECT NO. 4-0-0011
APPROVED BY: Barry D. McCalla, CITY ENGINEER	TBM #1 SET RR SPIKE 0.5' ABOVE GROUND IN W. SIDE PP#2317142E LOCATED AT NE COR. HEACOCK & CACTUS	REF. / DESCRIPTION / APPR. / DATE	DESIGNED BY: E. LOTZ; DRAWN BY: P.M., N.W.C.; DATE DRAWN: ; CHECKED BY: CL		DRAWING NO. 4-610
DATE: 12-9-94 R.C.E. NO. 29459	EL. 1545.89		RECOMMENDED FOR APPROVAL BY: DESIGN ENGINEER R.E. No. 16757 DATE: 12 DEC 94; APPROVED BY: CHIEF ENGINEER R.E. NO. 12400 DATE: 12-12-94	TITLE SHEET	SHEET NO. 1 OF 23



Note: There is another Section on the downstream side of this culvert that does not show in this drawing, but this is the drawing were provided by RCFC WCD to show the Eastern Feeder Pipline encroachment

NOTES

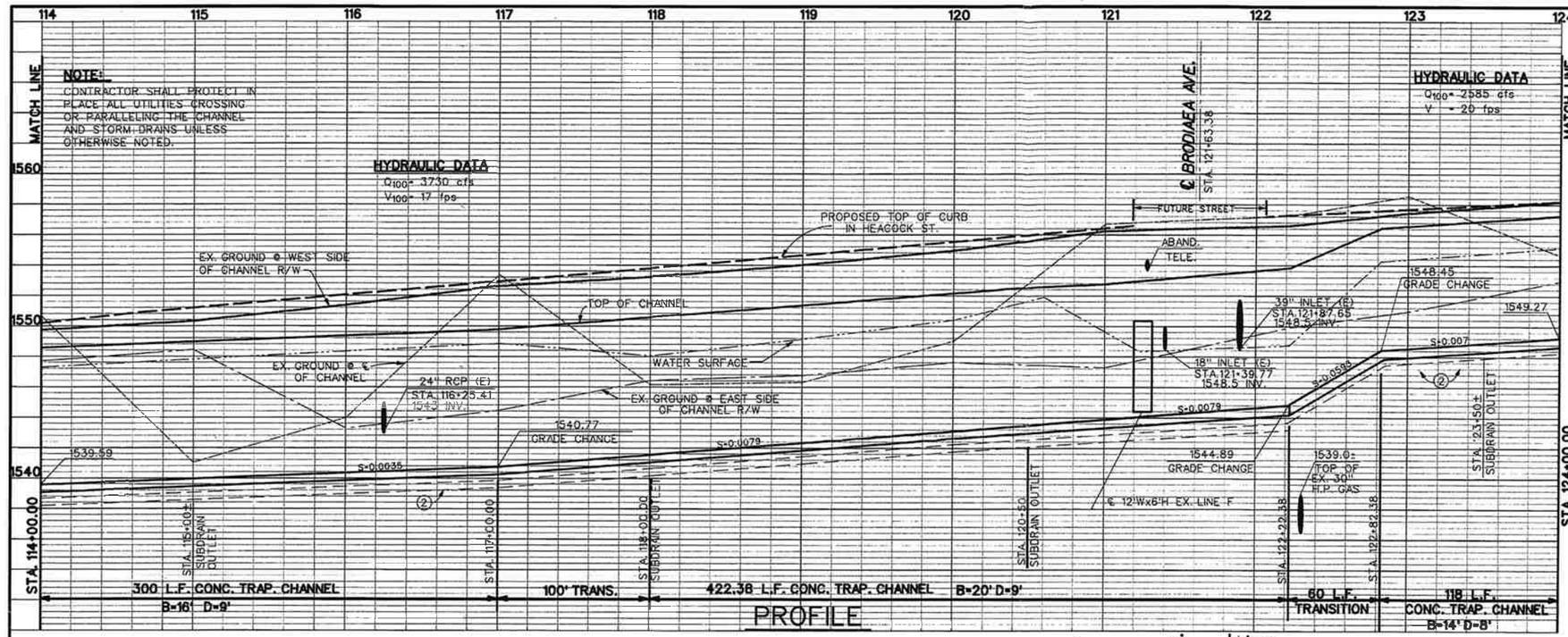
1. CONC. TRAP CHANNEL PER STD. CH326 AND TYPICAL SECTION ON SHT. 4.
2. EXISTING DOUBLE 11' W X 10' H.
3. SUBDRAIN SYSTEM PER STD. CH332. SEE ALSO TYP. SECTION, SHT. 4.
4. 6' CHAIN LINK FENCE PER STD. M801.
5. 14' DOUBLE DRIVE GATE PER STD. M801.
6. TRANSITION STRUCTURE PER R.C.F.C.D. STD. DWG. CH329.
7. REMOVE EXISTING RIPRAP.
8. EXISTING 80'-30" PLASTIC CASING.
9. SEE SHEET 4 FOR TYPICAL CHANNEL SECTION DETAIL.
10. A SEVEN (7) DAY ADVANCE NOTIFICATION IS REQUIRED PRIOR TO STARTING WORK WITHIN D.W.R.'s RIGHT OF WAY. CONTACT THE DIVISION OF LAND AND RIGHT OF WAY, ENCROACHMENT PERMIT SECTION, SACRAMENTO, CALIFORNIA AT (916) 653-6957.
11. ALL TRENCH EXCAVATION SHALL COMPLY WITH THE MOST CURRENT OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION STANDARDS. TRENCH BACKFILL SHALL BE PLACED IN NO GREATER THAN 4-INCH LIFTS IF HAND COMPACTED OR NOT GREATER THAN 8-INCH LIFTS IF POWER COMPACTED. TRENCH BACKFILL COMPACTION SHALL MEET 93% RELATIVE COMPACTION (ASTM D1557) ACROSS DWR'S PIPELINE. TRENCH BACKFILL ELSEWHERE WITHIN DWR'S RIGHT OF WAY SHALL BE COMPACTED TO 88% RELATIVE COMPACTION (ASTM D1557).
12. THE CONTRACTOR WILL BE LIABLE FOR ANY DAMAGE TO D.W.R.'S FACILITIES AS A RESULT OF THE PROPOSED CONSTRUCTION. ANY EXCAVATION OR BACKFILL COMPACTION WITHIN THREE FEET OF DWR'S PIPELINES SHALL BE DONE BY USING HAND HELD TOOLS.
13. THE TOP OF DWR's PIPELINE SHALL BE LOCATED IN THE PRESENCE OF A DWR FIELD DIVISION INSPECTOR BY POTHOLING AT THE POINT WHERE THE PROPOSED CHANNEL CROSSES THE PIPELINE. THE RESULTANT ELEVATION SHALL BE DELINEATED ON THE DRAWING AND LABELED "T.O.P. POTHOLED ELEVATION".
14. FLAG IN FIELD AND PROTECT IN PLACE, DWR CATHODIC PROTECTION TEST STATIONS.
15. ADJUST HEIGHT OF EXISTING SEWER MANHOLES TO LEVEL OF CHANNEL MAINTENENCE ROAD.

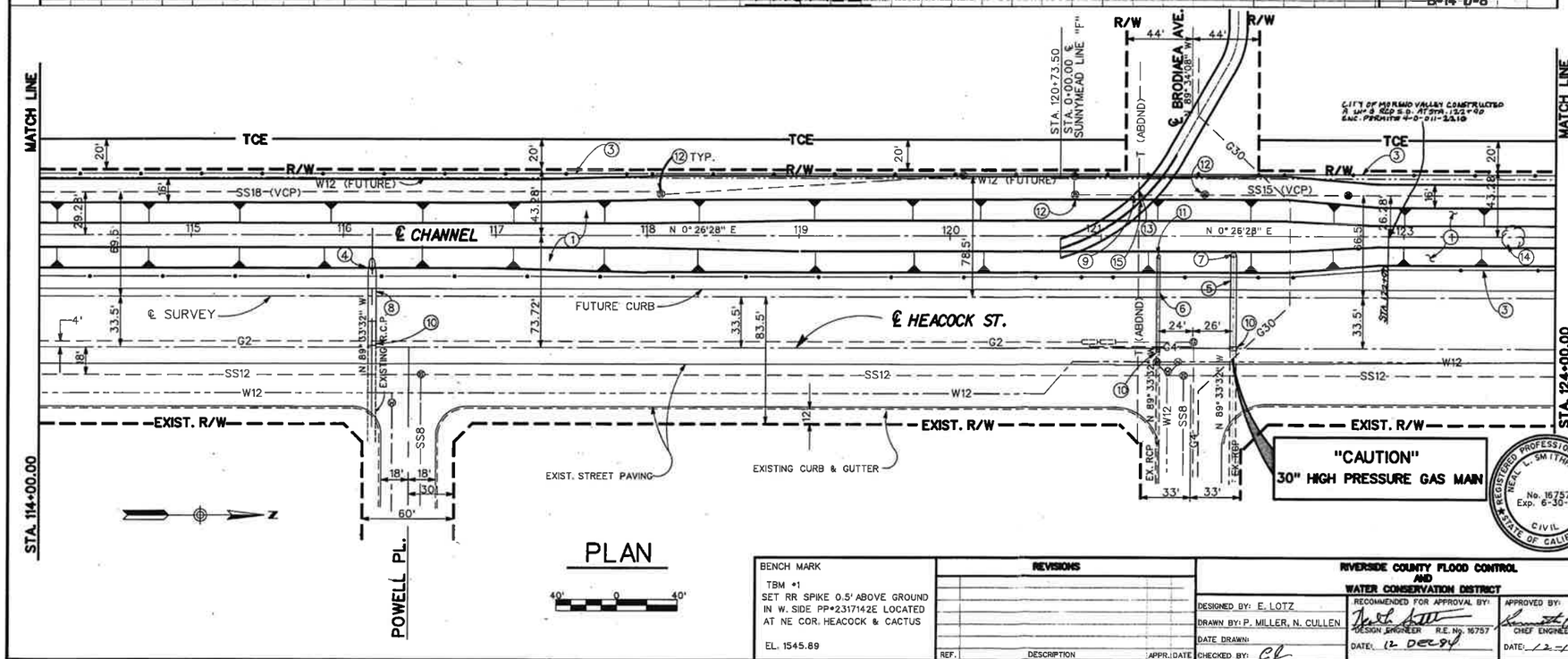


REGISTERED PROFESSIONAL ENGINEER NEAL L. SMITHHAMMER No. 16757 Exp. 6-30-97 CIVIL STATE OF CALIFORNIA

AS BUILT
APPROVED: d.d.
DATE: 6/5/96

BENCH MARK	REVISIONS	RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT	HEACOCK CHANNEL (SUNNYMEAD LINE B) STAGE 2	PROJECT NO. 4-0-0011
TBM #1 SET RR SPIKE 0.5' ABOVE GROUND IN W. SIDE PP#2317142E LOCATED AT NE COR. HEACOCK & CACTUS EL. 1545.89	REF. / DESCRIPTION / APPR. / DATE	DESIGNED BY: E. LOTZ; DRAWN BY: P. MILLER, N. CULLEN; DATE DRAWN: ; CHECKED BY: CL; RECOMMENDED FOR APPROVAL BY: DESIGN ENGINEER R.E. No. 16757 DATE: 12-04-94; APPROVED BY: CHIEF ENGINEER R.E. No. 12400 DATE: 12-12-94	BEGINNING OF PROJECT TO STA. 114+00	DRAWING NO. 4-610; SHEET NO. 2 OF 23





NOTES

1. CONC. TRAP. CHANNEL PER STD. CH326 AND TYPICAL SECTION, SHT. 4.
2. SUBDRAIN SYSTEM PER STD. CH332. SEE ALSO TYP. SECTION, SHT. 4.
3. 6' CHAIN LINK FENCE PER STD. M801.
4. J.S. NO. 6 PER STD. JS231. A=90°; C=11.75'; D=24"; L=20'; EL. R=1543.17; EL. S=1543.00
5. INSTALL 50'-39" RCP-1100D.
6. INSTALL 50'-18" RCP-2000D.
7. J.S. NO. 6 PER STD. DWG. JS231 A=90°, D=39", C=15.85', L=25'; EL. R=1548.7, EL. S=1548.5.
8. INSTALL 55'-24" RCP-2000D.
9. SANITARY SEWER PROTECTION PER STD. DWG. M807 (CASE II).
10. CONC. COLLAR PER STD. DWG. M803.
11. J.S. NO. 6 PER STD. DWG. JS231. D=18", L=25', A=90°, C=16.25', EL. R=1548.7, EL.S=1548.5.
12. ADJUST HEIGHT OF EXISTING SEWER MANHOLES TO LEVEL OF CHANNEL MAINTENENCE ROAD. FORM SLOPE PAVING CONCRETE AROUND SEWER MANHOLES THAT ARE WITHIN CHANNEL SIDES (APPROXIMATELY TWO PLACES).
13. REMOVE INTERFERING PORTION OF ABANDONDED UTILITY.
14. REMOVE EXISTING TREES.
15. CUT OFF AND REMOVE EXIST. INTERFERRING PORTION OF RCB AND REPLACE WITH RECTANGULAR CHANNEL PER DETAILS ON SHT. 6. VERIFY IN FIELD STATION AND INVERT ELEVATION WHERE MODIFIED LINE F WILL INTERSECT CHANNEL.

AS BUILT
APPROVED BY: C.d.
DATE 6/5/96

BENCH MARK
TBM #1
SET RR SPIKE 0.5' ABOVE GROUND IN W. SIDE PP#2317142E LOCATED AT NE COR. HEACOCK & CACTUS
EL. 1545.89

REF.	DESCRIPTION	APPR.	DATE
	REVISIONS		

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

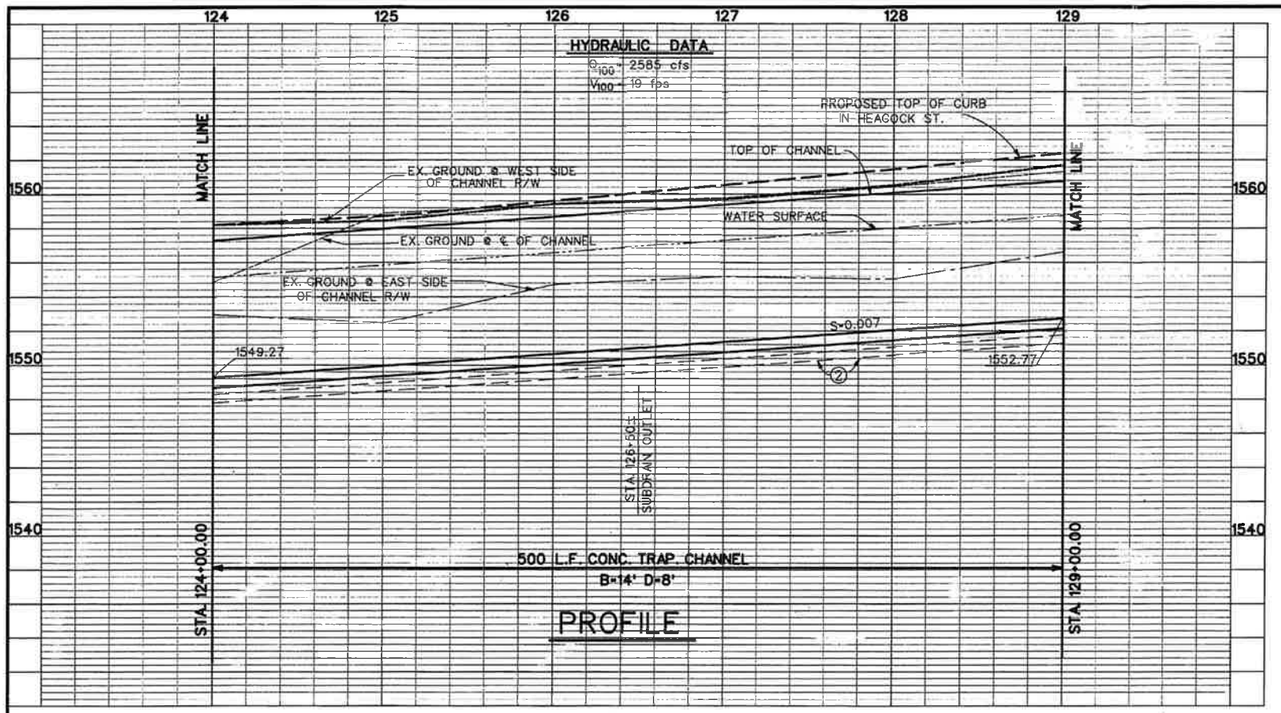
DESIGNED BY: E. LOTZ
DRAWN BY: P. MILLER, N. CULLEN
DATE DRAWN:
CHECKED BY:

RECOMMENDED FOR APPROVAL BY: DESIGN ENGINEER R.E. No. 16757 DATE: 12 DEC 94

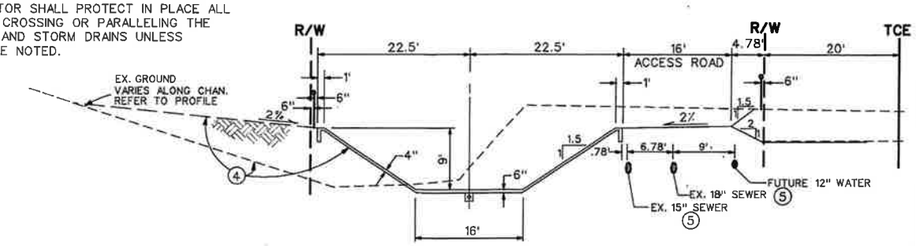
APPROVED BY: CHIEF ENGINEER R.E. NO. 12400 DATE: 12-12-94

HEACOCK CHANNEL
(SUNNYMEAD LINE B)
STAGE 2
STA. 114+00 TO STA. 124+00

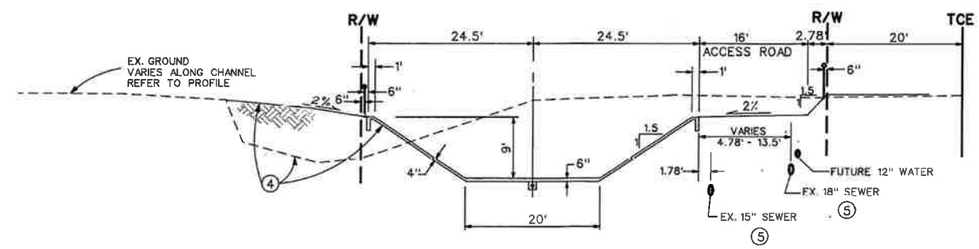
PROJECT NO. 4-0-0011
DRAWING NO. 4-610
SHEET NO. 3 OF 23



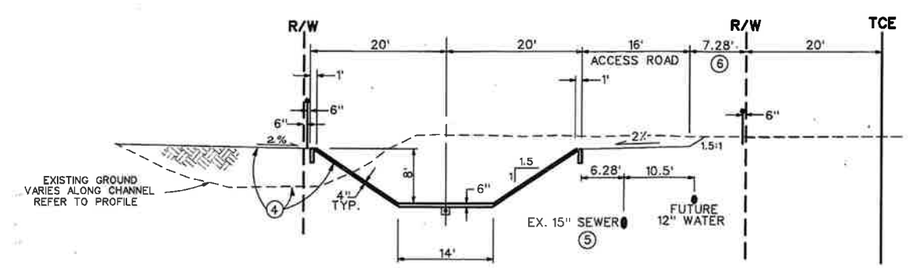
NOTE:
CONTRACTOR SHALL PROTECT IN PLACE ALL UTILITIES CROSSING OR PARALLELING THE CHANNEL AND STORM DRAINS UNLESS OTHERWISE NOTED.



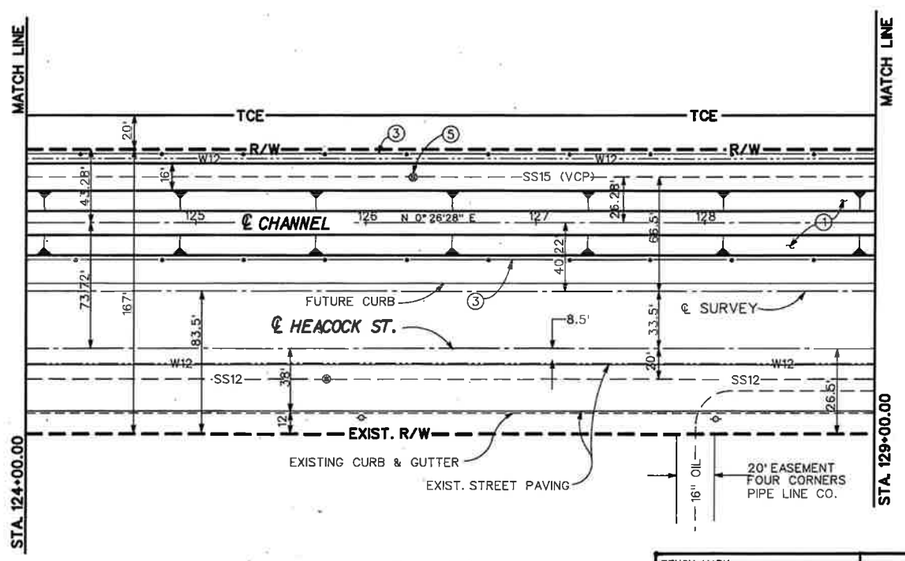
TYPICAL SECTION
STA. 110+15.24 TO STA. 117+00



TYPICAL SECTION
STA. 118+00 TO STA. 122+22.38



TYPICAL SECTION
STA. 122+82.38 TO STA. 132+10.78



PLAN
40' 0' 40'

NOTES

1. CONSTRUCT CONC. CHANNEL PER STD. CH326 AND TYPICAL SECTIONS HEREON.
2. CONST. SUBDRAIN SYSTEM PER STD. CH332.
3. CONST. 6' CHAIN LINK FENCE PER STD. M801.
4. FILL EXISTING NATURAL CHANNEL.
5. ADJUST HEIGHT OF EXISTING SEWER MANHOLES TO LEVEL OF CHANNEL MAINTENENCE ROAD.
6. WIDTH VARIES BEYOND 130+00.

REGISTERED PROFESSIONAL ENGINEER NEAL L. SMITHHAMMER No. 16757 Exp. 6-30-97 CIVIL STATE OF CALIFORNIA

AS BUILT
APPROVED BY: d.c.
DATE: 6/5/96

BENCH MARK
TBM #1
SET RR SPIKE 0.5' ABOVE GROUND IN W. SIDE PP#2317142E LOCATED AT NE COR. HEACOCK & CACTUS
EL. 1545.89

REVISIONS			
REF.	DESCRIPTION	APPR.	DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

DESIGNED BY: E. LOTZ
DRAWN BY: P. MILLER, N. CULLEN
DATE DRAWN:
CHECKED BY: CJ

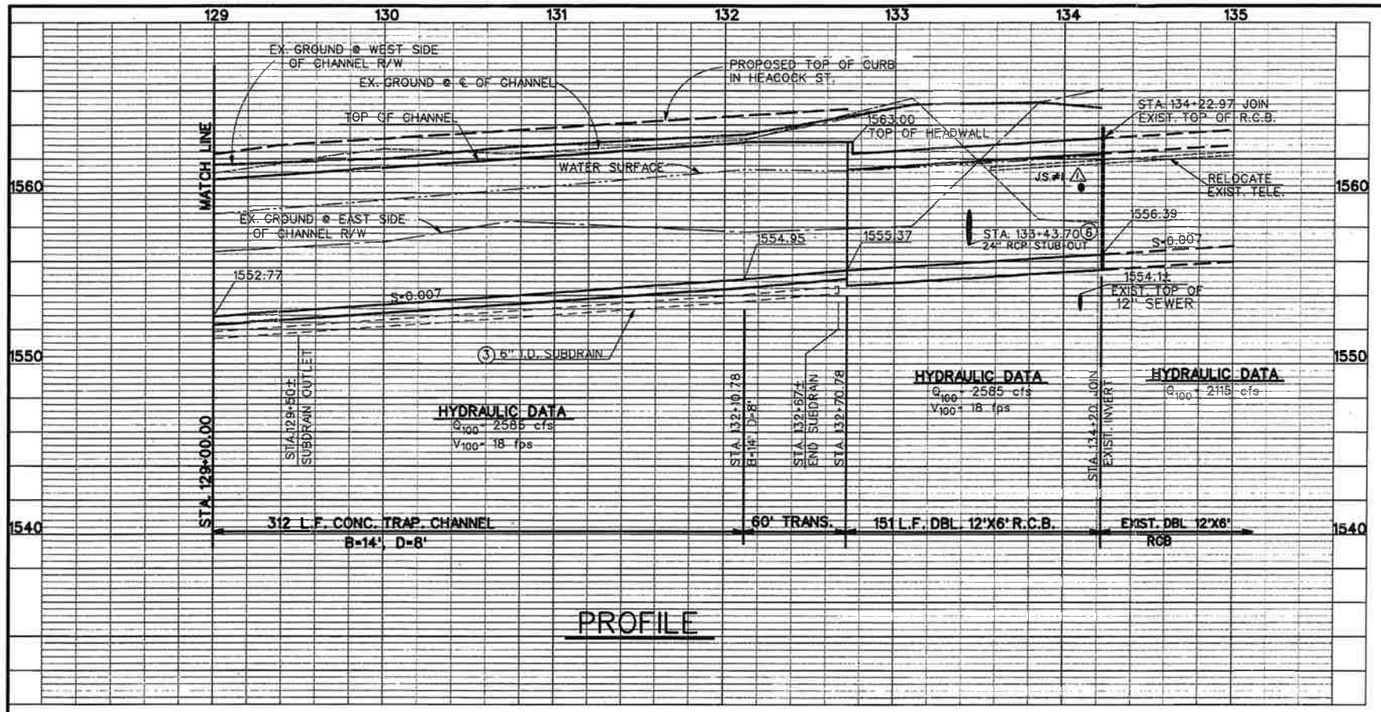
RECOMMENDED FOR APPROVAL BY: DESIGN ENGINEER R.E. No. 16757 DATE: 12-12-94

APPROVED BY: CHIEF ENGINEER R.E. NO. 12400 DATE: 12-12-94

HEACOCK CHANNEL
(SUNNYMEAD LINE B)
STAGE 2

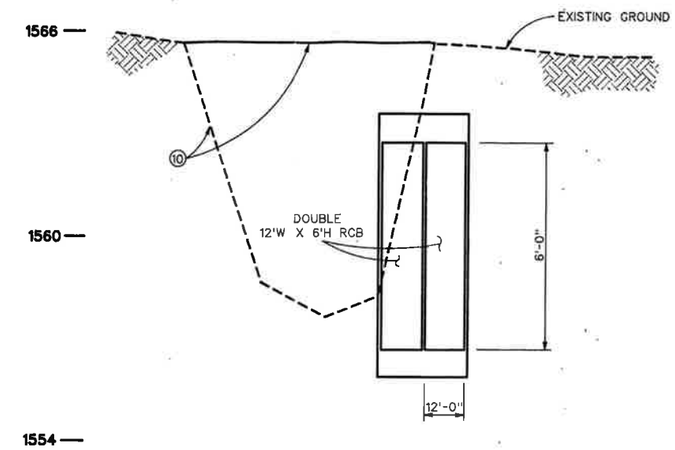
STA. 124+00 TO STA. 129+00

PROJECT NO. 4-0-0011
DRAWING NO. 4-610
SHEET NO. 4 OF 23

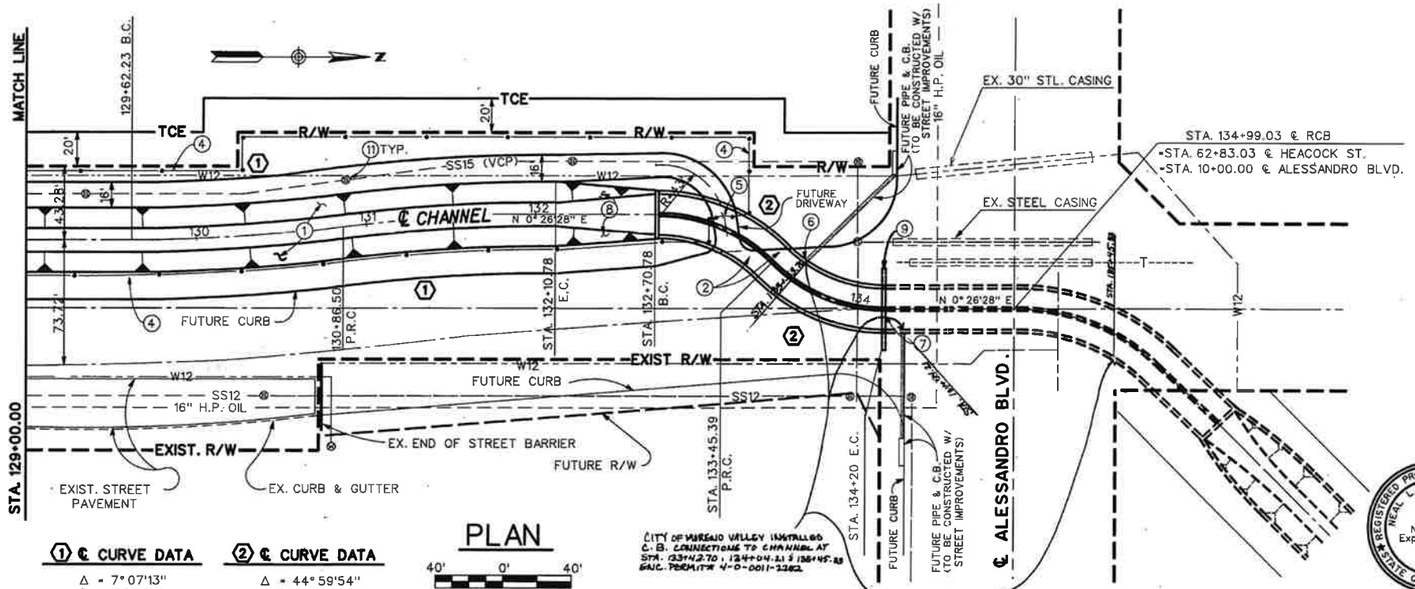


PROFILE

NOTE:
CONTRACTOR SHALL PROTECT IN PLACE ALL UTILITIES CROSSING OR PARALLELING THE CHANNEL AND STORM DRAINS UNLESS OTHERWISE NOTED.



TYPICAL SECTION FROM STA. 132+70.78 TO 134+20



PLAN

40' 0' 40'

NOTES

1. CONSTRUCT CONC. TRAP CHANNEL PER STD. CH326 AND TYPICAL SECTION ON SHT. 4.
2. CONST. DOUBLE BOX CULVERT WITH HEADWALL PER CALTRANS STD. PLAN D81 (FLAT INVERT).
3. INSTALL SUBDRAIN SYSTEM PER STD. CH332. SEE ALSO TYP. SECTION, SHT. 4.
4. INSTALL 6' CHAIN LINK FENCE PER STD. M801.
5. INSTALL 14' DOUBLE DRIVE GATE PER STD. M801.
6. CONST. J.S. No. 1. A=90°, B=24", C=7', ELEV. "S"= 1557'. CONSTRUCT TIMBER BULKHEAD ON 24" R.C.P.
7. RCB JOIN PER CULVERT EXTENSION DETAIL ON CALTRANS STD. PLAN NO. D83.
8. CONSTRUCT TRANSITION STRUCTURE PER STD. CH329.
9. REMOVE EXISTING HEADWALL.
10. FILL EXISTING NATURAL CHANNEL.
11. ADJUST HEIGHT OF EXISTING SEWER MANHOLES TO LEVEL OF CHANNEL MAINTENENCE ROAD.

(1) ℄ CURVE DATA

Δ = 7°07'13"
R = 1000.00'
T = 62.22'
L = 124.27'
B.C. = 129+62.23
P.R.C. = 130+86.50
E.C. = 132+10.78

(2) ℄ CURVE DATA

Δ = 44°59'54"
R = 95.00'
T = 39.35'
L = 74.61'
B.C. = 132+70.78
P.R.C. = 133+45.39
E.C. = 134+20.00

REGISTERED PROFESSIONAL ENGINEER NEAL L. SMITHHAMMER No. 16757 Exp. 6-30-97 CIVIL STATE OF CALIFORNIA

AS BUILT
APPROVED BY: A.A.
DATE 6/5/96

BENCH MARK
TBM #1
SET RR SPIKE 0.5' ABOVE GROUND IN W. SIDE PP#2317142E LOCATED AT NE COR. HEACOCK & CACTUS
EL. 1545.89

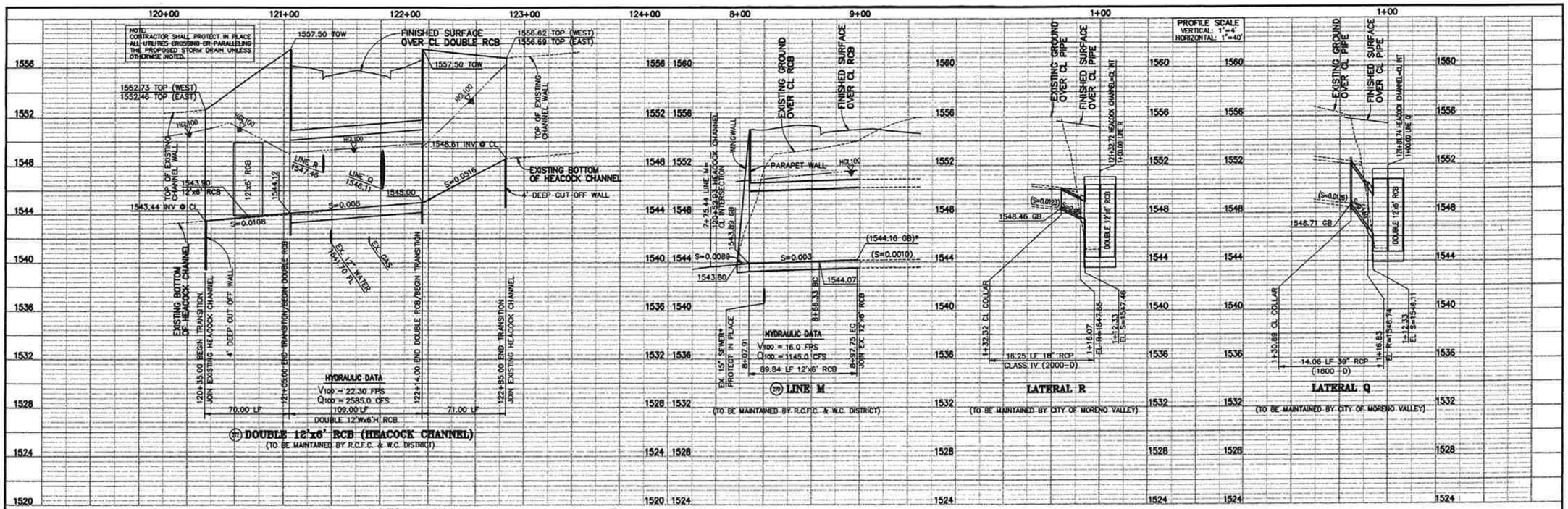
REVISIONS			
REF.	DESCRIPTION	APPR.	DATE
1	ADDED JS NO. 1		

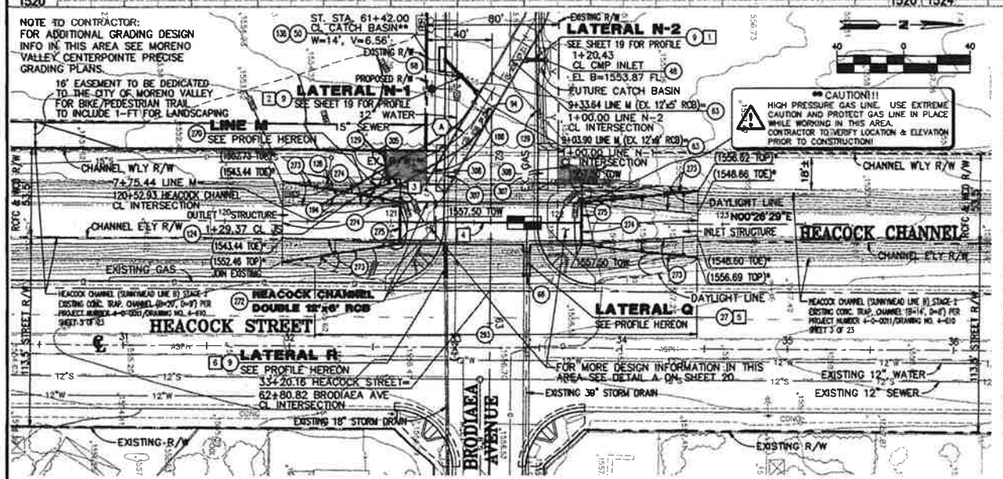
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

DESIGNED BY: E. LOTZ
DRAWN BY: P. MILLER, N. CULLEN
DATE DRAWN:
CHECKED BY:
RECOMMENDED FOR APPROVAL BY: DESIGN ENGINEER R.E. No. 16757 DATE: 12-12-94
APPROVED BY: CHIEF ENGINEER R.E. NO. 12400 DATE: 12-12-94

HEACOCK CHANNEL
(SUNNYMEAD LINE B)
STAGE 2
STA. 129+00 TO END OF PROJECT

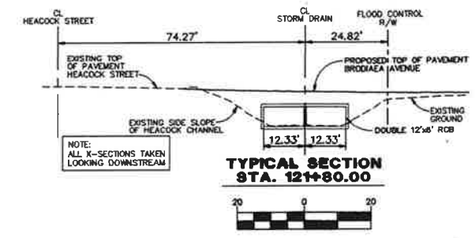
PROJECT NO. 4-0-0011
DRAWING NO. 4-610
SHEET NO. 5 OF 23





CONSTRUCTION NOTES

9. INSTALL 24" RCP (CLASS IV, 2000-D), PROFILE AS SHOWN ON PLANS
27. INSTALL 39" RCP (D-LOAD AND PROFILE AS SHOWN ON PLANS)
48. CONSTRUCT CMP INLET PER DETAIL ON SHEET 21 (12 GAUGE - RISER # PER PLAN)
50. CONSTRUCT CATCH BASIN PER R.C.F.C. & WCD STD. PLAN CB100 (WIDTH & V-DEPTH PER PLAN)
53. CONSTRUCT JUNCTION STRUCTURE NO. 1 PER R.C.F.C. & WCD STD. PLAN JS226
68. CONSTRUCT CONCRETE COLLAR FOR RCP PER R.C.F.C. & WCD STD. PLAN M803
96. JOIN EXISTING RCB PER CALTRANS CULVERT EXTENSION STANDARD DETAIL D83
124. CONSTRUCT RCB TO WARPED WINGWALL JUNCTION PER DETAILS ON SHEET 20
136. ADJUST MANHOLE RIM TO GRADE AFTER FINAL SURFACE HAS BEEN INSTALLED
150. PROTECT IN PLACE (ITEM AS INDICATED ON PLANS)
168. FOR CONSTRUCTION OF LOCAL DEPRESSION SEE PUBLIC STREET IMPROVEMENT PLANS
169. REMOVE PORTIONS OF EXISTING RCB
194. CONSTRUCT BOX CULVERT WINGWALL PER LINE M SECTION A-A SHOWN ON SHEET 20
270. CONSTRUCT 12'x6' RCB PER CALTRANS STD. PLAN D80
272. CONSTRUCT DOUBLE 12'x6' RCB PER CALTRANS STD. PLAN D81
273. CONSTRUCT BOX CULVERT WARPED WINGWALL PER CALTRANS STD. PLAN D86-A
274. CONSTRUCT BOX CULVERT CONCRETE APRON AND CUT-OFF WALL PER CALTRANS STD. PLAN D86-A
275. CONSTRUCT BOX CULVERT PARAPET WALL PER DETAIL ON SHEET 22
353. REMOVE CONFLICTING PORTIONS OF EXISTING CHANNEL BOTTOM AND WALLS
365. CONSTRUCT PARAPET WALL PER LINE M JUNCTION SECTION B-B ON SHEET 20
367. DRIVEWAY TO BE CONSTRUCTED PER PUBLIC STREET IMPROVEMENT PLANS
368. CONSTRUCT 4" AC OVER 7" CAB



TYPICAL SECTION
STA. 121+80.00

AS BUILT
APPROVED BY: Maurice Murad
DATE 10/20/2009

CURVE DATA

	Δ	R	L	T
A	30°00'38"	60.00'	31.43'	16.08'

COURSE DATA

	BEARING	DISTANCE
1	N00°25'29"E	20.43'
2	N46°32'09"E	35.74'
3	N29°33'31"W	90.69'
4	N00°26'29"E	110.00'
5	N89°40'14"W	30.89'
6	N89°28'13"E	32.32'

* NOTE:
HORIZONTAL AND VERTICAL LOCATIONS TO BE VERIFIED IN THE FIELD AND ENGINEER NOTIFIED OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION.

CITY OF MORENO VALLEY
APPROVED: 6/26/06 DATE
PREM KUMAR
INTERIM CITY ENGINEER, CITY OF MORENO VALLEY
R.C.E. NO. 52463 (EXP. 12/31/2008)
REC. BY:

DIGALERT
CALL BEFORE YOU DIG — TWO WORKING DAYS BEFORE YOU DIG
TOLL FREE 1-800-227-2600
A PUBLIC SERVICE BY UNDERGROUND SERVICE ALERT

REGISTERED PROFESSIONAL ENGINEER MAURICE H. MURAD NO. 33366 EXPIRATION 6-30-2006 CIVIL STATE OF CALIFORNIA

HUITT-ZOLLARS
Huitt-Zollars, Inc. Ontario
1101 S. MILLIKEN AVENUE, SUITE G * ONTARIO, CALIFORNIA 91761 * (909) 390-8400
PREPARED UNDER THE SUPERVISION OF: MAURICE H. MURAD
R.C.E. 33366 EXPIRES 6-30-06 DATE 5/12/06

PERMANENT BENCH MARK
B.M. NO. M-61-69 ELEV. 1569.963
LOCATION:
AT THE NORTHWEST CORNER OF FREDERICK STREET AND ALESSANDRO BLVD. 175 FEET WEST OF FREDERICK STREET, 48 FEET NORTH OF ALESSANDRO BLVD. 4 FEET SOUTHWEST OF A GAS STATION LIGHT STANCHION AT THE SOUTH END AND INSIDE OF A 4 INCH HIGH CONCRETE PLANTER SET A BRASS DISK MARKED M-61-69 IN THE TOP OF A CONCRETE POST "NO MARKER POST SET"

REVISIONS

REF.	DESCRIPTION		APPR.	DATE
A	AS-BUILT / RECORD DRAWING	MH	BS	10/16/06

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

DESIGNED BY: M.H.M.
DRAWN BY: H-Z STAFF
DATE DRAWN: 4-2006
CHECKED BY: M.H.M.
RECOMMENDED FOR APPROVAL BY: Stuart E. McKelvey
DATE: 6/26/06
APPROVED BY: Stuart E. McKelvey
DATE: 6-30-2006

HEACOCK CHANNEL
DOUBLE 12'x6' RCB
STA.120+55.00 TO STA.122+85.00
LATERALS N-1, N-2, Q, R & LINE M

PROJECT NO. 4-0-00737
DRAWING NO. 4-888
SHEET NO. 14 OF 22

MAY 12, 2006 08:14 H:\PROJ\11024\NO\DWG\4-888.DWG

HEC-1 RESULTS

The Corps' HEC-1 computer program was used to determine peak discharges for the 2-, 5-, 10-, 25-, 50-, 100-, 200- and 500-year storm events. HEC-1 output files for Heacock and Cactus Channels at various concentration points for each storm event are presented in Appendix A. Summary of the peak discharge results are shown in **Table 4 - Summary of HEC-1 Model Peak Discharges**.

Table 4 - Summary of HEC-1 Model Peak Discharges

Conc. Point #	Location	DA $(mi)^2$	Discharges (ft^3/s)							
			500-YR	200-YR	100-YR	50-YR	25-YR	10-YR	5-YR	2-YR
1	Upstream of Pigeon Pass Reservoir	8.948	5476	4713	4176	3373	2802	2046	1449	690
	Downstream of Pigeon Pass Reservoir		120	117	115	111	109	104	100	90
2	Upstream of Festival Development Basin	10.311	1674	1482	1346	1167	1015	807	634	374
	Downstream of Festival Development Basin		235	218	206	185	171	150	132	107
3	Downstream of confluence for Sunnymead Ch. Stage 1 & Pigeon Pass Ch.	12.141	2120	1874	1701	1474	1283	1019	802	493
4	Heacock Ch. @ Alessandro Blvd.	13.848	3666	3232	2925	2525	2188	1727	1346	812
4 - B	Downstream of confluence for Heacock Ch. & Sunnymead MDP Line F	15.196	4607	4056	3675	3169	2729	2146	1672	1002
4 - A	Cactus Ch. Tributary to Area 4A	1.35	1299	1141	1031	887	765	600	464	274
4 - AC	Cactus Ch. just upstream of Heacock Ch. confluence tributary to Areas 4A & 4C	1.865	1687	1481	1336	1147	989	773	597	353
5	Downstream of confluence for Heacock Ch. & Cactus Ch.	17.313	6048	5316	4809	4132	3553	2788	2166	1295
6	Downstream of confluence for Heacock Ch. & MARB lateral south of Meyer Dr./JFK Dr.	17.838	6058	5321	4810	4125	3544	2776	2154	1289
7	Downstream of confluence for Heacock Ch. & MARB lateral north of Iris Avenue	19.663	6404	5609	5059	4309	3693	2885	2237	1342
8	Upstream of confluence for Heacock Ch. & MARB lateral south of Iris Avenue	19.993	6395	5599	5048	4294	3677	2872	2223	1336

APPENDIX B

HYDROLOGY CALCULATIONS

2-YEAR

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                      (RCFC&WCD)  1978 HYDROLOGY MANUAL
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                      (Rational Tabling Version 23.0)
                 Release Date: 07/01/2016  License ID 1435

                          Analysis prepared by:




 ************************** DESCRIPTION OF STUDY **************************
* TEI JOB NO 3566                                                          *
* 2 YEAR EVENT                                                             *
* EXISTING CONDITION                                                       *
 ****************************************************************************

  FILE NAME: W:\3566\EX2.DAT
  TIME/DATE OF STUDY: 15:53 11/13/2017
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  2-YEAR, 1-HOUR PRECIPITATION(INCH) =  0.455
  100-YEAR, 1-HOUR PRECIPITATION(INCH) =  1.150
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =    2.00   1-HOUR INTENSITY(INCH/HOUR) =   0.455
  SLOPE OF INTENSITY DURATION CURVE = 0.5000
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH FAIR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   840.00
  UPSTREAM ELEVATION(FEET) =   1570.10
  DOWNSTREAM ELEVATION(FEET) =   1561.00
  ELEVATION DIFFERENCE(FEET) =      9.10
  TC = 0.709*[(  840.00**3)/(     9.10)]**.2 =   25.921
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  0.692
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .3581
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      2.01
  TOTAL AREA(ACRES) =      8.10   TOTAL RUNOFF(CFS) =      2.01

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1561.00  DOWNSTREAM(FEET) =   1558.60
  CHANNEL LENGTH THRU SUBAREA(FEET) =   440.00   CHANNEL SLOPE =  0.0055
  CHANNEL FLOW THRU SUBAREA(CFS) =       2.01
  FLOW VELOCITY(FEET/SEC) =   1.27 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   5.76   Tc(MIN.) =   31.69
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =    1280.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  0.626
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .3367
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    7.70   SUBAREA RUNOFF(CFS) =    1.62
  TOTAL AREA(ACRES) =       15.8   TOTAL RUNOFF(CFS) =       3.63
  TC(MIN.) =   31.69
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       15.8  TC(MIN.) =     31.69
  PEAK FLOW RATE(CFS)   =       3.63
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                      (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2016 Advanced Engineering Software (aes)
                      (Rational Tabling Version 23.0)
                 Release Date: 07/01/2016  License ID 1435

                          Analysis prepared by:




 ************************** DESCRIPTION OF STUDY **************************
* TEI 33566                                                                *
* PROPOSED CONDITION - 2 YEAR EVENT                                        *
*                                                                          *
 ****************************************************************************

  FILE NAME: W:\3566\PR100-2.DAT
  TIME/DATE OF STUDY: 08:50 12/08/2017
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  2-YEAR, 1-HOUR PRECIPITATION(INCH) =  0.455
  100-YEAR, 1-HOUR PRECIPITATION(INCH) =  1.150
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =    2.00   1-HOUR INTENSITY(INCH/HOUR) =   0.455
  SLOPE OF INTENSITY DURATION CURVE = 0.5000
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1000.00
  UPSTREAM ELEVATION(FEET) =   1565.60
  DOWNSTREAM ELEVATION(FEET) =   1558.48
  ELEVATION DIFFERENCE(FEET) =      7.12
  TC = 0.303*[( 1000.00**3)/(     7.12)]**.2 =   12.915
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  0.981
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8535
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      5.23
  TOTAL AREA(ACRES) =      6.25   TOTAL RUNOFF(CFS) =      5.23

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1555.00  DOWNSTREAM(FEET) =  1552.00
  FLOW LENGTH(FEET) =   225.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.87
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.23
  PIPE TRAVEL TIME(MIN.) =   0.55    Tc(MIN.) =   13.46
```

```
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =    1225.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  0.961
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8531
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    0.35   SUBAREA RUNOFF(CFS) =    0.29
  TOTAL AREA(ACRES) =        6.6   TOTAL RUNOFF(CFS) =       5.52
  TC(MIN.) =   13.46

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1552.02  DOWNSTREAM(FEET) =  1551.82
  FLOW LENGTH(FEET) =    33.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.18
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.52
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =   13.57
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    103.00 =    1258.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        6.6  TC(MIN.) =     13.57
  PEAK FLOW RATE(CFS)   =       5.52
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

♀

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                      (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2016 Advanced Engineering Software (aes)
                      (Rational Tabling Version 23.0)
                 Release Date: 07/01/2016  License ID 1435

                          Analysis prepared by:




 ************************** DESCRIPTION OF STUDY **************************
* TEI 3566                                                                 *
* PROPOSED CONDITION - 2 YEAR EVENT                                        *
*                                                                          *
 ****************************************************************************

  FILE NAME: W:\3566\PR200-2.DAT
  TIME/DATE OF STUDY: 16:39 12/14/2017
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  2-YEAR, 1-HOUR PRECIPITATION(INCH) =  0.455
  100-YEAR, 1-HOUR PRECIPITATION(INCH) =  1.150
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =    2.00   1-HOUR INTENSITY(INCH/HOUR) =   0.455
  SLOPE OF INTENSITY DURATION CURVE = 0.5000
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   880.00
  UPSTREAM ELEVATION(FEET) =   1565.42
  DOWNSTREAM ELEVATION(FEET) =   1557.77
  ELEVATION DIFFERENCE(FEET) =      7.65
  TC = 0.303*[(  880.00**3)/(     7.65)]**.2 =   11.791
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.026
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8545
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      4.17
  TOTAL AREA(ACRES) =      4.75   TOTAL RUNOFF(CFS) =      4.17

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1553.77  DOWNSTREAM(FEET) =  1552.22
  FLOW LENGTH(FEET) =    86.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.18
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.17
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =   11.99
```

```
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    202.00 =     966.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        4.8  TC(MIN.) =     11.99
  PEAK FLOW RATE(CFS)   =       4.17
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

♀

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****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
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                      (Rational Tabling Version 23.0)
                 Release Date: 07/01/2016  License ID 1435

                          Analysis prepared by:




 ************************** DESCRIPTION OF STUDY **************************
* TEI 3566                                                                 *
* PROPOSED CONDITION - 2 YEAR EVENT                                        *
* NORTHERLY OFFSITE AREA                                                   *
 ****************************************************************************

  FILE NAME: W:\3566\PR300-2.DAT
  TIME/DATE OF STUDY: 08:57 12/08/2017
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  2-YEAR, 1-HOUR PRECIPITATION(INCH) =  0.455
  100-YEAR, 1-HOUR PRECIPITATION(INCH) =  1.150
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =    2.00   1-HOUR INTENSITY(INCH/HOUR) =   0.455
  SLOPE OF INTENSITY DURATION CURVE = 0.5000
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    301.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   685.00
  UPSTREAM ELEVATION(FEET) =   1570.00
  DOWNSTREAM ELEVATION(FEET) =   1563.30
  ELEVATION DIFFERENCE(FEET) =      6.70
  TC = 0.303*[(  685.00**3)/(     6.70)]**.2 =   10.418
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.092
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8559
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      3.50
  TOTAL AREA(ACRES) =      3.75   TOTAL RUNOFF(CFS) =      3.50

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    302.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1560.00  DOWNSTREAM(FEET) =  1559.00
  FLOW LENGTH(FEET) =    82.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.94
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.50
  PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =   10.65
```

```
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    302.00 =     767.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        3.8  TC(MIN.) =     10.65
  PEAK FLOW RATE(CFS)   =       3.50
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

♀

100-YEAR

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                      (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2016 Advanced Engineering Software (aes)
                      (Rational Tabling Version 23.0)
                 Release Date: 07/01/2016  License ID 1435

                           Analysis prepared by:

                         Thienes Engineering, Inc.
                            14349 Firestone Blvd
                            La Mirada, CA 90638
                                714-521-4811

 ************************** DESCRIPTION OF STUDY **************************
* TEI JOB 3566                                                             *
* EXISTING CONDITION (NODES 100-102)                                       *
* 100 YEAR STORM EVENT                                                     *
 ****************************************************************************

  FILE NAME: W:\3566\EX100.DAT
  TIME/DATE OF STUDY: 09:30 09/20/2017
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  2-YEAR, 1-HOUR PRECIPITATION(INCH) =  0.455
  100-YEAR, 1-HOUR PRECIPITATION(INCH) =  1.150
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.150
  SLOPE OF INTENSITY DURATION CURVE = 0.5000
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH FAIR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   840.00
  UPSTREAM ELEVATION(FEET) =   1570.10
  DOWNSTREAM ELEVATION(FEET) =   1561.00
  ELEVATION DIFFERENCE(FEET) =      9.10
  TC = 0.709*[(  840.00**3)/(     9.10)]**.2 =   25.921
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.750
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .5629
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      7.98
  TOTAL AREA(ACRES) =      8.10   TOTAL RUNOFF(CFS) =      7.98

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1561.00  DOWNSTREAM(FEET) =   1558.60
  CHANNEL LENGTH THRU SUBAREA(FEET) =   440.00   CHANNEL SLOPE =  0.0055
  CHANNEL FLOW THRU SUBAREA(CFS) =       7.98
  FLOW VELOCITY(FEET/SEC) =   1.74 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   4.20   Tc(MIN.) =   30.13
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =    1280.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.623
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .5469
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    7.70   SUBAREA RUNOFF(CFS) =    6.84
  TOTAL AREA(ACRES) =       15.8   TOTAL RUNOFF(CFS) =      14.81
  TC(MIN.) =   30.13
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       15.8  TC(MIN.) =     30.13
  PEAK FLOW RATE(CFS)   =      14.81
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

♀

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                      (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2016 Advanced Engineering Software (aes)
                      (Rational Tabling Version 23.0)
                 Release Date: 07/01/2016  License ID 1435

                          Analysis prepared by:




 ************************** DESCRIPTION OF STUDY **************************
* TEI JOB NO 3556                                                          *
* PROPOSED CONDITION                                                       *
* 100 YEAR STORM EVENT                                                     *
 ****************************************************************************

  FILE NAME: W:\3566\PR100.DAT
  TIME/DATE OF STUDY: 17:07 12/07/2017
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  2-YEAR, 1-HOUR PRECIPITATION(INCH) =  0.455
  100-YEAR, 1-HOUR PRECIPITATION(INCH) =  1.150
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.150
  SLOPE OF INTENSITY DURATION CURVE = 0.5000
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1000.00
  UPSTREAM ELEVATION(FEET) =   1565.60
  DOWNSTREAM ELEVATION(FEET) =   1558.48
  ELEVATION DIFFERENCE(FEET) =      7.12
  TC = 0.303*[( 1000.00**3)/(     7.12)]**.2 =   12.915
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.479
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8733
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =     13.53
  TOTAL AREA(ACRES) =      6.25   TOTAL RUNOFF(CFS) =     13.53

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1555.00  DOWNSTREAM(FEET) =  1552.00
  FLOW LENGTH(FEET) =   225.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.69
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.53
  PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =   13.35
```

```
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =    1225.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.438
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8730
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    0.35   SUBAREA RUNOFF(CFS) =    0.74
  TOTAL AREA(ACRES) =        6.6   TOTAL RUNOFF(CFS) =      14.27
  TC(MIN.) =   13.35

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1552.02  DOWNSTREAM(FEET) =  1551.82
  FLOW LENGTH(FEET) =    33.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.53
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.27
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   13.43
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    103.00 =    1258.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        6.6  TC(MIN.) =     13.43
  PEAK FLOW RATE(CFS)   =      14.27
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

♀

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                      (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2016 Advanced Engineering Software (aes)
                      (Rational Tabling Version 23.0)
                 Release Date: 07/01/2016  License ID 1435

                          Analysis prepared by:




 ************************** DESCRIPTION OF STUDY **************************
* TEI JOB NO 3566                                                          *
* PROPOSED CONDITION                                                       *
* 100 YEAR STORM EVENT                                                     *
 ***************************************************************************

  FILE NAME: W:\3566\PR200.DAT
  TIME/DATE OF STUDY: 16:39 12/14/2017
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  2-YEAR, 1-HOUR PRECIPITATION(INCH) =  0.455
  100-YEAR, 1-HOUR PRECIPITATION(INCH) =  1.150
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.150
  SLOPE OF INTENSITY DURATION CURVE = 0.5000
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   880.00
  UPSTREAM ELEVATION(FEET) =   1565.42
  DOWNSTREAM ELEVATION(FEET) =   1557.77
  ELEVATION DIFFERENCE(FEET) =      7.65
  TC = 0.303*[(  880.00**3)/(     7.65)]**.2 =   11.791
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.594
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8741
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =     10.77
  TOTAL AREA(ACRES) =      4.75   TOTAL RUNOFF(CFS) =     10.77

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1553.77  DOWNSTREAM(FEET) =  1552.22
  FLOW LENGTH(FEET) =    86.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.18
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.77
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =   11.95
```

```
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    202.00 =     966.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        4.8  TC(MIN.) =     11.95
  PEAK FLOW RATE(CFS)   =      10.77
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

♀

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
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                      (Rational Tabling Version 23.0)
                 Release Date: 07/01/2016  License ID 1435

                          Analysis prepared by:




 ************************** DESCRIPTION OF STUDY **************************
* TEI JOB NO 3566                                                          *
* OFF SITE AREA                                                            *
* 100 YEAR STORM EVENT                                                     *
 ****************************************************************************

  FILE NAME: W:\3566\PR300.DAT
  TIME/DATE OF STUDY: 17:17 12/07/2017
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  2-YEAR, 1-HOUR PRECIPITATION(INCH) =  0.455
  100-YEAR, 1-HOUR PRECIPITATION(INCH) =  1.150
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.150
  SLOPE OF INTENSITY DURATION CURVE = 0.5000
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    301.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   685.00
  UPSTREAM ELEVATION(FEET) =   1570.00
  DOWNSTREAM ELEVATION(FEET) =   1563.30
  ELEVATION DIFFERENCE(FEET) =      6.70
  TC = 0.303*[(  685.00**3)/(     6.70)]**.2 =   10.418
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.760
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8752
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      9.06
  TOTAL AREA(ACRES) =      3.75   TOTAL RUNOFF(CFS) =      9.06

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    302.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1560.00  DOWNSTREAM(FEET) =  1559.00
  FLOW LENGTH(FEET) =    82.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.59
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.06
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =   10.60
```

```
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    302.00 =     767.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        3.8  TC(MIN.) =     10.60
  PEAK FLOW RATE(CFS)   =       9.06
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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APPENDIX C

HYDRAULIC CALCULATIONS

DATE: 9/21/2017
TIME: 7:30

F0515P
WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING

CARD CODE	SECT NO	CHN TYPE	NO OF PIERS	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	30	4			2.50														
CD	24	4			2.00														
CD	18	4			1.50														

F 0 5 1 5 P

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

TEI JOB NO 3566

HEADING LINE NO 2 IS -

SD LINE A

HEADING LINE NO 3 IS -

100

F 0 5 1 5 P

WATER SURFACE PROFILE - ELEMENT CARD LISTING

```
ELEMENT NO   1 IS A SYSTEM OUTLET      *          *      *                                          W S ELEV
                   U/S DATA   STATION     INVERT   SECT                                            1558.20
                                1000.00 1551.73    30

ELEMENT NO   2 IS A REACH              *          *      *                                 RADIUS  ANGLE  ANG PT  MAN H
                   U/S DATA   STATION     INVERT   SECT          N                          0.00   0.00    0.00      0
                                1276.74 1552.86    30        0.012

ELEMENT NO   3 IS A JUNCTION           *          *      *      *                  *                  *                 *
                   U/S DATA   STATION     INVERT   SECT LAT-1 LAT-2   N      Q3       Q4    INVERT-3 INVERT-4  PHI 3   PHI 4
                                1276.74 1552.86    30    18     0  0.012     5.0      0.0  1553.36     0.00   45.00    0.00
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING
WARNING - ADJACENT SECTIONS ARE NOT IDENTICAL - SEE SECTION NUMBERS AND CHANNEL DEFINITIONS

ELEMENT NO   4 IS A REACH              *          *      *                                 RADIUS  ANGLE  ANG PT  MAN H
                   U/S DATA   STATION     INVERT   SECT          N                          0.00   0.00    0.00      0
                                1448.32 1553.72    24        0.012

ELEMENT NO   5 IS A JUNCTION           *          *      *      *                  *                  *                 *
                   U/S DATA   STATION     INVERT   SECT LAT-1 LAT-2   N      Q3       Q4    INVERT-3 INVERT-4  PHI 3   PHI 4
                                1448.32 1553.72    24    18     0  0.012     3.2      0.0  1554.22     0.00   45.00    0.00
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING

ELEMENT NO   6 IS A REACH              *          *      *                                 RADIUS  ANGLE  ANG PT  MAN H
                   U/S DATA   STATION     INVERT   SECT          N                          0.00   0.00    0.00      0
                                1612.34 1554.79    24        0.012

ELEMENT NO   7 IS A REACH              *          *      *                                 RADIUS  ANGLE  ANG PT  MAN H
                   U/S DATA   STATION     INVERT   SECT          N                         22.50  45.00    0.00      0
                                1630.01 1554.88    24        0.012

ELEMENT NO   8 IS A REACH              *          *      *                                 RADIUS  ANGLE  ANG PT  MAN H
                   U/S DATA   STATION     INVERT   SECT          N                          0.00   0.00    0.00      0
                                1653.01 1555.00    24        0.012

ELEMENT NO   9 IS A SYSTEM HEADWORKS                  *                  *                                W S ELEV
                   U/S DATA   STATION     INVERT   SECT                                               0.00
                                1653.00 1555.00    24
NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING
** WARNING NO. 2 ** - WATER SURFACE ELEVATION GIVEN IS LESS THAN OR EQUALS INVERT ELEVATION IN HDWKDS, W.S.ELEV = INV + DC
```


LICENSEE: THIENES ENGINEERING

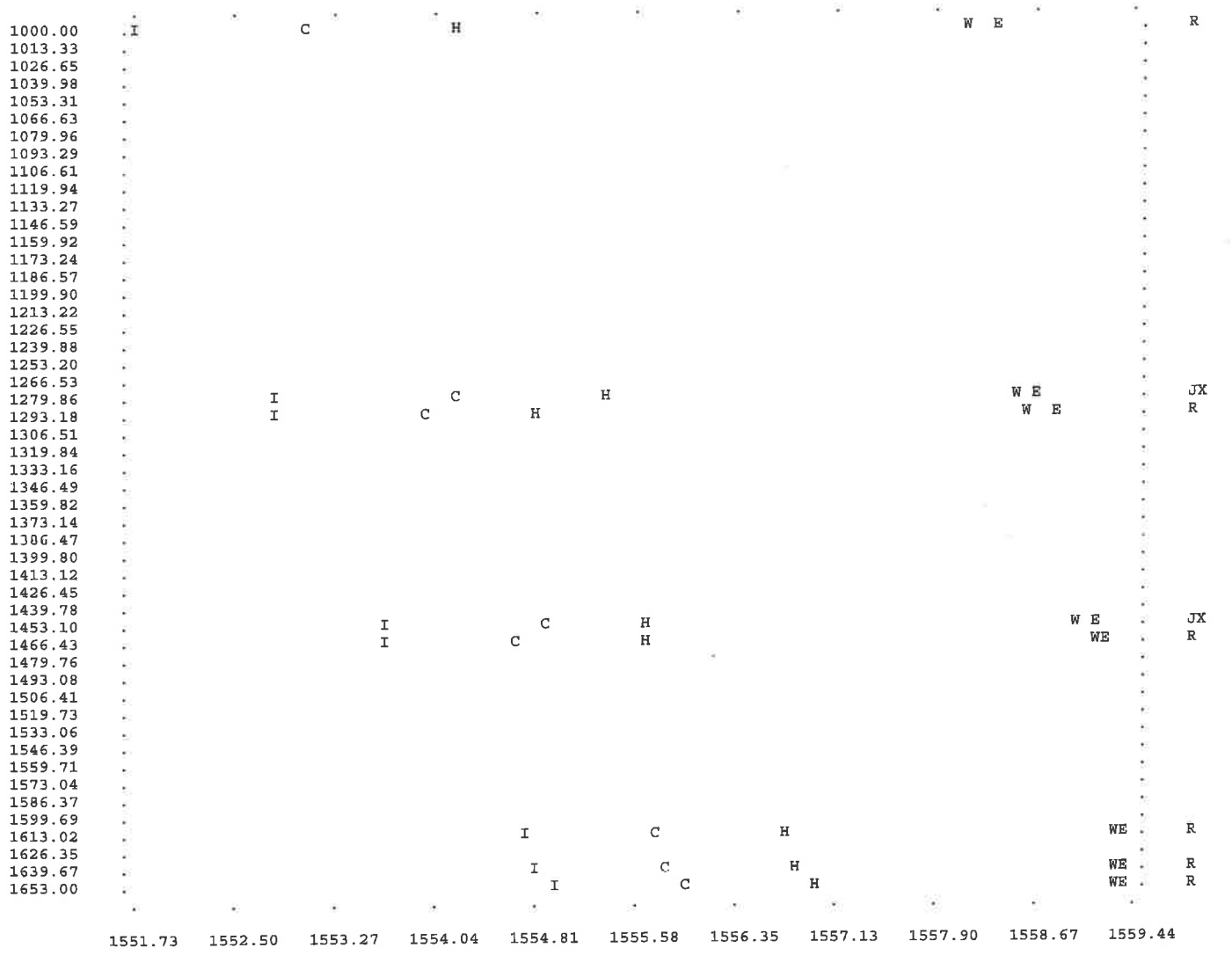
F0515P
WATER SURFACE PROFILE LISTING

TEI JOB NO 3566
SD LINE A
100

STATION / L/ELEM	INVERT ELEV / SO	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD / SF AVE	ENERGY GRD.EL. / HF	SUPER ELEV	CRITICAL DEPTH / NORM DEPTH	HGT/ DIA / ZR	BASE/ ID NO.	ZL	NO PIER	AVBPR
1000.00	1551.73	6.470	1558.200	15.8	3.22	0.161	1558.361	0.00	1.342	2.50	0.00	0.00	0	0.00
276.74	0.00408					.001264	0.35		1.331			0.00		
1276.74	1552.86	5.690	1558.550	15.8	3.22	0.161	1558.711	0.00	1.342	2.50	0.00	0.00	0	0.00
JUNCT STR	0.00000					.000927	0.00					0.00		
1276.74	1552.86	5.798	1558.658	10.8	3.44	0.183	1558.841	0.00	1.178	2.00	0.00	0.00	0	0.00
171.58	0.00501					.001942	0.33		1.140			0.00		
1448.32	1553.72	5.271	1558.991	10.8	3.44	0.183	1559.174	0.00	1.178	2.00	0.00	0.00	0	0.00

JUNCT STR	0.00000					.001452	0.00						0.00		
1448.32	1553.72	5.416	1559.136	7.6	2.42	0.091	1559.227	0.00	0.980		2.00	0.00	0.00	0	0.00
164.02	0.00652					.000962	0.16			0.860			0.00		
1612.34	1554.79	4.504	1559.294	7.6	2.42	0.091	1559.385	0.00	0.980		2.00	0.00	0.00	0	0.00
17.67	0.00509					.000962	0.02			0.920			0.00		
1630.01	1554.88	4.444	1559.324	7.6	2.42	0.091	1559.415	0.00	0.980		2.00	0.00	0.00	0	0.00
23.00	0.00522					.000962	0.02			0.913			0.00		
1653.01	1555.00	4.346	1559.346	7.6	2.42	0.091	1559.437	0.00	0.980		2.00	0.00	0.00	0	0.00
-0.01	0.00522					.003064	-0.07			0.913			0.00		
1653.00	1555.00	4.346	1559.346	7.6	2.42	0.091	1559.437	0.00	0.980		2.00	0.00	0.00	0	0.00

TEI JOB NO 3566
SD LINE A
100



N O T E S
1. GLOSSARY
   I = INVERT ELEVATION
   C = CRITICAL DEPTH
   W = WATER SURFACE ELEVATION
   H = HEIGHT OF CHANNEL
   E = ENERGY GRADE LINE
   X = CURVES CROSSING OVER
   B = BRIDGE ENTRANCE OR EXIT
   Y = WALL ENTRANCE OR EXIT
2. STATIONS FOR POINTS AT A JUMP MAY NOT BE PLOTTED EXACTLY

DATE: 12/14/2017
TIME: 14:23

F0515P
WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING PAGE 1

CARD CODE	SECT NO	CHN TYPE	NO OF PIERS	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	24	4			2.00														

F 0 5 1 5 P PAGE NO 3

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

TEI JOB NO 3566

HEADING LINE NO 2 IS -

SD LINE B

HEADING LINE NO 3 IS -

100

F 0 5 1 5 P PAGE NO 2

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * * *
U/S DATA STATION INVERT SECT W S ELEV
1000.00 1552.10 24 1557.90

ELEMENT NO 2 IS A REACH * * *
U/S DATA STATION INVERT SECT N RADIUS ANGLE ANG PT MAN H
1035.57 1552.38 24 0.012 0.00 0.00 0.00 0

ELEMENT NO 3 IS A REACH * * *
U/S DATA STATION INVERT SECT N RADIUS ANGLE ANG PT MAN H
1053.25 1552.51 24 0.012 0.00 0.00 0.00 0

ELEMENT NO 4 IS A REACH * * *
U/S DATA STATION INVERT SECT N RADIUS ANGLE ANG PT MAN H
1085.22 1552.76 24 0.012 22.50 45.00 0.00 0

ELEMENT NO 5 IS A SYSTEM HEADWORKS * *
U/S DATA STATION INVERT SECT W S ELEV
1085.22 1552.76 24 0.00

NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING
** WARNING NO. 2 ** - WATER SURFACE ELEVATION GIVEN IS LESS THAN OR EQUALS INVERT ELEVATION IN HDWKDS, W.S.ELEV = INV + DC
LICENSEE: THIENES ENGINEERING F0515P PAGE 1
WATER SURFACE PROFILE LISTING

TEI JOB NO 3566
SD LINE B
100

STATION / L/ELEM	INVERT ELEV / SO	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD / SF AVE	ENERGY GRD.EL. / HF	SUPER ELEV	CRITICAL DEPTH / NORM DEPTH	HGT/ DIA / ZR	BASE/ ID NO.	ZL	NO PIER	AVBPR
1000.00	1552.10	5.800	1557.900	11.0	3.50	0.190	1558.090	0.00	1.189	2.00	0.00	0.00	0	0.00
35.57	0.00787					.002015	0.07		1.004			0.00		
1035.57	1552.38	5.592	1557.972	11.0	3.50	0.190	1558.162	0.00	1.189	2.00	0.00	0.00	0	0.00
17.68	0.00735					.002015	0.04		1.030			0.00		
1053.25	1552.51	5.497	1558.007	11.0	3.50	0.190	1558.197	0.00	1.189	2.00	0.00	0.00	0	0.00
31.97	0.00782					.002015	0.06		1.010			0.00		
1085.22	1552.76	5.339	1558.099	11.0	3.50	0.190	1558.289	0.00	1.189	2.00	0.00	0.00	0	0.00

TEI JOB NO 3566
SD LINE B
100

```
1000.00  .I                C          H                                    W  E  .    R
1001.74  .                                                                           .
1003.48  .                                                                           .
1005.22  .                                                                           .
1006.96  .                                                                           .
1008.70  .                                                                           .
1010.44  .                                                                           .
1012.17  .                                                                           .
1013.91  .                                                                           .
1015.65  .                                                                           .
1017.39  .                                                                           .
1019.13  .                                                                           .
1020.87  .                                                                           .
1022.61  .                                                                           .
1024.35  .                                                                           .
1026.09  .                                                                           .
1027.83  .                                                                           .
```

```
1029.57   .                                                                                                  .
1031.31   .                                                                                                  .
1033.04   .                                                                                                  .
1034.78   .                                                                                                  .
1036.52   .   I                 C           H                                                   W  E   .    R
1038.26   .                                                                                                  .
1040.00   .                                                                                                  .
1041.74   .                                                                                                  .
1043.48   .                                                                                                  .
1045.22   .                                                                                                  .
1046.96   .                                                                                                  .
1048.70   .                                                                                                  .
1050.44   .                                                                                                  .
1052.18   .                                                                                                  .
1053.91   .     I                 C           H                                                   W  E   .    R
1055.65   .                                                                                                  .
1057.39   .                                                                                                  .
1059.13   .                                                                                                  .
1060.87   .                                                                                                  .
1062.61   .                                                                                                  .
1064.35   .                                                                                                  .
1066.09   .                                                                                                  .
1067.83   .                                                                                                  .
1069.57   .                                                                                                  .
1071.31   .                                                                                                  .
1073.05   .                                                                                                  .
1074.78   .                                                                                                  .
1076.52   .                                                                                                  .
1078.26   .                                                                                                  .
1080.00   .                                                                                                  .
1081.74   .                                                                                                  .
1083.48   .                                                                                                  .
1085.22   .         I                 C           H                                                   W  E   .    R
          .         .         .         .         .         .         .         .         .         .         .
          1552.10   1552.72   1553.34   1553.96   1554.58   1555.19   1555.81   1556.43   1557.05   1557.67   1558.29
```

N O T E S

1. GLOSSARY
   I = INVERT ELEVATION
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   W = WATER SURFACE ELEVATION
   H = HEIGHT OF CHANNEL
   E = ENERGY GRADE LINE
   X = CURVES CROSSING OVER
   B = BRIDGE ENTRANCE OR EXIT
   Y = WALL ENTRANCE OR EXIT
2. STATIONS FOR POINTS AT A JUMP MAY NOT BE PLOTTED EXACTLY□

DATE: 9/21/2017
TIME: 9:34

F0515P
WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING

CARD CODE	SECT NO	CHN TYPE	NO OF PIERS	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	24	4			2.00														

F 0 5 1 5 P

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

TEI JOB NO 3566

HEADING LINE NO 2 IS -

SD LINE C OFFSITE FLOW (COMMERICAL DEVELOPED FLOW RATE)

HEADING LINE NO 3 IS -

100

F 0 5 1 5 P

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	1000.00	1557.81	24	1563.00

ELEMENT NO 2 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1082.18	1558.82	24	0.012	0.00	0.00	0.00	0

ELEMENT NO 3 IS A SYSTEM HEADWORKS * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	1082.18	1558.82	24	0.00

NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING
** WARNING NO. 2 ** - WATER SURFACE ELEVATION GIVEN IS LESS THAN OR EQUALS INVERT ELEVATION IN HDWKDS, W.S.ELEV = INV + DC

LICENSEE: THIENES ENGINEERING

F0515P
WATER SURFACE PROFILE LISTING

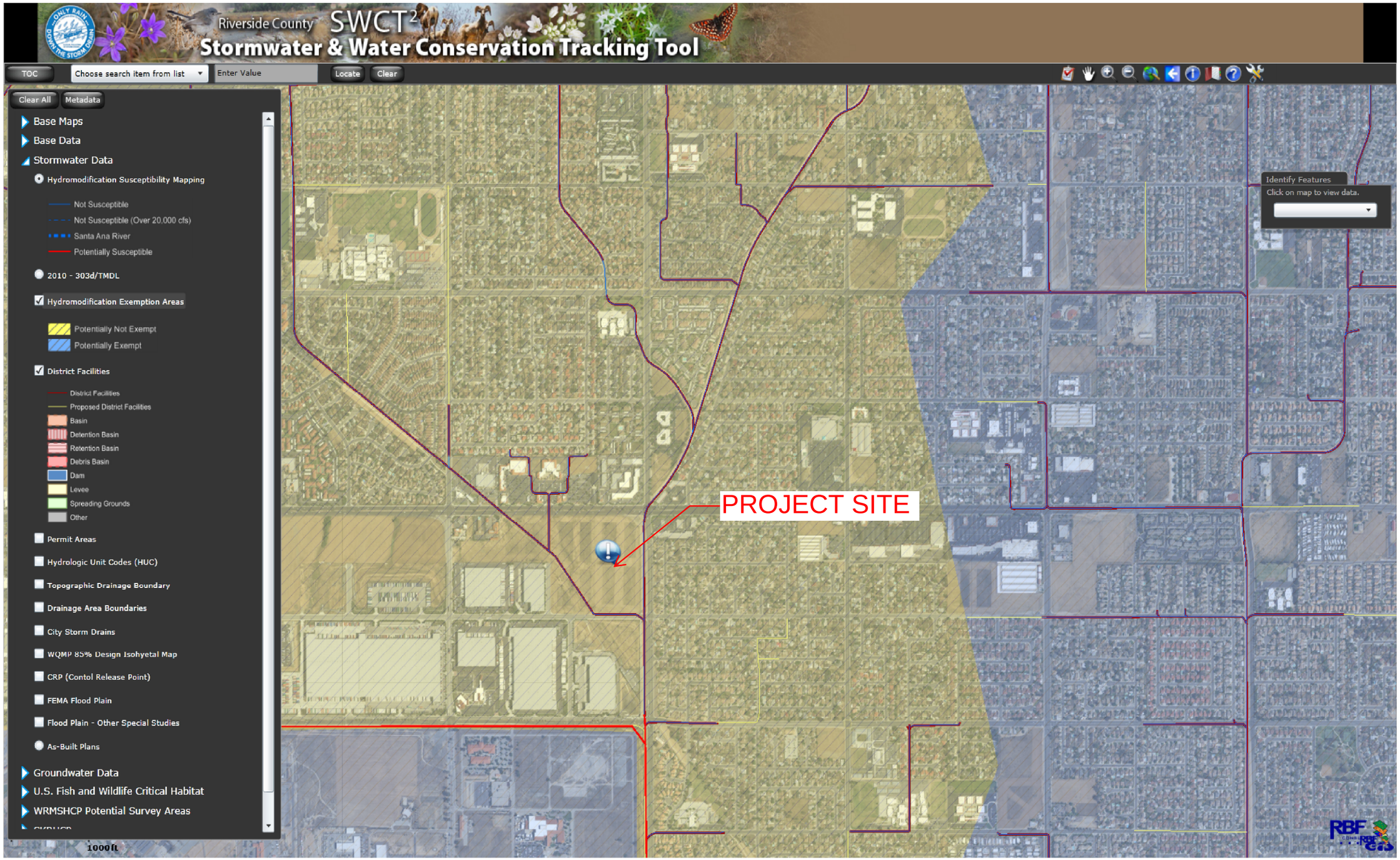
TEI JOB NO 3566
SD LINE C OFFSITE FLOW (COMMERICAL DEVELOPED FLOW RATE)
100

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH	HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF		NORM DEPTH			ZR		
1000.00	1557.81	5.190	1563.000	10.0	3.18	0.157	1563.157	0.00	1.132	2.00	0.00	0.00	0	0.00
82.18	0.01229					.001665	0.14		0.840			0.00		
1082.18	1558.82	4.317	1563.137	10.0	3.18	0.157	1563.294	0.00	1.132	2.00	0.00	0.00	0	0.00

** WARNING NO. 22 ** - NO PLOT GENERATED, BAD DATA OR NOT ENOUGH POINTS, 3 OR LESS

APPENDIX D

HCOC DETENTION CALCULATIONS


Riverside County SWCT²
Stormwater & Water Conservation Tracking Tool
TOC
Choose search item from list
Enter Value
Locate
Clear
Clear All
Metadata
Base Maps
Base Data
Stormwater Data
Hydromodification Susceptibility Mapping
Not Susceptible
Not Susceptible (Over 20,000 cfs)
Santa Ana River
Potentially Susceptible
2010 - 303d/TMDL
Hydromodification Exemption Areas
Potentially Not Exempt
Potentially Exempt
District Facilities
District Facilities
Proposed District Facilities
Basin
Detention Basin
Retention Basin
Debris Basin
Dam
Levee
Spreading Grounds
Other
Permit Areas
Hydrologic Unit Codes (HUC)
Topographic Drainage Boundary
Drainage Area Boundaries
City Storm Drains
WQMP 85% Design Isohyetal Map
CRP (Contol Release Point)
FEMA Flood Plain
Flood Plain - Other Special Studies
As-Built Plans
Groundwater Data
U.S. Fish and Wildlife Critical Habitat
WRMSHCP Potential Survey Areas
Identify Features
Click on map to view data.
PROJECT SITE
1000ft
RBF

U n i t H y d r o g r a p h A n a l y s i s

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Study date 12/13/17 File: 3566EX242.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6400

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

TEI JOB NO 3566
2 YEAR 24 HOUR EXISTING CONDITION

Drainage Area = 12.00(Ac.) = 0.019 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 12.00(Ac.) = 0.019 Sq. Mi.
Length along longest watercourse = 790.00(Ft.)
Length along longest watercourse measured to centroid = 350.00(Ft.)
Length along longest watercourse = 0.150 Mi.
Length along longest watercourse measured to centroid = 0.066 Mi.
Difference in elevation = 8.00(Ft.)
Slope along watercourse = 53.4684 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.059 Hr.
Lag time = 3.51 Min.
25% of lag time = 0.88 Min.
40% of lag time = 1.41 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.00	1.60	19.20

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.00	4.00	48.00

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 1.600(In)
Area Averaged 100-Year Rainfall = 4.000(In)

Point rain (area averaged) = 1.600(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.600(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
12.000	76.00	0.000

Total Area Entered = 12.00(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
76.0	58.2	0.488	0.000	0.488	1.000	0.488
					Sum (F) =	0.488

Area averaged mean soil loss (F) (In/Hr) = 0.488
Minimum soil loss rate ((In/Hr)) = 0.244
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	142.293	31.264	3.781
2	0.167	284.585	47.554	5.751
3	0.250	426.878	11.654	1.409
4	0.333	569.170	5.126	0.620
5	0.417	711.463	2.701	0.327
6	0.500	853.756	1.702	0.206
			Sum = 100.000	Sum= 12.094

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.013	(0.866)	0.012	0.001
2	0.17	0.07	0.013	(0.862)	0.012	0.001
3	0.25	0.07	0.013	(0.859)	0.012	0.001
4	0.33	0.10	0.019	(0.856)	0.017	0.002
5	0.42	0.10	0.019	(0.852)	0.017	0.002
6	0.50	0.10	0.019	(0.849)	0.017	0.002
7	0.58	0.10	0.019	(0.846)	0.017	0.002
8	0.67	0.10	0.019	(0.842)	0.017	0.002
9	0.75	0.10	0.019	(0.839)	0.017	0.002
10	0.83	0.13	0.026	(0.836)	0.023	0.003
11	0.92	0.13	0.026	(0.833)	0.023	0.003
12	1.00	0.13	0.026	(0.829)	0.023	0.003
13	1.08	0.10	0.019	(0.826)	0.017	0.002
14	1.17	0.10	0.019	(0.823)	0.017	0.002
15	1.25	0.10	0.019	(0.819)	0.017	0.002
16	1.33	0.10	0.019	(0.816)	0.017	0.002
17	1.42	0.10	0.019	(0.813)	0.017	0.002
18	1.50	0.10	0.019	(0.810)	0.017	0.002
19	1.58	0.10	0.019	(0.806)	0.017	0.002
20	1.67	0.10	0.019	(0.803)	0.017	0.002
21	1.75	0.10	0.019	(0.800)	0.017	0.002
22	1.83	0.13	0.026	(0.797)	0.023	0.003
23	1.92	0.13	0.026	(0.794)	0.023	0.003
24	2.00	0.13	0.026	(0.790)	0.023	0.003
25	2.08	0.13	0.026	(0.787)	0.023	0.003
26	2.17	0.13	0.026	(0.784)	0.023	0.003
27	2.25	0.13	0.026	(0.781)	0.023	0.003
28	2.33	0.13	0.026	(0.778)	0.023	0.003
29	2.42	0.13	0.026	(0.774)	0.023	0.003
30	2.50	0.13	0.026	(0.771)	0.023	0.003
31	2.58	0.17	0.032	(0.768)	0.029	0.003
32	2.67	0.17	0.032	(0.765)	0.029	0.003
33	2.75	0.17	0.032	(0.762)	0.029	0.003
34	2.83	0.17	0.032	(0.759)	0.029	0.003
35	2.92	0.17	0.032	(0.756)	0.029	0.003
36	3.00	0.17	0.032	(0.752)	0.029	0.003
37	3.08	0.17	0.032	(0.749)	0.029	0.003
38	3.17	0.17	0.032	(0.746)	0.029	0.003
39	3.25	0.17	0.032	(0.743)	0.029	0.003
40	3.33	0.17	0.032	(0.740)	0.029	0.003
41	3.42	0.17	0.032	(0.737)	0.029	0.003
42	3.50	0.17	0.032	(0.734)	0.029	0.003
43	3.58	0.17	0.032	(0.731)	0.029	0.003
44	3.67	0.17	0.032	(0.728)	0.029	0.003
45	3.75	0.17	0.032	(0.725)	0.029	0.003
46	3.83	0.20	0.038	(0.722)	0.035	0.004
47	3.92	0.20	0.038	(0.719)	0.035	0.004
48	4.00	0.20	0.038	(0.715)	0.035	0.004
49	4.08	0.20	0.038	(0.712)	0.035	0.004
50	4.17	0.20	0.038	(0.709)	0.035	0.004
51	4.25	0.20	0.038	(0.706)	0.035	0.004
52	4.33	0.23	0.045	(0.703)	0.040	0.004
53	4.42	0.23	0.045	(0.700)	0.040	0.004
54	4.50	0.23	0.045	(0.697)	0.040	0.004
55	4.58	0.23	0.045	(0.694)	0.040	0.004
56	4.67	0.23	0.045	(0.691)	0.040	0.004
57	4.75	0.23	0.045	(0.688)	0.040	0.004
58	4.83	0.27	0.051	(0.685)	0.046	0.005
59	4.92	0.27	0.051	(0.683)	0.046	0.005
60	5.00	0.27	0.051	(0.680)	0.046	0.005
61	5.08	0.20	0.038	(0.677)	0.035	0.004
62	5.17	0.20	0.038	(0.674)	0.035	0.004
63	5.25	0.20	0.038	(0.671)	0.035	0.004
64	5.33	0.23	0.045	(0.668)	0.040	0.004
65	5.42	0.23	0.045	(0.665)	0.040	0.004
66	5.50	0.23	0.045	(0.662)	0.040	0.004
67	5.58	0.27	0.051	(0.659)	0.046	0.005
68	5.67	0.27	0.051	(0.656)	0.046	0.005
69	5.75	0.27	0.051	(0.653)	0.046	0.005
70	5.83	0.27	0.051	(0.650)	0.046	0.005
71	5.92	0.27	0.051	(0.647)	0.046	0.005
72	6.00	0.27	0.051	(0.645)	0.046	0.005
73	6.08	0.30	0.058	(0.642)	0.052	0.006
74	6.17	0.30	0.058	(0.639)	0.052	0.006
75	6.25	0.30	0.058	(0.636)	0.052	0.006
76	6.33	0.30	0.058	(0.633)	0.052	0.006
77	6.42	0.30	0.058	(0.630)	0.052	0.006
78	6.50	0.30	0.058	(0.628)	0.052	0.006
79	6.58	0.33	0.064	(0.625)	0.058	0.006
80	6.67	0.33	0.064	(0.622)	0.058	0.006
81	6.75	0.33	0.064	(0.619)	0.058	0.006
82	6.83	0.33	0.064	(0.616)	0.058	0.006
83	6.92	0.33	0.064	(0.614)	0.058	0.006
84	7.00	0.33	0.064	(0.611)	0.058	0.006
85	7.08	0.33	0.064	(0.608)	0.058	0.006
86	7.17	0.33	0.064	(0.605)	0.058	0.006
87	7.25	0.33	0.064	(0.602)	0.058	0.006
88	7.33	0.37	0.070	(0.600)	0.063	0.007
89	7.42	0.37	0.070	(0.597)	0.063	0.007
90	7.50	0.37	0.070	(0.594)	0.063	0.007
91	7.58	0.40	0.077	(0.591)	0.069	0.008
92	7.67	0.40	0.077	(0.589)	0.069	0.008

93	7.75	0.40	0.077	(0.586)	0.069	0.008
94	7.83	0.43	0.083	(0.583)	0.075	0.008
95	7.92	0.43	0.083	(0.581)	0.075	0.008
96	8.00	0.43	0.083	(0.578)	0.075	0.008
97	8.08	0.50	0.096	(0.575)	0.086	0.010
98	8.17	0.50	0.096	(0.573)	0.086	0.010
99	8.25	0.50	0.096	(0.570)	0.086	0.010
100	8.33	0.50	0.096	(0.567)	0.086	0.010
101	8.42	0.50	0.096	(0.565)	0.086	0.010
102	8.50	0.50	0.096	(0.562)	0.086	0.010
103	8.58	0.53	0.102	(0.559)	0.092	0.010
104	8.67	0.53	0.102	(0.557)	0.092	0.010
105	8.75	0.53	0.102	(0.554)	0.092	0.010
106	8.83	0.57	0.109	(0.551)	0.098	0.011
107	8.92	0.57	0.109	(0.549)	0.098	0.011
108	9.00	0.57	0.109	(0.546)	0.098	0.011
109	9.08	0.63	0.122	(0.544)	0.109	0.012
110	9.17	0.63	0.122	(0.541)	0.109	0.012
111	9.25	0.63	0.122	(0.539)	0.109	0.012
112	9.33	0.67	0.128	(0.536)	0.115	0.013
113	9.42	0.67	0.128	(0.533)	0.115	0.013
114	9.50	0.67	0.128	(0.531)	0.115	0.013
115	9.58	0.70	0.134	(0.528)	0.121	0.013
116	9.67	0.70	0.134	(0.526)	0.121	0.013
117	9.75	0.70	0.134	(0.523)	0.121	0.013
118	9.83	0.73	0.141	(0.521)	0.127	0.014
119	9.92	0.73	0.141	(0.518)	0.127	0.014
120	10.00	0.73	0.141	(0.516)	0.127	0.014
121	10.08	0.50	0.096	(0.513)	0.086	0.010
122	10.17	0.50	0.096	(0.511)	0.086	0.010
123	10.25	0.50	0.096	(0.508)	0.086	0.010
124	10.33	0.50	0.096	(0.506)	0.086	0.010
125	10.42	0.50	0.096	(0.503)	0.086	0.010
126	10.50	0.50	0.096	(0.501)	0.086	0.010
127	10.58	0.67	0.128	(0.498)	0.115	0.013
128	10.67	0.67	0.128	(0.496)	0.115	0.013
129	10.75	0.67	0.128	(0.494)	0.115	0.013
130	10.83	0.67	0.128	(0.491)	0.115	0.013
131	10.92	0.67	0.128	(0.489)	0.115	0.013
132	11.00	0.67	0.128	(0.486)	0.115	0.013
133	11.08	0.63	0.122	(0.484)	0.109	0.012
134	11.17	0.63	0.122	(0.482)	0.109	0.012
135	11.25	0.63	0.122	(0.479)	0.109	0.012
136	11.33	0.63	0.122	(0.477)	0.109	0.012
137	11.42	0.63	0.122	(0.474)	0.109	0.012
138	11.50	0.63	0.122	(0.472)	0.109	0.012
139	11.58	0.57	0.109	(0.470)	0.098	0.011
140	11.67	0.57	0.109	(0.467)	0.098	0.011
141	11.75	0.57	0.109	(0.465)	0.098	0.011
142	11.83	0.60	0.115	(0.463)	0.104	0.012
143	11.92	0.60	0.115	(0.460)	0.104	0.012
144	12.00	0.60	0.115	(0.458)	0.104	0.012
145	12.08	0.83	0.160	(0.456)	0.144	0.016
146	12.17	0.83	0.160	(0.454)	0.144	0.016
147	12.25	0.83	0.160	(0.451)	0.144	0.016
148	12.33	0.87	0.166	(0.449)	0.150	0.017
149	12.42	0.87	0.166	(0.447)	0.150	0.017
150	12.50	0.87	0.166	(0.445)	0.150	0.017
151	12.58	0.93	0.179	(0.442)	0.161	0.018
152	12.67	0.93	0.179	(0.440)	0.161	0.018
153	12.75	0.93	0.179	(0.438)	0.161	0.018
154	12.83	0.97	0.186	(0.436)	0.167	0.019
155	12.92	0.97	0.186	(0.433)	0.167	0.019
156	13.00	0.97	0.186	(0.431)	0.167	0.019
157	13.08	1.13	0.218	(0.429)	0.196	0.022
158	13.17	1.13	0.218	(0.427)	0.196	0.022
159	13.25	1.13	0.218	(0.425)	0.196	0.022
160	13.33	1.13	0.218	(0.423)	0.196	0.022
161	13.42	1.13	0.218	(0.420)	0.196	0.022
162	13.50	1.13	0.218	(0.418)	0.196	0.022
163	13.58	0.77	0.147	(0.416)	0.132	0.015
164	13.67	0.77	0.147	(0.414)	0.132	0.015
165	13.75	0.77	0.147	(0.412)	0.132	0.015
166	13.83	0.77	0.147	(0.410)	0.132	0.015
167	13.92	0.77	0.147	(0.408)	0.132	0.015
168	14.00	0.77	0.147	(0.406)	0.132	0.015
169	14.08	0.90	0.173	(0.404)	0.156	0.017
170	14.17	0.90	0.173	(0.402)	0.156	0.017
171	14.25	0.90	0.173	(0.399)	0.156	0.017
172	14.33	0.87	0.166	(0.397)	0.150	0.017
173	14.42	0.87	0.166	(0.395)	0.150	0.017
174	14.50	0.87	0.166	(0.393)	0.150	0.017
175	14.58	0.87	0.166	(0.391)	0.150	0.017
176	14.67	0.87	0.166	(0.389)	0.150	0.017
177	14.75	0.87	0.166	(0.387)	0.150	0.017
178	14.83	0.83	0.160	(0.385)	0.144	0.016
179	14.92	0.83	0.160	(0.383)	0.144	0.016
180	15.00	0.83	0.160	(0.381)	0.144	0.016
181	15.08	0.80	0.154	(0.379)	0.138	0.015
182	15.17	0.80	0.154	(0.378)	0.138	0.015
183	15.25	0.80	0.154	(0.376)	0.138	0.015
184	15.33	0.77	0.147	(0.374)	0.132	0.015
185	15.42	0.77	0.147	(0.372)	0.132	0.015
186	15.50	0.77	0.147	(0.370)	0.132	0.015
187	15.58	0.63	0.122	(0.368)	0.109	0.012
188	15.67	0.63	0.122	(0.366)	0.109	0.012
189	15.75	0.63	0.122	(0.364)	0.109	0.012
190	15.83	0.63	0.122	(0.362)	0.109	0.012
191	15.92	0.63	0.122	(0.360)	0.109	0.012

192	16.00	0.63	0.122	(0.359)	0.109	0.012
193	16.08	0.13	0.026	(0.357)	0.023	0.003
194	16.17	0.13	0.026	(0.355)	0.023	0.003
195	16.25	0.13	0.026	(0.353)	0.023	0.003
196	16.33	0.13	0.026	(0.351)	0.023	0.003
197	16.42	0.13	0.026	(0.350)	0.023	0.003
198	16.50	0.13	0.026	(0.348)	0.023	0.003
199	16.58	0.10	0.019	(0.346)	0.017	0.002
200	16.67	0.10	0.019	(0.344)	0.017	0.002
201	16.75	0.10	0.019	(0.343)	0.017	0.002
202	16.83	0.10	0.019	(0.341)	0.017	0.002
203	16.92	0.10	0.019	(0.339)	0.017	0.002
204	17.00	0.10	0.019	(0.337)	0.017	0.002
205	17.08	0.17	0.032	(0.336)	0.029	0.003
206	17.17	0.17	0.032	(0.334)	0.029	0.003
207	17.25	0.17	0.032	(0.332)	0.029	0.003
208	17.33	0.17	0.032	(0.331)	0.029	0.003
209	17.42	0.17	0.032	(0.329)	0.029	0.003
210	17.50	0.17	0.032	(0.327)	0.029	0.003
211	17.58	0.17	0.032	(0.326)	0.029	0.003
212	17.67	0.17	0.032	(0.324)	0.029	0.003
213	17.75	0.17	0.032	(0.322)	0.029	0.003
214	17.83	0.13	0.026	(0.321)	0.023	0.003
215	17.92	0.13	0.026	(0.319)	0.023	0.003
216	18.00	0.13	0.026	(0.318)	0.023	0.003
217	18.08	0.13	0.026	(0.316)	0.023	0.003
218	18.17	0.13	0.026	(0.315)	0.023	0.003
219	18.25	0.13	0.026	(0.313)	0.023	0.003
220	18.33	0.13	0.026	(0.311)	0.023	0.003
221	18.42	0.13	0.026	(0.310)	0.023	0.003
222	18.50	0.13	0.026	(0.308)	0.023	0.003
223	18.58	0.10	0.019	(0.307)	0.017	0.002
224	18.67	0.10	0.019	(0.305)	0.017	0.002
225	18.75	0.10	0.019	(0.304)	0.017	0.002
226	18.83	0.07	0.013	(0.303)	0.012	0.001
227	18.92	0.07	0.013	(0.301)	0.012	0.001
228	19.00	0.07	0.013	(0.300)	0.012	0.001
229	19.08	0.10	0.019	(0.298)	0.017	0.002
230	19.17	0.10	0.019	(0.297)	0.017	0.002
231	19.25	0.10	0.019	(0.295)	0.017	0.002
232	19.33	0.13	0.026	(0.294)	0.023	0.003
233	19.42	0.13	0.026	(0.293)	0.023	0.003
234	19.50	0.13	0.026	(0.291)	0.023	0.003
235	19.58	0.10	0.019	(0.290)	0.017	0.002
236	19.67	0.10	0.019	(0.289)	0.017	0.002
237	19.75	0.10	0.019	(0.287)	0.017	0.002
238	19.83	0.07	0.013	(0.286)	0.012	0.001
239	19.92	0.07	0.013	(0.285)	0.012	0.001
240	20.00	0.07	0.013	(0.284)	0.012	0.001
241	20.08	0.10	0.019	(0.282)	0.017	0.002
242	20.17	0.10	0.019	(0.281)	0.017	0.002
243	20.25	0.10	0.019	(0.280)	0.017	0.002
244	20.33	0.10	0.019	(0.279)	0.017	0.002
245	20.42	0.10	0.019	(0.277)	0.017	0.002
246	20.50	0.10	0.019	(0.276)	0.017	0.002
247	20.58	0.10	0.019	(0.275)	0.017	0.002
248	20.67	0.10	0.019	(0.274)	0.017	0.002
249	20.75	0.10	0.019	(0.273)	0.017	0.002
250	20.83	0.07	0.013	(0.272)	0.012	0.001
251	20.92	0.07	0.013	(0.271)	0.012	0.001
252	21.00	0.07	0.013	(0.270)	0.012	0.001
253	21.08	0.10	0.019	(0.268)	0.017	0.002
254	21.17	0.10	0.019	(0.267)	0.017	0.002
255	21.25	0.10	0.019	(0.266)	0.017	0.002
256	21.33	0.07	0.013	(0.265)	0.012	0.001
257	21.42	0.07	0.013	(0.264)	0.012	0.001
258	21.50	0.07	0.013	(0.263)	0.012	0.001
259	21.58	0.10	0.019	(0.262)	0.017	0.002
260	21.67	0.10	0.019	(0.261)	0.017	0.002
261	21.75	0.10	0.019	(0.261)	0.017	0.002
262	21.83	0.07	0.013	(0.260)	0.012	0.001
263	21.92	0.07	0.013	(0.259)	0.012	0.001
264	22.00	0.07	0.013	(0.258)	0.012	0.001
265	22.08	0.10	0.019	(0.257)	0.017	0.002
266	22.17	0.10	0.019	(0.256)	0.017	0.002
267	22.25	0.10	0.019	(0.255)	0.017	0.002
268	22.33	0.07	0.013	(0.255)	0.012	0.001
269	22.42	0.07	0.013	(0.254)	0.012	0.001
270	22.50	0.07	0.013	(0.253)	0.012	0.001
271	22.58	0.07	0.013	(0.252)	0.012	0.001
272	22.67	0.07	0.013	(0.252)	0.012	0.001
273	22.75	0.07	0.013	(0.251)	0.012	0.001
274	22.83	0.07	0.013	(0.250)	0.012	0.001
275	22.92	0.07	0.013	(0.250)	0.012	0.001
276	23.00	0.07	0.013	(0.249)	0.012	0.001
277	23.08	0.07	0.013	(0.248)	0.012	0.001
278	23.17	0.07	0.013	(0.248)	0.012	0.001
279	23.25	0.07	0.013	(0.247)	0.012	0.001
280	23.33	0.07	0.013	(0.247)	0.012	0.001
281	23.42	0.07	0.013	(0.246)	0.012	0.001
282	23.50	0.07	0.013	(0.246)	0.012	0.001
283	23.58	0.07	0.013	(0.246)	0.012	0.001
284	23.67	0.07	0.013	(0.245)	0.012	0.001
285	23.75	0.07	0.013	(0.245)	0.012	0.001
286	23.83	0.07	0.013	(0.245)	0.012	0.001
287	23.92	0.07	0.013	(0.244)	0.012	0.001
288	24.00	0.07	0.013	(0.244)	0.012	0.001
		(Loss Rate Not Used)				
	Sum =	100.0			Sum =	1.9

```
Flood volume = Effective rainfall      0.16(In)
 times area      12.0(Ac.)/[(In)/(Ft.)] =       0.2(Ac.Ft)
Total soil loss =      1.44(In)
Total soil loss =     1.440(Ac.Ft)
Total rainfall =      1.60(In)
Flood volume =        6969.4 Cubic Feet
Total soil loss =       62724.9 Cubic Feet
-------------------------------------------------------------------
 Peak flow rate of this hydrograph =      0.263(CFS)
-------------------------------------------------------------------
+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                     24 - H O U R    S T O R M
                R u n o f f      H y d r o g r a p h
-------------------------------------------------------------------
            Hydrograph in   5   Minute intervals ((CFS))

-------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
-------------------------------------------------------------------
  0+ 5       0.0000      0.00  Q         |         |         |         |
  0+10       0.0001      0.01  Q         |         |         |         |
  0+15       0.0002      0.01  Q         |         |         |         |
  0+20       0.0003      0.02  Q         |         |         |         |
  0+25       0.0005      0.02  Q         |         |         |         |
  0+30       0.0006      0.02  Q         |         |         |         |
  0+35       0.0008      0.02  Q         |         |         |         |
  0+40       0.0010      0.02  Q         |         |         |         |
  0+45       0.0011      0.02  Q         |         |         |         |
  0+50       0.0013      0.03  Q         |         |         |         |
  0+55       0.0015      0.03  Q         |         |         |         |
  1+ 0       0.0017      0.03  Q         |         |         |         |
  1+ 5       0.0019      0.03  Q         |         |         |         |
  1+10       0.0021      0.02  Q         |         |         |         |
  1+15       0.0022      0.02  Q         |         |         |         |
  1+20       0.0024      0.02  Q         |         |         |         |
  1+25       0.0026      0.02  Q         |         |         |         |
  1+30       0.0027      0.02  Q         |         |         |         |
  1+35       0.0029      0.02  Q         |         |         |         |
  1+40       0.0030      0.02  Q         |         |         |         |
  1+45       0.0032      0.02  Q         |         |         |         |
  1+50       0.0034      0.03  Q         |         |         |         |
  1+55       0.0036      0.03  Q         |         |         |         |
  2+ 0       0.0038      0.03  Q         |         |         |         |
  2+ 5       0.0040      0.03  Q         |         |         |         |
  2+10       0.0042      0.03  QV        |         |         |         |
  2+15       0.0044      0.03  QV        |         |         |         |
  2+20       0.0046      0.03  QV        |         |         |         |
  2+25       0.0048      0.03  QV        |         |         |         |
  2+30       0.0051      0.03  QV        |         |         |         |
  2+35       0.0053      0.03  QV        |         |         |         |
  2+40       0.0055      0.04  QV        |         |         |         |
  2+45       0.0058      0.04  QV        |         |         |         |
  2+50       0.0061      0.04  QV        |         |         |         |
  2+55       0.0063      0.04  QV        |         |         |         |
  3+ 0       0.0066      0.04  QV        |         |         |         |
  3+ 5       0.0069      0.04  QV        |         |         |         |
  3+10       0.0071      0.04  QV        |         |         |         |
  3+15       0.0074      0.04  QV        |         |         |         |
  3+20       0.0077      0.04  QV        |         |         |         |
  3+25       0.0079      0.04  QV        |         |         |         |
  3+30       0.0082      0.04  Q V       |         |         |         |
  3+35       0.0085      0.04  Q V       |         |         |         |
  3+40       0.0087      0.04  Q V       |         |         |         |
  3+45       0.0090      0.04  Q V       |         |         |         |
  3+50       0.0093      0.04  Q V       |         |         |         |
  3+55       0.0096      0.04  Q V       |         |         |         |
  4+ 0       0.0099      0.05  Q V       |         |         |         |
  4+ 5       0.0102      0.05  Q V       |         |         |         |
  4+10       0.0105      0.05  Q V       |         |         |         |
  4+15       0.0109      0.05  Q V       |         |         |         |
  4+20       0.0112      0.05  Q V       |         |         |         |
  4+25       0.0116      0.05  Q V       |         |         |         |
  4+30       0.0119      0.05  Q V       |         |         |         |
  4+35       0.0123      0.05  Q  V      |         |         |         |
  4+40       0.0127      0.05  Q  V      |         |         |         |
  4+45       0.0130      0.05  Q  V      |         |         |         |
  4+50       0.0134      0.06  Q  V      |         |         |         |
  4+55       0.0139      0.06  Q  V      |         |         |         |
  5+ 0       0.0143      0.06  Q  V      |         |         |         |
  5+ 5       0.0147      0.06  Q  V      |         |         |         |
  5+10       0.0150      0.05  Q  V      |         |         |         |
  5+15       0.0153      0.05  Q  V      |         |         |         |
  5+20       0.0157      0.05  Q  V      |         |         |         |
  5+25       0.0160      0.05  Q   V     |         |         |         |
  5+30       0.0164      0.05  Q   V     |         |         |         |
  5+35       0.0168      0.06  Q   V     |         |         |         |
  5+40       0.0172      0.06  Q   V     |         |         |         |
  5+45       0.0176      0.06  Q   V     |         |         |         |
  5+50       0.0181      0.06  Q   V     |         |         |         |
  5+55       0.0185      0.06  Q   V     |         |         |         |
  6+ 0       0.0189      0.06  Q   V     |         |         |         |
  6+ 5       0.0194      0.06  Q   V     |         |         |         |
  6+10       0.0198      0.07  Q   V     |         |         |         |
  6+15       0.0203      0.07  Q    V    |         |         |         |
  6+20       0.0208      0.07  Q    V    |         |         |         |
  6+25       0.0213      0.07  Q    V    |         |         |         |
  6+30       0.0217      0.07  Q    V    |         |         |         |
  6+35       0.0222      0.07  Q    V    |         |         |         |
  6+40       0.0228      0.08  Q    V    |         |         |         |
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 6+45       0.0233      0.08  Q    V    |         |         |         |
 6+50       0.0238      0.08  Q    V    |         |         |         |
 6+55       0.0243      0.08  Q     V   |         |         |         |
 7+ 0       0.0249      0.08  Q     V   |         |         |         |
 7+ 5       0.0254      0.08  Q     V   |         |         |         |
 7+10       0.0259      0.08  Q     V   |         |         |         |
 7+15       0.0265      0.08  Q     V   |         |         |         |
 7+20       0.0270      0.08  Q     V   |         |         |         |
 7+25       0.0276      0.08  Q     V   |         |         |         |
 7+30       0.0282      0.08  Q      V  |         |         |         |
 7+35       0.0288      0.09  Q      V  |         |         |         |
 7+40       0.0294      0.09  Q      V  |         |         |         |
 7+45       0.0300      0.09  Q      V  |         |         |         |
 7+50       0.0307      0.10  Q      V  |         |         |         |
 7+55       0.0314      0.10  Q      V  |         |         |         |
 8+ 0       0.0321      0.10  Q       V |         |         |         |
 8+ 5       0.0328      0.11  Q       V |         |         |         |
 8+10       0.0336      0.11  Q       V |         |         |         |
 8+15       0.0344      0.11  Q       V |         |         |         |
 8+20       0.0352      0.12  Q       V |         |         |         |
 8+25       0.0360      0.12  Q       V |         |         |         |
 8+30       0.0368      0.12  Q        V|         |         |         |
 8+35       0.0376      0.12  Q        V|         |         |         |
 8+40       0.0384      0.12  Q        V|         |         |         |
 8+45       0.0393      0.12  Q        V|         |         |         |
 8+50       0.0401      0.13  Q         V         |         |         |
 8+55       0.0410      0.13  Q         V         |         |         |
 9+ 0       0.0419      0.13  Q         V         |         |         |
 9+ 5       0.0429      0.14  Q         V         |         |         |
 9+10       0.0439      0.14  Q         V         |         |         |
 9+15       0.0449      0.15  Q         |V        |         |         |
 9+20       0.0459      0.15  Q         |V        |         |         |
 9+25       0.0469      0.15  Q         |V        |         |         |
 9+30       0.0480      0.15  Q         |V        |         |         |
 9+35       0.0491      0.16  Q         | V       |         |         |
 9+40       0.0502      0.16  Q         | V       |         |         |
 9+45       0.0513      0.16  Q         | V       |         |         |
 9+50       0.0524      0.16  Q         |  V      |         |         |
 9+55       0.0536      0.17  Q         |  V      |         |         |
10+ 0       0.0548      0.17  Q         |  V      |         |         |
10+ 5       0.0558      0.15  Q         |  V      |         |         |
10+10       0.0567      0.13  Q         |   V     |         |         |
10+15       0.0575      0.12  Q         |   V     |         |         |
10+20       0.0583      0.12  Q         |   V     |         |         |
10+25       0.0592      0.12  Q         |   V     |         |         |
10+30       0.0600      0.12  Q         |   V     |         |         |
10+35       0.0608      0.13  Q         |    V    |         |         |
10+40       0.0618      0.15  Q         |    V    |         |         |
10+45       0.0629      0.15  Q         |    V    |         |         |
10+50       0.0639      0.15  Q         |    V    |         |         |
10+55       0.0650      0.15  Q         |     V   |         |         |
11+ 0       0.0661      0.15  Q         |     V   |         |         |
11+ 5       0.0671      0.15  Q         |     V   |         |         |
11+10       0.0681      0.15  Q         |      V  |         |         |
11+15       0.0692      0.15  Q         |      V  |         |         |
11+20       0.0702      0.15  Q         |      V  |         |         |
11+25       0.0712      0.15  Q         |      V  |         |         |
11+30       0.0722      0.15  Q         |       V |         |         |
11+35       0.0732      0.14  Q         |       V |         |         |
11+40       0.0741      0.13  Q         |       V |         |         |
11+45       0.0750      0.13  Q         |       V |         |         |
11+50       0.0760      0.13  Q         |       V |         |         |
11+55       0.0769      0.14  Q         |        V|         |         |
12+ 0       0.0779      0.14  Q         |        V|         |         |
12+ 5       0.0789      0.16  Q         |        V|         |         |
12+10       0.0802      0.18  Q         |         V         |         |
12+15       0.0815      0.19  Q         |         V         |         |
12+20       0.0828      0.19  Q         |         V         |         |
12+25       0.0842      0.20  Q         |         |V        |         |
12+30       0.0856      0.20  Q         |         |V        |         |
12+35       0.0870      0.21  Q         |         |V        |         |
12+40       0.0885      0.21  Q         |         | V       |         |
12+45       0.0899      0.22  Q         |         | V       |         |
12+50       0.0915      0.22  Q         |         | V       |         |
12+55       0.0930      0.22  Q         |         |  V      |         |
13+ 0       0.0945      0.22  Q         |         |  V      |         |
13+ 5       0.0962      0.24  Q         |         |   V     |         |
13+10       0.0979      0.25  |Q        |         |   V     |         |
13+15       0.0997      0.26  |Q        |         |   V     |         |
13+20       0.1015      0.26  |Q        |         |    V    |         |
13+25       0.1033      0.26  |Q        |         |    V    |         |
13+30       0.1051      0.26  |Q        |         |     V   |         |
13+35       0.1068      0.24  Q         |         |     V   |         |
13+40       0.1081      0.20  Q         |         |      V  |         |
13+45       0.1094      0.19  Q         |         |      V  |         |
13+50       0.1106      0.18  Q         |         |      V  |         |
13+55       0.1119      0.18  Q         |         |      V  |         |
14+ 0       0.1131      0.18  Q         |         |       V |         |
14+ 5       0.1144      0.19  Q         |         |       V |         |
14+10       0.1158      0.20  Q         |         |       V |         |
14+15       0.1172      0.21  Q         |         |        V|         |
14+20       0.1186      0.21  Q         |         |        V|         |
14+25       0.1200      0.20  Q         |         |         V         |
14+30       0.1214      0.20  Q         |         |         V         |
14+35       0.1228      0.20  Q         |         |         V         |
14+40       0.1242      0.20  Q         |         |         |V        |
14+45       0.1256      0.20  Q         |         |         |V        |
14+50       0.1269      0.20  Q         |         |         |V        |
14+55       0.1283      0.20  Q         |         |         | V       |
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15+ 0       0.1296      0.19  Q         |         |         | V       |
15+ 5       0.1309      0.19  Q         |         |         | V       |
15+10       0.1322      0.19  Q         |         |         |  V      |
15+15       0.1335      0.19  Q         |         |         |  V      |
15+20       0.1348      0.18  Q         |         |         |  V      |
15+25       0.1360      0.18  Q         |         |         |   V     |
15+30       0.1373      0.18  Q         |         |         |   V     |
15+35       0.1384      0.17  Q         |         |         |   V     |
15+40       0.1395      0.15  Q         |         |         |   V     |
15+45       0.1405      0.15  Q         |         |         |    V    |
15+50       0.1415      0.15  Q         |         |         |    V    |
15+55       0.1426      0.15  Q         |         |         |    V    |
16+ 0       0.1436      0.15  Q         |         |         |    V    |
16+ 5       0.1443      0.11  Q         |         |         |     V   |
16+10       0.1447      0.06  Q         |         |         |     V   |
16+15       0.1450      0.04  Q         |         |         |     V   |
16+20       0.1453      0.04  Q         |         |         |     V   |
16+25       0.1455      0.03  Q         |         |         |     V   |
16+30       0.1457      0.03  Q         |         |         |     V   |
16+35       0.1459      0.03  Q         |         |         |     V   |
16+40       0.1461      0.02  Q         |         |         |     V   |
16+45       0.1462      0.02  Q         |         |         |     V   |
16+50       0.1464      0.02  Q         |         |         |     V   |
16+55       0.1465      0.02  Q         |         |         |     V   |
17+ 0       0.1467      0.02  Q         |         |         |     V   |
17+ 5       0.1469      0.03  Q         |         |         |     V   |
17+10       0.1471      0.04  Q         |         |         |     V   |
17+15       0.1474      0.04  Q         |         |         |     V   |
17+20       0.1477      0.04  Q         |         |         |     V   |
17+25       0.1479      0.04  Q         |         |         |     V   |
17+30       0.1482      0.04  Q         |         |         |      V  |
17+35       0.1485      0.04  Q         |         |         |      V  |
17+40       0.1487      0.04  Q         |         |         |      V  |
17+45       0.1490      0.04  Q         |         |         |      V  |
17+50       0.1492      0.04  Q         |         |         |      V  |
17+55       0.1495      0.03  Q         |         |         |      V  |
18+ 0       0.1497      0.03  Q         |         |         |      V  |
18+ 5       0.1499      0.03  Q         |         |         |      V  |
18+10       0.1501      0.03  Q         |         |         |      V  |
18+15       0.1503      0.03  Q         |         |         |      V  |
18+20       0.1505      0.03  Q         |         |         |      V  |
18+25       0.1508      0.03  Q         |         |         |      V  |
18+30       0.1510      0.03  Q         |         |         |      V  |
18+35       0.1512      0.03  Q         |         |         |      V  |
18+40       0.1513      0.02  Q         |         |         |      V  |
18+45       0.1515      0.02  Q         |         |         |      V  |
18+50       0.1516      0.02  Q         |         |         |      V  |
18+55       0.1518      0.02  Q         |         |         |      V  |
19+ 0       0.1519      0.02  Q         |         |         |      V  |
19+ 5       0.1520      0.02  Q         |         |         |       V |
19+10       0.1522      0.02  Q         |         |         |       V |
19+15       0.1523      0.02  Q         |         |         |       V |
19+20       0.1525      0.03  Q         |         |         |       V |
19+25       0.1527      0.03  Q         |         |         |       V |
19+30       0.1529      0.03  Q         |         |         |       V |
19+35       0.1531      0.03  Q         |         |         |       V |
19+40       0.1533      0.02  Q         |         |         |       V |
19+45       0.1534      0.02  Q         |         |         |       V |
19+50       0.1536      0.02  Q         |         |         |       V |
19+55       0.1537      0.02  Q         |         |         |       V |
20+ 0       0.1538      0.02  Q         |         |         |       V |
20+ 5       0.1539      0.02  Q         |         |         |       V |
20+10       0.1541      0.02  Q         |         |         |       V |
20+15       0.1542      0.02  Q         |         |         |       V |
20+20       0.1544      0.02  Q         |         |         |       V |
20+25       0.1545      0.02  Q         |         |         |       V |
20+30       0.1547      0.02  Q         |         |         |       V |
20+35       0.1549      0.02  Q         |         |         |       V |
20+40       0.1550      0.02  Q         |         |         |       V |
20+45       0.1552      0.02  Q         |         |         |       V |
20+50       0.1553      0.02  Q         |         |         |       V |
20+55       0.1554      0.02  Q         |         |         |       V |
21+ 0       0.1556      0.02  Q         |         |         |       V |
21+ 5       0.1557      0.02  Q         |         |         |       V |
21+10       0.1558      0.02  Q         |         |         |       V |
21+15       0.1560      0.02  Q         |         |         |       V |
21+20       0.1561      0.02  Q         |         |         |        V|
21+25       0.1562      0.02  Q         |         |         |        V|
21+30       0.1564      0.02  Q         |         |         |        V|
21+35       0.1565      0.02  Q         |         |         |        V|
21+40       0.1566      0.02  Q         |         |         |        V|
21+45       0.1568      0.02  Q         |         |         |        V|
21+50       0.1569      0.02  Q         |         |         |        V|
21+55       0.1570      0.02  Q         |         |         |        V|
22+ 0       0.1572      0.02  Q         |         |         |        V|
22+ 5       0.1573      0.02  Q         |         |         |        V|
22+10       0.1574      0.02  Q         |         |         |        V|
22+15       0.1576      0.02  Q         |         |         |        V|
22+20       0.1577      0.02  Q         |         |         |        V|
22+25       0.1578      0.02  Q         |         |         |        V|
22+30       0.1580      0.02  Q         |         |         |        V|
22+35       0.1581      0.02  Q         |         |         |        V|
22+40       0.1582      0.02  Q         |         |         |        V|
22+45       0.1583      0.02  Q         |         |         |        V|
22+50       0.1584      0.02  Q         |         |         |        V|
22+55       0.1585      0.02  Q         |         |         |        V|
23+ 0       0.1586      0.02  Q         |         |         |        V|
23+ 5       0.1587      0.02  Q         |         |         |        V|
23+10       0.1588      0.02  Q         |         |         |        V|
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   23+15       0.1589      0.02  Q         |         |         |        V|
   23+20       0.1590      0.02  Q         |         |         |        V|
   23+25       0.1591      0.02  Q         |         |         |        V|
   23+30       0.1592      0.02  Q         |         |         |        V|
   23+35       0.1594      0.02  Q         |         |         |        V|
   23+40       0.1595      0.02  Q         |         |         |        V|
   23+45       0.1596      0.02  Q         |         |         |        V|
   23+50       0.1597      0.02  Q         |         |         |        V|
   23+55       0.1598      0.02  Q         |         |         |        V|
   24+ 0       0.1599      0.02  Q         |         |         |        V|
   24+ 5       0.1600      0.01  Q         |         |         |        V|
   24+10       0.1600      0.00  Q         |         |         |        V|
   24+15       0.1600      0.00  Q         |         |         |        V|
   24+20       0.1600      0.00  Q         |         |         |        V|
   24+25       0.1600      0.00  Q         |         |         |         V
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U n i t H y d r o g r a p h A n a l y s i s

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Study date 12/13/17 File: 3566PR242.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6400

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

JOB NO. 3566
2-YEAR 24-HOUR PROPOSED CONDITION HYDROGRAPH

Drainage Area = 12.00(Ac.) = 0.019 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 12.00(Ac.) = 0.019 Sq. Mi.
Length along longest watercourse = 1133.00(Ft.)
Length along longest watercourse measured to centroid = 500.00(Ft.)
Length along longest watercourse = 0.215 Mi.
Length along longest watercourse measured to centroid = 0.095 Mi.
Difference in elevation = 3.00(Ft.)
Slope along watercourse = 13.9806 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.050 Hr.
Lag time = 2.98 Min.
25% of lag time = 0.74 Min.
40% of lag time = 1.19 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.00	1.60	19.20

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.00	4.00	48.00

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 1.600(In)
Area Averaged 100-Year Rainfall = 4.000(In)

Point rain (area averaged) = 1.600(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.600(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
12.000	56.00	0.900

Total Area Entered = 12.00(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
56.0	36.0	0.706	0.900	0.134	1.000	0.134
					Sum (F) =	0.134

Area averaged mean soil loss (F) (In/Hr) = 0.134
Minimum soil loss rate ((In/Hr)) = 0.067
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	167.939	37.252	4.505
2	0.167	335.878	45.670	5.523
3	0.250	503.817	10.239	1.238
4	0.333	671.756	4.327	0.523
5	0.417	839.696	2.512	0.304
			Sum = 100.000	Sum= 12.094

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.013	(0.238)	0.002	0.010
2	0.17	0.07	0.013	(0.237)	0.002	0.010
3	0.25	0.07	0.013	(0.236)	0.002	0.010
4	0.33	0.10	0.019	(0.235)	0.003	0.016
5	0.42	0.10	0.019	(0.234)	0.003	0.016
6	0.50	0.10	0.019	(0.233)	0.003	0.016
7	0.58	0.10	0.019	(0.232)	0.003	0.016
8	0.67	0.10	0.019	(0.231)	0.003	0.016
9	0.75	0.10	0.019	(0.230)	0.003	0.016
10	0.83	0.13	0.026	(0.230)	0.005	0.021
11	0.92	0.13	0.026	(0.229)	0.005	0.021
12	1.00	0.13	0.026	(0.228)	0.005	0.021
13	1.08	0.10	0.019	(0.227)	0.003	0.016
14	1.17	0.10	0.019	(0.226)	0.003	0.016
15	1.25	0.10	0.019	(0.225)	0.003	0.016
16	1.33	0.10	0.019	(0.224)	0.003	0.016
17	1.42	0.10	0.019	(0.223)	0.003	0.016
18	1.50	0.10	0.019	(0.222)	0.003	0.016
19	1.58	0.10	0.019	(0.222)	0.003	0.016
20	1.67	0.10	0.019	(0.221)	0.003	0.016
21	1.75	0.10	0.019	(0.220)	0.003	0.016
22	1.83	0.13	0.026	(0.219)	0.005	0.021
23	1.92	0.13	0.026	(0.218)	0.005	0.021
24	2.00	0.13	0.026	(0.217)	0.005	0.021
25	2.08	0.13	0.026	(0.216)	0.005	0.021
26	2.17	0.13	0.026	(0.215)	0.005	0.021
27	2.25	0.13	0.026	(0.214)	0.005	0.021
28	2.33	0.13	0.026	(0.214)	0.005	0.021
29	2.42	0.13	0.026	(0.213)	0.005	0.021
30	2.50	0.13	0.026	(0.212)	0.005	0.021
31	2.58	0.17	0.032	(0.211)	0.006	0.026
32	2.67	0.17	0.032	(0.210)	0.006	0.026
33	2.75	0.17	0.032	(0.209)	0.006	0.026
34	2.83	0.17	0.032	(0.208)	0.006	0.026
35	2.92	0.17	0.032	(0.208)	0.006	0.026
36	3.00	0.17	0.032	(0.207)	0.006	0.026
37	3.08	0.17	0.032	(0.206)	0.006	0.026
38	3.17	0.17	0.032	(0.205)	0.006	0.026
39	3.25	0.17	0.032	(0.204)	0.006	0.026
40	3.33	0.17	0.032	(0.203)	0.006	0.026
41	3.42	0.17	0.032	(0.202)	0.006	0.026
42	3.50	0.17	0.032	(0.202)	0.006	0.026
43	3.58	0.17	0.032	(0.201)	0.006	0.026
44	3.67	0.17	0.032	(0.200)	0.006	0.026
45	3.75	0.17	0.032	(0.199)	0.006	0.026
46	3.83	0.20	0.038	(0.198)	0.007	0.031
47	3.92	0.20	0.038	(0.197)	0.007	0.031
48	4.00	0.20	0.038	(0.197)	0.007	0.031
49	4.08	0.20	0.038	(0.196)	0.007	0.031
50	4.17	0.20	0.038	(0.195)	0.007	0.031
51	4.25	0.20	0.038	(0.194)	0.007	0.031
52	4.33	0.23	0.045	(0.193)	0.008	0.037
53	4.42	0.23	0.045	(0.192)	0.008	0.037
54	4.50	0.23	0.045	(0.192)	0.008	0.037
55	4.58	0.23	0.045	(0.191)	0.008	0.037
56	4.67	0.23	0.045	(0.190)	0.008	0.037
57	4.75	0.23	0.045	(0.189)	0.008	0.037
58	4.83	0.27	0.051	(0.188)	0.009	0.042
59	4.92	0.27	0.051	(0.187)	0.009	0.042
60	5.00	0.27	0.051	(0.187)	0.009	0.042
61	5.08	0.20	0.038	(0.186)	0.007	0.031
62	5.17	0.20	0.038	(0.185)	0.007	0.031
63	5.25	0.20	0.038	(0.184)	0.007	0.031
64	5.33	0.23	0.045	(0.183)	0.008	0.037
65	5.42	0.23	0.045	(0.183)	0.008	0.037
66	5.50	0.23	0.045	(0.182)	0.008	0.037
67	5.58	0.27	0.051	(0.181)	0.009	0.042
68	5.67	0.27	0.051	(0.180)	0.009	0.042
69	5.75	0.27	0.051	(0.179)	0.009	0.042
70	5.83	0.27	0.051	(0.179)	0.009	0.042
71	5.92	0.27	0.051	(0.178)	0.009	0.042
72	6.00	0.27	0.051	(0.177)	0.009	0.042
73	6.08	0.30	0.058	(0.176)	0.010	0.047
74	6.17	0.30	0.058	(0.175)	0.010	0.047
75	6.25	0.30	0.058	(0.175)	0.010	0.047
76	6.33	0.30	0.058	(0.174)	0.010	0.047
77	6.42	0.30	0.058	(0.173)	0.010	0.047
78	6.50	0.30	0.058	(0.172)	0.010	0.047
79	6.58	0.33	0.064	(0.172)	0.012	0.052
80	6.67	0.33	0.064	(0.171)	0.012	0.052
81	6.75	0.33	0.064	(0.170)	0.012	0.052
82	6.83	0.33	0.064	(0.169)	0.012	0.052
83	6.92	0.33	0.064	(0.169)	0.012	0.052
84	7.00	0.33	0.064	(0.168)	0.012	0.052
85	7.08	0.33	0.064	(0.167)	0.012	0.052
86	7.17	0.33	0.064	(0.166)	0.012	0.052
87	7.25	0.33	0.064	(0.165)	0.012	0.052
88	7.33	0.37	0.070	(0.165)	0.013	0.058
89	7.42	0.37	0.070	(0.164)	0.013	0.058
90	7.50	0.37	0.070	(0.163)	0.013	0.058
91	7.58	0.40	0.077	(0.162)	0.014	0.063
92	7.67	0.40	0.077	(0.162)	0.014	0.063
93	7.75	0.40	0.077	(0.161)	0.014	0.063

94	7.83	0.43	0.083	(0.160)	0.015	0.068
95	7.92	0.43	0.083	(0.159)	0.015	0.068
96	8.00	0.43	0.083	(0.159)	0.015	0.068
97	8.08	0.50	0.096	(0.158)	0.017	0.079
98	8.17	0.50	0.096	(0.157)	0.017	0.079
99	8.25	0.50	0.096	(0.157)	0.017	0.079
100	8.33	0.50	0.096	(0.156)	0.017	0.079
101	8.42	0.50	0.096	(0.155)	0.017	0.079
102	8.50	0.50	0.096	(0.154)	0.017	0.079
103	8.58	0.53	0.102	(0.154)	0.018	0.084
104	8.67	0.53	0.102	(0.153)	0.018	0.084
105	8.75	0.53	0.102	(0.152)	0.018	0.084
106	8.83	0.57	0.109	(0.151)	0.020	0.089
107	8.92	0.57	0.109	(0.151)	0.020	0.089
108	9.00	0.57	0.109	(0.150)	0.020	0.089
109	9.08	0.63	0.122	(0.149)	0.022	0.100
110	9.17	0.63	0.122	(0.149)	0.022	0.100
111	9.25	0.63	0.122	(0.148)	0.022	0.100
112	9.33	0.67	0.128	(0.147)	0.023	0.105
113	9.42	0.67	0.128	(0.147)	0.023	0.105
114	9.50	0.67	0.128	(0.146)	0.023	0.105
115	9.58	0.70	0.134	(0.145)	0.024	0.110
116	9.67	0.70	0.134	(0.144)	0.024	0.110
117	9.75	0.70	0.134	(0.144)	0.024	0.110
118	9.83	0.73	0.141	(0.143)	0.025	0.115
119	9.92	0.73	0.141	(0.142)	0.025	0.115
120	10.00	0.73	0.141	(0.142)	0.025	0.115
121	10.08	0.50	0.096	(0.141)	0.017	0.079
122	10.17	0.50	0.096	(0.140)	0.017	0.079
123	10.25	0.50	0.096	(0.140)	0.017	0.079
124	10.33	0.50	0.096	(0.139)	0.017	0.079
125	10.42	0.50	0.096	(0.138)	0.017	0.079
126	10.50	0.50	0.096	(0.138)	0.017	0.079
127	10.58	0.67	0.128	(0.137)	0.023	0.105
128	10.67	0.67	0.128	(0.136)	0.023	0.105
129	10.75	0.67	0.128	(0.136)	0.023	0.105
130	10.83	0.67	0.128	(0.135)	0.023	0.105
131	10.92	0.67	0.128	(0.134)	0.023	0.105
132	11.00	0.67	0.128	(0.134)	0.023	0.105
133	11.08	0.63	0.122	(0.133)	0.022	0.100
134	11.17	0.63	0.122	(0.132)	0.022	0.100
135	11.25	0.63	0.122	(0.132)	0.022	0.100
136	11.33	0.63	0.122	(0.131)	0.022	0.100
137	11.42	0.63	0.122	(0.130)	0.022	0.100
138	11.50	0.63	0.122	(0.130)	0.022	0.100
139	11.58	0.57	0.109	(0.129)	0.020	0.089
140	11.67	0.57	0.109	(0.128)	0.020	0.089
141	11.75	0.57	0.109	(0.128)	0.020	0.089
142	11.83	0.60	0.115	(0.127)	0.021	0.094
143	11.92	0.60	0.115	(0.126)	0.021	0.094
144	12.00	0.60	0.115	(0.126)	0.021	0.094
145	12.08	0.83	0.160	(0.125)	0.029	0.131
146	12.17	0.83	0.160	(0.125)	0.029	0.131
147	12.25	0.83	0.160	(0.124)	0.029	0.131
148	12.33	0.87	0.166	(0.123)	0.030	0.136
149	12.42	0.87	0.166	(0.123)	0.030	0.136
150	12.50	0.87	0.166	(0.122)	0.030	0.136
151	12.58	0.93	0.179	(0.121)	0.032	0.147
152	12.67	0.93	0.179	(0.121)	0.032	0.147
153	12.75	0.93	0.179	(0.120)	0.032	0.147
154	12.83	0.97	0.186	(0.120)	0.033	0.152
155	12.92	0.97	0.186	(0.119)	0.033	0.152
156	13.00	0.97	0.186	(0.118)	0.033	0.152
157	13.08	1.13	0.218	(0.118)	0.039	0.178
158	13.17	1.13	0.218	(0.117)	0.039	0.178
159	13.25	1.13	0.218	(0.117)	0.039	0.178
160	13.33	1.13	0.218	(0.116)	0.039	0.178
161	13.42	1.13	0.218	(0.115)	0.039	0.178
162	13.50	1.13	0.218	(0.115)	0.039	0.178
163	13.58	0.77	0.147	(0.114)	0.026	0.121
164	13.67	0.77	0.147	(0.114)	0.026	0.121
165	13.75	0.77	0.147	(0.113)	0.026	0.121
166	13.83	0.77	0.147	(0.113)	0.026	0.121
167	13.92	0.77	0.147	(0.112)	0.026	0.121
168	14.00	0.77	0.147	(0.111)	0.026	0.121
169	14.08	0.90	0.173	(0.111)	0.031	0.142
170	14.17	0.90	0.173	(0.110)	0.031	0.142
171	14.25	0.90	0.173	(0.110)	0.031	0.142
172	14.33	0.87	0.166	(0.109)	0.030	0.136
173	14.42	0.87	0.166	(0.109)	0.030	0.136
174	14.50	0.87	0.166	(0.108)	0.030	0.136
175	14.58	0.87	0.166	(0.107)	0.030	0.136
176	14.67	0.87	0.166	(0.107)	0.030	0.136
177	14.75	0.87	0.166	(0.106)	0.030	0.136
178	14.83	0.83	0.160	(0.106)	0.029	0.131
179	14.92	0.83	0.160	(0.105)	0.029	0.131
180	15.00	0.83	0.160	(0.105)	0.029	0.131
181	15.08	0.80	0.154	(0.104)	0.028	0.126
182	15.17	0.80	0.154	(0.104)	0.028	0.126
183	15.25	0.80	0.154	(0.103)	0.028	0.126
184	15.33	0.77	0.147	(0.103)	0.026	0.121
185	15.42	0.77	0.147	(0.102)	0.026	0.121
186	15.50	0.77	0.147	(0.102)	0.026	0.121
187	15.58	0.63	0.122	(0.101)	0.022	0.100
188	15.67	0.63	0.122	(0.101)	0.022	0.100
189	15.75	0.63	0.122	(0.100)	0.022	0.100
190	15.83	0.63	0.122	(0.100)	0.022	0.100
191	15.92	0.63	0.122	(0.099)	0.022	0.100
192	16.00	0.63	0.122	(0.099)	0.022	0.100

193	16.08	0.13	0.026	(0.098)	0.005	0.021
194	16.17	0.13	0.026	(0.098)	0.005	0.021
195	16.25	0.13	0.026	(0.097)	0.005	0.021
196	16.33	0.13	0.026	(0.097)	0.005	0.021
197	16.42	0.13	0.026	(0.096)	0.005	0.021
198	16.50	0.13	0.026	(0.096)	0.005	0.021
199	16.58	0.10	0.019	(0.095)	0.003	0.016
200	16.67	0.10	0.019	(0.095)	0.003	0.016
201	16.75	0.10	0.019	(0.094)	0.003	0.016
202	16.83	0.10	0.019	(0.094)	0.003	0.016
203	16.92	0.10	0.019	(0.093)	0.003	0.016
204	17.00	0.10	0.019	(0.093)	0.003	0.016
205	17.08	0.17	0.032	(0.092)	0.006	0.026
206	17.17	0.17	0.032	(0.092)	0.006	0.026
207	17.25	0.17	0.032	(0.091)	0.006	0.026
208	17.33	0.17	0.032	(0.091)	0.006	0.026
209	17.42	0.17	0.032	(0.090)	0.006	0.026
210	17.50	0.17	0.032	(0.090)	0.006	0.026
211	17.58	0.17	0.032	(0.089)	0.006	0.026
212	17.67	0.17	0.032	(0.089)	0.006	0.026
213	17.75	0.17	0.032	(0.089)	0.006	0.026
214	17.83	0.13	0.026	(0.088)	0.005	0.021
215	17.92	0.13	0.026	(0.088)	0.005	0.021
216	18.00	0.13	0.026	(0.087)	0.005	0.021
217	18.08	0.13	0.026	(0.087)	0.005	0.021
218	18.17	0.13	0.026	(0.086)	0.005	0.021
219	18.25	0.13	0.026	(0.086)	0.005	0.021
220	18.33	0.13	0.026	(0.086)	0.005	0.021
221	18.42	0.13	0.026	(0.085)	0.005	0.021
222	18.50	0.13	0.026	(0.085)	0.005	0.021
223	18.58	0.10	0.019	(0.084)	0.003	0.016
224	18.67	0.10	0.019	(0.084)	0.003	0.016
225	18.75	0.10	0.019	(0.084)	0.003	0.016
226	18.83	0.07	0.013	(0.083)	0.002	0.010
227	18.92	0.07	0.013	(0.083)	0.002	0.010
228	19.00	0.07	0.013	(0.082)	0.002	0.010
229	19.08	0.10	0.019	(0.082)	0.003	0.016
230	19.17	0.10	0.019	(0.082)	0.003	0.016
231	19.25	0.10	0.019	(0.081)	0.003	0.016
232	19.33	0.13	0.026	(0.081)	0.005	0.021
233	19.42	0.13	0.026	(0.080)	0.005	0.021
234	19.50	0.13	0.026	(0.080)	0.005	0.021
235	19.58	0.10	0.019	(0.080)	0.003	0.016
236	19.67	0.10	0.019	(0.079)	0.003	0.016
237	19.75	0.10	0.019	(0.079)	0.003	0.016
238	19.83	0.07	0.013	(0.079)	0.002	0.010
239	19.92	0.07	0.013	(0.078)	0.002	0.010
240	20.00	0.07	0.013	(0.078)	0.002	0.010
241	20.08	0.10	0.019	(0.078)	0.003	0.016
242	20.17	0.10	0.019	(0.077)	0.003	0.016
243	20.25	0.10	0.019	(0.077)	0.003	0.016
244	20.33	0.10	0.019	(0.077)	0.003	0.016
245	20.42	0.10	0.019	(0.076)	0.003	0.016
246	20.50	0.10	0.019	(0.076)	0.003	0.016
247	20.58	0.10	0.019	(0.076)	0.003	0.016
248	20.67	0.10	0.019	(0.075)	0.003	0.016
249	20.75	0.10	0.019	(0.075)	0.003	0.016
250	20.83	0.07	0.013	(0.075)	0.002	0.010
251	20.92	0.07	0.013	(0.074)	0.002	0.010
252	21.00	0.07	0.013	(0.074)	0.002	0.010
253	21.08	0.10	0.019	(0.074)	0.003	0.016
254	21.17	0.10	0.019	(0.073)	0.003	0.016
255	21.25	0.10	0.019	(0.073)	0.003	0.016
256	21.33	0.07	0.013	(0.073)	0.002	0.010
257	21.42	0.07	0.013	(0.073)	0.002	0.010
258	21.50	0.07	0.013	(0.072)	0.002	0.010
259	21.58	0.10	0.019	(0.072)	0.003	0.016
260	21.67	0.10	0.019	(0.072)	0.003	0.016
261	21.75	0.10	0.019	(0.072)	0.003	0.016
262	21.83	0.07	0.013	(0.071)	0.002	0.010
263	21.92	0.07	0.013	(0.071)	0.002	0.010
264	22.00	0.07	0.013	(0.071)	0.002	0.010
265	22.08	0.10	0.019	(0.071)	0.003	0.016
266	22.17	0.10	0.019	(0.070)	0.003	0.016
267	22.25	0.10	0.019	(0.070)	0.003	0.016
268	22.33	0.07	0.013	(0.070)	0.002	0.010
269	22.42	0.07	0.013	(0.070)	0.002	0.010
270	22.50	0.07	0.013	(0.069)	0.002	0.010
271	22.58	0.07	0.013	(0.069)	0.002	0.010
272	22.67	0.07	0.013	(0.069)	0.002	0.010
273	22.75	0.07	0.013	(0.069)	0.002	0.010
274	22.83	0.07	0.013	(0.069)	0.002	0.010
275	22.92	0.07	0.013	(0.069)	0.002	0.010
276	23.00	0.07	0.013	(0.068)	0.002	0.010
277	23.08	0.07	0.013	(0.068)	0.002	0.010
278	23.17	0.07	0.013	(0.068)	0.002	0.010
279	23.25	0.07	0.013	(0.068)	0.002	0.010
280	23.33	0.07	0.013	(0.068)	0.002	0.010
281	23.42	0.07	0.013	(0.068)	0.002	0.010
282	23.50	0.07	0.013	(0.068)	0.002	0.010
283	23.58	0.07	0.013	(0.067)	0.002	0.010
284	23.67	0.07	0.013	(0.067)	0.002	0.010
285	23.75	0.07	0.013	(0.067)	0.002	0.010
286	23.83	0.07	0.013	(0.067)	0.002	0.010
287	23.92	0.07	0.013	(0.067)	0.002	0.010
288	24.00	0.07	0.013	(0.067)	0.002	0.010

(Loss Rate Not Used)

Sum = 100.0 Sum = 15.7

Flood volume = Effective rainfall 1.31(In)

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 times area      12.0(Ac.)/[(In)/(Ft.)] =       1.3(Ac.Ft)
Total soil loss =      0.29(In)
Total soil loss =     0.288(Ac.Ft)
Total rainfall =      1.60(In)
Flood volume =       57149.4 Cubic Feet
Total soil loss =       12545.0 Cubic Feet
---------------------------------------------------------------------
 Peak flow rate of this hydrograph =      2.159(CFS)
---------------------------------------------------------------------
+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                    24 - H O U R    S T O R M
                R u n o f f      H y d r o g r a p h
---------------------------------------------------------------------
            Hydrograph in   5   Minute intervals ((CFS))

---------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
-----------------------------------------------------------------------
  0+ 5       0.0003      0.05  Q         |         |         |         |
  0+10       0.0011      0.11  Q         |         |         |         |
  0+15       0.0019      0.12  Q         |         |         |         |
  0+20       0.0029      0.15  Q         |         |         |         |
  0+25       0.0041      0.18  Q         |         |         |         |
  0+30       0.0054      0.19  Q         |         |         |         |
  0+35       0.0067      0.19  Q         |         |         |         |
  0+40       0.0080      0.19  Q         |         |         |         |
  0+45       0.0093      0.19  Q         |         |         |         |
  0+50       0.0108      0.21  Q         |         |         |         |
  0+55       0.0125      0.24  Q         |         |         |         |
  1+ 0       0.0142      0.25  Q         |         |         |         |
  1+ 5       0.0158      0.23  Q         |         |         |         |
  1+10       0.0172      0.20  Q         |         |         |         |
  1+15       0.0185      0.19  Q         |         |         |         |
  1+20       0.0198      0.19  Q         |         |         |         |
  1+25       0.0211      0.19  Q         |         |         |         |
  1+30       0.0224      0.19  Q         |         |         |         |
  1+35       0.0238      0.19  Q         |         |         |         |
  1+40       0.0251      0.19  Q         |         |         |         |
  1+45       0.0264      0.19  Q         |         |         |         |
  1+50       0.0279      0.21  Q         |         |         |         |
  1+55       0.0295      0.24  Q         |         |         |         |
  2+ 0       0.0313      0.25  Q         |         |         |         |
  2+ 5       0.0330      0.25  |Q        |         |         |         |
  2+10       0.0347      0.25  |Q        |         |         |         |
  2+15       0.0365      0.25  |Q        |         |         |         |
  2+20       0.0382      0.25  |Q        |         |         |         |
  2+25       0.0400      0.25  |Q        |         |         |         |
  2+30       0.0417      0.25  |Q        |         |         |         |
  2+35       0.0436      0.28  |Q        |         |         |         |
  2+40       0.0458      0.31  |Q        |         |         |         |
  2+45       0.0479      0.31  |Q        |         |         |         |
  2+50       0.0501      0.32  |Q        |         |         |         |
  2+55       0.0523      0.32  |Q        |         |         |         |
  3+ 0       0.0545      0.32  |Q        |         |         |         |
  3+ 5       0.0567      0.32  |Q        |         |         |         |
  3+10       0.0588      0.32  |Q        |         |         |         |
  3+15       0.0610      0.32  |Q        |         |         |         |
  3+20       0.0632      0.32  |Q        |         |         |         |
  3+25       0.0654      0.32  |Q        |         |         |         |
  3+30       0.0676      0.32  |QV       |         |         |         |
  3+35       0.0698      0.32  |QV       |         |         |         |
  3+40       0.0720      0.32  |QV       |         |         |         |
  3+45       0.0741      0.32  |QV       |         |         |         |
  3+50       0.0765      0.34  |QV       |         |         |         |
  3+55       0.0790      0.37  |QV       |         |         |         |
  4+ 0       0.0816      0.38  |QV       |         |         |         |
  4+ 5       0.0843      0.38  |QV       |         |         |         |
  4+10       0.0869      0.38  |QV       |         |         |         |
  4+15       0.0895      0.38  |QV       |         |         |         |
  4+20       0.0923      0.40  |QV       |         |         |         |
  4+25       0.0953      0.43  |QV       |         |         |         |
  4+30       0.0983      0.44  |QV       |         |         |         |
  4+35       0.1014      0.44  |Q V      |         |         |         |
  4+40       0.1044      0.44  |Q V      |         |         |         |
  4+45       0.1075      0.44  |Q V      |         |         |         |
  4+50       0.1107      0.47  |Q V      |         |         |         |
  4+55       0.1141      0.50  |Q V      |         |         |         |
  5+ 0       0.1176      0.50  | QV      |         |         |         |
  5+ 5       0.1208      0.46  |Q V      |         |         |         |
  5+10       0.1235      0.40  |Q V      |         |         |         |
  5+15       0.1262      0.39  |Q V      |         |         |         |
  5+20       0.1290      0.41  |Q V      |         |         |         |
  5+25       0.1320      0.43  |Q  V     |         |         |         |
  5+30       0.1350      0.44  |Q  V     |         |         |         |
  5+35       0.1383      0.47  |Q  V     |         |         |         |
  5+40       0.1417      0.50  |Q  V     |         |         |         |
  5+45       0.1451      0.50  | Q V     |         |         |         |
  5+50       0.1486      0.51  | Q V     |         |         |         |
  5+55       0.1521      0.51  | Q V     |         |         |         |
  6+ 0       0.1556      0.51  | Q V     |         |         |         |
  6+ 5       0.1593      0.53  | Q V     |         |         |         |
  6+10       0.1632      0.56  | Q V     |         |         |         |
  6+15       0.1671      0.57  | Q  V    |         |         |         |
  6+20       0.1710      0.57  | Q  V    |         |         |         |
  6+25       0.1749      0.57  | Q  V    |         |         |         |
  6+30       0.1789      0.57  | Q  V    |         |         |         |
  6+35       0.1830      0.60  | Q  V    |         |         |         |
  6+40       0.1873      0.62  | Q  V    |         |         |         |
  6+45       0.1916      0.63  | Q  V    |         |         |         |
```

```
 6+50       0.1960      0.63  | Q  V    |         |         |         |
 6+55       0.2003      0.63  | Q   V   |         |         |         |
 7+ 0       0.2047      0.63  | Q   V   |         |         |         |
 7+ 5       0.2091      0.63  | Q   V   |         |         |         |
 7+10       0.2134      0.63  | Q   V   |         |         |         |
 7+15       0.2178      0.63  | Q   V   |         |         |         |
 7+20       0.2224      0.66  | Q   V   |         |         |         |
 7+25       0.2271      0.69  | Q   V   |         |         |         |
 7+30       0.2319      0.69  | Q    V  |         |         |         |
 7+35       0.2368      0.72  | Q    V  |         |         |         |
 7+40       0.2420      0.75  |  Q   V  |         |         |         |
 7+45       0.2472      0.76  |  Q   V  |         |         |         |
 7+50       0.2526      0.78  |  Q   V  |         |         |         |
 7+55       0.2582      0.81  |  Q   V  |         |         |         |
 8+ 0       0.2639      0.82  |  Q    V |         |         |         |
 8+ 5       0.2699      0.87  |  Q    V |         |         |         |
 8+10       0.2763      0.93  |  Q    V |         |         |         |
 8+15       0.2828      0.94  |  Q    V |         |         |         |
 8+20       0.2893      0.95  |  Q    V |         |         |         |
 8+25       0.2959      0.95  |  Q     V|         |         |         |
 8+30       0.3025      0.95  |  Q     V|         |         |         |
 8+35       0.3092      0.98  |  Q     V|         |         |         |
 8+40       0.3161      1.01  |   Q    V|         |         |         |
 8+45       0.3231      1.01  |   Q    V|         |         |         |
 8+50       0.3302      1.04  |   Q     V         |         |         |
 8+55       0.3376      1.07  |   Q     V         |         |         |
 9+ 0       0.3450      1.08  |   Q     V         |         |         |
 9+ 5       0.3527      1.13  |   Q     V         |         |         |
 9+10       0.3609      1.18  |   Q     |V        |         |         |
 9+15       0.3691      1.20  |   Q     |V        |         |         |
 9+20       0.3776      1.23  |   Q     |V        |         |         |
 9+25       0.3863      1.26  |    Q    |V        |         |         |
 9+30       0.3950      1.27  |    Q    | V       |         |         |
 9+35       0.4039      1.29  |    Q    | V       |         |         |
 9+40       0.4130      1.32  |    Q    | V       |         |         |
 9+45       0.4221      1.33  |    Q    | V       |         |         |
 9+50       0.4315      1.36  |    Q    |  V      |         |         |
 9+55       0.4410      1.39  |    Q    |  V      |         |         |
10+ 0       0.4506      1.39  |    Q    |  V      |         |         |
10+ 5       0.4591      1.23  |   Q     |  V      |         |         |
10+10       0.4662      1.03  |   Q     |   V     |         |         |
10+15       0.4729      0.98  |  Q      |   V     |         |         |
10+20       0.4796      0.96  |  Q      |   V     |         |         |
10+25       0.4861      0.95  |  Q      |   V     |         |         |
10+30       0.4927      0.95  |  Q      |    V    |         |         |
10+35       0.5001      1.07  |   Q     |    V    |         |         |
10+40       0.5084      1.22  |   Q     |    V    |         |         |
10+45       0.5170      1.25  |   Q     |    V    |         |         |
10+50       0.5257      1.26  |    Q    |     V   |         |         |
10+55       0.5345      1.27  |    Q    |     V   |         |         |
11+ 0       0.5432      1.27  |    Q    |     V   |         |         |
11+ 5       0.5518      1.25  |   Q     |     V   |         |         |
11+10       0.5602      1.22  |   Q     |      V  |         |         |
11+15       0.5685      1.21  |   Q     |      V  |         |         |
11+20       0.5769      1.21  |   Q     |      V  |         |         |
11+25       0.5852      1.21  |   Q     |      V  |         |         |
11+30       0.5935      1.21  |   Q     |       V |         |         |
11+35       0.6015      1.16  |   Q     |       V |         |         |
11+40       0.6090      1.10  |   Q     |       V |         |         |
11+45       0.6165      1.09  |   Q     |       V |         |         |
11+50       0.6242      1.11  |   Q     |        V|         |         |
11+55       0.6320      1.13  |   Q     |        V|         |         |
12+ 0       0.6398      1.14  |   Q     |        V|         |         |
12+ 5       0.6488      1.31  |    Q    |        V|         |         |
12+10       0.6592      1.51  |     Q   |         V         |         |
12+15       0.6699      1.56  |     Q   |         V         |         |
12+20       0.6809      1.60  |     Q   |         V         |         |
12+25       0.6922      1.64  |     Q   |         |V        |         |
12+30       0.7036      1.65  |     Q   |         |V        |         |
12+35       0.7153      1.70  |     Q   |         |V        |         |
12+40       0.7274      1.76  |      Q  |         | V       |         |
12+45       0.7395      1.77  |      Q  |         | V       |         |
12+50       0.7519      1.80  |      Q  |         | V       |         |
12+55       0.7645      1.83  |      Q  |         |  V      |         |
13+ 0       0.7772      1.84  |      Q  |         |  V      |         |
13+ 5       0.7907      1.96  |      Q  |         |   V     |         |
13+10       0.8052      2.10  |       Q |         |   V     |         |
13+15       0.8199      2.14  |       Q |         |   V     |         |
13+20       0.8347      2.15  |       Q |         |    V    |         |
13+25       0.8496      2.16  |       Q |         |    V    |         |
13+30       0.8644      2.16  |       Q |         |     V   |         |
13+35       0.8775      1.90  |      Q  |         |     V   |         |
13+40       0.8884      1.58  |     Q   |         |      V  |         |
13+45       0.8988      1.51  |     Q   |         |      V  |         |
13+50       0.9090      1.48  |    Q    |         |      V  |         |
13+55       0.9190      1.46  |    Q    |         |       V |         |
14+ 0       0.9291      1.46  |    Q    |         |       V |         |
14+ 5       0.9398      1.56  |     Q   |         |       V |         |
14+10       0.9513      1.67  |     Q   |         |        V|         |
14+15       0.9630      1.70  |     Q   |         |        V|         |
14+20       0.9746      1.68  |     Q   |         |        V|         |
14+25       0.9860      1.66  |     Q   |         |         V         |
14+30       0.9974      1.66  |     Q   |         |         V         |
14+35       1.0088      1.65  |     Q   |         |         V         |
14+40       1.0202      1.65  |     Q   |         |         |V        |
14+45       1.0316      1.65  |     Q   |         |         |V        |
14+50       1.0428      1.63  |     Q   |         |         |V        |
14+55       1.0538      1.60  |     Q   |         |         | V       |
15+ 0       1.0647      1.59  |     Q   |         |         | V       |
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15+ 5       1.0755      1.57  |     Q   |         |         | V       |
15+10       1.0861      1.53  |     Q   |         |         |  V      |
15+15       1.0966      1.53  |     Q   |         |         |  V      |
15+20       1.1070      1.50  |     Q   |         |         |  V      |
15+25       1.1171      1.47  |    Q    |         |         |   V     |
15+30       1.1272      1.46  |    Q    |         |         |   V     |
15+35       1.1366      1.37  |    Q    |         |         |   V     |
15+40       1.1452      1.25  |   Q     |         |         |   V     |
15+45       1.1536      1.22  |   Q     |         |         |    V    |
15+50       1.1620      1.21  |   Q     |         |         |    V    |
15+55       1.1703      1.21  |   Q     |         |         |    V    |
16+ 0       1.1786      1.21  |   Q     |         |         |    V    |
16+ 5       1.1845      0.85  |  Q      |         |         |     V   |
16+10       1.1873      0.42  |Q        |         |         |     V   |
16+15       1.1895      0.32  |Q        |         |         |     V   |
16+20       1.1915      0.28  |Q        |         |         |     V   |
16+25       1.1932      0.25  |Q        |         |         |     V   |
16+30       1.1950      0.25  |Q        |         |         |     V   |
16+35       1.1965      0.23  Q         |         |         |     V   |
16+40       1.1979      0.20  Q         |         |         |     V   |
16+45       1.1993      0.19  Q         |         |         |     V   |
16+50       1.2006      0.19  Q         |         |         |     V   |
16+55       1.2019      0.19  Q         |         |         |     V   |
17+ 0       1.2032      0.19  Q         |         |         |     V   |
17+ 5       1.2049      0.24  Q         |         |         |     V   |
17+10       1.2069      0.30  |Q        |         |         |     V   |
17+15       1.2090      0.31  |Q        |         |         |     V   |
17+20       1.2112      0.31  |Q        |         |         |     V   |
17+25       1.2134      0.32  |Q        |         |         |     V   |
17+30       1.2156      0.32  |Q        |         |         |      V  |
17+35       1.2177      0.32  |Q        |         |         |      V  |
17+40       1.2199      0.32  |Q        |         |         |      V  |
17+45       1.2221      0.32  |Q        |         |         |      V  |
17+50       1.2241      0.29  |Q        |         |         |      V  |
17+55       1.2260      0.26  |Q        |         |         |      V  |
18+ 0       1.2277      0.26  |Q        |         |         |      V  |
18+ 5       1.2295      0.26  |Q        |         |         |      V  |
18+10       1.2313      0.25  |Q        |         |         |      V  |
18+15       1.2330      0.25  |Q        |         |         |      V  |
18+20       1.2348      0.25  |Q        |         |         |      V  |
18+25       1.2365      0.25  |Q        |         |         |      V  |
18+30       1.2383      0.25  |Q        |         |         |      V  |
18+35       1.2398      0.23  Q         |         |         |      V  |
18+40       1.2412      0.20  Q         |         |         |      V  |
18+45       1.2426      0.19  Q         |         |         |      V  |
18+50       1.2437      0.17  Q         |         |         |      V  |
18+55       1.2447      0.14  Q         |         |         |      V  |
19+ 0       1.2456      0.13  Q         |         |         |      V  |
19+ 5       1.2466      0.15  Q         |         |         |       V |
19+10       1.2479      0.18  Q         |         |         |       V |
19+15       1.2491      0.19  Q         |         |         |       V |
19+20       1.2506      0.21  Q         |         |         |       V |
19+25       1.2523      0.24  Q         |         |         |       V |
19+30       1.2540      0.25  Q         |         |         |       V |
19+35       1.2556      0.23  Q         |         |         |       V |
19+40       1.2570      0.20  Q         |         |         |       V |
19+45       1.2583      0.19  Q         |         |         |       V |
19+50       1.2595      0.17  Q         |         |         |       V |
19+55       1.2604      0.14  Q         |         |         |       V |
20+ 0       1.2613      0.13  Q         |         |         |       V |
20+ 5       1.2624      0.15  Q         |         |         |       V |
20+10       1.2636      0.18  Q         |         |         |       V |
20+15       1.2649      0.19  Q         |         |         |       V |
20+20       1.2662      0.19  Q         |         |         |       V |
20+25       1.2675      0.19  Q         |         |         |       V |
20+30       1.2688      0.19  Q         |         |         |       V |
20+35       1.2701      0.19  Q         |         |         |       V |
20+40       1.2714      0.19  Q         |         |         |       V |
20+45       1.2728      0.19  Q         |         |         |       V |
20+50       1.2739      0.17  Q         |         |         |       V |
20+55       1.2749      0.14  Q         |         |         |       V |
21+ 0       1.2758      0.13  Q         |         |         |       V |
21+ 5       1.2768      0.15  Q         |         |         |       V |
21+10       1.2780      0.18  Q         |         |         |       V |
21+15       1.2793      0.19  Q         |         |         |        V|
21+20       1.2805      0.17  Q         |         |         |        V|
21+25       1.2814      0.14  Q         |         |         |        V|
21+30       1.2823      0.13  Q         |         |         |        V|
21+35       1.2834      0.15  Q         |         |         |        V|
21+40       1.2846      0.18  Q         |         |         |        V|
21+45       1.2859      0.19  Q         |         |         |        V|
21+50       1.2870      0.17  Q         |         |         |        V|
21+55       1.2880      0.14  Q         |         |         |        V|
22+ 0       1.2889      0.13  Q         |         |         |        V|
22+ 5       1.2899      0.15  Q         |         |         |        V|
22+10       1.2912      0.18  Q         |         |         |        V|
22+15       1.2924      0.19  Q         |         |         |        V|
22+20       1.2936      0.17  Q         |         |         |        V|
22+25       1.2945      0.14  Q         |         |         |        V|
22+30       1.2954      0.13  Q         |         |         |        V|
22+35       1.2963      0.13  Q         |         |         |        V|
22+40       1.2972      0.13  Q         |         |         |        V|
22+45       1.2981      0.13  Q         |         |         |        V|
22+50       1.2989      0.13  Q         |         |         |        V|
22+55       1.2998      0.13  Q         |         |         |        V|
23+ 0       1.3007      0.13  Q         |         |         |        V|
23+ 5       1.3016      0.13  Q         |         |         |        V|
23+10       1.3024      0.13  Q         |         |         |        V|
23+15       1.3033      0.13  Q         |         |         |        V|
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   23+20       1.3042      0.13  Q         |         |         |        V|
   23+25       1.3051      0.13  Q         |         |         |        V|
   23+30       1.3059      0.13  Q         |         |         |        V|
   23+35       1.3068      0.13  Q         |         |         |        V|
   23+40       1.3077      0.13  Q         |         |         |        V|
   23+45       1.3086      0.13  Q         |         |         |        V|
   23+50       1.3094      0.13  Q         |         |         |        V|
   23+55       1.3103      0.13  Q         |         |         |        V|
   24+ 0       1.3112      0.13  Q         |         |         |        V|
   24+ 5       1.3117      0.08  Q         |         |         |        V|
   24+10       1.3119      0.02  Q         |         |         |        V|
   24+15       1.3119      0.01  Q         |         |         |        V|
   24+20       1.3120      0.00  Q         |         |         |         V
-----------------------------------------------------------------------
```

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                      (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2016 Advanced Engineering Software (aes)
                      (Rational Tabling Version 23.0)
                  Release Date: 07/01/2016  License ID 1435

                         Analysis prepared by:



 ************************* DESCRIPTION OF STUDY *************************
* TEI JOB NO 3566                                                        *
* 2 YEAR EVENT                                                           *
* EXISTING CONDITION                                                     *
 ************************************************************************

  FILE NAME: W:\3566\EX2.DAT
  TIME/DATE OF STUDY: 15:53 11/13/2017
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  2-YEAR, 1-HOUR PRECIPITATION(INCH) =  0.455
  100-YEAR, 1-HOUR PRECIPITATION(INCH) =  1.150
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =    2.00   1-HOUR INTENSITY(INCH/HOUR) =   0.455
  SLOPE OF INTENSITY DURATION CURVE = 0.5000
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH FAIR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   840.00
  UPSTREAM ELEVATION(FEET) =   1570.10
  DOWNSTREAM ELEVATION(FEET) =   1561.00
  ELEVATION DIFFERENCE(FEET) =      9.10
  TC = 0.709*[(  840.00**3)/(     9.10)]**.2 =   25.921
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  0.692
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .3581
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      2.01
  TOTAL AREA(ACRES) =      8.10   TOTAL RUNOFF(CFS) =      2.01

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1561.00  DOWNSTREAM(FEET) =   1558.60
  CHANNEL LENGTH THRU SUBAREA(FEET) =   440.00   CHANNEL SLOPE =  0.0055
  CHANNEL FLOW THRU SUBAREA(CFS) =       2.01
  FLOW VELOCITY(FEET/SEC) =   1.27 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   5.76   Tc(MIN.) =   31.69
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =    1280.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  0.626
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .3367
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    7.70   SUBAREA RUNOFF(CFS) =    1.62
  TOTAL AREA(ACRES) =       15.8   TOTAL RUNOFF(CFS) =       3.63
  TC(MIN.) =   31.69
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       15.8  TC(MIN.) =     31.69
  PEAK FLOW RATE(CFS)   =       3.63
```

==========
==========
END OF RATIONAL METHOD ANALYSIS

♀

```
____________________________________________________________________________
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                      (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2016 Advanced Engineering Software (aes)
                      (Rational Tabling Version 23.0)
                  Release Date: 07/01/2016  License ID 1435

                           Analysis prepared by:




 ************************** DESCRIPTION OF STUDY **************************
* TEI 33566                                                                *
* PROPOSED CONDITION - 2 YEAR EVENT                                        *
*                                                                          *
 ****************************************************************************

  FILE NAME: W:\3566\PR100-2.DAT
  TIME/DATE OF STUDY: 08:50 12/08/2017
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  2-YEAR, 1-HOUR PRECIPITATION(INCH) =  0.455
  100-YEAR, 1-HOUR PRECIPITATION(INCH) =  1.150
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =    2.00   1-HOUR INTENSITY(INCH/HOUR) =   0.455
  SLOPE OF INTENSITY DURATION CURVE = 0.5000
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1000.00
  UPSTREAM ELEVATION(FEET) =   1565.60
  DOWNSTREAM ELEVATION(FEET) =   1558.48
  ELEVATION DIFFERENCE(FEET) =      7.12
  TC = 0.303*[( 1000.00**3)/(     7.12)]**.2 =   12.915
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  0.981
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8535
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      5.23
  TOTAL AREA(ACRES) =      6.25   TOTAL RUNOFF(CFS) =      5.23

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1555.00  DOWNSTREAM(FEET) =  1552.00
  FLOW LENGTH(FEET) =   225.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.87
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.23
  PIPE TRAVEL TIME(MIN.) =   0.55    Tc(MIN.) =   13.46
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =    1225.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  0.961
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8531
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    0.35   SUBAREA RUNOFF(CFS) =    0.29
  TOTAL AREA(ACRES) =        6.6   TOTAL RUNOFF(CFS) =       5.52
  TC(MIN.) =   13.46

****************************************************************************
```

```
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1552.02  DOWNSTREAM(FEET) =  1551.82
  FLOW LENGTH(FEET) =    33.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.18
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.52
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =   13.57
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    103.00 =    1258.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        6.6  TC(MIN.) =     13.57
  PEAK FLOW RATE(CFS)   =       5.52
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

♀

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                      (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2016 Advanced Engineering Software (aes)
                      (Rational Tabling Version 23.0)
                 Release Date: 07/01/2016  License ID 1435

                          Analysis prepared by:




 ************************** DESCRIPTION OF STUDY **************************
* TEI 3566                                                                 *
* PROPOSED CONDITION - 2 YEAR EVENT                                        *
*                                                                          *
 ****************************************************************************

  FILE NAME: W:\3566\PR200-2.DAT
  TIME/DATE OF STUDY: 16:39 12/14/2017
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  2-YEAR, 1-HOUR PRECIPITATION(INCH) =  0.455
  100-YEAR, 1-HOUR PRECIPITATION(INCH) =  1.150
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =    2.00   1-HOUR INTENSITY(INCH/HOUR) =   0.455
  SLOPE OF INTENSITY DURATION CURVE = 0.5000
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   880.00
  UPSTREAM ELEVATION(FEET) =   1565.42
  DOWNSTREAM ELEVATION(FEET) =   1557.77
  ELEVATION DIFFERENCE(FEET) =      7.65
  TC = 0.303*[(  880.00**3)/(     7.65)]**.2 =   11.791
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.026
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8545
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      4.17
  TOTAL AREA(ACRES) =      4.75   TOTAL RUNOFF(CFS) =      4.17

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1553.77  DOWNSTREAM(FEET) =  1552.22
  FLOW LENGTH(FEET) =    86.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.18
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.17
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =   11.99
```

```
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    202.00 =     966.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        4.8  TC(MIN.) =     11.99
  PEAK FLOW RATE(CFS)   =       4.17
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

♀

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CONTECH® CMP DETENTION SYSTEMS

CONTECH® CONSTRUCTION PRODUCTS INC.

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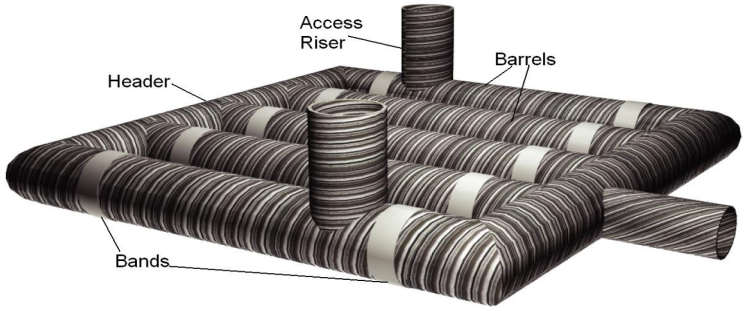
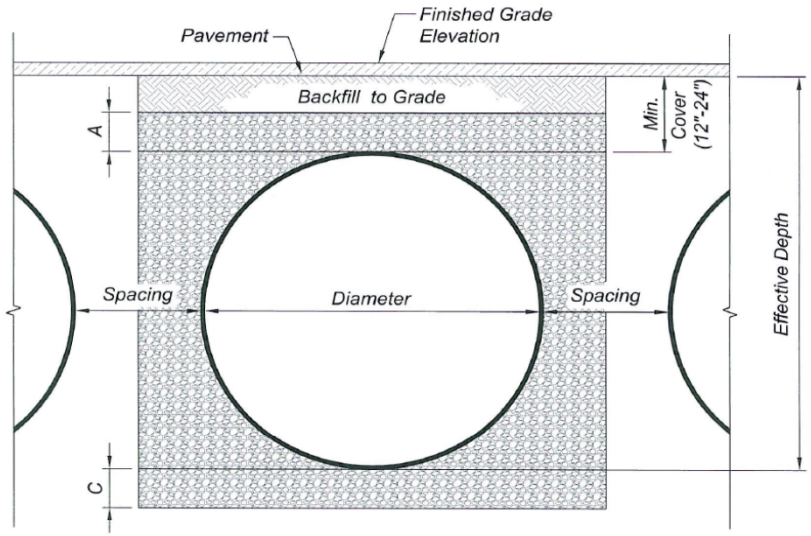


Project Summary

Date:	12/12/2017	
Project Name:	Brodiaea Business Park (HCOC)	
City / County:	Moreno Valley	
State:	California	
Designed By:	Luis Prado	
Company:	Thienes Engineering, Inc.	**Enter Information in Blue Cells**
Telephone:	(714) 521-4811	

Corrugated Metal Pipe Calculator

Storage Volume Required (cf):	26,223	
Limiting Width (ft):	40.00	
Invert Depth Below Asphalt (ft):	7.00	
Solid or Perforated Pipe:	Solid	
Shape Or Diameter (in):	60	19.63 ft^2 Pipe Area
Number Of Headers:	1	
Spacing between Barrels (ft):	2.50	
Stone Width Around Perimeter of System (ft):	1	
Depth A: Porous Stone Above Pipe (in):	6	
Depth C: Porous Stone Below Pipe (in):	6	
Stone Porosity (0 to 40%):	40	



System Sizing

Pipe Storage:	26,311	cf	
Porous Stone Storage:	0	cf	
Total Storage Provided:	26,311	cf	100.3% Of Required Storage
Number of Barrels:	5	barrels	
Length per Barrel:	261.0	ft	
Length Per Header:	35.0	ft	
Rectangular Footprint (W x L):	37. ft x 268. ft		

CONTECH Materials

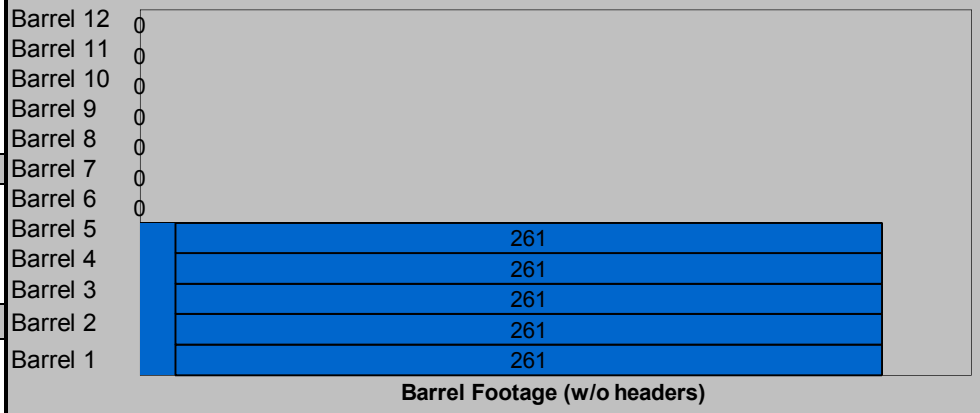
Total CMP Footage:	1,340	ft
Approximate Total Pieces:	57	pcs
Approximate Coupling Bands:	56	bands
Approximate Truckloads:	15	trucks

Construction Quantities**

Total Excavation:	2571	cy
Porous Stone Backfill For Storage:	0	cy stone
Backfill to Grade Excluding Stone:	1597	cy fill

***Construction quantities are approximate and should be verified upon final design*

System Layout



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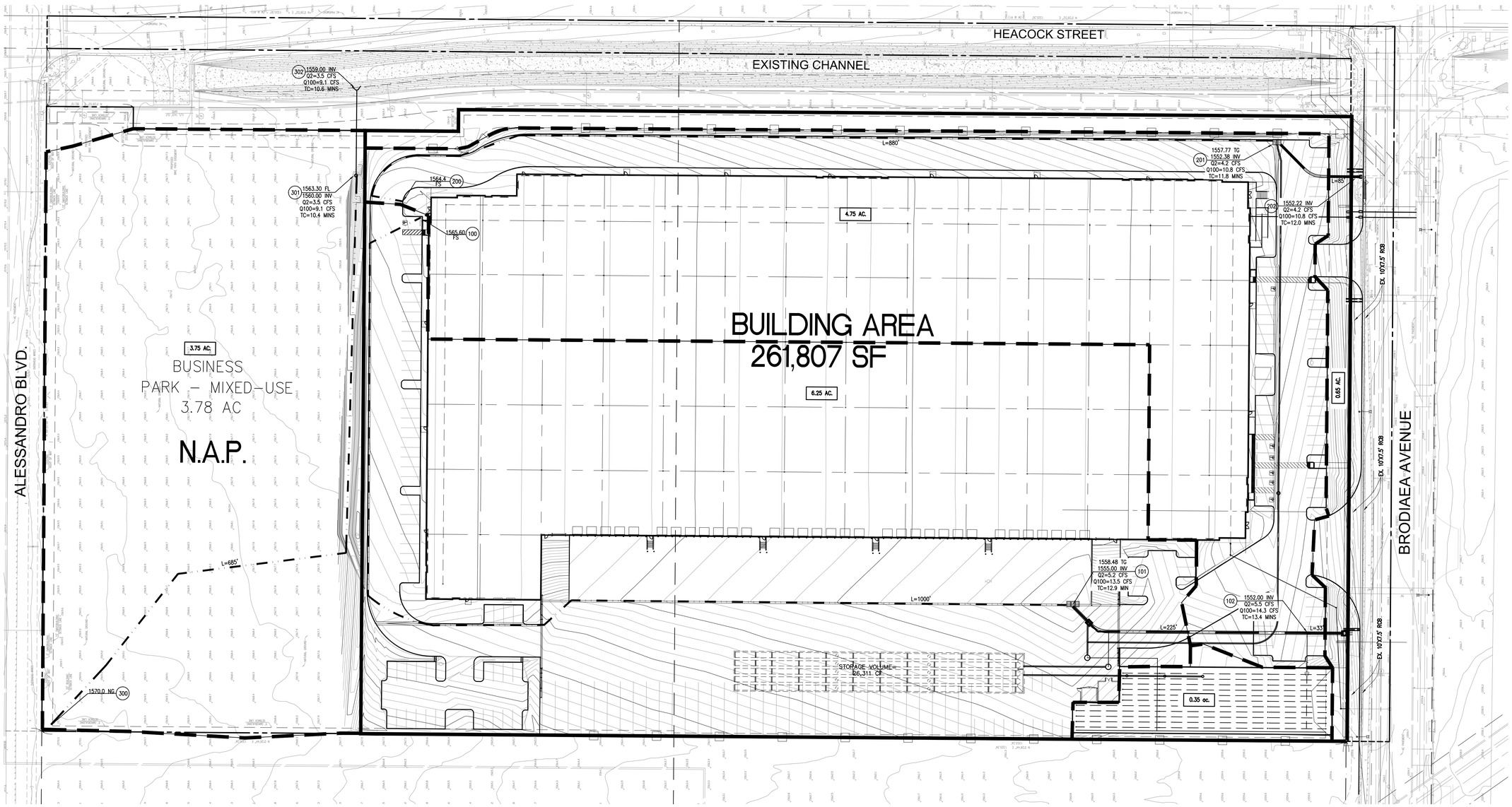
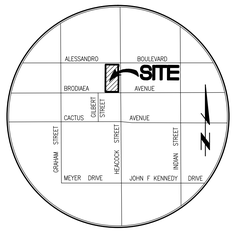
APPENDIX E

HYDROLOGY MAP





VICINITY MAP

N.T.S.

LEGEND	
	PROJECT BOUNDARY
	SUBAREA BOUNDARY
	FLOW PATH
1.00 AC.	SUBAREA AREA
100	NODE NUMBER

0 20 40 80 120

SCALE:1"=40'

Last Update:1/18/18
O:\3500-3599\3566\3566HYD.dwg

CITY OF MORENO VALLEY

PUBLIC WORKS DEPARTMENT

PROPOSED CONDITION HYDROLOGY MAP

BRODIAEA BUSINESS PARK

NEC BRODIA AVE. AND HEACOCK AVE

PREPARED FOR:

ALERE PROPERTY GROUP LLC
100 BAYVIEW CIRCLE SUITE 310
NEWPORT BEACH, CA 92660
(949) 509-5000
(949) 509-5001

PREPARED BY:

Thienes Engineering, Inc.
CIVIL ENGINEERING • LAND SURVEYING
14349 FIRESTONE BOULEVARD
LA MIRADA, CALIFORNIA 90638
PH:(714)521-4811 FAX(714)521-4173

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Checked by
Date

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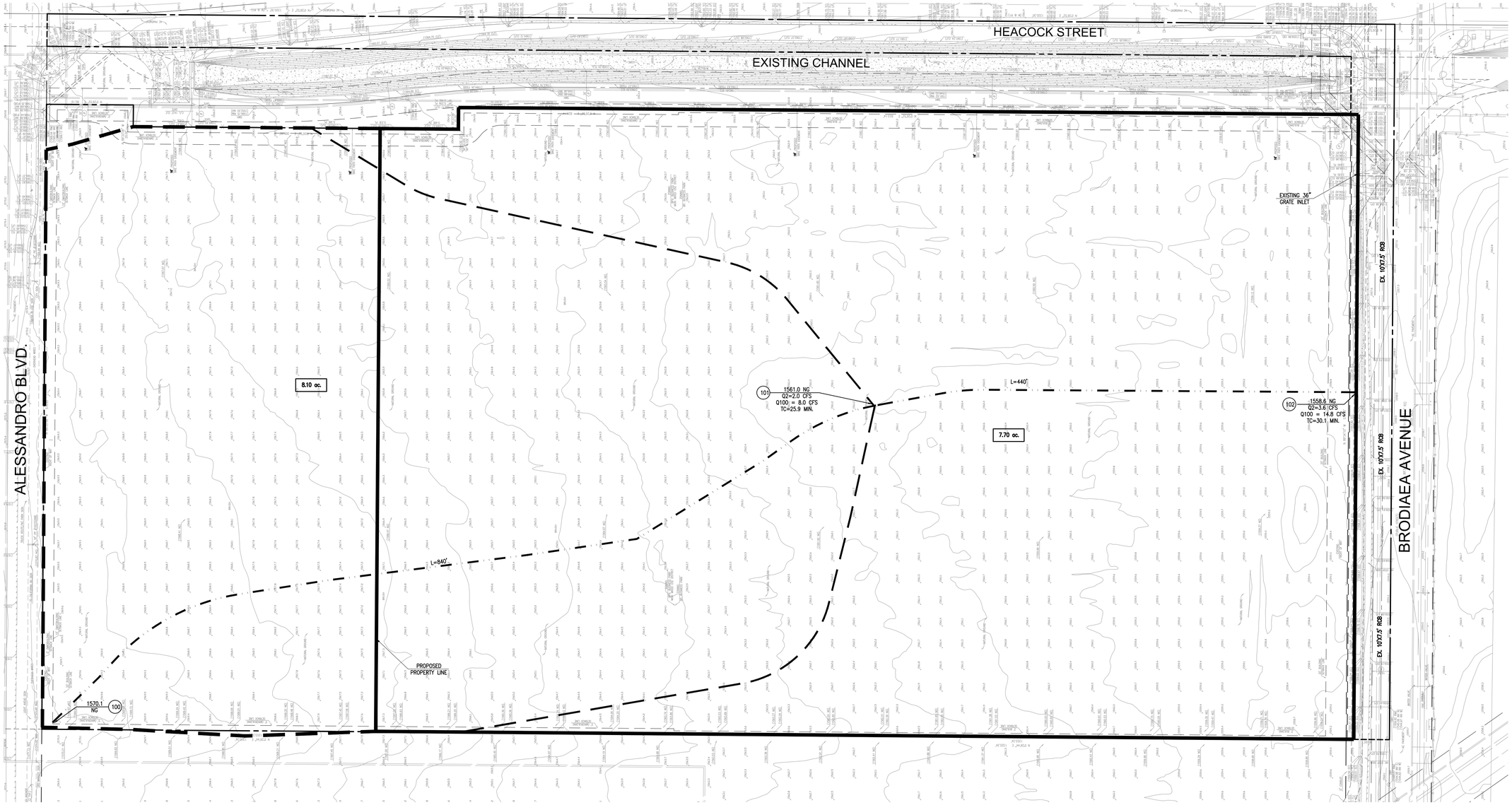

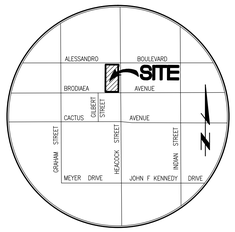

VICINITY MAP

N.T.S.

LEGEND

	PROJECT BOUNDARY
	SUBAREA BOUNDARY
	FLOW PATH
1.00 AC.	SUBAREA AREA
100	NODE NUMBER

0 20 40 80 120

SCALE:1"=40'

Last Update: 11/13/17
O:\3500-3599\3566\3566HYD-EX.dwg

CITY OF MORENO VALLEY

PUBLIC WORKS DEPARTMENT

EXISTING CONDITION HYDROLOGY MAP

BODIAEA BUSINESS PARK

NEC OF BRODIAEA AVE AND HEACOCK ST

PREPARED FOR:

ALERE PROPERTY GROUP LLC
100 BAYVIEW CIRCLE SUITE 310
NEWPORT BEACH, CA 92660
(949) 509-5000
(949) 509-5001

PREPARED BY:

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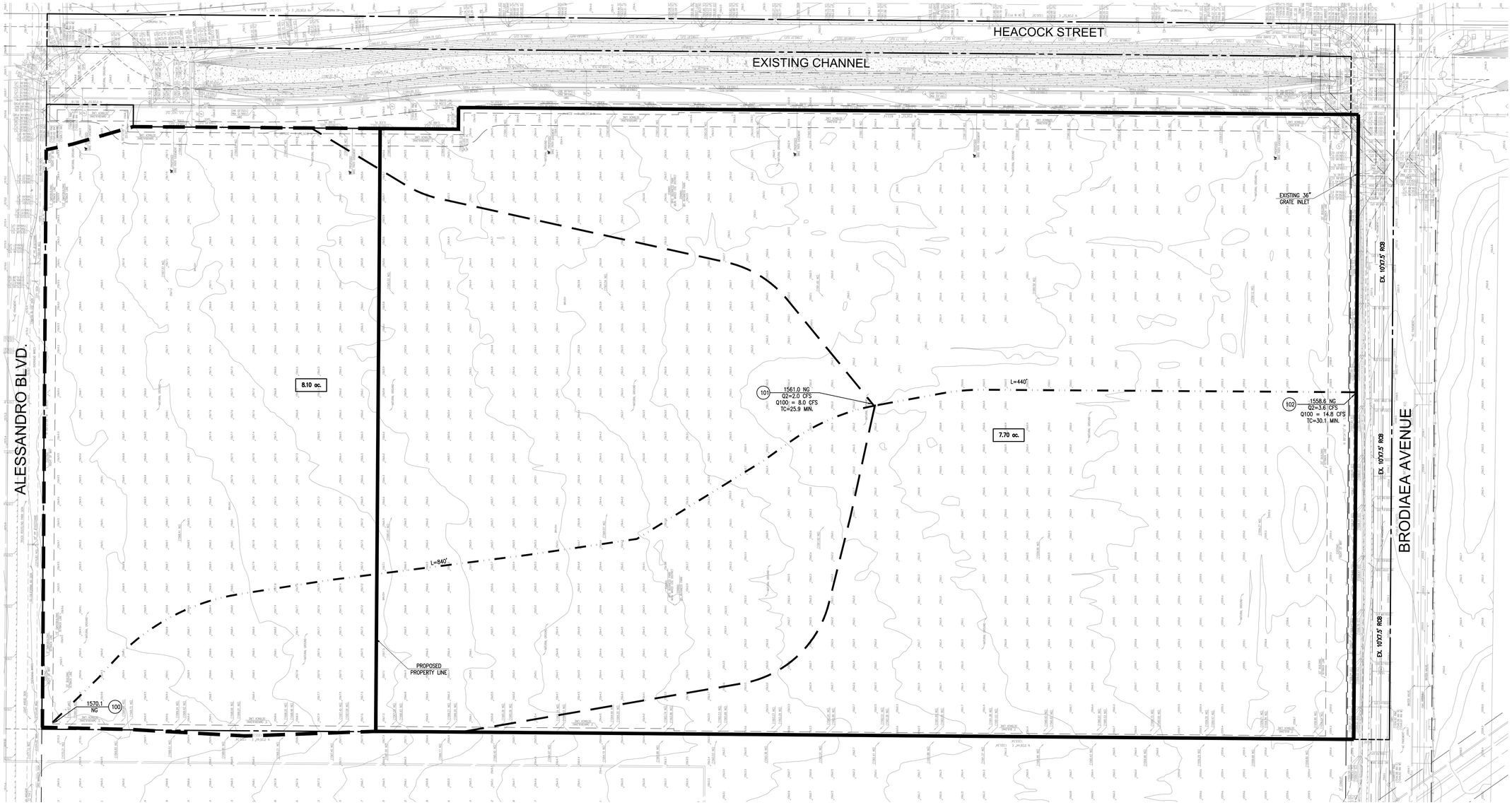

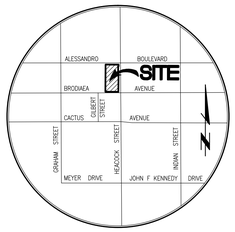

VICINITY MAP

N.T.S.

LEGEND

	PROJECT BOUNDARY
	SUBAREA BOUNDARY
	FLOW PATH
1.00 AC.	SUBAREA AREA
100	NODE NUMBER

0 20 40 80 120

SCALE:1"=40'

Last Update: 11/13/17
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CITY OF MORENO VALLEY

PUBLIC WORKS DEPARTMENT

EXISTING CONDITION HYDROLOGY MAP

BODIAEA BUSINESS PARK

NEC OF BRODIAEA AVE AND HEACOCK ST

PREPARED FOR:

ALERE PROPERTY GROUP LLC
100 BAYVIEW CIRCLE SUITE 310
NEWPORT BEACH, CA 92660
(949) 509-5000
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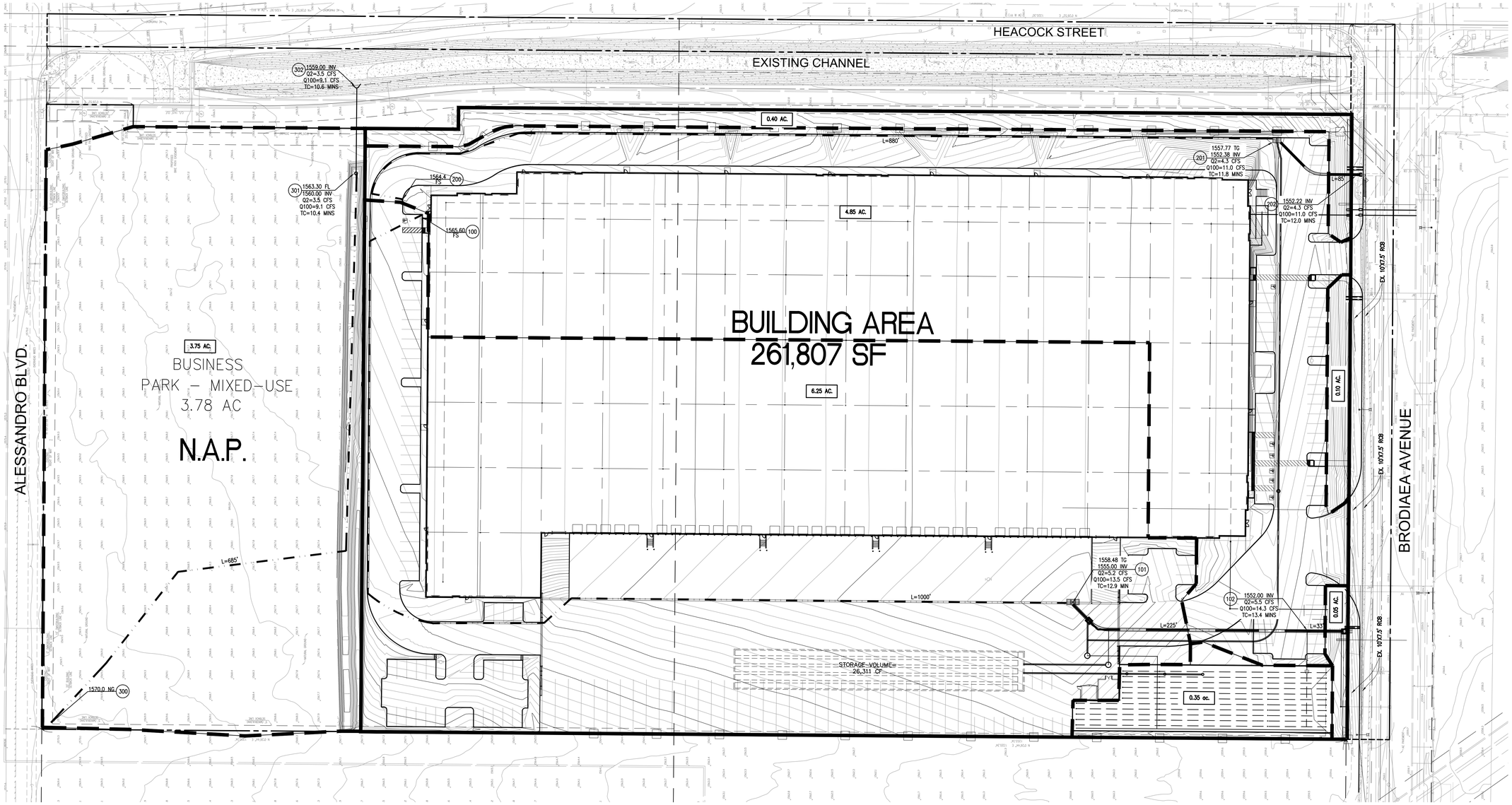

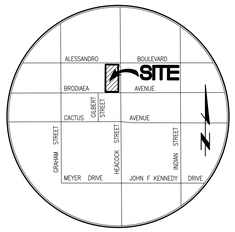

VICINITY MAP

N.T.S.

LEGEND

▬	PROJECT BOUNDARY
▬ ▬	SUBAREA BOUNDARY
- - -	FLOW PATH
1.00 AC.	SUBAREA AREA
(100)	NODE NUMBER

0 20 40 80 120

SCALE:1"=40'

Last Update:12/8/17
O:\3500-3599\3566\3566HYD.dwg

CITY OF MORENO VALLEY

PUBLIC WORKS DEPARTMENT

PROPOSED CONDITION HYDROLOGY MAP

BRODIAEA BUSINESS PARK

NEC BRODIA AVE. AND HEACOCK AVE

PREPARED FOR:

ALERE PROPERTY GROUP LLC
100 BAYVIEW CIRCLE SUITE 310
NEWPORT BEACH, CA 92660
(949) 509-5000
(949) 509-5001

PREPARED BY:

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PH:(714)521-4811 FAX(714)521-4173

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Date	
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Date	
Designed by	
Date	
Checked by	
Date	

Sheet 1 of 1 Sheets

3566/1 OF 1 SHEET

Brodiaea Commerce Center

NOISE IMPACT ANALYSIS

CITY OF MORENO VALLEY

PREPARED BY:

Bill Lawson, PE, INCE
blawson@urbanxroads.com
(949) 336-5979

Alex Wolfe, INCE
awolfe@urbanxroads.com
(949) 336-5977

JANUARY 22, 2018

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LIST OF ABBREVIATED TERMS

(1)	Reference
ADT	Average Daily Traffic
ANSI	American National Standards Institute
Calveno	California Vehicle Noise
CEQA	California Environmental Quality Act
CNEL	Community Noise Equivalent Level
dBA	A-weighted decibels
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
Hz	Hertz
I-215	Interstate 215
INCE	Institute of Noise Control Engineering
L_{eq}	Equivalent continuous (average) sound level
L_{max}	Maximum level measured over the time interval
L_{min}	Minimum level measured over the time interval
MARB/IPA	March Air Reserve Base/Inland Port Airport
mph	Miles per hour
OPR	Office of Planning and Research
PPV	Peak particle velocity
Project	Brodiaea Commerce Center
REMEL	Reference Energy Mean Emission Level
RMS	Root-mean-square
VdB	Vibration Decibels

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EXECUTIVE SUMMARY

Urban Crossroads, Inc. has prepared this noise study to determine the noise exposure and the necessary noise mitigation measures for the proposed Brodiaea Commerce Center development ("Project"). The Project site is located on the northwest corner of Heacock Street and Brodiaea Avenue in the City of Moreno Valley. The Project is proposed to consist of up to 262,398 square feet of High-Cube Warehouse / Distribution Center use within a single building. This study has been prepared to satisfy the City of Moreno Valley noise standards and derives thresholds of significance based on guidance provided by Appendix G of the California Environmental Quality Act (CEQA) Guidelines. (1)

OFF-SITE TRAFFIC NOISE ANALYSIS

Traffic generated by the operation of the proposed Project will influence the traffic noise levels in surrounding off-site areas. To quantify the off-site traffic noise increases on the surrounding off-site areas, the changes in traffic noise levels on nine roadway segments surrounding the Project site were calculated based on the change in the average daily traffic (ADT) volumes. The traffic noise levels provided in this analysis are based on the traffic forecasts found in the *Brodiaea Commerce Center Traffic Impact Analysis* prepared by Urban Crossroads, Inc. (2) To assess the off-site noise level impacts associated with the proposed Project, noise contour boundaries were developed for Existing, Opening Year 2022, and Horizon Year 2040 traffic conditions. The analysis shows that the Project-related traffic noise level increases under all traffic scenarios will be *less than significant*.

OPERATIONAL NOISE ANALYSIS

Using reference noise levels to represent the expected noise sources from the Brodiaea Commerce Center site, this analysis estimates the Project-related stationary-source noise levels at nearby sensitive receiver locations. The normal activities associated with the proposed Brodiaea Commerce Center are anticipated to include idling trucks, delivery truck activities, backup alarms, as well as loading and unloading of dry goods, roof-top air conditioning units, and parking lot vehicle movements. The operational noise analysis shows that the Project-related stationary-source noise levels due to the idling trucks, delivery truck activities, backup alarms, as well as loading and unloading of dry goods, roof-top air conditioning units, and parking lot vehicle movements will satisfy the City of Moreno Valley 65 dBA L_{eq} daytime and 60 dBA L_{eq} nighttime noise level standards at 200 feet from the property line of the noise source (Project site) and at all nearby sensitive receiver locations. Further, since the Project-related operational noise levels will satisfy the more restrictive 65 dBA L_{eq} daytime and 60 dBA L_{eq} nighttime exterior noise level standards, they will also comply with the 90 dBA L_{eq} 8-hour continuous noise level limit identified in the City of Moreno Valley Municipal Code.

In addition, this analysis demonstrates that the Project will contribute *less than significant* operational noise level contributions to the existing ambient noise environment during the daytime and nighttime hours at all of the sensitive receiver locations. Therefore, the operational noise level impacts associated with the proposed 24-hour seven days per week Project activities,

such as the idling trucks, delivery truck activities, backup alarms, as well as loading and unloading of dry goods, roof-top air conditioning units, and parking lot vehicle movements, will be *less than significant*.

OPERATIONAL VIBRATION ANALYSIS

The operation of the Project site will include heavy trucks transiting on site to and from the loading dock areas. Truck vibration levels are dependent on vehicle characteristics, load, speed, and pavement conditions. Typical vibration levels for heavy trucks at normal traffic speeds do not exceed 65 VdB, and therefore, will be below the Federal Transit Administration (FTA) vibration threshold of 80 VdB at nearby sensitive receiver locations. Since truck deliveries transiting on site will be travelling at very low speeds it is expected that delivery truck vibration impacts at nearby homes will be *less than significant*.

CONSTRUCTION NOISE ANALYSIS

Construction noise represents a short-term increase on the ambient noise levels. Construction-related noise impacts are expected to create temporary and intermittent high-level noise conditions at receivers surrounding the Project site when certain activities occur at the Project site boundary. Using sample reference noise levels to represent the planned construction activities of the Brodiaea Commerce Center site, this analysis estimates the Project-related construction noise levels at nearby sensitive receiver locations. The Project-related short-term construction noise levels are expected to range from 47.4 to 64.8 dBA L_{eq} during the daytime hours and from 39.4 to 56.8 dBA L_{eq} during nighttime concrete pours, and will satisfy the City of Moreno Valley Municipal Code Municipal Code 65 dBA L_{eq} daytime and 60 dBA L_{eq} nighttime noise level thresholds, respectively, at all noise receiver locations. Therefore, based on the results of this analysis, all receiver locations will experience *less than significant* impacts due to Project construction noise levels.

CONSTRUCTION VIBRATION ANALYSIS

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods used, distance to the affected structures and soil type. It is expected that ground-borne vibration from Project construction activities would cause only intermittent, localized intrusion. The analysis shows that the unmitigated Project-construction vibration levels of up to 60 VdB will remain below the Federal Transit Administration (FTA) 80 VdB threshold at all receiver locations, and are therefore, considered a *less than significant* impact. Further, vibration levels at the site of the closest sensitive receiver are unlikely to be sustained during the entire construction period, but will occur rather only during the times that heavy construction equipment is operating at the Project site perimeter. Moreover, construction at the Project site will be restricted to daytime hours consistent with City of Moreno Valley requirements thereby eliminating potential vibration impacts during the sensitive nighttime hours.

CONSTRUCTION NOISE AND VIBRATION ABATEMENT MEASURES

Though construction noise is temporary, intermittent and of short duration, and will not present any long-term impacts, the following practices would reduce noise level increases produced by the construction equipment to the nearby noise-sensitive residential land uses:

- Prior to approval of grading plans and/or issuance of building permits, plans shall indicate the following: *Noise-generating Project construction activities that would create noise levels of greater than 60 dBA L_{eq} at sensitive receivers shall be restricted to the hours of 7:00 a.m. to 8:00 p.m. on any day. Grading operations shall be limited to the hours of 8:00 a.m. to 6:00 p.m. weekdays, and 8:00 a.m. to 4:00 p.m. on weekends and holidays, or as otherwise approved by the City Engineer. The Project construction supervisor shall ensure compliance with the note and the City shall conduct periodic inspection at its discretion.*
- During all Project site construction, the construction contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers, consistent with manufacturers' standards. The construction contractor shall place all stationary construction equipment so that emitted noise is directed away from the noise sensitive receivers nearest the Project site.
- The construction contractor shall limit haul truck deliveries to the same hours specified for construction equipment (between the hours of 7:00 a.m. to 8:00 p.m. on any day). The contractor shall prepare a haul route exhibit for review and approval by the Public Works Department, Land Development Division, and shall design delivery routes to minimize the exposure of sensitive land uses or residential dwellings to delivery truck-related noise (City of Moreno Valley Municipal Code, Section 8.21.050 (H) (7)).
- Any nighttime construction activity requires an exemption from the City of Moreno Valley Municipal Code as indicated in Section 11.80.030 (E) (8) for a special event permit (Section 11.80.040). The special event permit application shall be submitted to the City of Moreno Valley Planning Department for approval and meet the requirements of Municipal Code Section 11.80.040.

SIGNIFICANCE FINDINGS

The results of this Brodiaea Commerce Center Noise Impact Analysis are summarized below based on the significance criteria in Section 4 of this report. Table ES-1 shows the findings of significance for each potential noise and/or vibration impact before and after any required mitigation measures.

TABLE ES-1: SUMMARY OF SIGNIFICANCE FINDINGS

Analysis	Report Section	Significance Findings	
		Unmitigated	Mitigated
Off-Site Traffic Noise	7	*Less Than Significant*	*n/a*
Operational Noise	9	*Less Than Significant*	*n/a*
Operational Vibration		*Less Than Significant*	*n/a*
Construction Noise	10	*Less Than Significant*	*n/a*
Construction Vibration		*Less Than Significant*	*n/a*

"n/a" = No mitigation is required.

1 INTRODUCTION

This noise analysis has been completed to determine the noise impacts associated with the development of the proposed Brodiaea Commerce Center ("Project"). This noise study briefly describes the proposed Project, provides information regarding noise fundamentals, describes the local regulatory setting, provides the study methods and procedures for traffic noise analysis, and evaluates the future exterior noise environment. In addition, this study includes an analysis of the potential Project-related long-term operational and short-term construction noise impacts.

1.1 SITE LOCATION

The proposed Brodiaea Commerce Center site is located on the northwest corner of Heacock Street and Brodiaea Avenue in the City of Moreno Valley, as shown on Exhibit 1-A. The Project site is bounded by business park-designated land use to the north, west, and south. The closest existing residential homes to the Project site are located approximately 180 feet east of the Project site across Heacock Street on the other side of an existing 6-foot high noise barrier. The March Air Reserve Base/Inland Port Airport (MARB/IPA) is located approximately one mile southwest of the Project site, and the Interstate 215 (I-215) Freeway is located roughly 2 miles west of the Project site.

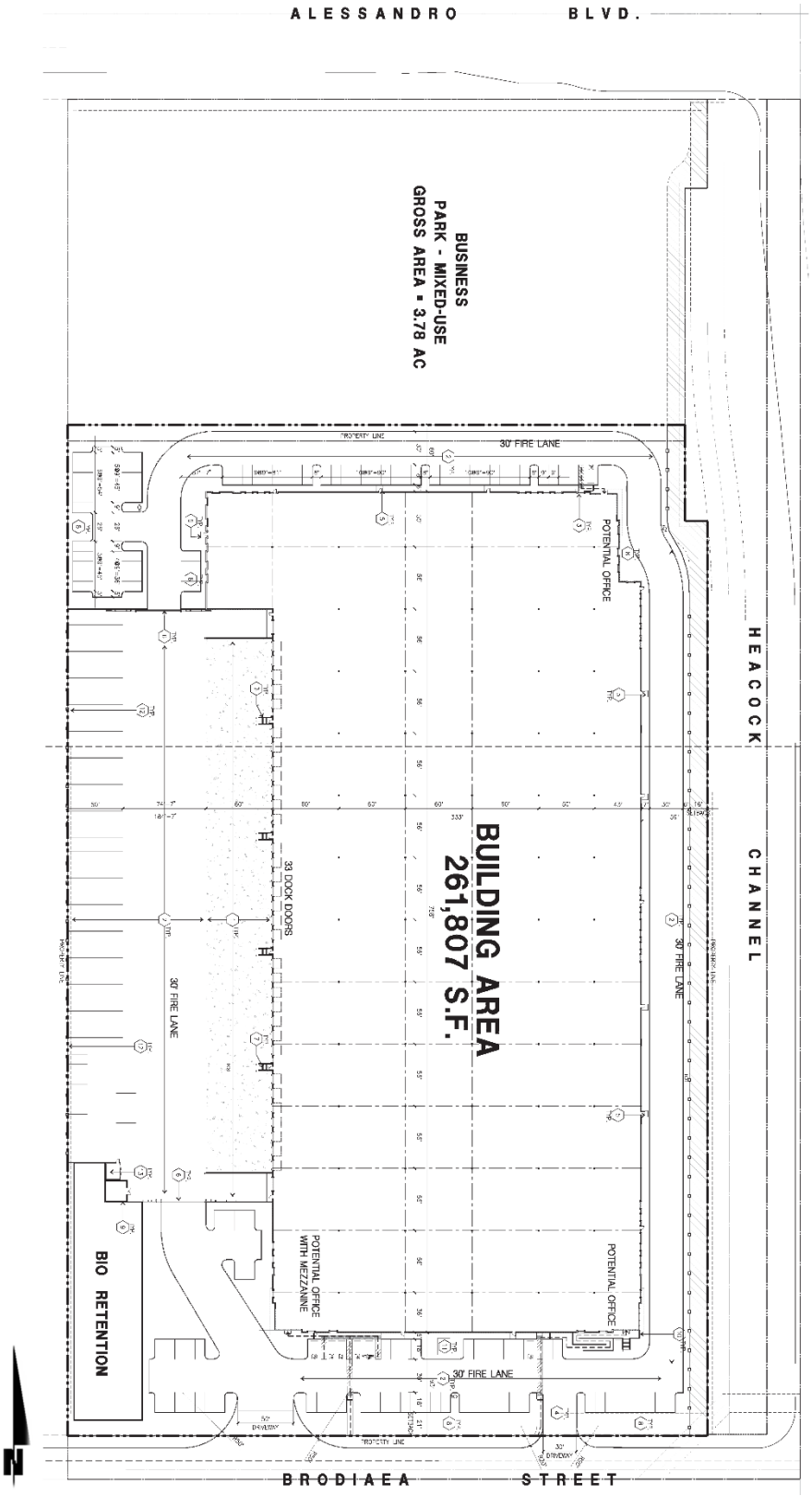
1.2 PROJECT DESCRIPTION

The Project is proposed to consist of up to 262,398 square feet of High-Cube Warehouse / Distribution Center use within a single building, as shown on Exhibit 1-B. At the time this noise analysis was prepared the future tenants of the proposed Project were unknown. To present the potential worst-case noise conditions, this analysis assumes the Project would be operational 24 hours per day, seven days per week. The Project business operations would primarily be conducted within the enclosed buildings, except for traffic movement, parking, as well as loading and unloading of trucks at designated loading bays. The on-site Project-related noise sources are expected to include: idling trucks, delivery truck activities, backup alarms, as well as loading and unloading of dry goods, roof-top air conditioning units, and parking lot vehicle movements. This noise analysis is intended to describe noise level impacts associated with the expected typical warehouse and distribution storage activities at the Project site. At the time of this analysis, no cold storage was planned at the Project site, and therefore is not analyzed in this report.

According to the *Brodiaea Commerce Center Traffic Impact Analysis* prepared by Urban Crossroads, Inc., the Project is expected to generate a net total of approximately 441 trip-ends per day (actual vehicles) with 29 AM peak hour trips and 31 PM peak hour trips. (2) The net Project trip generation includes 168 truck trip-ends per day from the proposed buildings within the Project site. This noise study relies on the net Project trips to accurately account for the effect of individual truck trips on the study area roadway network.

EXHIBIT 1-A: LOCATION MAP

EXHIBIT 1-B: SITE PLAN



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2 FUNDAMENTALS

Noise has been simply defined as "unwanted sound." Sound becomes unwanted when it interferes with normal activities, when it causes actual physical harm or when it has adverse effects on health. Noise is measured on a logarithmic scale of sound pressure level known as a decibel (dB). A-weighted decibels (dBA) approximate the subjective response of the human ear to broad frequency noise source by discriminating against very low and very high frequencies of the audible spectrum. They are adjusted to reflect only those frequencies which are audible to the human ear. Exhibit 2-A presents a summary of the typical noise levels and their subjective loudness and effects that are described in more detail below.

EXHIBIT 2-A: TYPICAL NOISE LEVELS

COMMON OUTDOOR ACTIVITIES	COMMON INDOOR ACTIVITIES	A - WEIGHTED SOUND LEVEL dBA	SUBJECTIVE LOUDNESS	EFFECTS OF NOISE
THRESHOLD OF PAIN		140	INTOLERABLE OR DEAFENING	HEARING LOSS
NEAR JET ENGINE		130		
		120		
JET FLY-OVER AT 300m (1000 ft)	ROCK BAND	110		
LOUD AUTO HORN		100	VERY NOISY	
GAS LAWN MOWER AT 1m (3 ft)		90		
DIESEL TRUCK AT 15m (50 ft), at 80 km/hr (50 mph)	FOOD BLENDER AT 1m (3 ft)	80		SPEECH INTERFERENCE
NOISY URBAN AREA, DAYTIME	VACUUM CLEANER AT 3m (10 ft)	70	LOUD	
HEAVY TRAFFIC AT 90m (300 ft)	NORMAL SPEECH AT 1m (3 ft)	60		
QUIET URBAN DAYTIME	LARGE BUSINESS OFFICE	50	MODERATE	
QUIET URBAN NIGHTTIME	THEATER, LARGE CONFERENCE ROOM (BACKGROUND)	40		SLEEP DISTURBANCE
QUIET SUBURBAN NIGHTTIME	LIBRARY	30	FAINT	NO EFFECT
QUIET RURAL NIGHTTIME	BEDROOM AT NIGHT, CONCERT HALL (BACKGROUND)	20		
	BROADCAST/RECORDING STUDIO	10	VERY FAINT	
LOWEST THRESHOLD OF HUMAN HEARING	LOWEST THRESHOLD OF HUMAN HEARING	0		

Source: Environmental Protection Agency Office of Noise Abatement and Control, Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety (EPA/ONAC 550/9-74-004) March 1974.

2.1 RANGE OF NOISE

Since the range of intensities that the human ear can detect is so large, the scale frequently used to measure intensity is a scale based on multiples of 10, the logarithmic scale. The scale for measuring intensity is the decibel scale. Each interval of 10 decibels indicates a sound energy ten times greater than before, which is perceived by the human ear as being roughly twice as loud. (3) The most common sounds vary between 40 dBA (very quiet) to 100 dBA (very loud). Normal conversation at three feet is roughly at 60 dBA, while loud jet engine noises equate to 110 dBA

at approximately 100 feet, which can cause serious discomfort. (4) Another important aspect of noise is the duration of the sound and the way it is described and distributed in time.

2.2 NOISE DESCRIPTORS

Environmental noise descriptors are generally based on averages, rather than instantaneous, noise levels. The most commonly used figure is the equivalent level (L_{eq}). Equivalent sound levels are not measured directly but are calculated from sound pressure levels typically measured in A-weighted decibels (dBA). The equivalent sound level (L_{eq}) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period and is commonly used to describe the "average" noise levels within the environment.

Peak hour or average noise levels, while useful, do not completely describe a given noise environment. Noise levels lower than peak hour may be disturbing if they occur during times when quiet is most desirable, namely evening and nighttime (sleeping) hours. To account for this, the Day-Night Average Noise Level (LDN) and the Community Noise Equivalent Level (CNEL), representing a composite 24-hour noise level is utilized. The LDN and CNEL are weighted averages of the intensity of a sound, with corrections for time of day, and averaged over 24 hours. The LDN time of day corrections include the addition of 10 decibels to dBA L_{eq} sound levels at night between 10:00 p.m. and 7:00 a.m. The CNEL time of day corrections require the addition of 5 decibels to dBA L_{eq} sound levels in the evening from 7:00 p.m. to 10:00 p.m., in addition to the corrections for the LDN. These additions are made to account for the noise sensitive time periods during the evening and night hours when sound appears louder. LDN and CNEL do not represent the actual sound level heard at any particular time, but rather represent the total sound exposure. The City of Moreno Valley relies on the 24-hour CNEL level to assess land use compatibility with transportation related noise sources, and therefore, this analysis uses the CNEL noise level to apply the more conservative evening hour corrections to the 24-hour noise levels.

2.3 SOUND PROPAGATION

When sound propagates over a distance, it changes in level and frequency content. The manner in which noise reduces with distance depends on the following factors.

2.3.1 GEOMETRIC SPREADING

Sound from a localized source (i.e., a stationary point source) propagates uniformly outward in a spherical pattern. The sound level attenuates (or decreases) at a rate of 6 dB for each doubling of distance from a point source. Highways consist of several localized noise sources on a defined path and hence can be treated as a line source, which approximates the effect of several point sources. Noise from a line source propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of 3 dB for each doubling of distance from a line source. (3)

2.3.2 GROUND ABSORPTION

The propagation path of noise from a highway to a receptor is usually very close to the ground. Noise attenuation from ground absorption and reflective wave canceling adds to the attenuation associated with geometric spreading. Traditionally, the excess attenuation has also been expressed in terms of attenuation per doubling of distance. This approximation is usually sufficiently accurate for distances of less than 200 ft. For acoustically hard sites (i.e., sites with a reflective surface between the source and the receptor, such as a parking lot or body of water), no excess ground attenuation is assumed. For acoustically absorptive or soft sites (i.e., those sites with an absorptive ground surface between the source and the receptor such as soft dirt, grass, or scattered bushes and trees), an excess ground attenuation value of 1.5 dB per doubling of distance is normally assumed. When added to the cylindrical spreading, the excess ground attenuation results in an overall drop-off rate of 4.5 dB per doubling of distance from a line source. (5)

2.3.3 ATMOSPHERIC EFFECTS

Receptors located downwind from a source can be exposed to increased noise levels relative to calm conditions, whereas locations upwind can have lowered noise levels. Sound levels can be increased at large distances (e.g., more than 500 feet) due to atmospheric temperature inversion (i.e., increasing temperature with elevation). Other factors such as air temperature, humidity, and turbulence can also have significant effects. (3)

2.3.4 SHIELDING

A large object or barrier in the path between a noise source and a receptor can substantially attenuate noise levels at the receptor. The amount of attenuation provided by shielding depends on the size of the object and the frequency content of the noise source. Shielding by trees and other such vegetation typically only has an “out of sight, out of mind” effect. That is, the perception of noise impact tends to decrease when vegetation blocks the line-of-sight to nearby resident. However, for vegetation to provide a substantial, or even noticeable, noise reduction, the vegetation area must be at least 15 feet in height, 100 feet wide and dense enough to completely obstruct the line-of sight between the source and the receiver. This size of vegetation may provide up to 5 dBA of noise reduction. The FHWA does not consider the planting of vegetation to be a noise abatement measure. (5)

2.4 NOISE CONTROL

Noise control is the process of obtaining an acceptable noise environment for a particular observation point or receptor by controlling the noise source, transmission path, receptor, or all three. This concept is known as the source-path-receptor concept. In general, noise control measures can be applied to any and all of these three elements.

2.5 NOISE BARRIER ATTENUATION

Effective noise barriers can reduce noise levels by 10 to 15 dBA, cutting the loudness of traffic noise in half. A noise barrier is most effective when placed close to the noise source or receptor.

Noise barriers, however, do have limitations. For a noise barrier to work, it must be high enough and long enough to block the path of the noise source. (5)

2.6 LAND USE COMPATIBILITY WITH NOISE

Some land uses are more tolerant of noise than others. For example, schools, hospitals, churches, and residences are more sensitive to noise intrusion than are commercial or industrial developments and related activities. As ambient noise levels affect the perceived amenity or livability of a development, so too can the mismanagement of noise impacts impair the economic health and growth potential of a community by reducing the area's desirability as a place to live, shop and work. For this reason, land use compatibility with the noise environment is an important consideration in the planning and design process. The FHWA encourages State and Local government to regulate land development in such a way that noise-sensitive land uses are either prohibited from being located adjacent to a highway, or that the developments are planned, designed, and constructed in such a way that noise impacts are minimized. (6)

2.7 COMMUNITY RESPONSE TO NOISE

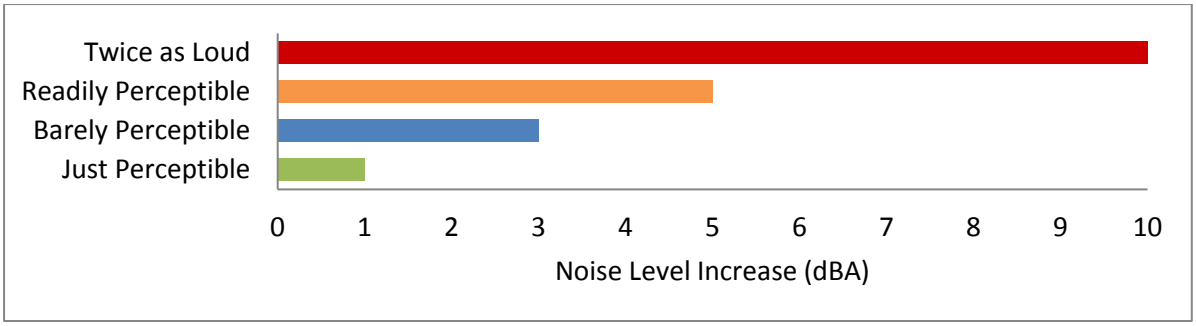
Community responses to noise may range from registering a complaint by telephone or letter, to initiating court action, depending upon each individual's susceptibility to noise and personal attitudes about noise. Several factors are related to the level of community annoyance including:

- Fear associated with noise producing activities;
- Socio-economic status and educational level;
- Perception that those affected are being unfairly treated;
- Attitudes regarding the usefulness of the noise-producing activity;
- Belief that the noise source can be controlled.

Approximately ten percent of the population has a very low tolerance for noise and will object to any noise not of their making. Consequently, even in the quietest environment, some complaints will occur. Another twenty-five percent of the population will not complain even in very severe noise environments. Thus, a variety of reactions can be expected from people exposed to any given noise environment. (7) Surveys have shown that about ten percent of the people exposed to traffic noise of 60 dBA will report being highly annoyed with the noise, and each increase of one dBA is associated with approximately two percent more people being highly annoyed. When traffic noise exceeds 60 dBA or aircraft noise exceeds 55 dBA, people may begin to complain. (7)

Despite this variability in behavior on an individual level, the population as a whole can be expected to exhibit the following responses to changes in noise levels as shown on Exhibit 2-B. An increase or decrease of 1 dBA cannot be perceived except in carefully controlled laboratory experiments, a change of 3 dBA are considered *barely perceptible*, and changes of 5 dBA are considered *readily perceptible*. (5)

EXHIBIT 2-B: NOISE LEVEL INCREASE PERCEPTION



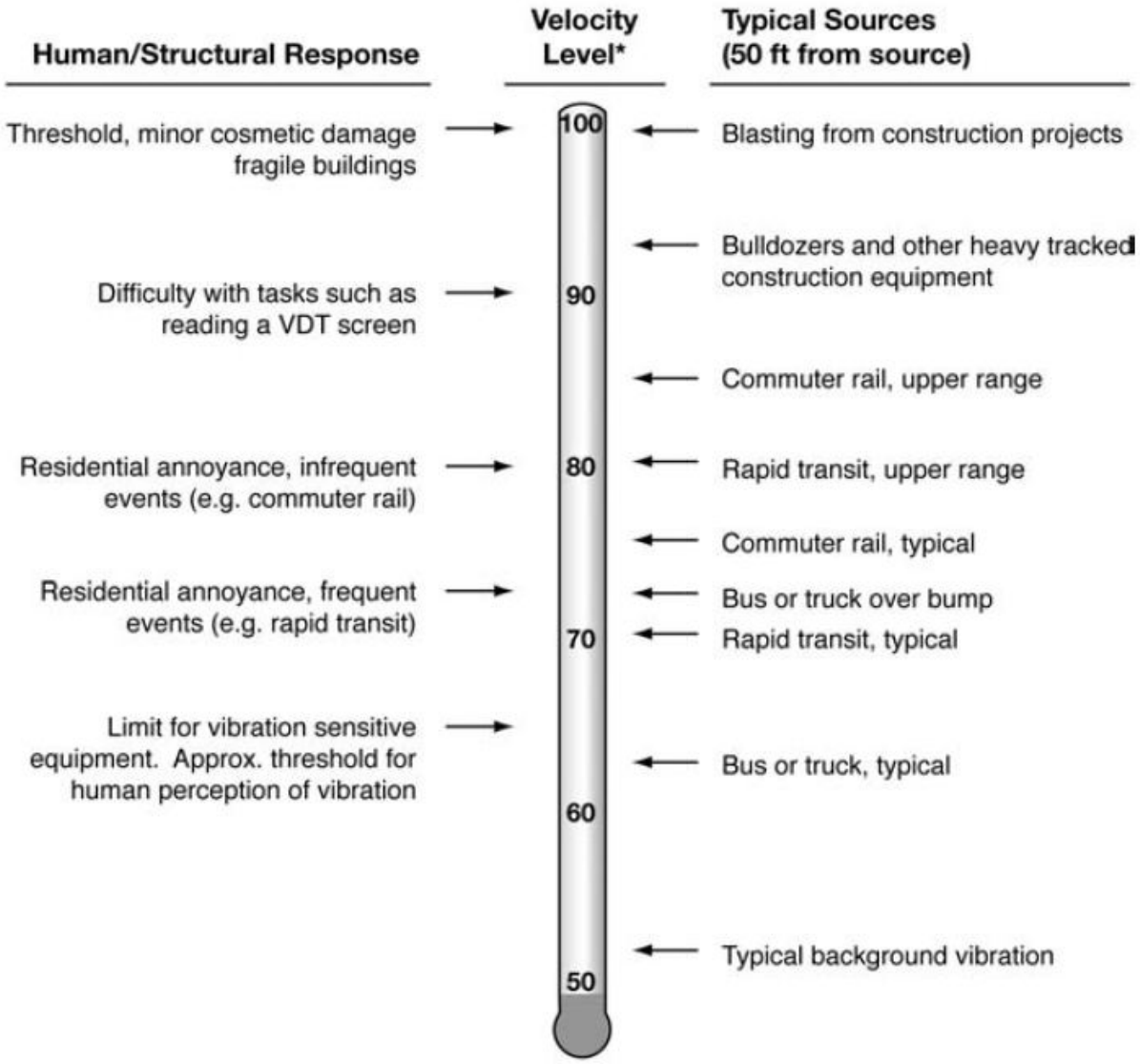
2.8 VIBRATION

According to the Federal Transit Administration (FTA) *Transit Noise Impact and Vibration Assessment* (8), vibration is the periodic oscillation of a medium or object. The rumbling sound caused by the vibration of room surfaces is called structure-borne noise. Sources of ground-borne vibrations include natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves, landslides) or human-made causes (e.g., explosions, machinery, traffic, trains, construction equipment). Vibration sources may be continuous, such as factory machinery, or transient, such as explosions. As is the case with airborne sound, ground-borne vibrations may be described by amplitude and frequency.

There are several different methods that are used to quantify vibration. The peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal. The PPV is most frequently used to describe vibration impacts to buildings, but is not always suitable for evaluating human response (annoyance) because it takes some time for the human body to respond to vibration signals. Instead, the human body responds to average vibration amplitude often described as the root mean square (RMS). The RMS amplitude is defined as the average of the squared amplitude of the signal, and is most frequently used to describe the effect of vibration on the human body. Decibel notation (VdB) is commonly used to measure RMS. Decibel notation (VdB) serves to reduce the range of numbers used to describe human response to vibration. Typically, ground-borne vibration generated by man-made activities attenuates rapidly with distance from the source of the vibration. Sensitive receivers for vibration include structures (especially older masonry structures), people (especially residents, the elderly, and sick), and vibration-sensitive equipment.

The background vibration-velocity level in residential areas is generally 50 VdB. Ground-borne vibration is normally perceptible to humans at approximately 65 VdB. For most people, a vibration-velocity level of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels. Typical outdoor sources of perceptible ground-borne vibration are construction equipment, steel-wheeled trains, and traffic on rough roads. If a roadway is smooth, the ground-borne vibration is rarely perceptible. The range of interest is from approximately 50 VdB, which is the typical background vibration-velocity level, to 100 VdB, which is the general threshold where minor damage can occur in fragile buildings. Exhibit 2-C illustrates common vibration sources and the human and structural response to ground-borne vibration.

EXHIBIT 2-C: TYPICAL LEVELS OF GROUND-BORNE VIBRATION



** RMS Vibration Velocity Level in VdB relative to 10^{-6} inches/second*

Source: Federal Transit Administration (FTA) Transit Noise Impact and Vibration Assessment.

3 REGULATORY SETTING

To limit population exposure to physically and/or psychologically damaging as well as intrusive noise levels, the federal government, the State of California, various county governments, and most municipalities in the state have established standards and ordinances to control noise. In most areas, automobile and truck traffic is the major source of environmental noise. Traffic activity generally produces an average sound level that remains fairly constant with time. Air and rail traffic, and commercial and industrial activities are also major sources of noise in some areas. Federal, state, and local agencies regulate different aspects of environmental noise. Federal and state agencies generally set noise standards for mobile sources such as aircraft and motor vehicles, while regulation of stationary sources is left to local agencies.

3.1 STATE OF CALIFORNIA NOISE REQUIREMENTS

The State of California regulates freeway noise, sets standards for sound transmission, provides occupational noise control criteria, identifies noise standards, and provides guidance for local land use compatibility. State law requires that each county and city adopt a General Plan that includes a Noise Element which is to be prepared according to guidelines adopted by the Governor's Office of Planning and Research (OPR). (9) The purpose of the Noise Element is to *limit the exposure of the community to excessive noise levels*.

3.2 STATE OF CALIFORNIA GREEN BUILDING STANDARDS CODE

The 2014 State of California's Green Building Standards Code contains mandatory measures for non-residential building construction in Section 5.507 on Environmental Comfort. (10) These noise standards are applied to new construction in California for the purpose of controlling interior noise levels resulting from exterior noise sources. The regulations specify that acoustical studies must be prepared when non-residential structures are developed in areas where the exterior noise levels exceed 65 dBA CNEL, such as within a noise contour of an airport, freeway, railroad, and other areas where noise contours are not readily available. If the development falls within an airport or freeway 65 dBA CNEL noise contour, the combined sound transmission class (STC) rating of the wall and roof-ceiling assemblies must be at least 50. For those developments in areas where noise contours are not readily available, and the noise level exceeds 65 dBA L_{eq} for any hour of operation, a wall and roof-ceiling combined STC rating of 45, and exterior windows with a minimum STC rating of 40 are required (Section 5.507.4.1).

3.3 CITY OF MORENO VALLEY GENERAL PLAN

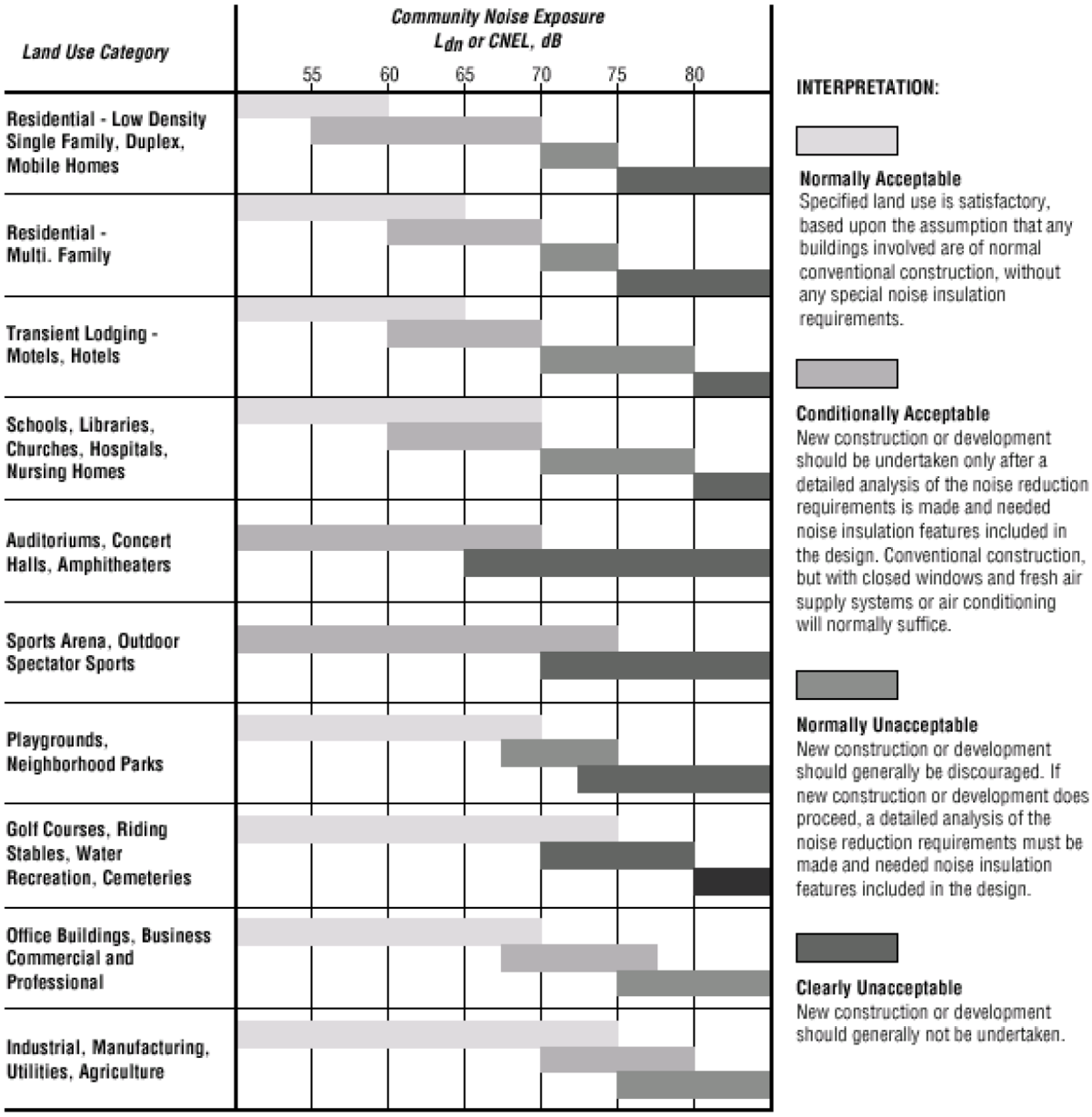
The City of Moreno Valley Noise Element typically provides the standards for land use compatibility for community noise exposure. However, the City of Moreno Valley General Plan does not include a noise element or specific transportation-related noise standards. Rather, noise is considered in the Environmental Safety section of the General Plan Safety Element. (11) While the General Plan provides background and noise fundamentals, it does not identify criteria to assess the impacts associated with off-site transportation-related noise impacts. Therefore,

for this analysis, the transportation noise criteria are derived from standards contained in the California Office of Planning and Research (OPR) *General Plan Guidelines*.

The OPR land use/noise compatibility standards are used by many California cities and counties and specify the maximum noise levels allowable for new developments impacted by transportation noise sources. The OPR land use/noise compatibility criteria, found in Figure 2 of the *General Plan Guidelines, Appendix C: Noise Element Guidelines,* identify the criteria for industrial land uses such as the Project, as shown on Exhibit 3-A. When the unmitigated exterior noise levels approach 70 dBA CNEL industrial land use is considered *normally acceptable*. With exterior noise levels ranging from 70 to 80 dBA CNEL, industrial land uses are considered *conditionally acceptable*, and with exterior noise levels greater than 80 dBA CNEL, they are considered *normally unacceptable*. For *normally unacceptable* land use, *new construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.* (9) For the purposes of this analysis, industrial land use such as the Project does not contain outdoor living areas requiring exterior noise mitigation as outlined in the OPR *General Plan Guidelines*, and therefore, only the interior noise levels experienced by employees at the Project site are evaluated against the appropriate noise level standards.

The purpose of the transportation noise criteria is to protect, create, and maintain an environment free from noise and vibration that may jeopardize the health or welfare of sensitive receptors, or degrade quality of life. City General Policies (City of Moreno Valley General Plan, pp.9-31, 9-32) act to ensure that when exterior noise levels exceed 65 dBA CNEL at sensitive receptors, mitigation is provided to ensure that interior noise levels of 45 dBA CNEL are maintained. General Plan Policies in this regard are consistent with, and support, the California Building Code interior noise standards.

EXHIBIT 3-A: LAND USE NOISE COMPATIBILITY CRITERIA



Source: OPR General Plan Guidelines, Appendix C: Noise Element Guidelines, Figure 2.

3.4 OPERATIONAL NOISE STANDARDS

To analyze noise impacts originating from a designated fixed location or private property such as the Brodiaea Commerce Center Project, stationary-source (operational) noise such as the expected idling trucks, delivery truck activities, backup alarms, as well as loading and unloading of dry goods, roof-top air conditioning units, and parking lot vehicle movements are typically evaluated against standards established under a City's Municipal Code.

The City of Moreno Valley Municipal Code, Chapter 11.80 *Noise Regulation*, provides performance standards and noise control guidelines for determining and mitigating non-transportation or stationary-source noise impacts from operations at private properties. The City of Moreno Valley Municipal Code defines *Maximum Sound Levels (in dB(A)) for Source Land Uses* in Table 11.80.030-2 for *Residential* and *Commercial* land uses. As defined by the Municipal Code, Section 11.80.020 *Definitions*, *Commercial* land use *means all uses of land not otherwise classified as residential,* and *Residential* land use *means all uses of land primarily for dwelling units, as well as hospitals, schools, colleges and universities, and places of religious assembly.* (12) For the purpose of this analysis, the Brodiaea Commerce Center Project is considered *Commercial* land use since it is not classified as residential. Based on this standard, the operational noise level limits for commercial land use, from Table 11.80.030-2, of 65 dBA L_{eq} during the daytime (8:00 a.m. to 10:00 p.m.) hours and 60 dBA L_{eq} during the nighttime (10:01 p.m. to 7:59 a.m.) hours shall apply to the operational noise from the Project.

Further, Section 11.80.030 (C) *Prohibited Acts*, *Nonimpulsive Sound Decibel Limits*, states: *No person shall maintain, create, operate or cause to be operated on private property any source of sound in such a manner as to create any nonimpulsive sound which exceeds the limits set forth for the source land use category (as defined in Section 11.80.020) in Table 11.80.030-2 when measured at a distance of two hundred (200) feet or more from the real property line of the source of the sound, if the sound occurs on a privately owned property…* (12) Therefore, at a distance of 200 feet from the property line, the Project's operational noise levels shall not exceed the 65 dBA L_{eq} daytime and 60 dBA L_{eq} nighttime noise level standards for commercial land uses, as shown on Table 3-1.

The City of Moreno Valley Municipal Code also identifies continuous sound level limits in Table 11.80.030-1 based on the Center for Disease Control and Prevention and the National Institute for Occupational Safety and Health (NIOSH) noise exposure guidelines. A division of the U.S. Department of Health and Human Services, NIOSH identifies a noise level threshold based on the duration of exposure to the source. The City of Moreno Valley noise level threshold starts at 90 dBA for more than eight hours per day, and for every increase, the exposure time is reduced. The City of Moreno Valley identifies noise level thresholds of 92 dBA for more than 6 hours per day, 95 dBA for more than 4 hour per day, 97 dBA for more than 3 hours per day, and up to 100 dBA for more than 2 hours per day. However, this noise study uses the more restrictive City of Moreno Valley noise level limits identified on Table 11.80.030-2 for source land uses in the Municipal Code, shown on Table 3-1 of this report, to evaluate the potential operational noise levels due to the operation of the Project.

TABLE 3-1: OPERATIONAL NOISE STANDARDS AT 200 FEET FROM THE SOURCE

Jurisdiction	Source Land Use	Time Period	Maximum Noise Level for Source Land Uses @ 200' (dBA L_{eq})[2]
City of Moreno Valley[1]	Commercial	Daytime (8:00 a.m. - 10:00 p.m.)	65
		Nighttime (10:01 p.m. - 7:59 a.m.)	60

[1] Source: City of Moreno Valley Municipal Code, Chapter 11.80 Noise Regulation, Table 11.80.030-2 Maximum Sound Levels (in dB(A)) for Source Land Uses when measured at a distance of 200 feet from the property line of the source land use (Appendix 3.1).
[2] Leq represents a steady state sound level containing the same total energy as a time varying signal over a given sample period.

3.5 CONSTRUCTION NOISE STANDARDS

To analyze noise impacts originating from the construction of the Brodiaea Commerce Center site, noise from construction activities are typically evaluated against standards established under a City's Municipal Code. The Municipal Code noise standards for construction are described below for the City of Moreno Valley to determine the potential noise impacts at nearby receiver locations. The construction-related noise standards are shown on Table 3-2.

The Municipal Code noise standards for construction are described below for the City of Moreno Valley to determine the potential noise impacts at nearby sensitive receiver locations. As a subset of its stationary-source noise regulations, the City Municipal Code establishes permitted hours of construction activity. More specifically, Municipal Code Section 11.80.030 (D) (7), *Construction and Demolition*, provides the following:

> *No person shall operate or cause operation of any tools or equipment used in construction, drilling, repair, alteration, or demolition work between the hours of eight p.m. and seven a.m. the following day such that the sound there from creates a noise disturbance, except for emergency work by public service utilities or for other work approved by the city manager or designee.*

Therefore, based on the Section 11.80.030 (D) (7) construction regulations, a construction-related *noise disturbance* occurs if Project construction activity occurs outside of the permitted hours. However, for this analysis, the stationary-source noise level limits of 65 dBA L_{eq} during the daytime hours and 60 dBA L_{eq} during the nighttime hours are used as appropriate thresholds for the nearby sensitive land uses (e.g. residential homes) in the Project study area. In addition, grading operations shall be limited to the hours identified in Section 8.21.050 (O) of 7:00 a.m. to 6:00 p.m., Monday through Friday, and 8:00 a.m. to 4:00 p.m. on weekends and holidays or as approved by the City Engineer. The City of Moreno Valley construction noise standards are shown on Table 3-2 and included in Appendix 3.1. As previously discussed in Section 3.4, the construction noise level threshold used in this noise study represents a conservative approach, since it is more restrictive than the continuous sound level limits of Table 11.80.030-1 of the City of Moreno Valley Municipal Code.

TABLE 3-2: CONSTRUCTION NOISE STANDARDS FROM THE SOURCE LAND USE

Jurisdiction	Permitted Hours of Construction Activity	Construction Noise Level Standard (dBA L_{eq})[2]	
		Daytime	Nighttime
City of Moreno Valley[1]	General Activity: 7:00 a.m. to 8:00 p.m. on any day. Grading is limited to 7:00 a.m. to 6:00 p.m. Monday to Friday; 8:00 a.m. to 4:00 p.m. on weekends and holidays.	65	60[3]

[1] Source: City of Moreno Valley Municipal Code, Section 11.80.030 (D) (7) and Section 8.21.050 (O) (Appendix 3.1).
[2] Acceptable threshold for determining the relative significance of short-term Project construction noise levels, based on the City of Moreno Valley stationary noise standards shown on Table 3-1.
[3] Any nighttime construction activity requires an exemption from the City of Moreno Valley Municipal Code as indicated in Section 11.80.030 (E) (8) for a special event permit (Section 11.80.040). The special event permit application shall be submitted to the City of Moreno Valley Planning Department for approval and meet the requirements of Municipal Code Section 11.80.040.
"Daytime" = 8:00 a.m. to 10:00 p.m.; "Nighttime" = 10:01 p.m. to 7:59 a.m.

3.6 VIBRATION STANDARDS

The City of Moreno Valley has not identified or adopted specific vibration level standards. However, the United States Department of Transportation Federal Transit Administration (FTA) provides guidelines for maximum-acceptable vibration criteria for different types of land uses. These guidelines allow 80 VdB for residential uses and buildings where people normally sleep. (8) Operational and construction activities can result in varying degrees of ground-borne vibration, depending on the equipment and methods used, distance to the affected structures and soil type. Construction vibration is generally associated with pile driving and rock blasting. Other construction equipment such as air compressors, light trucks, hydraulic loaders, etc., generates little or no ground vibration. Large bulldozers and loaded trucks can cause perceptible vibration levels proximate receptors. The FTA guidelines of 80 VdB for sensitive land uses provide a substantiated basis for determining the relative significance of potential Project-related vibration impacts due to on-site operational and construction activities.

3.7 MARCH AIR RESERVE BASE/INLAND PORT AIRPORT LAND USE COMPATIBILITY

The March Air Reserve Base/Inland Port Airport (MARB/IPA) is located approximately one mile southwest of the Project site. The *Riverside County Airport Land Use Compatibility Plan Policy Document* (RC ALUCP) includes the policies for determining the land use compatibility of the Project since it is located within 2 miles of an airport runway. Policy 4.1.5 *Noise Exposure for Other Land Uses* of the RC ALUCP requires that land uses, such as the industrial land use of the Project site, demonstrate compatibility with the acceptable noise levels on Table 2B. The Table 2B *Supporting Compatibility Criteria: Noise* matrix is shown on Exhibit 3-B and indicates that *clearly acceptable* industrial land uses experience exterior noise levels below 65 dBA CNEL. For *clearly acceptable* noise levels, *the activities associated with the specified land use can be carried out with essentially no interference from the noise exposure*. *Normally acceptable* noise levels for industrial land uses range from 65 to 70 dBA CNEL, and *noise is a factor to be considered in*

that slight interference with outdoor activities may occur. Conventional construction methods will eliminate most noise intrusions upon indoor activities. (13)

The noise contour boundaries used to determine the potential aircraft-related noise impacts at the Project site are found on Exhibit MA-4 of the RC ALUCP, and are presented on Exhibit 3-C of this report. Based on the RC ALUCP noise level contours for the MARB/IPA, the Project is located outside of the 60 dBA CNEL noise level contours, and therefore, represents *clearly acceptable* land use based on the RC ALUCP compatibility criteria, and no noise mitigation is required with typical building construction.

EXHIBIT 3-B: RC ALUCP SUPPORTING COMPATIBILITY CRITERIA: NOISE

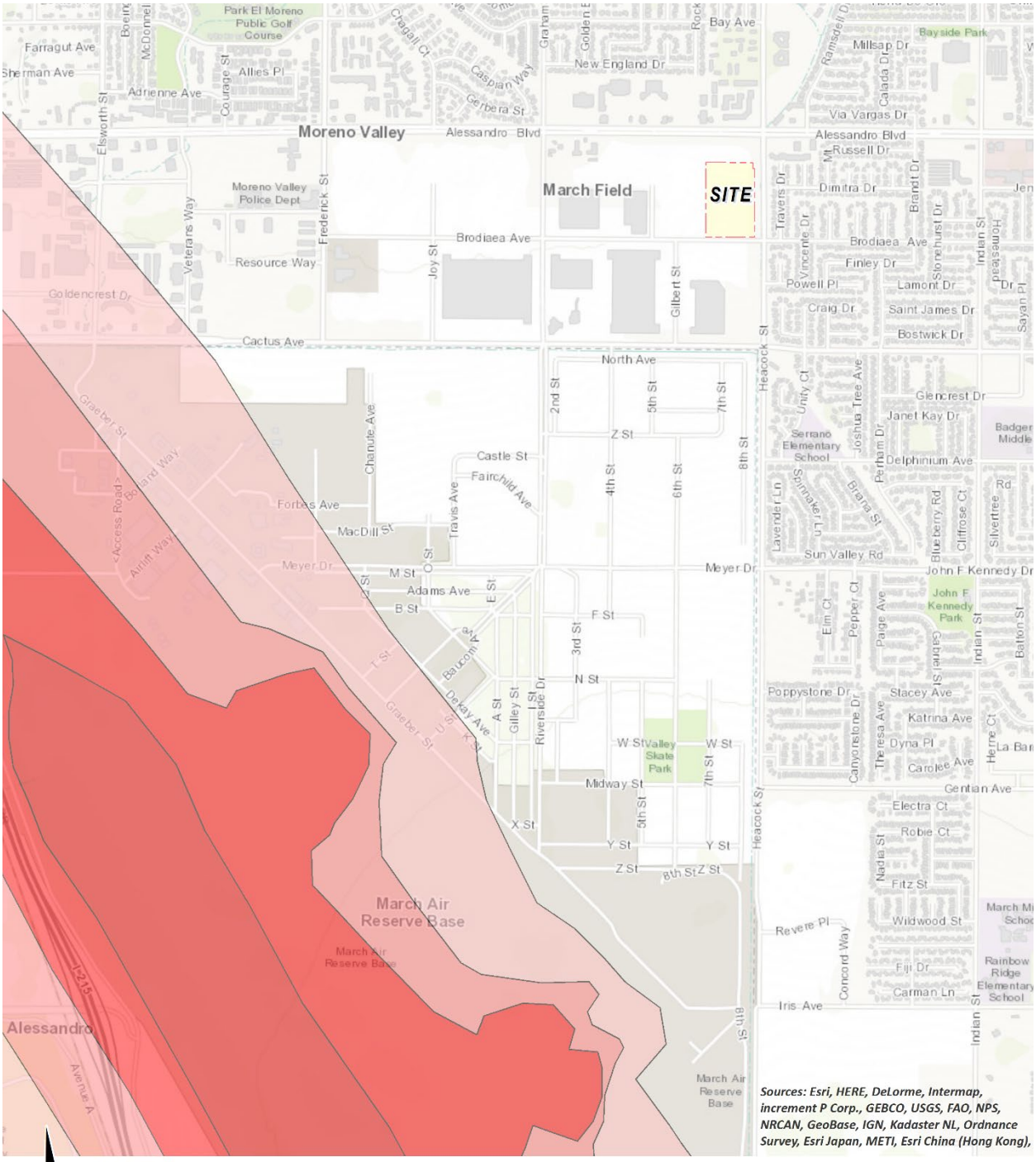
	CNEL (dB)				
Land Use Category	**50–55**	**55–60**	**60–65**	**65–70**	**70–75**
Residential *					
single-family, nursing homes, mobile homes	++	o	–	– –	– –
multi-family, apartments, condominiums	++	+	o	– –	– –
Public					
schools, libraries, hospitals	+	o	–	– –	– –
churches, auditoriums, concert halls	+	o	o	–	– –
transportation, parking, cemeteries	++	++	++	+	o
Commercial and Industrial					
offices, retail trade	++	+	o	o	–
service commercial, wholesale trade, warehousing, light industrial	++	++	+	o	o
general manufacturing, utilities, extractive industry	++	++	++	+	+
Agricultural and Recreational					
cropland	++	++	++	++	+
livestock breeding	++	+	o	o	–
parks, playgrounds, zoos	++	+	+	o	–
golf courses, riding stables, water recreation	++	++	+	o	o
outdoor spectator sports	++	+	+	o	–
amphitheaters	+	o	–	– –	– –

Land Use Acceptability		Interpretation/Comments
++	*Clearly Acceptable*	The activities associated with the specified land use can be carried out with essentially no interference from the noise exposure.
+	*Normally Acceptable*	Noise is a factor to be considered in that slight interference with outdoor activities may occur. Conventional construction methods will eliminate most noise intrusions upon indoor activities.
o	*Marginally Acceptable*	The indicated noise exposure will cause moderate interference with outdoor activities and with indoor activities when windows are open. The land use is acceptable on the conditions that outdoor activities are minimal and construction features which provide sufficient noise attenuation are used (e.g., installation of air conditioning so that windows can be kept closed). Under other circumstances, the land use should be discouraged.
–	*Normally Unacceptable*	Noise will create substantial interference with both outdoor and indoor activities. Noise intrusion upon indoor activities can be mitigated by requiring special noise insulation construction. Land uses which have conventionally constructed structures and/or involve outdoor activities which would be disrupted by noise should generally be avoided.
– –	*Clearly Unacceptable*	Unacceptable noise intrusion upon land use activities will occur. Adequate structural noise insulation is not practical under most circumstances. The indicated land use should be avoided unless strong overriding factors prevail and it should be prohibited if outdoor activities are involved.

* Subtract 5 dB for low-activity outlying airports (Chiriaco Summit and Desert Center)

Source: Riverside County Airport Land Use Compatibility Plan, Table 2B.

EXHIBIT 3-C: MARB/IPA FUTURE AIRPORT NOISE CONTOURS



LEGEND:

Unmitigated Noise Level Contour Boundaries

60 dBA CNEL | 65 dBA CNEL | 70 dBA CNEL | 75 dBA CNEL | 80 dBA CNEL

Source: Riverside County, Airport Land Use Compatibility Plan, Exhibit MA-4.

4 SIGNIFICANCE CRITERIA

The following significance criteria are based on guidance provided by Appendix G of the California Environmental Quality Act (CEQA) Guidelines. For the purposes of this report, impacts would be potentially significant if the Project results in or causes:

A. Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;

B. Exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels.

C. A substantial permanent increase in ambient noise levels in the Project vicinity above existing levels without the proposed Project; or

D. A substantial temporary or periodic increase in ambient noise levels in the Project vicinity above noise levels existing without the proposed Project.

E. For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, expose people residing or working in the Project area to excessive noise levels.

F. For a project within the vicinity of a private airstrip, expose people residing or working in the Project area to excessive noise levels.

While the CEQA Guidelines and the City of Moreno Valley General Plan Guidelines provide direction on noise compatibility and establish noise standards by land use type that are sufficient to assess the significance of noise impacts under CEQA Guideline A, they do not define the levels at which increases are considered substantial for use under Guidelines B, C, and D. CEQA Guidelines E and F apply to nearby public and private airports, if any, and the Project's land use compatibility. The closest airport which would require additional noise analysis under CEQA guidelines E and F is the MARB/IPA. As previously shown on Exhibit 3-C, the Project site is located outside of the 60 dBA CNEL noise level contour boundary of the MARB/IPA. Based on the RC ALUCP noise level contours for the MARB/IPA, the Project is located outside of the 60 dBA CNEL noise level contours, and therefore, represents *clearly acceptable* land use based on the RC ALUCP compatibility criteria, and no noise mitigation is required with typical building construction. Therefore, the potential impacts under CEQA guidelines E and F are considered to be *less than significant*, and are not further analyzed in this noise study.

4.1 NOISE-SENSITIVE RECEIVERS

Noise level increases resulting from the Project are evaluated based on the Appendix G CEQA Guidelines described above at the closest sensitive receiver locations. Under CEQA, consideration must be given to the magnitude of the increase, the existing ambient noise levels and the location of noise-sensitive receivers in order to determine if a noise increase represents a significant adverse environmental impact. This approach recognizes *that there is no single noise increase that renders the noise impact significant.* (14)

Unfortunately, there is no completely satisfactory way to measure the subjective effects of noise or of the corresponding human reactions of annoyance and dissatisfaction. This is primarily because of the wide variation in individual thresholds of annoyance and differing individual experiences with noise. Thus, an important way of determining a person's subjective reaction to a new noise is the comparison of it to the existing environment to which one has adapted—the so-called *ambient* environment.

In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will typically be judged. The Federal Interagency Committee on Noise (FICON) (15) developed guidance to be used for the assessment of project-generated increases in noise levels that consider the ambient noise level. The FICON recommendations are based on studies that relate aircraft noise levels to the percentage of persons highly annoyed by aircraft noise. Although the FICON recommendations were specifically developed to assess aircraft noise impacts, these recommendations are often used in environmental noise impact assessments involving the use of cumulative noise exposure metrics, such as the average-daily noise level (i.e., CNEL).

For example, if the ambient noise environment is quiet (<60 dBA) and the new noise source greatly increases the noise levels, an impact may occur if the noise criteria may be exceeded. Therefore, for this analysis, FICON identifies a *readily perceptible* 5 dBA or greater project-related noise level increase is considered a significant impact when the noise criteria for a given land use is exceeded. According to the FICON, in areas where the without project noise levels range from 60 to 65 dBA, a 3 dBA *barely perceptible* noise level increase appears to be appropriate for most people. When the without project noise levels already exceed 65 dBA, any increase in community noise louder than 1.5 dBA or greater is considered a significant impact if the noise criteria for a given land use is exceeded, since it likely contributes to an existing noise exposure exceedance. Table 4-1 below provides a summary of the potential noise impact significance criteria, based on guidance from FICON.

TABLE 4-1: SIGNIFICANCE OF NOISE IMPACTS AT NOISE-SENSITIVE RECEIVERS

Without Project Noise Level	Potential Significant Impact
< 60 dBA	5 dBA or more
60 - 65 dBA	3 dBA or more
> 65 dBA	1.5 dBA or more

Federal Interagency Committee on Noise (FICON), 1992.

4.2 NON-NOISE-SENSITIVE RECEIVERS

Since the City of Moreno Valley General Plan Safety Element does not identify criteria to assess the impacts associated with off-site transportation-related noise impacts, the OPR land use/noise compatibility criteria, found in Figure 2 of the *General Plan Guidelines, Appendix C: Noise Element Guidelines* is used to determine potential impacts at adjacent land uses. As previously shown on Exhibit 3-A, the *normally acceptable* exterior noise level for non-noise-sensitive land use, such as industrial use, is 70 dBA CNEL. Noise levels greater than 70 dBA CNEL are considered *conditionally acceptable* according to the *Land Use Compatibility Criteria*. (9)

To determine if Project-related traffic noise level increases are significant at off-site non-noise-sensitive land uses, a *readily perceptible* 5 dBA and *barely perceptible* 3 dBA criteria are used. When the without Project noise levels at the non-noise-sensitive land uses are below the *normally acceptable* 70 dBA CNEL compatibility criteria, a *readily perceptible* 5 dBA or greater noise level increase is considered a significant impact. When the without Project noise levels are greater than the *normally acceptable* 70 dBA CNEL land use compatibility criteria, a *barely perceptible* 3 dBA or greater noise level increase is considered a significant impact since the noise level criteria is already exceeded. The noise level increases used to determine significant impacts for non-noise-sensitive land uses is generally consistent with the FICON noise level increase thresholds for noise-sensitive land uses but instead rely on the OPR land use/noise compatibility criteria, found in Figure 2 of the *General Plan Guidelines, Appendix C: Noise Element Guidelines normally acceptable* 70 dBA CNEL exterior noise level criteria.

4.3 SIGNIFICANCE CRITERIA SUMMARY

Noise impacts shall be considered significant if any of the following occur as a direct result of the proposed development. Table 4-2 shows the significance criteria summary matrix.

OFF-SITE TRAFFIC NOISE

- When the noise levels at existing and future noise-sensitive land uses (e.g. residential, etc.):
  - are less than 60 dBA and the Project creates a *readily perceptible* 5 dBA or greater Project-related noise level increase; or
  - range from 60 to 65 dBA and the Project creates a *barely perceptible* 3 dBA or greater Project-related noise level increase; or
  - already exceed 65 dBA, and the Project creates a community noise level impact of greater than 1.5 dBA (FICON, 1992).
- When the noise levels at existing and future non-noise-sensitive land uses (e.g. industrial, etc.):
  - are less than the OPR General Plan Guidelines, Figure 2, *normally acceptable* 70 dBA and the Project creates a *readily perceptible* 5 dBA or greater Project-related noise level increase; or
  - are greater than the OPR General Plan Guidelines, Figure 2, *normally acceptable* 70 dBA and the Project creates a *barely perceptible* 3 dBA or greater Project-related noise level increase.

OPERATIONAL NOISE

- If Project-related operational (stationary source) noise levels:
  - exceed the 65 dBA L_{eq} daytime or 60 dBA L_{eq} nighttime noise level standards at 200 feet from the property line of the noise source (City of Moreno Valley Municipal Code, Table 11.80.030-2); or
  - exceed the 65 dBA L_{eq} daytime or 60 dBA L_{eq} nighttime noise level standards at residential receivers in the City of Moreno Valley (City of Moreno Valley Municipal Code, Table 11.80.030-2).
- If the existing ambient noise levels at the nearby noise-sensitive receivers near the Project site:
  - are less than 60 dBA L_{eq} and the Project creates a *readily perceptible* 5 dBA L_{eq} or greater Project-related noise level increase; or
  - range from 60 to 65 dBA L_{eq} and the Project creates a *barely perceptible* 3 dBA L_{eq} or greater Project-related noise level increase; or
  - already exceed 65 dBA L_{eq}, and the Project creates a community noise level increase of greater than 1.5 dBA L_{eq} (FICON, 1992).

CONSTRUCTION NOISE AND VIBRATION

- If Project-related construction activities:
  - occur at any time other than the permitted hours provided by the City of Moreno Valley Municipal Code; or
  - create noise levels at sensitive residential receivers in the City of Moreno Valley which exceed the short-term construction noise level threshold of 65 dBA L_{eq} during the daytime hours, or 60 dBA L_{eq} during the nighttime hours, or the continuous noise level limit of 90 dBA L_{eq} (based on the City of Moreno Valley Municipal Code, Table 11.80.030-2 source land use noise level limits, and the Table 11.80.030-1 continuous noise level limits).
- If short-term project generated construction source vibration levels could exceed the FTA maximum acceptable vibration standard of 80 vibration decibels (VdB) at noise-sensitive receiver locations.

TABLE 4-2: SIGNIFICANCE CRITERIA SUMMARY

Analysis	Receiving Land Use	Condition(s)	Significance Criteria	
			Daytime	Nighttime
Off-Site	Noise-Sensitive[1]	if ambient is < 60 dBA CNEL	≥ 5 dBA CNEL Project increase	
		if ambient is 60 - 65 dBA CNEL	≥ 3 dBA CNEL Project increase	
		if ambient is > 65 dBA CNEL	≥ 1.5 dBA CNEL Project increase	
	Non-Noise-Sensitive[2]	if ambient is < 70 dBA CNEL	≥ 5 dBA CNEL Project increase	
		if ambient is > 70 dBA CNEL	≥ 3 dBA CNEL Project increase	
Operational	Noise-Sensitive	At 200' from the property line of the source[3]	65 dBA L_{eq}	60 dBA L_{eq}
		At residential land use[3]	65 dBA L_{eq}	60 dBA L_{eq}
		if ambient is < 60 dBA L_{eq}[1]	≥ 5 dBA L_{eq} Project increase	
		if ambient is 60 - 65 dBA L_{eq}[1]	≥ 3 dBA L_{eq} Project increase	
		if ambient is > 65 dBA L_{eq}[1]	≥ 1.5 dBA L_{eq} Project increase	
		Vibration Level Threshold[4]	80 VdB	n/a
Construction	Noise-Sensitive	At residential land use[3]	65 dBA L_{eq}	60 dBA L_{eq}
			90 dBA L_{eq}	90 dBA L_{eq}
		Vibration Level Threshold[4]	80 VdB	n/a

[1] Source: FICON, 1992.
[2] Source: OPR General Plan Guidelines, Figure 2 Land Use Compatibility Criteria.
[3] Source: City of Moreno Valley Municipal Code, Chapter 11.80 Noise Regulation (Appendix 3.1).
[4] Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment, May 2006.
"Daytime" = 8:00 a.m. - 10:00 p.m.; "Nighttime" = 10:01 p.m. - 7:59 a.m.

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5 EXISTING NOISE LEVEL MEASUREMENTS

To assess the existing noise level environment, eight 24-hour noise level measurements were taken at potential receiver locations in the Project study area. The receiver locations were selected to describe and document the existing noise environment within the Project study area. Exhibit 5-A provides the boundaries of the Project study area and the noise level measurement locations. To fully describe the existing noise conditions, noise level measurements were collected by Urban Crossroads, Inc. on Wednesday, September 13th, 2017. Appendix 5.1 includes study area photos.

5.1 MEASUREMENT PROCEDURE AND CRITERIA

To describe the existing noise environment, the hourly noise levels were measured during typical weekday conditions over a 24-hour period. By collecting individual hourly noise level measurements, it is possible to describe the daytime and nighttime hourly noise levels and calculate the 24-hour CNEL. The long-term noise readings were recorded using Piccolo Type 2 integrating sound level meter and dataloggers. The Piccolo sound level meters were calibrated using a Larson-Davis calibrator, Model CAL 150. All noise meters were programmed in "slow" mode to record noise levels in "A" weighted form. The sound level meters and microphones were equipped with a windscreen during all measurements. All noise level measurement equipment satisfies the American National Standards Institute (ANSI) standard specifications for sound level meters ANSI S1.4-2014/IEC 61672-1:2013. (16)

5.2 NOISE MEASUREMENT LOCATIONS

The long-term noise level measurements were positioned as close to the nearest sensitive receiver locations as possible to assess the existing ambient hourly noise levels surrounding the Project site. Both Caltrans and the FTA recognize that it is not reasonable to collect noise level measurements that can fully represent every part of a private yard, patio, deck, or balcony normally used for human activity when estimating impacts for new development projects. This is demonstrated in the Caltrans general site location guidelines which indicate that, *sites must be free of noise contamination by sources other than sources of interest. Avoid sites located near sources such as barking dogs, lawnmowers, pool pumps, and air conditioners unless it is the express intent of the analyst to measure these sources*. (3) Further, FTA guidance states, t*hat it is not necessary nor recommended that existing noise exposure be determined by measuring at every noise-sensitive location in the project area. Rather, the recommended approach is to characterize the noise environment for clusters of sites based on measurements or estimates at representative locations in the community*. (8)

Based on recommendations of Caltrans and the FTA, it is not necessary to collect measurements at each individual building or residence, because each receiver measurement represents a group of buildings that share acoustical equivalence. (8) In other words, the area represented by the receiver shares similar shielding, terrain, and geometric relationship to the reference noise source. Receivers represent a location of noise sensitive areas and are used to estimate the future noise level impacts. Collecting reference ambient noise level measurements at the nearby

sensitive receiver locations allows for a comparison of the before and after Project noise levels and is necessary to assess potential noise impacts due to the Project's contribution to the ambient noise levels.

5.3 NOISE MEASUREMENT RESULTS

The noise measurements presented below focus on the average or equivalent sound levels (L_{eq}). The equivalent sound level (L_{eq}) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period. Table 5-1 identifies the hourly daytime (8:00 a.m. to 10:00 p.m.) and nighttime (10:01 p.m. to 7:59 a.m.) noise levels at each noise level measurement location consistent with the City of Moreno Valley Municipal Code. Appendix 5.2 provides a summary of the existing hourly ambient noise levels described below:

- Location L1 represents the noise levels northwest of the Project site on Alessandro Boulevard near an existing motel, car wash, and commercial uses. The noise level measurements collected show an overall 24-hour exterior noise level of 62.4 dBA CNEL. The hourly noise levels measured at location L1 ranged from 54.4 to 62.8 dBA L_{eq} during the daytime hours and from 48.8 to 59.8 dBA L_{eq} during the nighttime hours. The energy (logarithmic) average daytime noise level was calculated at 59.4 dBA L_{eq} with an average nighttime noise level of 55.5 dBA L_{eq}.
- Location L2 represents the noise levels west of the Project site near an existing industrial warehouse use on Brodiaea Avenue. The noise level measurements collected show an overall 24-hour exterior noise level of 54.9 dBA CNEL. The hourly noise levels measured at location L2 ranged from 45.7 to 54.8 dBA L_{eq} during the daytime hours and from 46.0 to 51.4 dBA L_{eq} during the nighttime hours. The energy (logarithmic) average daytime noise level was calculated at 49.7 dBA L_{eq} with an average nighttime noise level of 48.3 dBA L_{eq}.
- Located north of the Project site, location L3 represents the noise levels adjacent to existing residential homes west of Heacock Street. The noise level measurements collected show an overall 24-hour exterior noise level of 59.1 dBA CNEL. The hourly noise levels measured at location L3 ranged from 47.7 to 61.7 dBA L_{eq} during the daytime hours and from 46.2 to 55.8 dBA L_{eq} during the nighttime hours. The energy (logarithmic) average daytime noise level was calculated at 55.8 dBA L_{eq} with an average nighttime noise level of 51.5 dBA L_{eq}.
- Location L4 represents the noise levels northeast of the Project site on Ramsdell Drive near existing residential homes. The noise level measurements collected show an overall 24-hour exterior noise level of 64.7 dBA CNEL. The hourly noise levels measured at location L4 ranged from 56.9 to 62.4 dBA L_{eq} during the daytime hours and from 50.5 to 61.4 dBA L_{eq} during the nighttime hours. The energy (logarithmic) average daytime noise level was calculated at 60.7 dBA L_{eq} with an average nighttime noise level of 57.8 dBA L_{eq}.
- Location L5 represents the noise levels east of the Project site on Dimitra Drive near existing residential homes. The noise level measurements collected show an overall 24-hour exterior noise level of 62.3 dBA CNEL. The hourly noise levels measured at location L5 ranged from 53.1 to 64.1 dBA L_{eq} during the daytime hours and from 46.1 to 59.2 dBA L_{eq} during the nighttime hours. The energy (logarithmic) average daytime noise level was calculated at 59.3 dBA L_{eq} with an average nighttime noise level of 54.5 dBA L_{eq}.
- Located southeast of the Project site, location L6 represents the noise levels on Powell Place near existing residential homes. The noise level measurements collected show an overall 24-hour exterior noise level of 66.1 dBA CNEL. The hourly noise levels measured at location L6 ranged

from 58.9 to 66.4 dBA L_{eq} during the daytime hours and from 54.1 to 63.7 dBA L_{eq} during the nighttime hours. The energy (logarithmic) average daytime noise level was calculated at 62.0 dBA L_{eq} with an average nighttime noise level of 59.6 dBA L_{eq}.

- Location L7 represents the noise levels southeast of the Project site on Unity Court near existing residential homes and Serrano Elementary School. The noise level measurements collected show an overall 24-hour exterior noise level of 59.3 dBA CNEL. The hourly noise levels measured at location L7 ranged from 50.5 to 60.1 dBA L_{eq} during the daytime hours and from 46.6 to 58.9 dBA L_{eq} during the nighttime hours. The energy (logarithmic) average daytime noise level was calculated at 56.2 dBA L_{eq} with an average nighttime noise level of 53.1 dBA L_{eq}.
- Located south of the Project site, location L8 represents the noise levels adjacent to March Air Reserve Base and existing industrial uses on Cactus Avenue. The noise level measurements collected show an overall 24-hour exterior noise level of 64.4 dBA CNEL. The hourly noise levels measured at location L8 ranged from 55.5 to 62.6 dBA L_{eq} during the daytime hours and from 51.9 to 60.1 dBA L_{eq} during the nighttime hours. The energy (logarithmic) average daytime noise level was calculated at 60.2 dBA L_{eq} with an average nighttime noise level of 57.3 dBA L_{eq}.

Table 5-1 provides the (energy average) noise levels used to describe the daytime and nighttime ambient conditions. These daytime and nighttime energy average noise levels represent the average of all hourly noise levels observed during these time periods expressed as a single number. Appendix 5.2 provides summary worksheets of the noise levels for each hour as well as the minimum, maximum, L_1, L_2, L_5, L_8, L_{25}, L_{50}, L_{90}, L_{95}, and L_{99} percentile noise levels observed during the daytime and nighttime periods.

The background ambient noise levels in the Project study area are dominated by the transportation-related noise associated with the arterial roadway network. This includes the auto and heavy truck activities on Heacock Street near the noise level measurement locations. Additional background noise sources in the Project study area include aircraft overflight noise from the MARB/IPA. The 24-hour existing noise level measurements are shown on Table 5-1.

TABLE 5-1: 24-HOUR AMBIENT NOISE LEVEL MEASUREMENTS

Location[1]	Distance to Project Boundary (Feet)	Description	Energy Average Hourly Noise Level (dBA L_{eq})[2]		CNEL
			Daytime	Nighttime	
L1	1,390'	Located northwest of the Project site on Alessandro Boulevard near an existing motel, car wash, and commercial uses.	59.4	55.5	62.4
L2	650'	Located west of the Project site near an existing industrial warehouse use on Brodiaea Avenue.	49.7	48.3	54.9
L3	1,060'	Located north of the Project site adjacent to existing residential homes west of Heacock Street.	55.8	51.5	59.1
L4	920'	Located northeast of the Project site on Ramsdell Drive near existing residential homes.	60.7	57.8	64.7
L5	340'	Located east of the Project site on Dimitra Drive near existing residential homes.	59.3	54.5	62.3
L6	560'	Located southeast of the Project site on Powell Place near existing residential homes.	62.0	59.6	66.1
L7	2,365'	Located southeast of the Project site on Unity Court near existing residential homes and Serrano Elementary School.	56.2	53.1	59.3
L8	1,880'	Located south of the Project site adjacent to March Air Reserve Base and existing industrial uses on Cactus Avenue.	60.2	57.3	64.4

[1] See Exhibit 5-A for the noise level measurement locations.
[2] Energy (logarithmic) average hourly levels. The long-term 24-hour measurement worksheets are included in Appendix 5.2.
"Daytime" = 8:00 a.m. to 10:00 p.m.; "Nighttime" = 10:01 p.m. to 7:59 a.m.

EXHIBIT 5-A: NOISE MEASUREMENT LOCATIONS

LEGEND:

Noise Measurement Locations

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6 METHODS AND PROCEDURES

The following section outlines the methods and procedures used to model and analyze the future traffic noise environment.

6.1 FHWA TRAFFIC NOISE PREDICTION MODEL

The expected roadway noise level increases from vehicular traffic were calculated by Urban Crossroads, Inc. using a computer program that replicates the Federal Highway Administration (FHWA) Traffic Noise Prediction Model- FHWA-RD-77-108. (17) The FHWA Model arrives at a predicted noise level through a series of adjustments to the Reference Energy Mean Emission Level (REMEL). In California the national REMELs are substituted with the California Vehicle Noise (Calveno) Emission Levels. (18) Adjustments are then made to the REMEL to account for: the roadway classification (e.g., collector, secondary, major or arterial), the roadway active width (i.e., the distance between the center of the outermost travel lanes on each side of the roadway), the total average daily traffic (ADT), the travel speed, the percentages of automobiles, medium trucks, and heavy trucks in the traffic volume, the roadway grade, the angle of view (e.g., whether the roadway view is blocked), the site conditions ("hard" or "soft" relates to the absorption of the ground, pavement, or landscaping), and the percentage of total ADT which flows each hour throughout a 24-hour period. Research conducted by Caltrans has shown that the use of soft site conditions is appropriate for the application of the FHWA traffic noise prediction model used in this analysis. (19)

6.2 OFF-SITE TRAFFIC NOISE PREDICTION MODEL INPUTS

Table 6-1 presents the roadway parameters used to assess the Project's off-site transportation noise impacts. Table 6-1 identifies the nine study area roadway segments, the distance from the centerline to adjacent land use based on the functional roadway classifications according to the City of Moreno Valley *General Plan Circulation Element*, and the posted vehicle speeds. The ADT volumes used in this study are presented on Table 6-2 were obtained from the *Brodiaea Commerce Center Traffic Impact Analysis* prepared by Urban Crossroads, Inc., for the following traffic scenarios: Existing, Opening Year 2022, and Horizon Year 2040 conditions. (2) Table 6-3 provides the time of day (daytime, evening, and nighttime) vehicle splits.

TABLE 6-1: OFF-SITE ROADWAY PARAMETERS

ID	Roadway	Segment	Adjacent Land Use[1]	Distance from Centerline to Nearest Adjacent Land Use (Feet)[2]	Posted Speed Limit (mph)
1	Gilbert St.	s/o Brodiaea Av.	Business Park	39'	35
2	Gilbert St.	n/o Cactus Av.	Business Park	39'	35
3	Heacock St.	n/o Alessandro Bl.	Commercial	50'	40
4	Heacock St.	s/o Alessandro Bl.	Residential	50'	45
5	Heacock St.	n/o Brodiaea Av.	Residential	50'	45
6	Heacock St.	s/o Brodiaea Av.	Residential	50'	45
7	Alessandro Bl.	w/o Heacock St.	Commercial	55'	45
8	Brodiaea Av.	e/o Gilbert St.	Business Park	39'	35
9	Cactus Av.	w/o Gilbert St.	Business Park	55'	50

[1] Source: City of Moreno Valley General Plan Land Use Map, Figure 2-2.
[2] Distance to adjacent land use is based upon the right-of-way distances for each functional roadway classification provided in the General Plan Circulation Element.

TABLE 6-2: AVERAGE DAILY TRAFFIC VOLUMES

ID	Roadway	Segment	Average Daily Traffic Volumes[1]					
			Existing (2017)		Opening Year 2022		Horizon Year 2040	
			Without Project	With Project	Without Project	With Project	Without Project	With Project
1	Gilbert St.	s/o Brodiaea Av.	408	652	450	694	495	739
2	Gilbert St.	n/o Cactus Av.	120	364	132	376	146	390
3	Heacock St.	n/o Alessandro Bl.	18,143	18,173	21,080	21,110	23,188	23,218
4	Heacock St.	s/o Alessandro Bl.	15,349	15,436	18,906	18,993	20,797	20,884
5	Heacock St.	n/o Brodiaea Av.	14,222	14,309	16,662	16,749	18,328	18,415
6	Heacock St.	s/o Brodiaea Av.	13,646	13,700	15,978	16,032	17,576	17,630
7	Alessandro Bl.	w/o Heacock St.	29,558	29,602	34,775	34,819	46,442	46,486
8	Brodiaea Av.	e/o Gilbert St.	2,746	3,031	3,056	3,341	3,361	3,646
9	Cactus Av.	w/o Gilbert St.	37,521	37,765	53,421	53,665	58,763	59,007

[1] Source: Brodiaea Commerce Center Traffic Impact Analysis, Urban Crossroads, Inc., January 2018.

TABLE 6-3: TIME OF DAY VEHICLE SPLITS

Vehicle Type	Time of Day Splits[1]			Total of Time of Day Splits
	Daytime	Evening	Nighttime	
Autos	69.15%	11.65%	19.21%	100.00%
Medium Trucks	72.22%	3.33%	24.44%	100.00%
Heavy Trucks	79.78%	3.37%	16.85%	100.00%

[1] Based on existing ADT counts by vehicle type taken on 9/12/2017 on Brodiaea Avenue west of Heacock Street (Brodiaea Commerce Center Traffic Impact Analysis, Urban Crossroads, Inc., January 2018). All values rounded to the nearest one-hundredth. "Daytime" = 7:00 a.m. to 7:00 p.m.; "Evening" = 7:00 p.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

According to the *Brodiaea Commerce Center Traffic Impact Analysis* prepared by Urban Crossroads, Inc., the Project is expected to generate a net total of approximately 441 trip-ends per day (actual vehicles) with 29 AM peak hour trips and 31 PM peak hour trips. (2) The net Project trip generation includes 168 truck trip-ends per day from the proposed buildings within the Project site. This noise study relies on the net Project trips to accurately account for the effect of individual truck trips on the study area roadway network.

To quantify the off-site noise levels, the Project related truck trips were added to the heavy truck category in the FHWA noise prediction model. The addition of the Project related truck trips increases the percentage of heavy trucks in the vehicle mix. This approach recognizes that the FHWA noise prediction model is significantly influenced by the number of heavy trucks in the vehicle mix.

The 168 daily Project truck trip-ends were assigned to the seven-individual off-site study area roadway segments based on the Project truck trip distribution percentages documented in the *Traffic Impact Analysis*. Using the Project truck trips in combination with the Project trip distribution, Urban Crossroads, Inc. calculated the number of additional Project truck trips and vehicle mix percentages for each of the study area roadway segments. Table 6-4 shows the traffic flow by vehicle type (vehicle mix) used for all without Project traffic scenarios, and Tables 6-5 to 6-7 show the vehicle mixes used for the with Project traffic scenarios.

TABLE 6-4: WITHOUT PROJECT CONDITIONS VEHICLE MIX

Classification	Total Daily % Traffic Flow[1]			Total
	Autos	Medium Trucks	Heavy Trucks	
All Segments	93.48%	3.28%	3.24%	100.00%

[1] Based on existing ADT counts by vehicle type taken on 9/12/2017 on Brodiaea Avenue west of Heacock Street (Brodiaea Commerce Center Traffic Impact Analysis, Urban Crossroads, Inc., January 2018).

TABLE 6-5: EXISTING WITH PROJECT CONDITIONS VEHICLE MIX

ID	Roadway	Segment	With Project[1]			
			Autos	Medium Trucks	Heavy Trucks	Total[2]
1	Gilbert St.	s/o Brodiaea Av.	75.22%	6.65%	18.13%	100.00%
2	Gilbert St.	n/o Cactus Av.	60.78%	9.32%	29.90%	100.00%
3	Heacock St.	n/o Alessandro Bl.	93.40%	3.29%	3.31%	100.00%
4	Heacock St.	s/o Alessandro Bl.	93.31%	3.30%	3.39%	100.00%
5	Heacock St.	n/o Brodiaea Av.	93.29%	3.31%	3.40%	100.00%
6	Heacock St.	s/o Brodiaea Av.	93.51%	3.26%	3.23%	100.00%
7	Alessandro Bl.	w/o Heacock St.	93.43%	3.29%	3.28%	100.00%
8	Brodiaea Av.	e/o Gilbert St.	89.64%	3.96%	6.40%	100.00%
9	Cactus Av.	w/o Gilbert St.	93.17%	3.34%	3.50%	100.00%

[1] Source: Brodiaea Commerce Center Traffic Impact Analysis, Urban Crossroads, Inc., January 2018.
[2] Total of vehicle mix percentage values rounded to the nearest one-hundredth.

TABLE 6-6: OPENING YEAR 2022 WITH PROJECT CONDITIONS VEHICLE MIX

ID	Roadway	Segment	With Project[1]			
			Autos	Medium Trucks	Heavy Trucks	Total[2]
1	Gilbert St.	s/o Brodiaea Av.	76.33%	6.45%	17.23%	100.00%
2	Gilbert St.	n/o Cactus Av.	61.83%	9.12%	29.05%	100.00%
3	Heacock St.	n/o Alessandro Bl.	93.41%	3.29%	3.30%	100.00%
4	Heacock St.	s/o Alessandro Bl.	93.34%	3.30%	3.36%	100.00%
5	Heacock St.	n/o Brodiaea Av.	93.32%	3.30%	3.38%	100.00%
6	Heacock St.	s/o Brodiaea Av.	93.50%	3.27%	3.23%	100.00%
7	Alessandro Bl.	w/o Heacock St.	93.44%	3.28%	3.27%	100.00%
8	Brodiaea Av.	e/o Gilbert St.	90.00%	3.90%	6.11%	100.00%
9	Cactus Av.	w/o Gilbert St.	93.26%	3.32%	3.42%	100.00%

[1] Source: Brodiaea Commerce Center Traffic Impact Analysis, Urban Crossroads, Inc., January 2018.
[2] Total of vehicle mix percentage values rounded to the nearest one-hundredth.

TABLE 6-7: HORIZON YEAR 2040 WITH PROJECT CONDITIONS VEHICLE MIX

ID	Roadway	Segment	With Project[1]			
			Autos	Medium Trucks	Heavy Trucks	Total[2]
1	Gilbert St.	s/o Brodiaea Av.	77.37%	6.25%	16.37%	100.00%
2	Gilbert St.	n/o Cactus Av.	62.96%	8.91%	28.12%	100.00%
3	Heacock St.	n/o Alessandro Bl.	93.42%	3.29%	3.29%	100.00%
4	Heacock St.	s/o Alessandro Bl.	93.35%	3.30%	3.35%	100.00%
5	Heacock St.	n/o Brodiaea Av.	93.33%	3.30%	3.37%	100.00%
6	Heacock St.	s/o Brodiaea Av.	93.50%	3.27%	3.23%	100.00%
7	Alessandro Bl.	w/o Heacock St.	93.45%	3.28%	3.27%	100.00%
8	Brodiaea Av.	e/o Gilbert St.	90.29%	3.84%	5.87%	100.00%
9	Cactus Av.	w/o Gilbert St.	93.28%	3.31%	3.41%	100.00%

[1] Source: Brodiaea Commerce Center Traffic Impact Analysis, Urban Crossroads, Inc., January 2018.
[2] Total of vehicle mix percentage values rounded to the nearest one-hundredth.

6.3 VIBRATION ASSESSMENT

This analysis focuses on the potential ground-borne vibration associated with vehicular traffic and construction activities. Ground-borne vibration levels from automobile traffic are generally overshadowed by vibration generated by heavy trucks that roll over the same uneven roadway surfaces. However, due to the rapid drop-off rate of ground-borne vibration and the short duration of the associated events, vehicular traffic-induced ground-borne vibration is rarely perceptible beyond the roadway right-of-way, and rarely results in vibration levels that cause damage to buildings in the vicinity.

However, while vehicular traffic is rarely perceptible, construction has the potential to result in varying degrees of temporary ground vibration, depending on the specific construction activities and equipment used. Ground vibration levels associated with various types of construction equipment are summarized on Table 6-8. Based on the representative vibration levels presented for various construction equipment types, it is possible to estimate the human response (annoyance) using the following vibration assessment methods defined by the FTA. To describe the human response (annoyance) associated with vibration impacts the FTA provides the following equation: $L_{VdB}(D) = L_{VdB}(25\text{ ft}) - 30\log(D/25)$

TABLE 6-8: VIBRATION SOURCE LEVELS FOR CONSTRUCTION EQUIPMENT

Equipment	Vibration Decibels (VdB) at 25 feet[1]
Small bulldozer	58
Jackhammer	79
Loaded Trucks	86
Large bulldozer	87

Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment, May 2006.

7 OFF-SITE TRANSPORTATION NOISE IMPACTS

To assess the off-site transportation CNEL noise level impacts associated with the proposed Project, noise contours were developed based on the *Brodiaea Commerce Center Traffic Impact Analysis*. (2) Noise contour boundaries represent the equal levels of noise exposure and are measured in CNEL from the center of the roadway. Noise contours were developed for the following traffic scenarios:

- Existing Without / With Project: This scenario refers to the existing present-day noise conditions, without and with the proposed Project.
- Opening Year 2022 Without / With Project: This scenario refers to the background noise conditions at future Year 2022 without and with the proposed Project plus ambient growth. This scenario corresponds to Year 2022 conditions, and includes all cumulative projects identified in the *Traffic Impact Analysis*.
- Horizon Year 2040 Without / With Project: This scenario refers to the background noise conditions at future Year 2040 without and with the proposed Project plus ambient growth. This scenario corresponds to Year 2040 conditions, and includes all cumulative projects identified in the *Traffic Impact Analysis*.

7.1 TRAFFIC NOISE CONTOURS

To quantify the Project's operational traffic noise impacts on the surrounding areas, the changes in traffic noise levels on roadway segments surrounding the Project were calculated based on the changes in the average daily traffic volumes. Based on the noise impact significance criteria described in Section 4 and shown on Table 4-2, a significant off-site traffic noise level impact occurs:

- When the noise levels at existing and future noise-sensitive land uses (e.g. residential, etc.):
  - are less than 60 dBA and the Project creates a *readily perceptible* 5 dBA or greater Project-related noise level increase; or
  - range from 60 to 65 dBA and the Project creates a *barely perceptible* 3 dBA or greater Project-related noise level increase; or
  - already exceed 65 dBA, and the Project creates a community noise level impact of greater than 1.5 dBA (FICON, 1992).
- When the noise levels at existing and future non-noise-sensitive land uses (e.g. industrial, etc.):
  - are less than the OPR General Plan Guidelines, Figure 2, *normally acceptable* 70 dBA and the Project creates a *readily perceptible* 5 dBA or greater Project-related noise level increase; or
  - are greater than the OPR General Plan Guidelines, Figure 2, *normally acceptable* 70 dBA and the Project creates a *barely perceptible* 3 dBA or greater Project-related noise level increase.

Noise contours were used to assess the Project's incremental traffic-related noise impacts at land uses adjacent to roadways conveying Project traffic. The noise contours represent the distance to noise levels of a constant value and are measured from the center of the roadway for the 70,

65, and 60 dBA noise levels. The noise contours do not take into account the effect of any existing noise barriers or topography that may attenuate ambient noise levels. In addition, because the noise contours reflect modeling of vehicular noise on area roadways, they appropriately do not reflect noise contributions from the surrounding stationary noise sources within the Project study area. Tables 7-1 through 7-6 present a summary of the exterior traffic noise levels, without barrier attenuation, for the nine study area roadway segments analyzed from the without Project to the with Project conditions in each of the three timeframes: Existing, Opening Year 2022, and Horizon Year 2040 conditions. Appendix 7.1 includes a summary of the traffic noise level contours for each of the four traffic scenarios.

TABLE 7-1: EXISTING WITHOUT PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	Adjacent Planned (Existing) Land Use[1]	CNEL at Nearest Adjacent Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Gilbert St.	s/o Brodiaea Av.	Business Park	55.9	RW	RW	RW
2	Gilbert St.	n/o Cactus Av.	Business Park	50.6	RW	RW	RW
3	Heacock St.	n/o Alessandro Bl.	Commercial	72.5	73	158	340
4	Heacock St.	s/o Alessandro Bl.	Residential	72.9	77	167	359
5	Heacock St.	n/o Brodiaea Av.	Residential	72.5	74	159	342
6	Heacock St.	s/o Brodiaea Av.	Residential	72.3	72	154	332
7	Alessandro Bl.	w/o Heacock St.	Commercial	76.1	141	303	652
8	Brodiaea Av.	e/o Gilbert St.	Business Park	64.2	RW	RW	74
9	Cactus Av.	w/o Gilbert St.	Business Park	78.1	192	413	890

[1] Source: City of Moreno Valley General Plan Land Use Map, Figure 2-2.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-2: EXISTING WITH PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	Adjacent Planned (Existing) Land Use[1]	CNEL at Nearest Adjacent Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Gilbert St.	s/o Brodiaea Av.	Business Park	63.3	RW	RW	65
2	Gilbert St.	n/o Cactus Av.	Business Park	62.7	RW	RW	59
3	Heacock St.	n/o Alessandro Bl.	Commercial	72.5	74	159	343
4	Heacock St.	s/o Alessandro Bl.	Residential	73.0	79	170	366
5	Heacock St.	n/o Brodiaea Av.	Residential	72.6	75	162	348
6	Heacock St.	s/o Brodiaea Av.	Residential	72.3	72	154	333
7	Alessandro Bl.	w/o Heacock St.	Commercial	76.1	141	304	655
8	Brodiaea Av.	e/o Gilbert St.	Business Park	66.4	RW	49	105
9	Cactus Av.	w/o Gilbert St.	Business Park	78.3	197	424	914

[1] Source: City of Moreno Valley General Plan Land Use Map, Figure 2-2.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-3: OPENING YEAR 2022 WITHOUT PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	Adjacent Planned (Existing) Land Use[1]	CNEL at Nearest Adjacent Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Gilbert St.	s/o Brodiaea Av.	Business Park	56.3	RW	RW	RW
2	Gilbert St.	n/o Cactus Av.	Business Park	51.0	RW	RW	RW
3	Heacock St.	n/o Alessandro Bl.	Commercial	73.1	81	175	376
4	Heacock St.	s/o Alessandro Bl.	Residential	73.8	89	192	413
5	Heacock St.	n/o Brodiaea Av.	Residential	73.2	82	176	380
6	Heacock St.	s/o Brodiaea Av.	Residential	73.0	80	171	369
7	Alessandro Bl.	w/o Heacock St.	Commercial	76.8	157	337	727
8	Brodiaea Av.	e/o Gilbert St.	Business Park	64.6	RW	RW	79
9	Cactus Av.	w/o Gilbert St.	Business Park	79.7	243	523	1126

[1] Source: City of Moreno Valley General Plan Land Use Map, Figure 2-2.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-4: OPENING YEAR 2022 WITH PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	Adjacent Planned (Existing) Land Use[1]	CNEL at Nearest Adjacent Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Gilbert St.	s/o Brodiaea Av.	Business Park	63.4	RW	RW	66
2	Gilbert St.	n/o Cactus Av.	Business Park	62.8	RW	RW	60
3	Heacock St.	n/o Alessandro Bl.	Commercial	73.2	82	176	379
4	Heacock St.	s/o Alessandro Bl.	Residential	73.8	90	194	419
5	Heacock St.	n/o Brodiaea Av.	Residential	73.3	83	179	386
6	Heacock St.	s/o Brodiaea Av.	Residential	73.0	80	172	370
7	Alessandro Bl.	w/o Heacock St.	Commercial	76.8	157	339	730
8	Brodiaea Av.	e/o Gilbert St.	Business Park	66.7	RW	51	109
9	Cactus Av.	w/o Gilbert St.	Business Park	79.8	247	533	1148

[1] Source: City of Moreno Valley General Plan Land Use Map, Figure 2-2.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-5: HORIZON YEAR 2040 WITHOUT PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	Adjacent Planned (Existing) Land Use[1]	CNEL at Nearest Adjacent Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Gilbert St.	s/o Brodiaea Av.	Business Park	56.7	RW	RW	RW
2	Gilbert St.	n/o Cactus Av.	Business Park	51.4	RW	RW	RW
3	Heacock St.	n/o Alessandro Bl.	Commercial	73.6	86	186	401
4	Heacock St.	s/o Alessandro Bl.	Residential	74.2	95	204	440
5	Heacock St.	n/o Brodiaea Av.	Residential	73.6	87	188	405
6	Heacock St.	s/o Brodiaea Av.	Residential	73.4	85	183	393
7	Alessandro Bl.	w/o Heacock St.	Commercial	78.1	190	409	881
8	Brodiaea Av.	e/o Gilbert St.	Business Park	65.0	RW	39	85
9	Cactus Av.	w/o Gilbert St.	Business Park	80.1	259	557	1200

[1] Source: City of Moreno Valley General Plan Land Use Map, Figure 2-2.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-6: HORIZON YEAR 2040 WITH PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	Adjacent Planned (Existing) Land Use[1]	CNEL at Nearest Adjacent Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Gilbert St.	s/o Brodiaea Av.	Business Park	63.5	RW	RW	67
2	Gilbert St.	n/o Cactus Av.	Business Park	62.8	RW	RW	60
3	Heacock St.	n/o Alessandro Bl.	Commercial	73.6	87	187	403
4	Heacock St.	s/o Alessandro Bl.	Residential	74.3	96	207	446
5	Heacock St.	n/o Brodiaea Av.	Residential	73.7	88	191	411
6	Heacock St.	s/o Brodiaea Av.	Residential	73.4	85	183	394
7	Alessandro Bl.	w/o Heacock St.	Commercial	78.1	190	410	884
8	Brodiaea Av.	e/o Gilbert St.	Business Park	67.0	RW	53	114
9	Cactus Av.	w/o Gilbert St.	Business Park	80.2	263	567	1221

[1] Source: City of Moreno Valley General Plan Land Use Map, Figure 2-2.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

7.2 EXISTING CONDITION PROJECT TRAFFIC NOISE LEVEL CONTRIBUTIONS

Table 7-1 presents the Existing without Project conditions CNEL noise levels. The Exiting without Project exterior noise levels are expected to range from 50.6 to 78.1 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 7-2 shows the Existing with Project conditions will range from 62.7 to 78.3 dBA CNEL. As shown on Table 7-7 the Project is expected to generate an exterior noise level increase of up to 0.1 dBA CNEL adjacent to noise-sensitive land uses, which will satisfy the significance thresholds for noise-sensitive land uses identified in Section 4. Therefore, the off-site Project-related traffic noise level increase is considered a *less than significant* impact under Existing conditions at noise-sensitive uses.

Table 7-7 also shows that the Project is expected to generate exterior noise level increases exceeding the non-noise-sensitive land use significance criteria on Gilbert Street, south of Brodiaea Avenue and north of Cactus Avenue, with Project-related increases ranging from 7.4 to 12.1 dBA CNEL. However, the with Project traffic noise levels are shown to range from 62.7 to 63.3 dBA CNEL under Existing with Project conditions, which will remain below the *normally acceptable* land use compatibility criteria previously shown on Exhibit 3-A for non-noise-sensitive use (e.g., business park). As such, the off-site Project-related traffic noise level increases are considered *less than significant* impacts under Existing conditions at non-noise-sensitive uses.

TABLE 7-7: EXISTING CONDITION OFF-SITE PROJECT-RELATED TRAFFIC NOISE IMPACT

ID	Road	Segment	Adjacent Planned (Existing) Land Use[1]	CNEL at Adjacent Land Use (dBA)[2]			Noise-Sensitive Land Use?[3]	Threshold Exceeded?[4]	Significant Impact?
				No Project	With Project	Project Addition			
1	Gilbert St.	s/o Brodiaea Av.	Business Park	55.9	63.3	7.4	No	Yes	No[5]
2	Gilbert St.	n/o Cactus Av.	Business Park	50.6	62.7	12.1	No	Yes	No[5]
3	Heacock St.	n/o Alessandro Bl.	Commercial	72.5	72.5	0.0	No	No	No
4	Heacock St.	s/o Alessandro Bl.	Residential	72.9	73.0	0.1	Yes	No	No
5	Heacock St.	n/o Brodiaea Av.	Residential	72.5	72.6	0.1	Yes	No	No
6	Heacock St.	s/o Brodiaea Av.	Residential	72.3	72.3	0.0	Yes	No	No
7	Alessandro Bl.	w/o Heacock St.	Commercial	76.1	76.1	0.0	No	No	No
8	Brodiaea Av.	e/o Gilbert St.	Business Park	64.2	66.4	2.2	No	No	No
9	Cactus Av.	w/o Gilbert St.	Business Park	78.1	78.3	0.2	No	No	No

[1] Source: City of Moreno Valley General Plan Land Use Map, Figure 2-2.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.
[3] "Yes" = Existing, noise-sensitive land uses adjacent to the study area roadway segment.
[4] Significance Criteria (Section 4).
[5] The with Project off-site traffic noise levels remain below the normally compatible land use compatibility criteria (70 dBA CNEL) for the adjacent business park use, and therefore, the impact is considered less than significant.

7.3 OPENING YEAR 2022 CUMULATIVE PROJECT TRAFFIC NOISE LEVEL CONTRIBUTIONS

Table 7-8 presents a comparison of the Opening Year 2022 without and with Project conditions CNEL noise levels. Table 7-3 shows that the exterior noise levels without accounting for any noise attenuation features are expected to range from 51.0 to 79.7 dBA CNEL without the Project. Table 7-4 presents the Opening Year 2022 with Project conditions noise level contours that are expected to range from 62.8 to 79.8 dBA CNEL. As shown on Table 7-8 the Project is expected to generate an exterior noise level increase of up to 0.1 dBA CNEL adjacent to noise-sensitive land uses, which will satisfy the significance thresholds for noise-sensitive land uses identified in Section 4. Therefore, the off-site Project-related traffic noise level increase is considered a *less than significant* impact under Opening Year 2022 conditions at noise-sensitive uses.

Table 7-8 also shows that the Project is expected to generate exterior noise level increases exceeding the non-noise-sensitive land use significance criteria on Gilbert Street, south of Brodiaea Avenue and north of Cactus Avenue, with Project-related increases ranging from 7.1 to 11.8 dBA CNEL. However, the with Project traffic noise levels are shown to range from 62.8 to 63.4 dBA CNEL under Opening Year 2022 with Project conditions, which will remain below the *normally acceptable* land use compatibility criteria previously shown on Exhibit 3-A for non-noise-sensitive use (e.g., business park). As such, the off-site Project-related traffic noise level increases are considered *less than significant* impacts under Opening Year 2022 conditions at non-noise-sensitive uses.

TABLE 7-8: OPENING YEAR 2022 OFF-SITE PROJECT-RELATED TRAFFIC NOISE IMPACTS

ID	Road	Segment	Adjacent Planned (Existing) Land Use[1]	CNEL at Adjacent Land Use (dBA)[2]			Noise-Sensitive Land Use?[3]	Threshold Exceeded?[4]	Significant Impact?
				No Project	With Project	Project Addition			
1	Gilbert St.	s/o Brodiaea Av.	Business Park	56.3	63.4	7.1	No	Yes	No
2	Gilbert St.	n/o Cactus Av.	Business Park	51.0	62.8	11.8	No	Yes	No
3	Heacock St.	n/o Alessandro Bl.	Commercial	73.1	73.2	0.1	No	No	No
4	Heacock St.	s/o Alessandro Bl.	Residential	73.8	73.8	0.0	Yes	No	No
5	Heacock St.	n/o Brodiaea Av.	Residential	73.2	73.3	0.1	Yes	No	No
6	Heacock St.	s/o Brodiaea Av.	Residential	73.0	73.0	0.0	Yes	No	No
7	Alessandro Bl.	w/o Heacock St.	Commercial	76.8	76.8	0.0	No	No	No
8	Brodiaea Av.	e/o Gilbert St.	Business Park	64.6	66.7	2.1	No	No	No
9	Cactus Av.	w/o Gilbert St.	Business Park	79.7	79.8	0.1	No	No	No

[1] Source: City of Moreno Valley General Plan Land Use Map, Figure 2-2.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.
[3] "Yes" = Existing, noise-sensitive land uses adjacent to the study area roadway segment.
[4] Significance Criteria (Section 4).
[5] The with Project off-site traffic noise levels remain below the normally compatible land use compatibility criteria (70 dBA CNEL) for the adjacent business park use, and therefore, the impact is considered less than significant.

7.4 HORIZON YEAR 2040 CUMULATIVE PROJECT TRAFFIC NOISE LEVEL CONTRIBUTIONS

Table 7-9 presents a comparison of the Horizon Year 2040 without and with Project conditions CNEL noise levels. Table 7-5 shows that the exterior noise levels without accounting for any noise attenuation features are expected to range from 51.4 to 80.1 dBA CNEL without the Project. Table 7-6 presents the Horizon Year 2040 with Project conditions noise level contours that are expected to range from 62.8 to 80.2 dBA CNEL. As shown on Table 7-9 the Project is expected to generate an exterior noise level increase of up to 0.1 dBA CNEL adjacent to noise-sensitive land uses, which will satisfy the significance thresholds for noise-sensitive land uses identified in Section 4. Therefore, the off-site Project-related traffic noise level increase is considered a *less than significant* impact under Horizon Year 2040 conditions at noise-sensitive uses.

Table 7-9 also shows that the Project is expected to generate exterior noise level increases exceeding the non-noise-sensitive land use significance criteria on Gilbert Street, south of Brodiaea Avenue and north of Cactus Avenue, with Project-related increases ranging from 6.8 to 11.4 dBA CNEL. However, the with Project traffic noise levels are shown to range from 62.8 to 63.5 dBA CNEL under Horizon Year 2040 with Project conditions, which will remain below the *normally acceptable* land use compatibility criteria previously shown on Exhibit 3-A for non-noise-sensitive use (e.g., business park). As such, the off-site Project-related traffic noise level increases are considered *less than significant* impacts under Horizon Year 2040 conditions at non-noise-sensitive uses.

TABLE 7-9: HORIZON YEAR 2040 OFF-SITE PROJECT-RELATED TRAFFIC NOISE IMPACTS

ID	Road	Segment	Adjacent Planned (Existing) Land Use[1]	CNEL at Adjacent Land Use (dBA)[2]			Noise-Sensitive Land Use?[3]	Threshold Exceeded?[4]	Significant Impact?
				No Project	With Project	Project Addition			
1	Gilbert St.	s/o Brodiaea Av.	Business Park	56.7	63.5	6.8	No	Yes	No
2	Gilbert St.	n/o Cactus Av.	Business Park	51.4	62.8	11.4	No	Yes	No
3	Heacock St.	n/o Alessandro Bl.	Commercial	73.6	73.6	0.0	No	No	No
4	Heacock St.	s/o Alessandro Bl.	Residential	74.2	74.3	0.1	Yes	No	No
5	Heacock St.	n/o Brodiaea Av.	Residential	73.6	73.7	0.1	Yes	No	No
6	Heacock St.	s/o Brodiaea Av.	Residential	73.4	73.4	0.0	Yes	No	No
7	Alessandro Bl.	w/o Heacock St.	Commercial	78.1	78.1	0.0	No	No	No
8	Brodiaea Av.	e/o Gilbert St.	Business Park	65.0	67.0	2.0	No	No	No
9	Cactus Av.	w/o Gilbert St.	Business Park	80.1	80.2	0.1	No	No	No

[1] Source: City of Moreno Valley General Plan Land Use Map, Figure 2-2.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.
[3] "Yes" = Existing, noise-sensitive land uses adjacent to the study area roadway segment.
[4] Significance Criteria (Section 4).
[5] The with Project off-site traffic noise levels remain below the normally compatible land use compatibility criteria (70 dBA CNEL) for the adjacent business park use, and therefore, the impact is considered less than significant.

8 RECEIVER LOCATIONS

To assess the potential for long-term operational and short-term construction noise impacts, the following seven receiver locations, as shown on Exhibit 8-A, were identified as representative locations for analysis. Sensitive receivers are generally defined as locations where people reside or where the presence of unwanted sound could otherwise adversely affect the use of the land. Noise-sensitive land uses are generally considered to include: schools, hospitals, single-family dwellings, mobile home parks, churches, libraries, and recreation areas. Moderately noise-sensitive land uses typically include: multi-family dwellings, hotels, motels, dormitories, out-patient clinics, cemeteries, golf courses, country clubs, athletic/tennis clubs, and equestrian clubs. Land uses that are considered relatively insensitive to noise include business, commercial, and professional developments. Land uses that are typically not affected by noise include: industrial, manufacturing, utilities, agriculture, natural open space, undeveloped land, parking lots, warehousing, liquid and solid waste facilities, salvage yards, and transit terminals.

Representative sensitive receivers in the Project study area include single-family residential homes, a motel, and a church. Other sensitive land uses in the Project study area that are located at greater distances than those identified in this noise study will experience lower noise levels than those presented in this report due to the additional attenuation from distance and the shielding of intervening structures.

R1: Located approximately 1,507 feet west of the Project site, R1 represents an existing Motel 7 on Alessandro Boulevard. A long-term noise measurement was taken near this location, L1, to describe the existing ambient noise environment.

R2: Location R2 represents existing residential homes located roughly 1,055 feet north of the Project site west of Heacock Street. A long-term noise measurement was taken near this location, L3, to describe the existing ambient noise environment.

R3: Location R3 represents the existing Oasis Community Church located north of the Project site at approximately 474 feet on Alessandro Boulevard. A long-term noise measurement was taken near this location, L3, to describe the existing ambient noise environment.

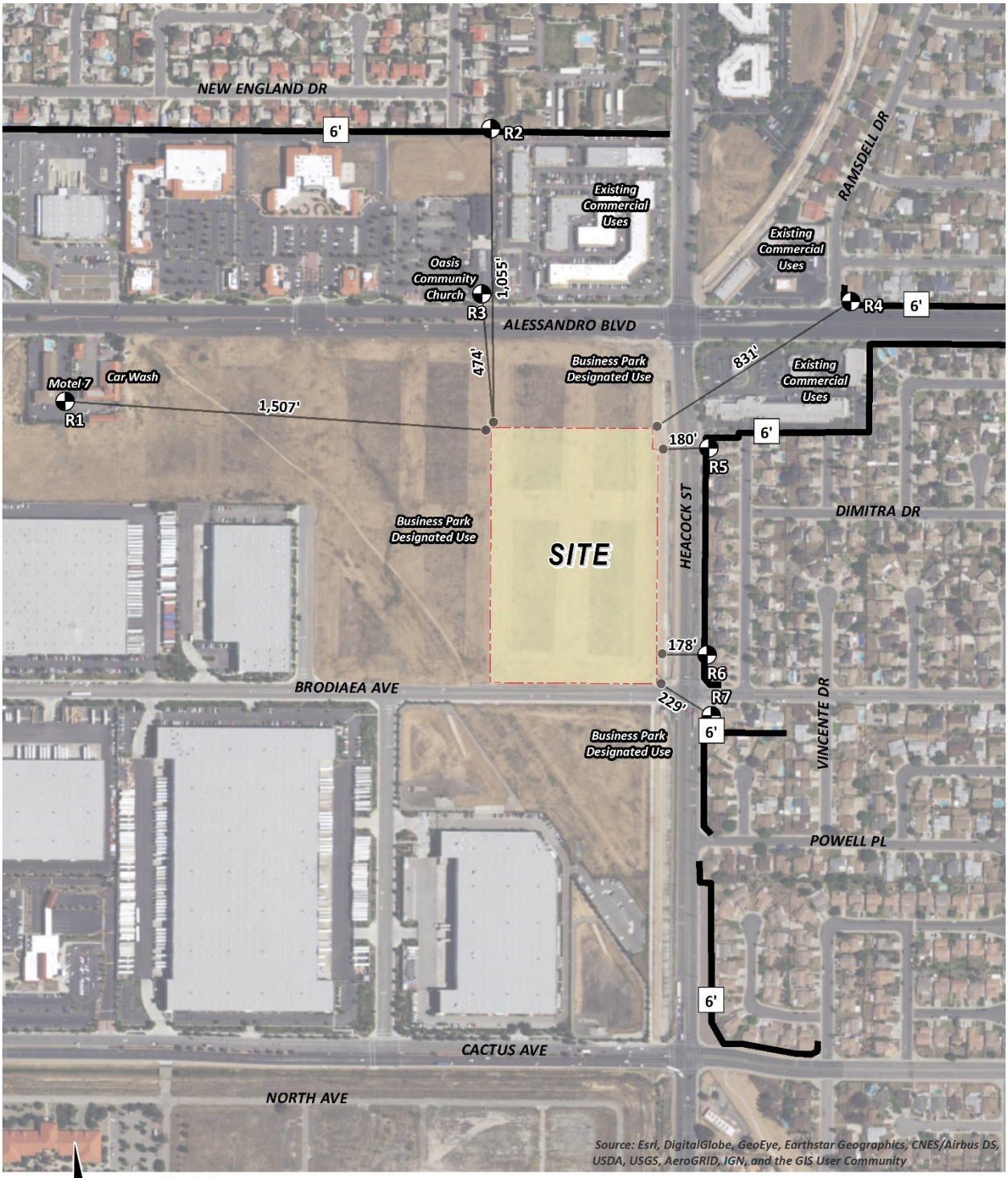
R4: Located approximately 831 feet northeast of the Project site, R4 represents existing residential homes on Ramsdell Drive. A long-term noise measurement was taken near this location, L4, to describe the existing ambient noise environment.

R5: Location R5 represents existing residential homes located roughly 180 feet east of the Project site across Heacock Street. A long-term noise measurement was taken near this location, L5, to describe the existing ambient noise environment.

R6: Location R6 represents the existing residential homes situated east of the Project site at approximately 178 feet across Heacock Street. A long-term noise measurement was taken near this location, L6, to describe the existing ambient noise environment.

R7: Location R7 represents the existing residential homes situated southeast of the Project site at approximately 229 feet on Brodiaea Avenue. A long-term noise measurement was taken near this location, L6, to describe the existing ambient noise environment.

EXHIBIT 8-A: RECEIVER LOCATIONS



9 OPERATIONAL NOISE IMPACTS

This section analyzes the potential stationary-source operational noise impacts at the nearby receiver locations, identified in Section 8, resulting from operation of the proposed Brodiaea Commerce Center Project. Exhibit 9-A identifies the representative receiver locations and noise source locations used to assess the operational noise levels.

9.1 OPERATIONAL NOISE STANDARDS

The City of Moreno Valley Municipal Code, Chapter 11.80 *Noise Regulation*, provides performance standards and noise control guidelines for determining and mitigating non-transportation or stationary-source noise impacts from operations at private properties. The City of Moreno Valley Municipal Code defines *Maximum Sound Levels (in dB(A)) for Source Land Uses* in Table 11.80.030-2 for *Residential* and *Commercial* land uses. As defined by the Municipal Code, Section 11.80.020 *Definitions*, *Commercial* land use *means all uses of land not otherwise classified as residential,* and *Residential* land use *means all uses of land primarily for dwelling units, as well as hospitals, schools, colleges and universities, and places of religious assembly.* (12) For the purpose of this analysis, the Brodiaea Commerce Center Project is considered *Commercial* land use since it is not classified as residential. Based on this standard, the operational noise level limits for commercial land use, from Table 11.80.030-2, of 65 dBA L_{eq} during the daytime (8:00 a.m. to 10:00 p.m.) hours and 60 dBA L_{eq} during the nighttime (10:01 p.m. to 7:59 a.m.) hours shall apply to the operational noise from the Project.

Further, Section 11.80.030 (C) *Prohibited Acts*, *Nonimpulsive Sound Decibel Limits*, states: *No person shall maintain, create, operate or cause to be operated on private property any source of sound in such a manner as to create any nonimpulsive sound which exceeds the limits set forth for the source land use category (as defined in Section 11.80.020) in Table 11.80.030-2 when measured at a distance of two hundred (200) feet or more from the real property line of the source of the sound, if the sound occurs on a privately owned property…* (12) Therefore, at a distance of 200 feet from the property line, the Project's operational noise levels shall not exceed the 65 dBA L_{eq} daytime and 60 dBA L_{eq} nighttime noise level standards for commercial land uses.

The City of Moreno Valley Municipal Code also identifies continuous sound level limits in Table 11.80.030-1 based on the Center for Disease Control and Prevention and the National Institute for Occupational Safety and Health (NIOSH) noise exposure guidelines. A division of the U.S. Department of Health and Human Services, NIOSH identifies a noise level threshold based on the duration of exposure to the source. The City of Moreno Valley noise level threshold starts at 90 dBA for more than eight hours per day, and for every increase, the exposure time is reduced. The City of Moreno Valley identifies noise level thresholds of 92 dBA for more than 6 hours per day, 95 dBA for more than 4 hour per day, 97 dBA for more than 3 hours per day, and up to 100 dBA for more than 2 hours per day. However, this noise study uses the more restrictive noise level limits identified on Table 11.80.030-2 for source land uses in the Municipal Code, shown on Table 3-1 of this report, to evaluate the potential operational noise levels due to the operation of the Project.

9.2 OPERATIONAL NOISE SOURCES

At the time this noise analysis was prepared the future tenants of the proposed Project were unknown. To present the potential worst-case noise conditions, this analysis assumes the Project would be operational 24 hours per day, seven days per week. The Project business operations would primarily be conducted within the enclosed buildings, except for traffic movement, parking, as well as loading and unloading of trucks at designated loading bays. The on-site Project-related noise sources are expected to include: idling trucks, delivery truck activities, backup alarms, as well as loading and unloading of dry goods, roof-top air conditioning units, and parking lot vehicle movements. This noise analysis is intended to describe noise level impacts associated with the expected typical warehouse and distribution storage activities at the Project site. At the time of this analysis, no cold storage was planned at the Project site, and therefore is not analyzed in this report.

9.3 REFERENCE NOISE LEVELS

Since the future tenants of the proposed Project are unknown, the Project's operational noise levels were estimated based on reference noise level measurements of similar operational activities. The reference noise levels are intended to describe the expected operational noise sources that may include idling trucks, delivery truck activities, backup alarms, as well as loading and unloading of dry goods, roof-top air conditioning units, and parking lot vehicle movements. To estimate the Project off-site operational noise impacts associated with the Brodiaea Commerce Center, the following reference noise level measurements were collected from existing logistics warehouse operations containing similar operational noise sources, as shown on Table 9-1. Appendix 9.1 includes reference noise source photos.

9.3.1 MOTIVATIONAL FULFILLMENT & LOGISTICS SERVICES DISTRIBUTION FACILITY (DRY GOODS)

Short-term reference noise level measurements were collected on Wednesday, January 7th, 2015, by Urban Crossroads, Inc. at the Motivational Fulfillment & Logistics Services distribution facility located at 6810 Bickmore Avenue in the City of Chino. The noise level measurements represent the typical weekday dry goods logistics warehouse operation in a single building with a loading dock area on the western side of the building façade. Up to ten trucks were observed in the loading dock area including a combination of track trailer semi-trucks, two-axle delivery trucks, and background forklift operations.

IDLING, DELIVERY TRUCK ACTIVITIES, BACKUP ALARMS, & LOADING/UNLOADING OF DRY GOODS

The unloading/docking activity noise level measurement was taken over a fifteen-minute period and represents multiple noise sources taken from the center of loading dock activities generating a reference noise level of 62.8 dBA L_{eq} at a uniform distance of 50 feet. At this measurement location, the noise sources associated with employees unloading a docked truck container included the squeaking of the truck's shocks when weight was removed from the truck, employees playing music over a radio, as well as a forklift horn and backup alarm. In addition, during the noise level measurement a truck entered the loading dock area and proceeded to reverse and dock in a nearby loading bay, adding truck engine and air brakes noise.

While the specific noise levels at the Project site will depend on the actual tenant, the intensity and the daytime / nighttime hours of operation, a reference noise level of 62.8 dBA L_{eq} for the unloading/docking activity at a normalized distance of 50 feet is used to describe the peak Project operational noise activity since it represents similar operational characteristics. The reference noise level of 62.8 dBA L_{eq} at a distance of 50 feet is intended to describe the worst-case noise levels associated with the expected typical warehouse and distribution storage operations at the Project site.

9.3.2 ROOF-TOP AIR CONDITIONING UNITS

In order to assess the impacts created by the roof-top air conditioning units at the Project buildings, reference noise levels measurements were taken at the Santee Walmart on July 27th, 2015. Located at 170 Town Center Parkway in the City of Santee, the noise level measurements describe a single mechanical roof-top air conditioning unit on the roof of an existing Walmart store. The reference noise level represents a Lennox SCA120 series 10-ton model packaged air conditioning unit. At 5 feet from the roof-top air conditioning unit, the exterior noise levels were measured at 77.2 dBA L_{eq}. Using the uniform reference distance of 50 feet, the noise level is 57.2 dBA L_{eq}. The operating conditions of the reference noise level measurement reflect peak summer cooling requirements with measured temperatures approaching 96 degrees Fahrenheit (°F) with average daytime temperatures of 82°F. The roof-top air condition units were observed to operate the most during the daytime hours, for a total of 39 minutes per hour, and are anticipated to operate during the daytime and nighttime hours at the Project site. The noise attenuation provided by a parapet wall is not reflected in this reference noise level measurement.

9.3.3 PARKING LOT VEHICLE MOVEMENTS (AUTOS)

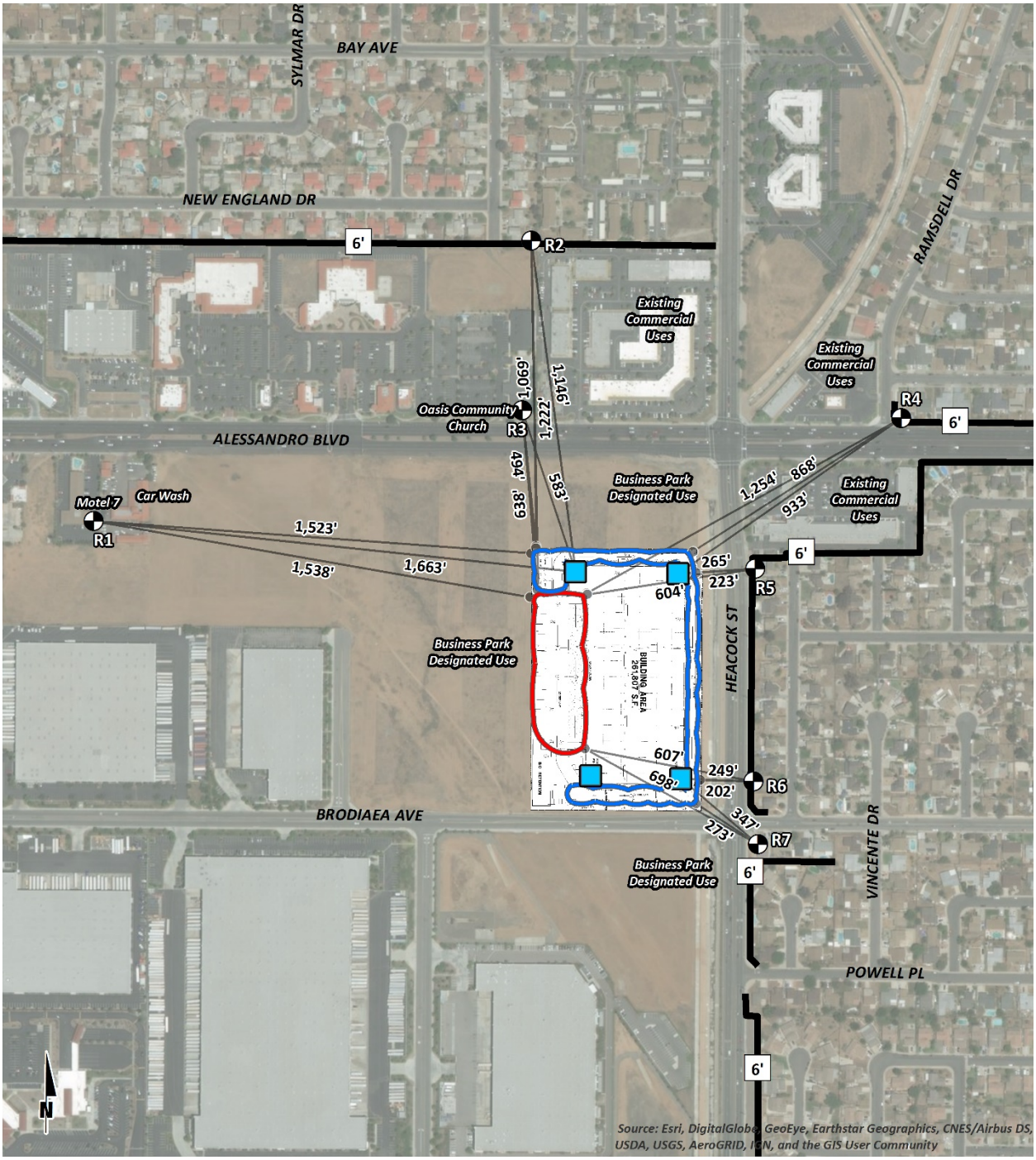
To determine the noise levels associated with parking lot vehicle movements, Urban Crossroads collected reference noise level measurements over a 24-hour period on May 17th, 2017 at the parking lot for the Panasonic Avionics Corporation in the City of Lake Forest. The peak hour of activity measured over the 24-hour noise level measurement period occurred between 12:00 p.m. to 1:00 p.m., or the typical lunch hour for employees working in the area. The measured reference noise level at 50 feet from parking lot vehicle movements was measured at 41.7 dBA L_{eq}. The parking lot noise levels are mainly due to cars pulling in and out of spaces during peak lunch hour activity and employees talking. Noise associated with parking lot vehicle movements is expected to operate for the entire hour (60 minutes).

TABLE 9-1: REFERENCE NOISE LEVEL MEASUREMENTS

Noise Source	Duration (hh:mm:ss)	Distance From Source (Feet)	Noise Source Height (Feet)	Hourly Activity (Minutes)[3]	Noise Level (dBA L_{eq})	
					@ Ref. Distance	@ 50 Feet
Unloading/Docking Activity[1]	00:15:00	30'	8'	60	67.2	62.8
Roof-Top Air Conditioning Units[2]	96:00:00	5'	25'	39	77.2	57.2
Parking Lot Vehicle Movements[3]	01:00:00	10'	5'	60	52.2	41.7

[1] Reference noise level measurements were collected on 1/7/2015 from the existing operations of the Motivational Fulfillment & Logistics Services distribution facility located at 6810 Bickmore Avenue in the City of Chino.
[2] As measured by Urban Crossroads, Inc. on 7/27/2015 at the Santee Walmart located at 170 Town Center Parkway.
[3] As measured by Urban Crossroads, Inc. on 5/17/2017 at the Panasonic Avionics Corporation parking lot in the City of Lake Forest.
[4] Anticipated duration (minutes within the hour) of noise activity during typical hourly conditions expected at the Project site based on the reference noise level measurement activity.

EXHIBIT 9-A: OPERATIONAL NOISE SOURCE LOCATIONS



LEGEND:

- Receiver Locations
- 6' Existing Barrier Height (in feet)
- Existing Barrier
- Roof-Top Air Conditioning Unit
- Parking Lot Vehicle Movements
- Distribution/Warehouse Activity
- Distance from receiver to noise source (in feet)

9.4 PROJECT OPERATIONAL NOISE LEVELS

Using the reference noise levels to represent the proposed warehouse operations that include idling trucks, delivery truck activities, backup alarms, as well as loading and unloading of dry goods, roof-top air conditioning units, and parking lot vehicle movements, Urban Crossroads, Inc. calculated the operational source noise levels that are expected to be generated at the Project site and the Project-related noise level increases that would be experienced at each of the sensitive receiver locations. The operational noise level calculations, shown on Table 9-2, account for the distance attenuation provided due to geometric spreading when sound from a localized stationary source (i.e., a point source) propagates uniformly outward in a spherical pattern. With geometric spreading, sound levels attenuate (or decrease) at a rate of 6 dB for each doubling of distance from a point source (e.g. idling trucks, delivery truck activities, backup alarms, as well as loading and unloading of dry goods, roof-top air conditioning units, and parking lot vehicle movements).

Table 9-2 presents the combined total operational noise level projections at 200 feet consistent with the City of Moreno Valley Municipal Code. The Project operational noise levels at 200 feet are estimated at 51.5 dBA L_{eq}. Based on the results of this analysis, the Project operational noise levels associated with the Brodiaea Commerce Center will satisfy the City of Moreno Valley Municipal Code 65 dBA L_{eq} daytime and 60 dBA L_{eq} nighttime exterior noise level standards at 200 feet from the source land use. Further, it should be noted that the land uses within 200 feet of the Project site boundary are designated as both business park and residential land use.

TABLE 9-2: OPERATIONAL NOISE LEVEL PROJECTIONS AT 200 FEET

Noise Source	Ref. Noise Level (dBA L_{eq})	Distance Atten. @ 200' (dBA L_{eq})[1]	Hourly Activity (Mins.)[2]	Hourly Activity Adjustment (dBA L_{eq})	Noise Level @ 200' (dBA L_{eq})
Unloading/Docking Activity	67.2	-16.5	60	0.0	50.7
Roof-Top Air Conditioning Units	77.2	-32.0	39	-1.9	43.3
Parking Lot Vehicle Movements	52.2	-19.5	60	0.0	32.7
				Combined Total:	51.5

[1] Drop off rate of 6 dBA per doubling of distance (point source).
[2] Anticipated duration (minutes within the hour) of noise activity during peak hourly conditions expected at the Project site.

Table 9-3 indicates that the unmitigated hourly noise levels associated with the Brodiaea Commerce Center Project at the nearby sensitive receiver locations are expected to range from 26.1 to 41.6 dBA L_{eq}. The Project-related operational noise levels, as shown on Table 9-3, will satisfy the City of Moreno Valley 65 dBA L_{eq} daytime and 60 dBA L_{eq} nighttime exterior noise level standards at all nearby sensitive receiver locations. The operational noise level calculations are included in Appendix 9.2 and include the barrier attenuation provided by the existing 6-foot high noise barriers shown on Exhibit 9-A.

TABLE 9-3: UNMITIGATED OPERATIONAL NOISE LEVEL PROJECTIONS AT RECEIVER LOCATIONS

Receiver Location[1]	Noise Levels by Noise Source (dBA L_{eq})[2]			Combined Operational Noise Levels (dBA L_{eq})[3]	Threshold Exceeded?[4]	
	Unloading/ Docking Activity	Roof-Top Air Conditioning Unit	Parking Lot Vehicle Movements		Daytime (65 dBA L_{eq})	Nighttime (60 dBA L_{eq})
R1	33.0	24.9	19.5	33.8	No	No
R2	29.5	22.8	16.3	30.5	No	No
R3	40.6	34.0	26.8	41.6	No	No
R4	17.2	24.7	17.6	26.1	No	No
R5	23.5	35.9	26.5	36.6	No	No
R6	23.5	36.5	27.1	37.2	No	No
R7	22.3	38.5	30.7	39.3	No	No

[1] See Exhibit 9-A for the receiver and noise source locations.
[2] Reference noise sources as shown on Table 9-1.
[3] Calculations for each noise source are provided in Appendix 9.2.
[4] Do the Project operational noise levels exceed the standards (Table 3-1)?

9.5 PROJECT OPERATIONAL NOISE CONTRIBUTION

To describe the Project operational noise level contributions, the Project operational noise levels are combined with the existing ambient noise levels measurements for the nearby receiver locations potentially impacted by Project operational noise sources. Since the units used to measure noise, decibels (dB), are logarithmic units, the Project-operational and existing ambient noise levels cannot be combined using standard arithmetic equations. (3) Instead, they must be logarithmically added using the following base equation:

$$SPL_{Total} = 10\log_{10}[10^{SPL1/10} + 10^{SPL2/10} + \ldots 10^{SPLn/10}]$$

Where "SPL1," "SPL2," etc. are equal to the sound pressure levels being combined, or in this case, the Project-operational and existing ambient noise levels. The difference between the combined Project and ambient noise levels describe the Project noise level contributions to the existing ambient noise environment. Noise levels that would be experienced at receiver locations when Project-source noise is added to the ambient daytime and nighttime conditions are presented on Tables 9-4 and 9-5.

As indicated on Tables 9-4 and 9-5, the Project will contribute a daytime operational noise level increase of up to 0.2 dBA L_{eq} and a nighttime operational noise level increase of up to 0.4 dBA L_{eq} at the sensitive receiver locations. Since the Project-related operational noise level contributions will satisfy the significance criteria discussed in Section 4, the increases at the sensitive receiver locations will be *less than significant*. On this basis, Project operational stationary-source noise would not result in a substantial temporary/periodic, or permanent increase in ambient noise levels in the Project vicinity above levels existing without the Project, and impacts in these regards will be *less than significant*.

TABLE 9-4: PROJECT DAYTIME NOISE LEVEL CONTRIBUTIONS

Receiver Location[1]	Total Project Operational Noise Level[2]	Measurement Location[3]	Reference Ambient Noise Levels[4]	Combined Project and Ambient[5]	Project Contribution[6]	Threshold Exceeded?[7]
R1	33.8	L1	59.4	59.4	0.0	No
R2	30.5	L3	55.8	55.8	0.0	No
R3	41.6	L3	55.8	56.0	0.2	No
R4	26.1	L4	60.7	60.7	0.0	No
R5	36.6	L5	59.3	59.3	0.0	No
R6	37.2	L6	62.0	62.0	0.0	No
R7	39.3	L6	62.0	62.0	0.0	No

[1] See Exhibit 9-A for the sensitive receiver locations.
[2] Total Project operational noise levels as shown on Table 9-3.
[3] Reference noise level measurement locations as shown on Exhibit 5-A.
[4] Observed daytime ambient noise levels as shown on Table 5-1.
[5] Represents the combined ambient conditions plus the Project activities.
[6] The noise level increase expected with the addition of the proposed Project activities.
[7] Significance Criteria as defined in Section 4.

TABLE 9-5: PROJECT NIGHTTIME NOISE LEVEL CONTRIBUTIONS

Receiver Location[1]	Total Project Operational Noise Level[2]	Measurement Location[3]	Reference Ambient Noise Levels[4]	Combined Project and Ambient[5]	Project Contribution[6]	Threshold Exceeded?[7]
R1	33.8	L1	55.5	55.5	0.0	No
R2	30.5	L3	51.5	51.5	0.0	No
R3	41.6	L3	51.5	51.9	0.4	No
R4	26.1	L4	57.8	57.8	0.0	No
R5	36.6	L5	54.5	54.6	0.1	No
R6	37.2	L6	59.6	59.6	0.0	No
R7	39.3	L6	59.6	59.6	0.0	No

[1] See Exhibit 9-A for the sensitive receiver locations.
[2] Total Project operational noise levels as shown on Table 9-3.
[3] Reference noise level measurement locations as shown on Exhibit 5-A.
[4] Observed nighttime ambient noise levels as shown on Table 5-1.
[5] Represents the combined ambient conditions plus the Project activities.
[6] The noise level increase expected with the addition of the proposed Project activities.
[7] Significance Criteria as defined in Section 4.

9.6 OPERATIONAL VIBRATION IMPACTS

Although the human threshold of perception for vibration is around 65 VdB, human response to vibration is not usually significant unless the vibration exceeds 70 VdB. Truck vibration levels are dependent on vehicle characteristics, load, speed, and pavement condition. Typical vibration levels for heavy trucks at normal traffic speeds do not exceed 65 VdB, and therefore, will be below the FTA vibration threshold of 80 VdB at nearby sensitive receiver locations. Truck deliveries transiting on site will be travelling at very low speeds so it is expected that delivery truck vibration impacts at nearby homes will not exceed the 80 VdB vibration threshold.

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10 CONSTRUCTION IMPACTS

This section analyzes potential impacts resulting from the short-term construction activities associated with the development of the Project. Exhibit 10-A shows the construction noise source locations in relation to the nearby sensitive receiver locations previously described in Section 8.

10.1 CONSTRUCTION NOISE STANDARDS

To analyze noise impacts originating from the construction of the Brodiaea Commerce Center site, noise from construction activities are typically evaluated against standards established under a City's Municipal Code. The Municipal Code noise standards for construction are described below for the City of Moreno Valley to determine the potential noise impacts at nearby receiver locations. The construction-related noise standards are shown on Table 3-2.

The Municipal Code noise standards for construction are described below for the City of Moreno Valley to determine the potential noise impacts at nearby sensitive receiver locations. As a subset of its stationary-source noise regulations, the City Municipal Code establishes permitted hours of construction activity. More specifically, Municipal Code Section 11.80.030 (D) (7), *Construction and Demolition*, provides the following:

> *No person shall operate or cause operation of any tools or equipment used in construction, drilling, repair, alteration, or demolition work between the hours of eight p.m. and seven a.m. the following day such that the sound there from creates a noise disturbance, except for emergency work by public service utilities or for other work approved by the city manager or designee.*

Therefore, based on the Section 11.80.030 (D) (7) construction regulations, a construction-related *noise disturbance* occurs if Project construction activity occurs outside of the permitted hours. However, for the purpose of this analysis, the stationary-source noise level limit of 65 dBA L_{eq} is used as an appropriate threshold for the nearby sensitive land uses (e.g. residential homes) in the Project study area. In addition, grading operations shall be limited to the hours identified in Section 8.21.050 (O) of 7:00 a.m. to 6:00 p.m., Monday through Friday, and 8:00 a.m. to 4:00 p.m. on weekends and holidays or as approved by the City Engineer. The City of Moreno Valley construction noise standards were previously shown on Table 3-2 and included in Appendix 3.1. As previously discussed in Section 3.4, the construction noise level threshold used in this noise study represents a conservative approach, since it is more restrictive than the continuous sound level limits of Table 11.80.030-1 of the City of Moreno Valley Municipal Code.

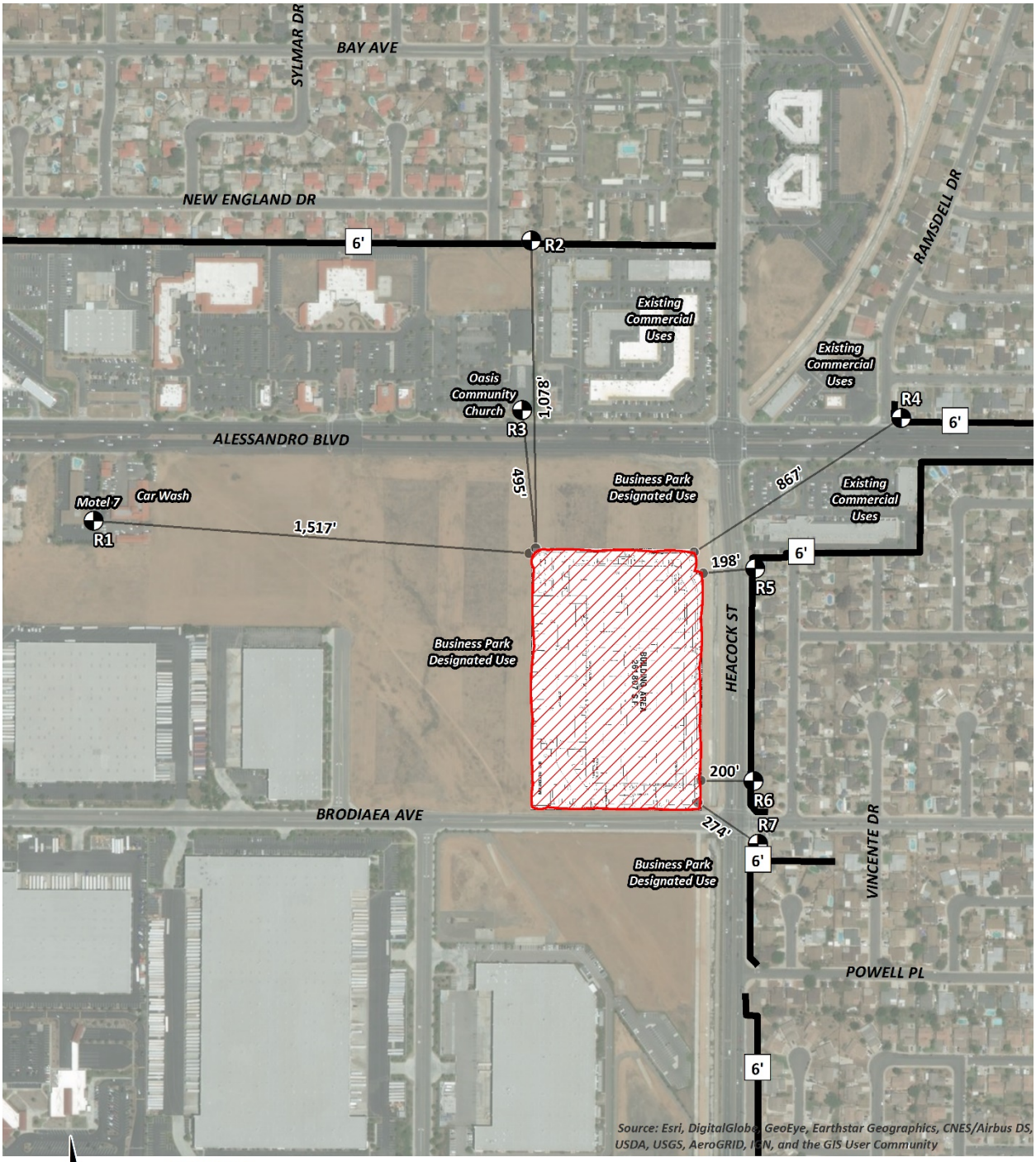
10.2 CONSTRUCTION NOISE LEVELS

Noise generated by the Project construction equipment will include a combination of trucks, power tools, concrete mixers and portable generators that when combined can reach high levels. The number and mix of construction equipment is expected to occur in the following stages:

- Site Preparation
- Grading
- Building Construction
- Paving
- Architectural Coating

This construction noise analysis was prepared using reference noise level measurements taken by Urban Crossroads, Inc. to describe the typical construction activity noise levels for each stage of Project construction. The construction reference noise level measurements represent a list of typical construction activity noise levels. Noise levels generated by heavy construction equipment can range from approximately 68 dBA to in excess of 80 dBA when measured at 50 feet. However, these noise levels diminish with distance from the construction site at a rate of 6 dBA per doubling of distance. For example, a noise level of 80 dBA measured at 50 feet from the noise source to the receiver would be reduced to 74 dBA at 100 feet from the source to the receiver, and would be further reduced to 68 dBA at 200 feet from the source to the receiver. The construction stages are based on the *Brodiaea Commerce Center Air Quality Impact Analysis* prepared by Urban Crossroads, Inc. (20)

EXHIBIT 10-A: CONSTRUCTION NOISE SOURCE LOCATIONS



10.3 CONSTRUCTION REFERENCE NOISE LEVELS

To describe the Project construction noise levels, measurements were collected for similar activities at several construction sites. Table 10-1 provides a summary of the 17-construction reference noise level measurements. Since the reference noise levels were collected at varying distances of 30 feet and 50 feet, all construction noise level measurements presented on Table 10-1 have been adjusted for consistency to describe a common reference distance of 50 feet.

TABLE 10-1: CONSTRUCTION REFERENCE NOISE LEVELS

ID	Noise Source	Reference Distance From Source (Feet)	Reference Noise Levels @ Reference Distance (dBA L_{eq})	Reference Noise Levels @ 50 Feet (dBA L_{eq})[7]
1	Truck Pass-Bys & Dozer Activity[1]	30'	63.6	59.2
2	Dozer Activity[1]	30'	68.6	64.2
3	Construction Vehicle Maintenance Activities[2]	30'	71.9	67.5
4	Foundation Trenching[2]	30'	72.6	68.2
5	Rough Grading Activities[2]	30'	77.9	73.5
6	Residential Framing[3]	30'	66.7	62.3
7	Water Truck Pass-By & Backup Alarm[4]	30'	76.3	71.9
8	Dozer Pass-By[4]	30'	84.0	79.6
9	Two Scrapers & Water Truck Pass-By[4]	30'	83.4	79.0
10	Two Scrapers Pass-By[4]	30'	83.7	79.3
11	Scraper, Water Truck, & Dozer Activity[4]	30'	79.7	75.3
12	Concrete Mixer Truck Movements[5]	50'	71.2	71.2
13	Concrete Paver Activities[5]	30'	70.0	65.6
14	Concrete Mixer Pour & Paving Activities[5]	30'	70.3	65.9
15	Concrete Mixer Backup Alarms & Air Brakes[5]	50'	71.6	71.6
16	Concrete Mixer Pour Activities[5]	50'	67.7	67.7
17	Forklift, Jackhammer, & Metal Truck Bed Loading	50'	67.9	67.9

[1] As measured by Urban Crossroads, Inc. on 10/14/15 at a business park construction site located at the northwest corner of Barranca Parkway and Alton Parkway in the City of Irvine.
[2] As measured by Urban Crossroads, Inc. on 10/20/15 at a construction site located in Rancho Mission Viejo.
[3] As measured by Urban Crossroads, Inc. on 10/20/15 at a residential construction site located in Rancho Mission Viejo.
[4] As measured by Urban Crossroads, Inc. on 10/30/15 during grading operations within an industrial construction site located in the City of Ontario.
[5] Reference noise level measurements were collected from a nighttime concrete pour at an industrial construction site, located at 27334 San Bernardino Avenue in the City of Redlands, between 1:00 a.m. to 2:00 a.m. on 7/1/15.
[6] As measured by Urban Crossroads, Inc. on 9/9/16 during the demolition of an existing paved parking lot at 41 Corporate Park in Irvine.
[7] Reference noise levels are calculated at 50 feet using a drop off rate of 6 dBA per doubling of distance (point source).

10.4 DAYTIME CONSTRUCTION NOISE ANALYSIS

Using the reference construction equipment noise levels, calculations of the daytime Project construction noise level impacts at the nearby sensitive receiver locations were completed. Tables 10-2 to 10-6 present the short-term daytime construction noise levels for each stage of construction. Table 10-7 provides a summary of the construction noise levels by phase at the noise receiver locations. Based on the stages of construction, the noise impacts associated with the proposed Project are expected to create temporarily high noise levels at the nearby receiver locations. To assess the peak daytime construction noise levels, this analysis shows the highest noise impacts when the equipment with the highest reference noise level is operating at the closest point from the primary construction activity to each receiver location.

TABLE 10-2: SITE PREPARATION EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{eq})
Truck Pass-Bys & Dozer Activity	59.2
Dozer Activity	64.2
Dozer Pass-By	79.6
Highest Reference Noise Level at 50 Feet (dBA L_{eq}):	79.6

Receiver Location	Distance to Construction Activity (Feet)[2]	Distance Attenuation (dBA L_{eq})[3]	Calculated Noise Barrier Attenuation (dBA L_{eq})[4]	Construction Noise Level (dBA L_{eq})
R1	1,517'	-29.6	0.0	49.9
R2	1,078'	-26.7	-5.5	47.4
R3	495'	-19.9	0.0	59.7
R4	867'	-24.8	-5.5	49.3
R5	198'	-12.0	-5.5	62.1
R6	200'	-12.0	-5.5	62.0
R7	274'	-14.8	0.0	64.8

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Calculated barrier attenuation from existing barriers in the Project study area (Appendix 9.2).

TABLE 10-3: GRADING EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{eq})
Truck Pass-Bys & Dozer Activity	59.2
Dozer Activity	64.2
Rough Grading Activities	73.5
Dozer Pass-By	79.6
Highest Reference Noise Level at 50 Feet (dBA L_{eq}):	79.6

Receiver Location	Distance to Construction Activity (Feet)[2]	Distance Attenuation (dBA L_{eq})[3]	Calculated Noise Barrier Attenuation (dBA L_{eq})[4]	Construction Noise Level (dBA L_{eq})
R1	1,517'	-29.6	0.0	49.9
R2	1,078'	-26.7	-5.5	47.4
R3	495'	-19.9	0.0	59.7
R4	867'	-24.8	-5.5	49.3
R5	198'	-12.0	-5.5	62.1
R6	200'	-12.0	-5.5	62.0
R7	274'	-14.8	0.0	64.8

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Calculated barrier attenuation from existing barriers in the Project study area (Appendix 9.2).

TABLE 10-4: BUILDING CONSTRUCTION EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{eq})
Construction Vehicle Maintenance Activities	67.5
Foundation Trenching	68.2
Framing	62.3
Highest Reference Noise Level at 50 Feet (dBA L_{eq}):	68.2

Receiver Location	Distance to Construction Activity (Feet)[2]	Distance Attenuation (dBA L_{eq})[3]	Calculated Noise Barrier Attenuation (dBA L_{eq})[4]	Construction Noise Level (dBA L_{eq})
R1	1,517'	-29.6	0.0	38.5
R2	1,078'	-26.7	-5.5	36.0
R3	495'	-19.9	0.0	48.3
R4	867'	-24.8	-5.5	37.9
R5	198'	-12.0	-5.5	50.7
R6	200'	-12.0	-5.5	50.6
R7	274'	-14.8	0.0	53.4

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Calculated barrier attenuation from existing barriers in the Project study area (Appendix 9.2).

TABLE 10-5: PAVING EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{eq})
Concrete Mixer Truck Movements	71.2
Concrete Paver Activities	65.6
Concrete Mixer Pour & Paving Activities	65.9
Concrete Mixer Backup Alarms & Air Brakes	71.6
Concrete Mixer Pour Activities	67.7
Highest Reference Noise Level at 50 Feet (dBA L_{eq}):	71.6

Receiver Location	Distance to Construction Activity (Feet)[2]	Distance Attenuation (dBA L_{eq})[3]	Calculated Noise Barrier Attenuation (dBA L_{eq})[4]	Construction Noise Level (dBA L_{eq})
R1	1,517'	-29.6	0.0	42.0
R2	1,078'	-26.7	-5.5	39.4
R3	495'	-19.9	0.0	51.7
R4	867'	-24.8	-5.5	41.3
R5	198'	-12.0	-5.5	54.1
R6	200'	-12.0	-5.5	54.1
R7	274'	-14.8	0.0	56.8

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Calculated barrier attenuation from existing barriers in the Project study area (Appendix 9.2).

TABLE 10-6: ARCHITECTURAL COATING EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{eq})
Construction Vehicle Maintenance Activities	67.5
Highest Reference Noise Level at 50 Feet (dBA L_{eq}):	67.5

Receiver Location	Distance to Construction Activity (Feet)[2]	Distance Attenuation (dBA L_{eq})[3]	Calculated Noise Barrier Attenuation (dBA L_{eq})[4]	Construction Noise Level (dBA L_{eq})
R1	1,517'	-29.6	0.0	37.8
R2	1,078'	-26.7	-5.5	35.3
R3	495'	-19.9	0.0	47.6
R4	867'	-24.8	-5.5	37.2
R5	198'	-12.0	-5.5	50.0
R6	200'	-12.0	-5.5	49.9
R7	274'	-14.8	0.0	52.7

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Calculated barrier attenuation from existing barriers in the Project study area (Appendix 9.2).

10.5 NIGHTTIME CONCRETE POUR NOISE ANALYSIS

Using the reference concrete pour activity construction equipment noise levels, calculations of the nighttime Project construction noise level impacts at the nearby sensitive receiver locations were completed. Table 10-7 presents the short-term nighttime construction noise levels at the noise receiver locations which are expected to range from 39.4 to 56.8 dBA L_{eq}. To assess the peak nighttime construction noise levels, this analysis shows the highest noise impacts when the equipment with the highest reference noise level is operating at the closest point from the primary construction activity to each receiver location.

TABLE 10-7: NIGHTTIME CONCRETE POUR EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{eq})
Concrete Mixer Truck Movements	71.2
Concrete Paver Activities	65.6
Concrete Mixer Pour & Paving Activities	65.9
Concrete Mixer Backup Alarms & Air Brakes	71.6
Concrete Mixer Pour Activities	67.7
Highest Reference Noise Level at 50 Feet (dBA L_{eq}):	71.6

Receiver Location	Distance to Construction Activity (Feet)[2]	Distance Attenuation (dBA L_{eq})[3]	Calculated Noise Barrier Attenuation (dBA L_{eq})[4]	Construction Noise Level (dBA L_{eq})
R1	1,517'	-29.6	0.0	42.0
R2	1,078'	-26.7	-5.5	39.4
R3	495'	-19.9	0.0	51.7
R4	867'	-24.8	-5.5	41.3
R5	198'	-12.0	-5.5	54.1
R6	200'	-12.0	-5.5	54.1
R7	274'	-14.8	0.0	56.8

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Calculated barrier attenuation from existing barriers in the Project study area (Appendix 9.2).

10.6 CONSTRUCTION NOISE THRESHOLDS OF SIGNIFICANCE

The construction noise analysis shows that the highest construction noise levels will occur when equipment is operating at the closest point from primary construction activity to each sensitive receiver location. As shown on Table 10-8, the highest unmitigated daytime construction noise levels are expected to range from 47.4 to 64.8 dBA L_{eq} and nighttime construction noise levels are expected to range from 39.4 to 56.8 dBA L_{eq} at the nearby sensitive receiver locations.

TABLE 10-8: UNMITIGATED CONSTRUCTION EQUIPMENT NOISE LEVEL SUMMARY (DBA L_{EQ})

Receiver Location	Distance to Receiver (Feet)	Daytime Construction Noise Levels (dBA L_{eq})[1]						Nighttime Concrete Pour Noise Levels (dBA L_{eq})[2]	Threshold Exceeded?[3]	
		Site Preparation	Grading	Building Construction	Paving	Architectural Coating	Highest Daytime Construction Noise Levels		Daytime (65 dBA L_{eq})	Nighttime (60 dBA L_{eq})
R1	1,517'	49.9	49.9	38.5	42.0	37.8	49.9	42.0	No	No
R2	1,078'	47.4	47.4	36.0	39.4	35.3	47.4	39.4	No	No
R3	495'	59.7	59.7	48.3	51.7	47.6	59.7	51.7	No	No
R4	867'	49.3	49.3	37.9	41.3	37.2	49.3	41.3	No	No
R5	198'	62.1	62.1	50.7	54.1	50.0	62.1	54.1	No	No
R6	200'	62.0	62.0	50.6	54.1	49.9	62.0	54.1	No	No
R7	274'	64.8	64.8	53.4	56.8	52.7	64.8	56.8	No	No

[1] Daytime construction noise levels as shown on Tables 10-2 to 10-6.
[2] Nighttime construction noise levels as shown on Table 10-7.
[3] Do the peak daytime and/or nighttime construction noise levels exceed their respective, applicable Municipal Code noise level standards?

As shown on Table 10-8, the unmitigated Project daytime and nighttime construction noise levels satisfy the 65 dBA Leq daytime and 60 dBA L_{eq} nighttime City of Moreno Valley Municipal Code thresholds, respectively, during peak Project construction activity at all sensitive receiver locations. Further, the unmitigated Project-related construction noise levels will satisfy the less restrictive 90 dBA Leq 8-hour continuous noise level limit identified in the City of Moreno Valley Municipal Code. Therefore, impacts from Project construction noise levels are considered less than significant.

10.7 CONSTRUCTION VIBRATION IMPACTS

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods used, distance to the affected structures and soil type. It is expected that ground-borne vibration from Project construction activities would cause only intermittent, localized intrusion. The proposed Project's construction activities most likely to cause vibration impacts are:

- Heavy Construction Equipment: Although all heavy mobile construction equipment has the potential of causing at least some perceptible vibration while operating close to building, the vibration is usually short-term and is not of sufficient magnitude to cause building damage. It is not expected that heavy equipment such as large bulldozers would operate close enough to any residences to cause a vibration impact.
- Trucks: Trucks hauling building materials to construction sites can be sources of vibration intrusion if the haul routes pass through residential neighborhoods on streets with bumps or potholes. Repairing the bumps and potholes generally eliminates the problem.

Ground-borne vibration levels resulting from construction activities occurring within the Project site were estimated by data published by the Federal Transit Administration. Construction activities that would have the potential to generate low levels of ground-borne vibration within the Project site include grading. Using the vibration source level of construction equipment provided on Table 6-8 and the construction vibration assessment methodology published by the FTA, it is possible to estimate the Project vibration impacts. Table 10-9 presents the expected Project related vibration levels at the nearby receiver locations.

Based on the reference vibration levels provided by the FTA, a large bulldozer represents the peak source of vibration with a reference level of 87 VdB at 25 feet. At distances ranging from 198 to 1,517 feet from the Project construction activities, construction vibration levels are expected to range from 33.5 to 60.0 VdB, as shown on Table 10-9. Using the construction vibration assessment methods provided by the FTA, Project construction vibration levels will remain below the FTA 80 VdB threshold at all sensitive receiver locations, and therefore, is considered a *less than significant* impact.

Further, vibration levels at the site of the closest sensitive receiver are unlikely to be sustained during the entire construction period, but will occur rather only during the times that heavy construction equipment is operating at the Project site perimeter. Moreover, construction at the Project site will be restricted to daytime hours consistent with City of Moreno Valley

requirements thereby eliminating potential vibration impacts during the sensitive nighttime hours.

TABLE 10-9: UNMITIGATED CONSTRUCTION EQUIPMENT VIBRATION LEVELS

Receiver Location[1]	Distance to Construction Activity (Feet)	Receiver Vibration Levels (VdB)[2]					Threshold Exceeded?[3]
		Small Bulldozer	Jackhammer	Loaded Trucks	Large Bulldozer	Highest Vibration Level	
R1	1,517'	4.5	25.5	32.5	33.5	33.5	No
R2	1,078'	9.0	30.0	37.0	38.0	38.0	No
R3	495'	19.1	40.1	47.1	48.1	48.1	No
R4	867'	11.8	32.8	39.8	40.8	40.8	No
R5	198'	31.0	52.0	59.0	60.0	60.0	No
R6	200'	30.9	51.9	58.9	59.9	59.9	No
R7	274'	26.8	47.8	54.8	55.8	55.8	No

[1] Noise receiver locations are shown on Exhibit 10-A.
[2] Based on the Vibration Source Levels of Construction Equipment included on Table 6-8.
[3] Does the peak vibration exceed the FTA maximum acceptable vibration standard of 80 VdB?

10.8 CONSTRUCTION NOISE AND VIBRATION ABATEMENT MEASURES

Though construction noise is temporary, intermittent and of short duration, and will not present any long-term impacts, the following practices would reduce noise level increases produced by the construction equipment to the nearby noise-sensitive residential land uses:

- Prior to approval of grading plans and/or issuance of building permits, plans shall indicate the following: *Noise-generating Project construction activities that would create noise levels of greater than 60 dBA L_{eq} at sensitive receivers shall be restricted to the hours of 7:00 a.m. to 8:00 p.m. on any day. Grading operations shall be limited to the hours of 8:00 a.m. to 6:00 p.m. weekdays, and 8:00 a.m. to 4:00 p.m. on weekends and holidays, or as otherwise approved by the City Engineer. The Project construction supervisor shall ensure compliance with the note and the City shall conduct periodic inspection at its discretion.*
- During all Project site construction, the construction contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers, consistent with manufacturers' standards. The construction contractor shall place all stationary construction equipment so that emitted noise is directed away from the noise sensitive receivers nearest the Project site.
- The construction contractor shall limit haul truck deliveries to the same hours specified for construction equipment (between the hours of 7:00 a.m. to 8:00 p.m. on any day). The contractor shall prepare a haul route exhibit for review and approval by the Public Works Department, Land Development Division, and shall design delivery routes to minimize the exposure of sensitive land uses or residential dwellings to delivery truck-related noise (City of Moreno Valley Municipal Code, Section 8.21.050 (H) (7)).

- Any nighttime construction activity requires an exemption from the City of Moreno Valley Municipal Code as indicated in Section 11.80.030 (E) (8) for a special event permit (Section 11.80.040). The special event permit application shall be submitted to the City of Moreno Valley Planning Department for approval and meet the requirements of Municipal Code Section 11.80.040.

11 REFERENCES

1. **State of California.** *California Environmental Quality Act, Appendix G.* 2016.
2. **Urban Crossroads, Inc.** *Brodiaea Commerce Center Traffic Impact Analysis.* January 2018.
3. **California Department of Transportation Environmental Program.** *Technical Noise Supplement - A Technical Supplement to the Traffic Noise Analysis Protocol.* Sacramento, CA : s.n., September 2013.
4. **Environmental Protection Agency Office of Noise Abatement and Control.** *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety.* March 1974. EPA/ONAC 550/9/74-004.
5. **U.S. Department of Transportation, Federal Highway Administration, Office of Environment and Planning, Noise and Air Quality Branch.** *Highway Traffic Noise Analysis and Abatement Policy and Guidance.* June, 1995.
6. **U.S. Department of Transportation, Federal Highway Administration.** *Highway Traffic Noise in the United States, Problem and Response.* April 2000. p. 3.
7. **U.S. Environmental Protection Agency Office of Noise Abatement and Control.** *Noise Effects Handbook-A Desk Reference to Health and Welfare Effects of Noise.* October 1979 (revised July 1981). EPA 550/9/82/106.
8. **U.S. Department of Transportation, Federal Transit Administration.** *Transit Noise and Vibration Impact Assessment.* May 2006. FTA-VA-90-1003-06.
9. **Office of Planning and Research.** *State of California General Plan Guidelines.* October 2003.
10. **State of California.** *2013 California Green Building Standards Code.* January 2014.
11. **City of Moreno Valley.** *General Plan Safety Element.* October 2006.
12. —. *Municipal Code, Chapter 11.80 Noise Regulation.*
13. **Riverside County.** *Airport Land Use Compatibility Plan.* October 2004.
14. **California Court of Appeal.** *Gray v. County of Madera, F053661.* 167 Cal.App.4th 1099; - Cal.Rptr.3d, October 2008.
15. **Federal Interagency Committee on Noise.** *Federal Agency Review of Selected Airport Noise Analysis Issues.* August 1992.
16. **American National Standards Institute (ANSI).** *Specification for Sound Level Meters ANSI S1.4-2014/IEC 61672-1:2013.*
17. **U.S. Department of Transportation, Federal Highway Administration.** *FHWA Highway Traffic Noise Prediction Model.* December 1978. FHWA-RD-77-108.
18. **California Department of Transportation Environmental Program, Office of Environmental Engineering.** *Use of California Vehicle Noise Reference Energy Mean Emission Levels (Calveno REMELs) in FHWA Highway Traffic Noise Prediction.* September 1995. TAN 95-03.
19. **California Department of Transportation.** *Traffic Noise Attenuation as a Function of Ground and Vegetation Final Report.* June 1995. FHWA/CA/TL-95/23.
20. **Urban Crossroads, Inc.** *Brodiaea Commerce Center Air Quality Impact Analysis.* January 2018.

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12 CERTIFICATION

The contents of this noise study report represent an accurate depiction of the noise environment and impacts associated with the proposed Brodiaea Commerce Center Project. The information contained in this noise study report is based on the best available data at the time of preparation. If you have any questions, please contact me directly at (949) 336-5979.

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EDUCATION

Master of Science in Civil and Environmental Engineering
California Polytechnic State University, San Luis Obispo • December, 1993

Bachelor of Science in City and Regional Planning
California Polytechnic State University, San Luis Obispo • June, 1992

PROFESSIONAL REGISTRATIONS

PE – Registered Professional Traffic Engineer – TR 2537 • January, 2009
AICP – American Institute of Certified Planners – 013011 • June, 1997–January 1, 2012
PTP – Professional Transportation Planner • May, 2007 – May, 2013
INCE – Institute of Noise Control Engineering • March, 2004

PROFESSIONAL AFFILIATIONS

ASA – Acoustical Society of America
ITE – Institute of Transportation Engineers

PROFESSIONAL CERTIFICATIONS

Certified Acoustical Consultant – County of Orange • February, 2011
FHWA-NHI-142051 Highway Traffic Noise Certificate of Training • February, 2013

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APPENDIX 3.1:

CITY OF MORENO VALLEY MUNICIPAL CODE

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Chapter 11.80 NOISE REGULATION

11.80.010 Legislative findings.

It is found and declared that:

A. Excessive sound within the limits of the city is a condition which has existed for some time, and the amount and intensity of such sound is increasing.

B. Such excessive sound is a detriment to the public health, safety, and welfare and quality of life of the residents of the city.

C. The necessity in the public interest for the provisions and prohibitions hereinafter contained and enacted is declared as a matter of legislative determination and public policy, and it is further declared that the provisions and prohibitions hereinafter contained and enacted are in pursuance of and for the purpose of securing and promoting the public health, safety, welfare and quality of life of the city and its inhabitants. (Ord. 740 § 1.2, 2007)

11.80.020 Definitions.

For purposes of this chapter, certain words and phrases used herein are defined as follows:

"A-weighted sound level" means the sound pressure level in decibels as measured with a sound level meter using the A-weighting network. The unit of measurement is the dB(A).

"Commercial" means all uses of land not otherwise classified as residential, as defined in this section.

"Construction" means any site preparation, and/or any assembly, erection, repair, or alteration, excluding demolition, of any structure, or improvements to real property.

"Continuous airborne sound" means sound that is measured by the slow-response setting of a meter manufactured to the specifications of ANSI Section 1.4-1983 (R2006) "Specification for Sound Level Meters," or its successor.

"Daytime" means eight a.m. to ten p.m. the same day.

"Decibel" (dB) means a unit for measuring the amplitude of sound, equal to twenty (20) times the logarithm to the base ten (10) of the ratio of the pressure of the sound measured to the reference pressure, which is twenty (20) microPascals (twenty (20) microNewtons per square meter.)

"Demolition" means any dismantling, intentional destruction or removal of structures or other improvements to real property.

"Disturb" means to interrupt, interfere with, or hinder the enjoyment of peace or quiet or the normal listening activities or the sleep, rest or mental concentration of the hearer.

"Emergency" means any occurrence or set of circumstances involving actual or imminent physical trauma or significant property damage which necessitates immediate action. Economic loss alone shall not constitute an emergency. It shall be the burden of an alleged violator to prove an "emergency."

"Emergency work" means any work made necessary to restore property to a safe condition following an emergency, or to protect persons or property threatened by an imminent emergency, to the extent such work is, in fact, necessary to protect persons or property from exposure to imminent danger or damage.

"Frequency" means the number of complete oscillation cycles per unit of time.

"Impulsive sound" means sound of short duration, usually less than one second, with an abrupt onset and rapid decay. Examples of sources of impulsive sound include explosions, drop forge impacts, and discharge of firearms.

"Nighttime" means 10:01 p.m. to 7:59 a.m. the following day.

"Noise disturbance" means any sound which:

1. Disturbs a reasonable person of normal sensitivities;

2. Exceeds the sound level limits set forth in this chapter; or

3. Is plainly audible as defined in this section. Where no specific distance is set forth for the determination of audibility, references to noise disturbance shall be deemed to mean plainly audible at a distance of two hundred (200) feet from the real property line of the source of the sound, if the sound occurs on privately owned property, or from the source of the sound, if the sound occurs on public right of way, public space or other publicly owned property.

"Person" means any person, person's firm, association, copartnership, joint venture, corporation, or any entity public or private in nature.

"Plainly audible" means that the sound or noise produced or reproduced by any particular source, can be clearly distinguished from ambient noise by a person using his/her normal hearing faculties.

"Public right-of-way" means any street, avenue, boulevard, sidewalk, bike path or alley, or similar place normally accessible to the public which is owned or controlled by a governmental entity.

"Public space" means any park, recreational or community facility, or lot which contains at least one building that is open to the general public during its hours of operation.

"Residential" means all uses of land primarily for dwelling units, as well as hospitals, schools, colleges and universities, and places of religious assembly.

"Sound" means an oscillation in pressure, particle displacement, particle velocity or other physical parameter, in a medium with internal forces that causes compression and rarefaction of that medium capable of producing an auditory impression. The description of sound may include any characteristic of such sound, including duration, intensity and frequency.

"Sound level" means the weighted sound pressure level as measured in dB(A) by a sound level meter and as specified in American National Standards Institute (ANSI) specifications for sound-level meters (ANSI Section 1.4-1971 (R1976)). If the frequency weighting employed is not indicated, the A-weighting shall apply.

"Sound level meter" means an instrument, demonstrably capable of accurately measuring sound levels as defined above.

All technical definitions not defined above shall be in accordance with applicable publications and standards of the American National Standards Institute (ANSI). (Ord. 740 § 1.2, 2007)

11.80.030 Prohibited acts.

A. General Prohibition. It is unlawful and a violation of this chapter to maintain, make, cause, or allow the making of any sound that causes a noise disturbance, as defined in Section 11.80.020.

B. Sound causing permanent hearing loss.

1. Sound level limits. Based on statistics from the Center for Disease Control and Prevention and the National Institute for Occupational Safety and Health, Table 1 and Table 1-A specify sound level limits which, if exceeded, will have a high probability of producing permanent hearing loss in anyone in the area where the sound levels are being exceeded. No sound shall be permitted within the city which exceeds the parameters set forth in Tables 11.80.030-1 and 11.80.030-1-A of this chapter:

Table 11.80.030-1

MAXIMUM CONTINUOUS SOUND LEVELS*

Duration per Day Continuous Hours	Sound level [db(A)]
8	90
6	92

4	95
3	97
2	100
1.5	102
1	105
0.5	110
0.25	115

* When the daily sound exposure is composed of two or more periods of sound exposure at different levels, the combined effect of all such periods shall constitute a violation of this section if the sum of the percent of allowed period of sound exposure at each level exceeds 100 percent

Table 11.80.030-1A

MAXIMUM IMPULSIVE SOUND LEVELS

Number of Repetitions per 24-Hour Period	Sound level [dB(A)]
1	145
10	135
100	125

2. Exemptions. No violation shall exist if the only persons exposed to sound levels in excess of those listed in Tables 11.80.030-1 and 11.80.030-1A are exposed as a result of:

a. Trespass;

b. Invitation upon private property by the person causing or permitting the sound; or

c. Employment by the person or a contractor of the person causing or permitting the sound.

C. Nonimpulsive Sound Decibel Limits. No person shall maintain, create, operate or cause to be operated on private property any source of sound in such a manner as to create any nonimplusive sound which exceeds the limits set forth for the source land use category (as defined in Section 11.80.020) in Table 11.80.030-2 when measured at a distance of two hundred (200) feet or more from the real property line of the source of the sound, if the sound occurs on privately owned property, or from the source of the sound, if the sound occurs on public right-of-way, public space or other publicly owned property. Any source of sound in violation of this subsection shall be deemed prima facie to be a noise disturbance.

Table 11.80.030-2

MAXIMUM SOUND LEVELS (IN dB(A)) FOR SOURCE LAND USES

Residential		Commercial	
Daytime	Nighttime	Daytime	Nighttime
60	55	65	60

D. Specific Prohibitions. In addition to the general prohibitions set out in subsection A of this section, and unless otherwise exempted by this chapter, the following specific acts, or the causing or permitting thereof, are regulated as follows:

1. Motor Vehicles. No person shall operate or cause to be operated a public or private motor vehicle, or combination of vehicles towed by a motor vehicle, that creates a sound exceeding the sound level limits in Table 11.80.030-2 when the vehicle(s) are not otherwise subject to noise regulations provided for by the California Vehicle Code.

2. Radios, Televisions, Electronic Audio Equipment, Musical Instruments or Similar Devices from a Stationary Source. No person shall operate, play or permit the operation or playing of any radio, tape player, television, electronic audio equipment, musical instrument, sound amplifier or other mechanical or electronic sound making device that produces, reproduces or amplifies sound in such a manner as to create a noise disturbance. However, this subsection shall not apply to any use or activity exempted in subsection E of this section and any use or activity for which a special permit has been issued pursuant to Section 11.80.040.

3. Radios, Electronic Audio Equipment, or Similar Devices from a Mobile Source Such as a Motor Vehicle. Sound amplification or reproduction equipment on or in a motor vehicle is subject to regulation in accordance with the California Vehicle Code when upon the public right-of-way. When upon public space or publicly owned property other than the public right-of-way or upon private property open to the public, sound amplification or reproduction equipment shall not be operated in such a manner that it is plainly audible at a distance of fifty (50) feet in any direction from the vehicle.

4. Portable, Hand-Held Music or Sound Amplification or Reproduction Equipment. Such equipment shall not be operated on a public right-of-way, public space or other publicly owned property in such a manner as to be plainly audible at a distance of fifty (50) feet in any direction from the operator.

5. Loudspeakers and Public Address Systems.

a. Except as permitted by Section 11.80.040, no person shall operate, or permit the operation of, any loudspeaker, public address system or similar device, for any commercial purpose:

1. Which produces, reproduces or amplifies sound in such a manner as to create a noise disturbance; or

2. During nighttime hours on a public right-of-way, public space or other publicly owned property.

b. No person shall operate, or permit the operation of, any loudspeaker, public address system or similar device, for any noncommercial purpose, during nighttime hours in such a manner as to create a noise disturbance.

6. Animals. No person shall own, possess or harbor an animal or bird that howls, barks, meows, squawks, or makes other sounds that:

a. Create a noise disturbance;

b. Are of frequent or continued duration for ten (10) or more consecutive minutes and are plainly audible at a distance of fifty (50) feet from the real property line of the source of the sound; or

c. Are intermittent for a period of thirty (30) or more minutes and are plainly audible at a distance of fifty (50) feet from the real property line of the source of the sound.

7. Construction and Demolition. No person shall operate or cause the operation of any tools or equipment used in construction, drilling, repair, alteration or demolition work between the hours of eight p.m. and seven a.m. the following day such that the sound there from creates a noise disturbance, except for emergency work by public service utilities or for other work approved by the city manager or designee. This section shall not apply to the use of power tools as provided in subsection (D)(9) of this section.

8. Emergency Signaling Devices. No person shall intentionally sound or permit the sounding outdoors of any fire, burglar or civil defense alarm, siren or whistle, or similar stationary emergency signaling device, except for emergency purposes or for testing as follows:

a. Testing of a stationary emergency signaling device shall not occur between seven p.m. and seven a.m. the following day;

b. Testing of a stationary emergency signaling device shall use only the minimum cycle test time, in no case to exceed sixty (60) seconds;

c. Testing of a complete emergency signaling system, including the functioning of the signaling device and the personnel response to the signaling device, shall not occur more than once in each calendar month. Such testing shall only occur only on weekdays between seven a.m. and seven p.m. and shall be exempt from the time limit specified in subsection (D)(8)(2) of this

section.

9. Power Tools. No person shall operate or permit the operation of any mechanically, electrically or gasoline motor-driven tool during nighttime hours so as to cause a noise disturbance across a residential real property boundary.

10. Pumps, Air Conditioners, Air-Handling Equipment and Other Continuously Operating Equipment. Notwithstanding the general prohibitions of subsection a of this section, no person shall operate or permit the operation of any pump, air conditioning, air-handling or other continuously operating motorized equipment in a state of disrepair or in a manner which otherwise creates a noise disturbance distinguishable from normal operating sounds.

E. Exemptions. The following uses and activities shall be exempt from the sound level regulations except the maximum sound levels provided in Tables 11.80.030-1 and 11.80.030-1A:

1. Sounds resulting from any authorized emergency vehicle when responding to an emergency call or acting in time of an emergency.

2. Sounds resulting from emergency work as defined in Section 11.80.020

3. Any aircraft operated in conformity with, or pursuant to, federal law, federal air regulations and air traffic control instruction used pursuant to and within the duly adopted federal air regulations; and any aircraft operating under technical difficulties in any kind of distress, under emergency orders of air traffic control, or being operated pursuant to and subsequent to the declaration of an emergency under federal air regulations.

4. All sounds coming from the normal operations of interstate motor and rail carriers, to the extent that local regulation of sound levels of such vehicles has been preempted by the Noise Control Act of 1972 (42 U.S.C. § 4901 et seq.) or other applicable federal laws or regulations

5. Sounds from the operation of motor vehicles, to the extent they are regulated by the California Vehicle Code.

6. Any constitutionally protected noncommercial speech or expression conducted within or upon a any public right-of-way, public space or other publicly owned property constituting an open or a designated public forum in compliance with any applicable reasonable time, place and manner restrictions on such speech or expression or otherwise pursuant to legal authority.

7. Sounds produced at otherwise lawful and permitted city-sponsored events, organized sporting events, school assemblies, school playground activities, by permitted fireworks, and by permitted parades on public right-of-way, public space or other publicly owned property.

8. An event for which a temporary use permit or special event permit has been issued under other provisions of this code, where the provisions of Section 11.80.040 are met, the permit granted expressly grants an exemption from specific standards contained in this chapter, and the permittee and all persons under the permittee's reasonable control actually comply with all conditions of such permit. Violation of any condition of such a permit related to sound or sound equipment shall be a violation of this chapter and punishable as such.

F. Nothing in this chapter shall be construed to limit, modify or repeal any other regulation elsewhere in this code relating to the regulation of noise sources, nor shall any such other regulation be read to permit the emission of noise in violation of any provision of this chapter. (Ord. 740 § 1.2, 2007)

11.80.040 Special provisions for temporary use and special event permits.

The exemption by permit set forth in Section 11.80.030(E)(8) shall be subject to the following requirements and conditions:

A. The permit application shall include the name, address and telephone number of the permit applicant; the date, hours and location for which the permit is requested; and the nature of the event or activity. It shall also specify the types of sounds and/or sound equipment to be permitted, the proposed duration of such sound, the specific standards from which the sound is to be exempted, and the reasons for each requested exemption.

B. The permit shall be issued provided the proposed activity meets the requirements of this section and the issuing official determines that the sound to be emitted at the event as proposed would not be detrimental to the public health, safety or welfare, that the event cannot reasonably achieve its legitimate aims and purposes without the exemption and that the sound levels proposed will not unreasonably damage the peace and quiet enjoyment of the lawful users of surrounding properties, nor constitute a public nuisance.

C. The official issuing the permit may prescribe any reasonable conditions or requirements he/she deems necessary to minimize noise disturbances upon the community or the surrounding neighborhood, and/or to protect the health, safety or welfare of the public, including participants in the permitted event, including use of mufflers, screens or other sound-attenuating devices.

D. Any permit granted must be in writing and shall contain all conditions upon which the permit shall be effective.

E. No more than six events requiring a sound limit exemption may be held at any particular location upon privately owned or controlled property per calendar year, provided further that the number of events shall not exceed the number permitted under the regulations for the type of permit issued. For purposes of this subsection, "location" means a legal parcel of real property or a complete shopping or commercial center or mall sharing common parking and access even if comprised of multiple legal parcels.

F. The exemption from sound limits under such permit shall not exceed maximum period of four hours in one twenty-four (24) hour day.

G. The permit will only be granted for hours between nine a.m. and ten p.m. on all days other than Friday and Saturday; and, on Friday and Saturday, between the hours of nine a.m. and one a.m. of the following day, except in the following circumstances:

1. A permit may be granted for hours between nine a.m. on New Year's Eve and one a.m. the following day (New Year's Day).

2. A permit may be granted for hours between nine a.m. and two a.m. the following day if there are no residences, hospitals, or nursing homes within a 0.5 mile radius of the property where the function is taking place.

H. Functions for which the permits are issued shall be limited to a continuous airborne sound level not to exceed seventy (70) dB(A), as measured two hundred (200) feet from the real property boundary of the source property if on private property, or from the source if on public right of way, public space or other publicly owned property. (Ord. 740 § 1.2, 2007)

11.80.050 Measurement or assessment of sound.

A. Measurement With Sound Meter.

1. The measurement of sound shall be made with a sound level meter meeting the standards prescribed by ANSI Section 1.4-1983 (R2006). The instruments shall be maintained in calibration and good working order. A calibration check shall be made of the system at the time of any sound level measurement. Measurements recorded shall be taken so as to provide a proper representation of the source of the sound. The microphone during measurement shall be positioned so as not to create any unnatural enhancement or diminution of the measured sound. A windscreen for the microphone shall be used at all times. However, a violation of this chapter may occur without the occasion of the measurements being made as otherwise provided.

2. The slow meter response of the sound level meter shall be used in order to best determine the average amplitude.

3. The measurement shall be made at any point on the property into which the sound is being transmitted and shall be made at least three feet away from any ground, wall, floor, ceiling, roof and other plane surface.

4. In case of multiple occupancy of a property, the measurement may be made at any point inside the premises to which any complainant has right of legal private occupancy; provided that the measurement shall not be made within three feet of any ground, wall, floor, ceiling, roof or other plane surface.

5. All measurements of sound provided for in this chapter will be made by qualified officials of the city who are designated by the city manger or designee to operate the apparatus used to make the measurements.

B. Assessment Without Sound Level Meter. Any police officer, code enforcement officer, or other official designated by the city manager or designee who hears a noise or sound that is plainly audible, as defined in Section 11.80.020, in violation of this chapter, may enforce this chapter and shall assess the noise or sound according to the following standards:

1. The primary means of detection shall be by means of the official's normal hearing faculties, not artificially enhanced.

2. The official shall first attempt to have a direct line of sight and hearing to the vehicle or real property from which the sound or noise emanates so that the official can readily identify the offending source of the sound or noise and the distance involved. If the official is unable to have a direct line of sight and hearing to the vehicle or real property from which the sound or noise emanates, then the official shall confirm the source of the sound or noise by approaching the suspected vehicle or real property until the official is able to obtain a direct line of sight and hearing, and confirm the source of the sound or noise that was heard at the place of the original assessment of the sound or noise.

3. The official need not be required to identify song titles, artists, or lyrics in order to establish a violation. (Ord. 740 § 1.2, 2007)

11.80.060 Violation.

A. Violation of Sound Level Limits. Any person violating any of the provisions of this chapter shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punishable by a fine not to exceed one thousand dollars ($1,000.00) and/or six months in the county jail, or both. Notwithstanding the foregoing, any violation of the provisions of this chapter may, in the discretion of the citing officer or the city attorney, be cited and/or prosecuted as an infraction or be subject to civil citation pursuant to Chapter 1.10.

B. Joint and Several Responsibility. In addition to the person causing the offending sound, the owner, tenant or lessee of property, or a manager, overseer or agent, or any other person lawfully entitled to possess the property from which the offending sound is emitted at the time the offending sound is emitted, shall be responsible for compliance with this chapter if the additionally responsible party knows or should have known of the offending noise disturbance. It shall not be a lawful defense to assert that some other person caused the sound. The lawful possessor or operator of the premises shall be responsible for operating or maintaining the premises in compliance with this chapter and may be cited regardless of whether or not the person actually causing the sound is also cited.

C. Violation May be Declared a Public Nuisance. The operation or maintenance of any device, equipment, instrument, vehicle or machinery in violation of any provisions of this chapter which endangers the public health, safety and quality of life of residents in the area is declared to be a public nuisance, and may be subject to abatement summarily or by a restraining order or injunction issued

by a court of competent jurisdiction. (Ord. 824 § 1.2, 2011; Ord. 740 § 1.2, 2007)

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APPENDIX 5.1:

STUDY AREA PHOTOS

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L1-N
33, 55' 4.550000", 117, 15' 0.960000"

L1-S
33, 55' 4.550000", 117, 15' 0.960000"

L1-W
33, 55' 4.550000", 117, 15' 0.960000"

L2-E
33, 54' 56.050000", 117, 14' 52.390000"

L2-N
33, 54' 55.020000", 117, 14' 53.550000"

L2-S
33, 54' 56.050000", 117, 14' 52.450000"

L2-W
33, 54' 56.050000", 117, 14' 52.450000"

L3-E
33, 55' 8.710000", 117, 14' 43.580000"

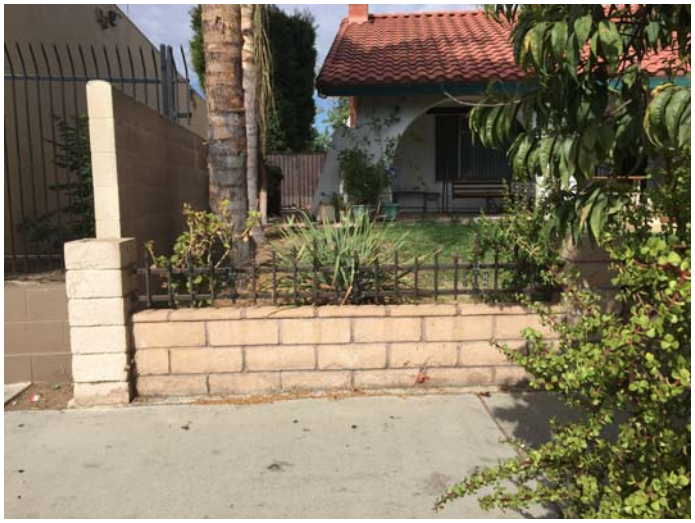
L3-S
33, 55' 8.710000", 117, 14' 43.580000"

L3-W
33, 55' 8.710000", 117, 14' 43.550000"

L4-E
33, 55' 5.690000", 117, 14' 31.270000"

L4-N
33, 55' 5.650000", 117, 14' 31.270000"

L4-S
33, 55' 5.690000", 117, 14' 31.270000"



L4-W
33, 55' 5.690000", 117, 14' 31.270000"

L5-E
33, 54' 55.640000", 117, 14' 33.390000"

L5-N
33, 54' 55.640000", 117, 14' 33.390000"

L5-W
33, 54' 55.540000", 117, 14' 33.500000"

L6-E
33, 54' 44.340000", 117, 14' 35.750000"

L6-S
33, 54' 44.340000", 117, 14' 35.750000"

L6-W
33, 54' 44.340000", 117, 14' 35.750000"

L7-E
33, 54' 28.490000", 117, 14' 31.930000"

L7-N
33, 54' 28.530000", 117, 14' 31.930000"

L7-S
33, 54' 28.500000", 117, 14' 31.900000"

L8-E
33, 54' 33.910000", 117, 14' 58.240000"

L8-N
33, 54' 33.940000", 117, 14' 58.210000"

L8-S
33, 54' 33.970000", 117, 14' 58.240000"

L8-W
33, 54' 33.950000", 117, 14' 58.210000"

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APPENDIX 5.2:

NOISE LEVEL MEASUREMENT WORKSHEETS

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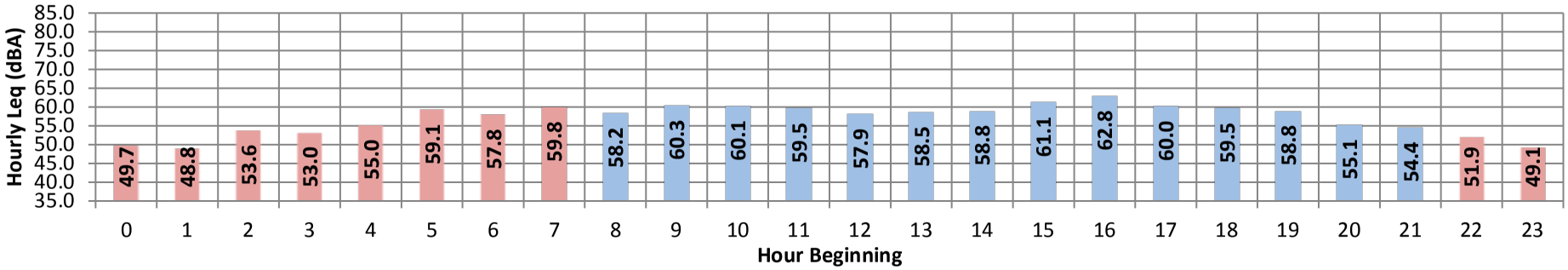
24-Hour Noise Level Measurement Summary

Project Name:	Brodiaea Ave. and Heacock St. Warehouse	*JN:*	11142	*Energy Average Leq*		*24-Hour*
Location:	L1- Located northwest of the Project site on Alessandro Boulevard near an existing motel, car wash, and commercial uses.	*Analyst:*	A. Wolfe	*Day*	*Night*	*CNEL*
		Date:	9/13/2017	59.4	55.5	62.4

Hourly Leq dBA Readings (unadjusted)



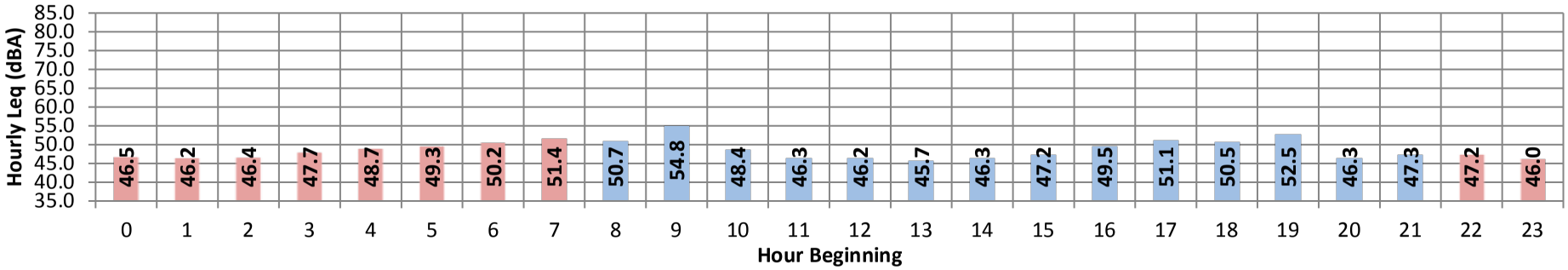
Time Period	*Hour*	*Leq*	*Lmax*	*Lmin*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*
Day	Min	54.4	73.0	42.1	65.0	63.0	59.0	58.0	52.0	49.0	45.0	44.0	43.0
	Max	62.8	85.7	51.6	73.0	70.0	66.0	64.0	61.0	59.0	55.0	54.0	53.0
Energy Average:		59.4	Average:		68.3	66.0	62.6	61.0	57.5	55.4	51.9	50.9	49.7
Night	Min	48.8	68.0	40.4	59.0	55.0	51.0	50.0	46.0	43.0	42.0	41.0	40.0
	Max	59.8	82.3	49.2	70.0	66.0	63.0	62.0	59.0	58.0	54.0	53.0	51.0
Energy Average:		55.5	Average:		63.6	60.6	57.1	55.3	51.4	49.0	45.9	45.3	44.2
Hourly Summary													
Night	0	49.7	71.3	40.8	60.0	57.0	53.0	50.0	46.0	44.0	42.0	42.0	41.0
	1	48.8	72.1	40.8	59.0	55.0	51.0	50.0	46.0	43.0	42.0	42.0	41.0
	2	53.6	80.7	40.4	65.0	62.0	54.0	51.0	46.0	44.0	42.0	41.0	40.0
	3	53.0	71.1	43.0	64.0	61.0	58.0	56.0	51.0	48.0	44.0	44.0	43.0
	4	55.0	72.2	45.1	65.0	63.0	60.0	57.0	53.0	51.0	48.0	47.0	46.0
	5	59.1	82.3	45.0	70.0	65.0	62.0	61.0	56.0	52.0	48.0	47.0	46.0
	6	57.8	75.1	48.1	65.0	63.0	61.0	60.0	58.0	56.0	51.0	50.0	49.0
	7	59.8	76.9	49.2	68.0	66.0	63.0	62.0	59.0	58.0	54.0	53.0	51.0
Day	8	58.2	75.1	49.1	66.0	64.0	62.0	61.0	58.0	56.0	52.0	51.0	50.0
	9	60.3	79.2	48.1	72.0	69.0	63.0	62.0	58.0	56.0	52.0	51.0	49.0
	10	60.1	85.7	47.7	67.0	65.0	62.0	60.0	57.0	55.0	52.0	50.0	49.0
	11	59.5	78.7	48.7	69.0	68.0	64.0	62.0	58.0	56.0	53.0	51.0	50.0
	12	57.9	73.1	50.4	65.0	64.0	62.0	60.0	58.0	56.0	53.0	52.0	51.0
	13	58.5	77.8	49.7	67.0	65.0	62.0	61.0	58.0	56.0	52.0	51.0	50.0
	14	58.8	78.1	50.6	66.0	64.0	62.0	61.0	58.0	57.0	54.0	53.0	52.0
	15	61.1	81.7	51.3	71.0	69.0	64.0	63.0	59.0	57.0	55.0	54.0	53.0
	16	62.8	83.4	51.6	73.0	70.0	66.0	64.0	61.0	59.0	55.0	54.0	53.0
	17	60.0	77.0	51.2	69.0	66.0	63.0	62.0	60.0	58.0	54.0	54.0	52.0
	18	59.5	78.3	50.0	69.0	67.0	64.0	62.0	58.0	56.0	53.0	52.0	51.0
	19	58.8	79.1	46.7	71.0	67.0	63.0	60.0	56.0	54.0	50.0	49.0	48.0
	20	55.1	74.2	43.6	66.0	63.0	59.0	58.0	54.0	51.0	47.0	46.0	45.0
	21	54.4	73.0	42.1	65.0	63.0	60.0	58.0	52.0	49.0	45.0	44.0	43.0
Night	22	51.9	70.6	42.8	61.0	58.0	55.0	54.0	51.0	49.0	46.0	45.0	44.0
	23	49.1	68.0	40.8	59.0	56.0	54.0	52.0	48.0	45.0	42.0	42.0	41.0

URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

Project Name:	Brodiaea Ave. and Heacock St. Warehouse	*JN:*	11142	*Energy Average Leq*		*24-Hour*
Location:	L2- Located west of the Project site near an existing industrial warehouse use on Brodiaea Avenue.	*Analyst:*	A. Wolfe	*Day*	*Night*	*CNEL*
		Date:	9/13/2017	49.7	48.3	54.9

Hourly Leq dBA Readings (unadjusted)



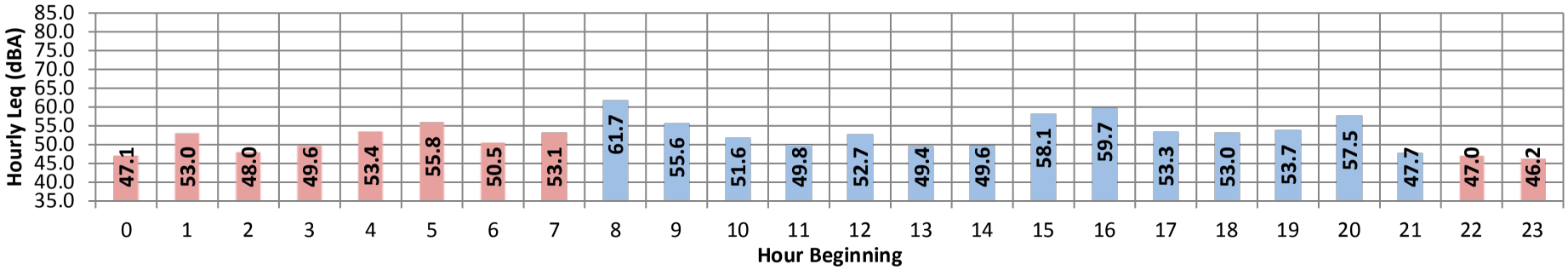
Time Period	*Hour*	*Leq*	*Lmax*	*Lmin*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*
Day	Min	45.7	58.7	39.2	53.0	51.0	49.0	48.0	45.0	43.0	41.0	40.0	40.0
	Max	54.8	77.5	43.7	67.0	64.0	57.0	55.0	50.0	48.0	46.0	45.0	45.0
Energy Average:		49.7	Average:		57.3	55.1	51.9	50.6	46.9	44.9	42.8	42.4	41.6
Night	Min	46.0	55.0	42.9	50.0	49.0	47.0	47.0	46.0	45.0	44.0	44.0	44.0
	Max	51.4	66.5	46.4	61.0	60.0	56.0	54.0	50.0	49.0	47.0	47.0	47.0
Energy Average:		48.3	Average:		53.7	52.4	50.0	49.1	47.4	46.6	45.4	45.2	44.9
Hourly Summary													
Night	0	46.5	63.5	43.4	54.0	51.0	48.0	47.0	46.0	45.0	44.0	44.0	44.0
	1	46.2	57.2	44.0	52.0	50.0	47.0	47.0	46.0	45.0	45.0	44.0	44.0
	2	46.4	57.6	44.2	50.0	49.0	48.0	47.0	46.0	46.0	45.0	45.0	44.0
	3	47.7	62.2	44.7	52.0	51.0	50.0	49.0	47.0	47.0	45.0	45.0	45.0
	4	48.7	66.5	45.6	54.0	53.0	51.0	50.0	48.0	47.0	46.0	46.0	46.0
	5	49.3	60.9	46.4	55.0	54.0	51.0	50.0	49.0	48.0	47.0	47.0	47.0
	6	50.2	61.6	46.2	57.0	56.0	53.0	52.0	49.0	49.0	47.0	47.0	47.0
	7	51.4	65.1	42.9	61.0	60.0	56.0	54.0	50.0	48.0	46.0	45.0	44.0
Day	8	50.7	63.8	41.0	61.0	60.0	57.0	55.0	48.0	45.0	43.0	42.0	41.0
	9	54.8	77.5	39.6	67.0	64.0	54.0	51.0	45.0	43.0	41.0	41.0	40.0
	10	48.4	71.3	39.2	56.0	54.0	51.0	49.0	45.0	43.0	41.0	40.0	40.0
	11	46.3	62.7	39.4	56.0	53.0	50.0	49.0	45.0	43.0	41.0	41.0	40.0
	12	46.2	61.6	39.3	55.0	53.0	50.0	49.0	45.0	43.0	41.0	41.0	40.0
	13	45.7	61.1	40.0	53.0	51.0	49.0	48.0	45.0	43.0	41.0	41.0	40.0
	14	46.3	62.9	40.3	53.0	52.0	50.0	49.0	46.0	44.0	42.0	42.0	41.0
	15	47.2	58.7	41.3	53.0	52.0	51.0	50.0	47.0	45.0	43.0	43.0	42.0
	16	49.5	67.8	41.7	57.0	55.0	53.0	52.0	49.0	47.0	45.0	44.0	43.0
	17	51.1	65.1	43.4	61.0	58.0	55.0	53.0	50.0	48.0	46.0	45.0	45.0
	18	50.5	66.5	43.7	59.0	57.0	54.0	53.0	50.0	48.0	46.0	45.0	45.0
	19	52.5	75.0	41.9	62.0	57.0	53.0	52.0	48.0	47.0	44.0	44.0	43.0
	20	46.3	58.7	40.3	54.0	53.0	50.0	49.0	46.0	44.0	42.0	42.0	41.0
	21	47.3	61.0	39.8	55.0	53.0	50.0	49.0	47.0	46.0	43.0	42.0	41.0
Night	22	47.2	56.5	43.7	52.0	51.0	49.0	48.0	47.0	46.0	45.0	45.0	44.0
	23	46.0	55.0	43.5	50.0	49.0	47.0	47.0	46.0	45.0	44.0	44.0	44.0

URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

Project Name:	Brodiaea Ave. and Heacock St. Warehouse	*JN:*	11142	*Energy Average Leq*		*24-Hour*
Location:	L3- Located north of the Project site adjacent to existing residential homes west of Heacock Street.	*Analyst:*	A. Wolfe	*Day*	*Night*	*CNEL*
		Date:	9/13/2017	55.8	51.5	59.1

Hourly Leq dBA Readings (unadjusted)



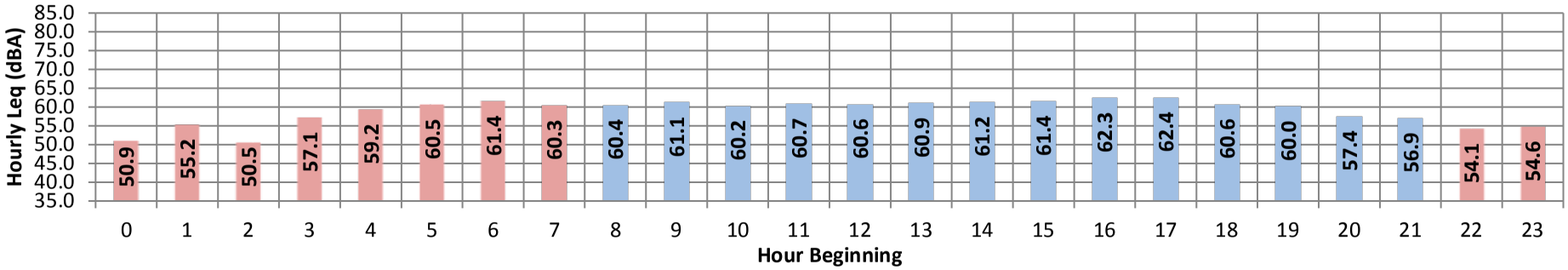
Time Period	*Hour*	*Leq*	*Lmax*	*Lmin*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*
Day	Min	47.7	61.4	43.0	54.0	52.0	50.0	49.0	47.0	46.0	45.0	44.0	43.0
	Max	61.7	89.0	48.1	70.0	69.0	61.0	60.0	54.0	52.0	49.0	49.0	48.0
Energy Average:		55.8	Average:		61.4	58.8	55.2	53.8	50.1	48.3	46.2	45.9	45.4
Night	Min	46.2	57.1	43.8	50.0	49.0	47.0	47.0	46.0	45.0	44.0	44.0	44.0
	Max	55.8	74.9	46.0	68.0	65.0	63.0	58.0	52.0	49.0	47.0	46.0	46.0
Energy Average:		51.5	Average:		58.0	56.4	54.1	51.5	48.4	47.0	45.7	45.4	45.1
Hourly Summary													
Night	0	47.1	57.1	45.2	50.0	49.0	48.0	48.0	47.0	46.0	46.0	45.0	45.0
	1	53.0	65.7	44.8	64.0	63.0	63.0	50.0	47.0	46.0	45.0	45.0	45.0
	2	48.0	64.9	44.8	56.0	54.0	50.0	48.0	47.0	46.0	45.0	45.0	45.0
	3	49.6	70.2	45.5	57.0	54.0	51.0	50.0	48.0	47.0	46.0	46.0	45.0
	4	53.4	64.6	46.0	63.0	63.0	62.0	56.0	49.0	48.0	46.0	46.0	46.0
	5	55.8	74.9	44.9	68.0	65.0	60.0	58.0	51.0	49.0	47.0	46.0	45.0
	6	50.5	64.7	44.4	59.0	57.0	54.0	53.0	50.0	48.0	46.0	46.0	45.0
	7	53.1	68.4	44.8	63.0	61.0	58.0	57.0	52.0	49.0	47.0	46.0	46.0
Day	8	61.7	89.0	43.8	68.0	65.0	60.0	58.0	52.0	49.0	45.0	45.0	44.0
	9	55.6	76.6	43.3	67.0	64.0	59.0	56.0	50.0	47.0	45.0	44.0	44.0
	10	51.6	75.7	43.3	58.0	54.0	52.0	51.0	48.0	47.0	45.0	45.0	44.0
	11	49.8	66.8	44.3	59.0	57.0	53.0	52.0	48.0	47.0	45.0	45.0	45.0
	12	52.7	77.4	43.0	63.0	60.0	56.0	54.0	49.0	47.0	45.0	44.0	43.0
	13	49.4	67.7	44.2	58.0	55.0	52.0	50.0	48.0	47.0	45.0	45.0	45.0
	14	49.6	68.3	43.9	59.0	56.0	52.0	51.0	48.0	47.0	45.0	45.0	44.0
	15	58.1	80.4	44.7	70.0	69.0	61.0	60.0	54.0	49.0	46.0	46.0	45.0
	16	59.7	88.4	46.2	62.0	60.0	56.0	55.0	51.0	50.0	48.0	48.0	47.0
	17	53.3	68.5	46.8	63.0	61.0	57.0	55.0	52.0	50.0	49.0	48.0	48.0
	18	53.0	73.1	48.1	60.0	56.0	54.0	53.0	51.0	50.0	49.0	49.0	48.0
	19	53.7	70.9	46.3	60.0	58.0	56.0	55.0	53.0	52.0	49.0	48.0	47.0
	20	57.5	88.3	45.6	59.0	56.0	55.0	54.0	50.0	48.0	46.0	46.0	46.0
	21	47.7	61.4	44.3	54.0	52.0	50.0	49.0	47.0	46.0	45.0	45.0	45.0
Night	22	47.0	59.8	44.6	50.0	49.0	48.0	48.0	47.0	46.0	45.0	45.0	45.0
	23	46.2	58.1	43.8	50.0	49.0	47.0	47.0	46.0	45.0	44.0	44.0	44.0

URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

Project Name:	Brodiaea Ave. and Heacock St. Warehouse	*JN:*	11142	*Energy Average Leq*		*24-Hour*
Location:	L4- Located northeast of the Project site on Ramsdell Drive near existing residential homes.	*Analyst:*	A. Wolfe	*Day*	*Night*	*CNEL*
		Date:	9/13/2017	60.7	57.8	64.7

Hourly Leq dBA Readings (unadjusted)



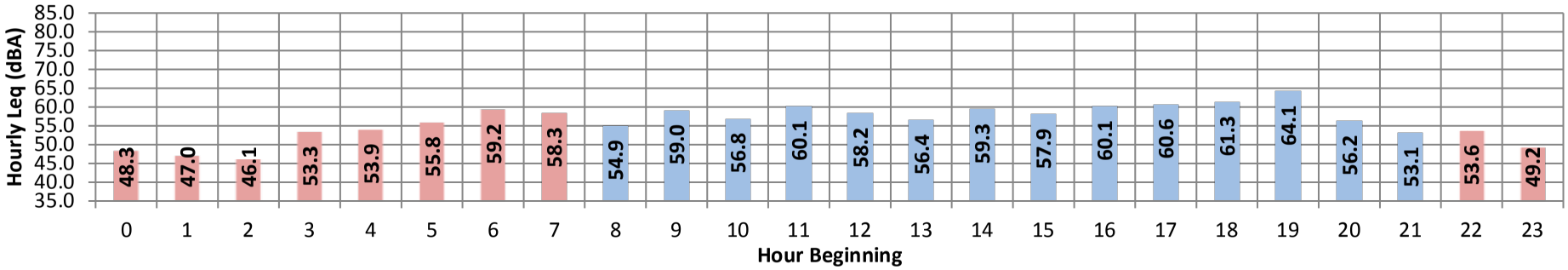
Time Period	*Hour*	*Leq*	*Lmax*	*Lmin*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*
Day	Min	56.9	76.5	43.3	68.0	66.0	63.0	60.0	53.0	49.0	45.0	44.0	44.0
	Max	62.4	85.5	49.4	73.0	71.0	68.0	67.0	60.0	55.0	52.0	51.0	50.0
Energy Average:		60.7	Average:		71.3	69.4	66.2	64.3	56.8	52.1	48.6	48.1	47.0
Night	Min	50.5	72.6	39.5	61.0	57.0	52.0	50.0	46.0	43.0	41.0	41.0	41.0
	Max	61.4	86.4	45.8	72.0	70.0	67.0	65.0	58.0	53.0	49.0	48.0	47.0
Energy Average:		57.8	Average:		67.9	65.0	60.3	57.2	51.0	47.7	45.0	44.5	44.0
Hourly Summary													
Night	0	50.9	73.6	41.2	63.0	59.0	52.0	50.0	47.0	44.0	42.0	42.0	42.0
	1	55.2	85.1	42.1	66.0	61.0	54.0	51.0	46.0	44.0	43.0	43.0	42.0
	2	50.5	72.6	42.4	61.0	57.0	53.0	51.0	48.0	45.0	43.0	43.0	43.0
	3	57.1	77.9	43.4	70.0	68.0	62.0	58.0	51.0	48.0	45.0	44.0	44.0
	4	59.2	86.4	45.4	71.0	68.0	64.0	60.0	53.0	50.0	47.0	46.0	46.0
	5	60.5	83.0	45.4	72.0	70.0	67.0	64.0	55.0	51.0	48.0	47.0	46.0
	6	61.4	85.4	45.6	72.0	70.0	67.0	64.0	56.0	52.0	48.0	48.0	46.0
	7	60.3	78.1	45.8	71.0	69.0	67.0	65.0	58.0	53.0	49.0	48.0	47.0
Day	8	60.4	79.3	45.4	72.0	70.0	67.0	64.0	57.0	52.0	48.0	48.0	46.0
	9	61.1	83.2	45.1	73.0	71.0	66.0	64.0	55.0	51.0	47.0	47.0	46.0
	10	60.2	81.9	45.4	72.0	70.0	66.0	64.0	55.0	51.0	47.0	47.0	46.0
	11	60.7	82.5	46.4	72.0	70.0	66.0	64.0	56.0	52.0	48.0	48.0	47.0
	12	60.6	80.7	46.7	71.0	70.0	67.0	65.0	57.0	52.0	48.0	48.0	47.0
	13	60.9	81.0	46.4	72.0	70.0	67.0	65.0	57.0	52.0	49.0	48.0	47.0
	14	61.2	79.8	46.5	72.0	70.0	67.0	66.0	58.0	53.0	49.0	49.0	47.0
	15	61.4	80.4	47.5	72.0	70.0	68.0	66.0	58.0	53.0	50.0	49.0	48.0
	16	62.3	85.5	48.4	72.0	70.0	67.0	66.0	59.0	54.0	51.0	50.0	49.0
	17	62.4	79.6	49.4	72.0	71.0	68.0	67.0	60.0	55.0	52.0	51.0	50.0
	18	60.6	82.8	48.5	71.0	69.0	66.0	64.0	58.0	54.0	51.0	50.0	49.0
	19	60.0	82.0	46.8	70.0	69.0	66.0	64.0	57.0	52.0	49.0	48.0	47.0
	20	57.4	76.5	44.7	69.0	66.0	63.0	61.0	55.0	50.0	47.0	46.0	45.0
	21	56.9	79.1	43.3	68.0	66.0	63.0	60.0	53.0	49.0	45.0	44.0	44.0
Night	22	54.1	73.4	42.3	66.0	64.0	60.0	56.0	50.0	47.0	44.0	43.0	43.0
	23	54.6	79.5	39.5	67.0	64.0	57.0	53.0	46.0	43.0	41.0	41.0	41.0

URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

Project Name:	Brodiaea Ave. and Heacock St. Warehouse	*JN:*	11142	*Energy Average Leq*		*24-Hour*
Location:	L5- Located east of the Project site on Dimitra Drive near existing residential homes.	*Analyst:*	A. Wolfe	*Day*	*Night*	*CNEL*
		Date:	9/13/2017	59.3	54.5	62.3

Hourly Leq dBA Readings (unadjusted)



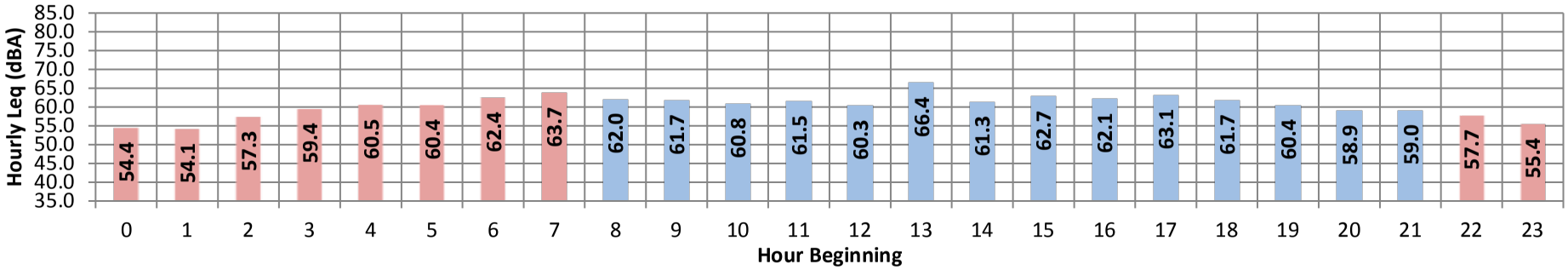
Time Period	*Hour*	*Leq*	*Lmax*	*Lmin*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*
Day	Min	53.1	71.0	41.6	64.0	61.0	57.0	55.0	52.0	49.0	45.0	44.0	43.0
	Max	64.1	90.5	52.2	75.0	71.0	65.0	63.0	60.0	58.0	55.0	54.0	53.0
Energy Average:		59.3	Average:		68.1	65.2	61.4	59.2	55.6	53.1	49.8	48.9	47.7
Night	Min	46.1	63.7	38.3	55.0	53.0	50.0	49.0	45.0	42.0	40.0	40.0	38.0
	Max	59.2	87.9	45.0	67.0	65.0	62.0	60.0	55.0	52.0	49.0	48.0	47.0
Energy Average:		54.5	Average:		61.5	59.2	56.1	54.4	50.6	48.0	44.7	44.0	43.1
Hourly Summary													
Night	0	48.3	66.5	41.3	58.0	55.0	52.0	50.0	47.0	45.0	43.0	42.0	42.0
	1	47.0	66.1	38.7	58.0	55.0	51.0	49.0	45.0	42.0	40.0	40.0	40.0
	2	46.1	63.7	38.3	55.0	53.0	50.0	49.0	45.0	43.0	40.0	40.0	38.0
	3	53.3	76.0	41.3	64.0	61.0	57.0	55.0	51.0	48.0	44.0	43.0	42.0
	4	53.9	73.4	44.2	63.0	62.0	58.0	57.0	53.0	50.0	47.0	46.0	45.0
	5	55.8	76.4	44.4	66.0	63.0	60.0	58.0	53.0	51.0	47.0	46.0	45.0
	6	59.2	87.9	44.2	66.0	64.0	61.0	58.0	55.0	52.0	49.0	48.0	47.0
	7	58.3	85.2	45.0	67.0	65.0	62.0	60.0	54.0	52.0	48.0	47.0	46.0
Day	8	54.9	73.7	43.9	65.0	63.0	59.0	57.0	54.0	51.0	47.0	46.0	45.0
	9	59.0	82.6	42.2	71.0	67.0	63.0	59.0	52.0	49.0	45.0	44.0	43.0
	10	56.8	78.8	43.7	68.0	65.0	61.0	58.0	53.0	50.0	46.0	46.0	45.0
	11	60.1	87.2	44.9	68.0	66.0	61.0	58.0	54.0	51.0	48.0	47.0	46.0
	12	58.2	83.4	45.2	68.0	64.0	60.0	59.0	54.0	52.0	49.0	48.0	46.0
	13	56.4	77.4	45.7	67.0	64.0	60.0	58.0	54.0	52.0	49.0	48.0	47.0
	14	59.3	88.0	47.0	66.0	63.0	60.0	58.0	55.0	53.0	50.0	49.0	48.0
	15	57.9	72.1	47.6	67.0	65.0	62.0	60.0	58.0	56.0	52.0	51.0	50.0
	16	60.1	83.3	50.1	69.0	66.0	63.0	61.0	59.0	57.0	54.0	53.0	52.0
	17	60.6	75.6	51.6	69.0	67.0	64.0	63.0	60.0	58.0	55.0	54.0	53.0
	18	61.3	85.6	52.2	70.0	68.0	64.0	63.0	60.0	58.0	55.0	54.0	53.0
	19	64.1	90.5	49.0	75.0	71.0	65.0	62.0	59.0	56.0	53.0	52.0	50.0
	20	56.2	76.1	45.5	66.0	63.0	60.0	58.0	55.0	52.0	49.0	48.0	47.0
	21	53.1	71.0	41.6	64.0	61.0	57.0	55.0	52.0	49.0	45.0	44.0	43.0
Night	22	53.6	70.6	43.8	61.0	59.0	57.0	56.0	54.0	51.0	47.0	46.0	45.0
	23	49.2	68.1	41.0	57.0	55.0	53.0	52.0	49.0	46.0	42.0	42.0	41.0

URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

Project Name:	Brodiaea Ave. and Heacock St. Warehouse	*JN:*	11142	*Energy Average Leq*		*24-Hour*
Location:	L6- Located southeast of the Project site on Powell Place near existing residential homes.	*Analyst:*	A. Wolfe	*Day*	*Night*	*CNEL*
		Date:	9/13/2017	62.0	59.6	66.1

Hourly Leq dBA Readings (unadjusted)



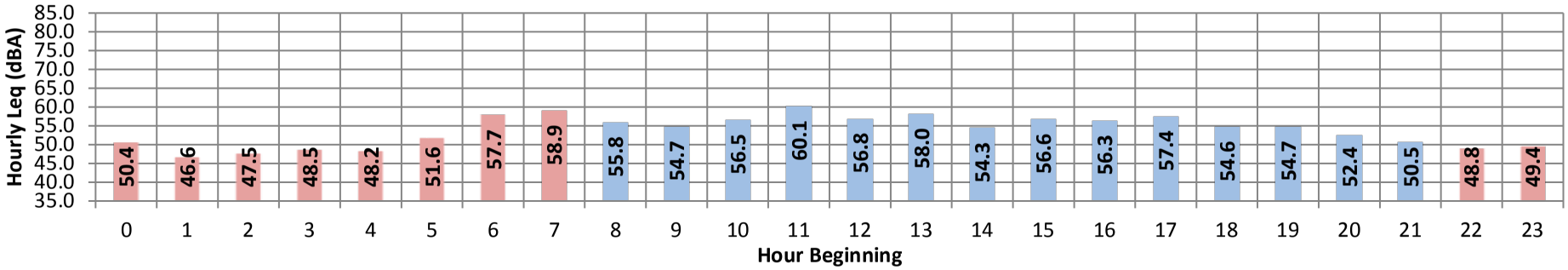
Time Period	*Hour*	*Leq*	*Lmax*	*Lmin*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*
Day	Min	58.9	74.0	42.5	68.0	66.0	64.0	63.0	58.0	51.0	45.0	45.0	44.0
	Max	66.4	96.1	48.8	71.0	69.0	67.0	66.0	64.0	59.0	52.0	51.0	49.0
Energy Average:		62.0	Average:		69.4	67.9	66.0	64.9	61.4	56.2	48.1	47.2	45.9
Night	Min	54.1	72.6	42.5	65.0	64.0	60.0	57.0	48.0	46.0	44.0	44.0	43.0
	Max	63.7	89.3	47.7	71.0	69.0	68.0	67.0	64.0	58.0	50.0	49.0	48.0
Energy Average:		59.6	Average:		68.0	66.6	64.2	62.5	56.0	50.6	46.2	45.8	44.9
Hourly Summary													
Night	0	54.4	75.7	42.6	65.0	64.0	61.0	58.0	50.0	46.0	44.0	44.0	43.0
	1	54.1	72.6	43.1	66.0	64.0	60.0	57.0	48.0	46.0	44.0	44.0	43.0
	2	57.3	82.7	42.5	68.0	66.0	62.0	60.0	50.0	46.0	44.0	44.0	43.0
	3	59.4	84.5	45.0	68.0	67.0	65.0	63.0	58.0	51.0	46.0	46.0	45.0
	4	60.5	81.6	45.2	69.0	68.0	66.0	65.0	60.0	53.0	47.0	46.0	46.0
	5	60.4	80.2	46.2	69.0	68.0	66.0	65.0	60.0	53.0	48.0	47.0	46.0
	6	62.4	76.7	47.7	70.0	69.0	68.0	67.0	63.0	58.0	50.0	49.0	48.0
	7	63.7	89.3	46.5	71.0	69.0	68.0	67.0	64.0	58.0	49.0	48.0	47.0
Day	8	62.0	79.9	45.8	70.0	69.0	67.0	66.0	63.0	57.0	48.0	47.0	46.0
	9	61.7	80.6	44.5	71.0	69.0	67.0	66.0	62.0	56.0	47.0	46.0	45.0
	10	60.8	74.0	43.9	69.0	68.0	66.0	65.0	61.0	56.0	47.0	46.0	45.0
	11	61.5	85.9	43.1	68.0	67.0	66.0	64.0	61.0	56.0	46.0	45.0	44.0
	12	60.3	75.6	42.5	70.0	68.0	65.0	64.0	61.0	56.0	46.0	45.0	44.0
	13	66.4	96.1	43.1	70.0	68.0	66.0	65.0	61.0	56.0	47.0	46.0	44.0
	14	61.3	77.1	45.0	69.0	68.0	66.0	65.0	62.0	58.0	48.0	47.0	46.0
	15	62.7	89.1	47.1	70.0	68.0	66.0	65.0	62.0	58.0	50.0	49.0	48.0
	16	62.1	79.6	47.7	69.0	68.0	67.0	66.0	63.0	59.0	51.0	50.0	49.0
	17	63.1	83.8	48.8	70.0	69.0	67.0	66.0	64.0	59.0	52.0	51.0	49.0
	18	61.7	77.7	47.6	70.0	68.0	66.0	66.0	62.0	58.0	51.0	50.0	48.0
	19	60.4	75.7	46.4	69.0	67.0	66.0	65.0	61.0	55.0	49.0	48.0	47.0
	20	58.9	75.0	44.3	68.0	66.0	64.0	63.0	59.0	52.0	46.0	46.0	44.0
	21	59.0	77.7	43.4	69.0	67.0	65.0	63.0	58.0	51.0	45.0	45.0	44.0
Night	22	57.7	76.8	44.4	68.0	66.0	64.0	63.0	56.0	49.0	46.0	46.0	45.0
	23	55.4	76.2	43.2	66.0	65.0	62.0	60.0	51.0	46.0	44.0	44.0	43.0

URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

Project Name:	Brodiaea Ave. and Heacock St. Warehouse	*JN:*	11142	*Energy Average Leq*		*24-Hour*
Location:	L7- Located southeast of the Project site on Unity Court near existing residential homes and Serrano Elementary School.	*Analyst:*	A. Wolfe	*Day*	*Night*	*CNEL*
		Date:	9/13/2017	56.2	53.1	59.3

Hourly Leq dBA Readings (unadjusted)



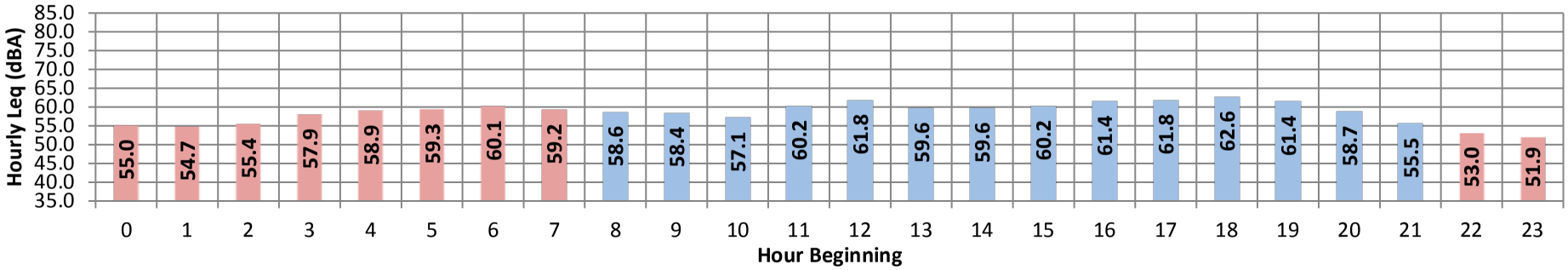
Time Period	*Hour*	*Leq*	*Lmax*	*Lmin*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*
Day	Min	50.5	73.9	38.8	61.0	55.0	51.0	50.0	45.0	43.0	40.0	40.0	39.0
	Max	60.1	82.3	46.6	72.0	69.0	65.0	63.0	57.0	52.0	49.0	49.0	48.0
Energy Average:		56.2	Average:		66.9	63.9	58.9	56.1	50.9	48.4	45.6	45.1	44.2
Night	Min	46.6	69.8	37.6	53.0	49.0	44.0	42.0	40.0	39.0	37.0	37.0	37.0
	Max	58.9	80.9	42.4	71.0	69.0	65.0	63.0	53.0	47.0	44.0	44.0	43.0
Energy Average:		53.1	Average:		61.2	56.3	50.9	48.9	45.1	43.0	40.7	40.6	39.9
Hourly Summary													
Night	0	50.4	77.3	37.7	60.0	53.0	46.0	44.0	41.0	40.0	39.0	39.0	37.0
	1	46.6	74.4	37.6	53.0	49.0	44.0	42.0	40.0	39.0	37.0	37.0	37.0
	2	47.5	69.8	37.6	61.0	53.0	45.0	45.0	41.0	39.0	37.0	37.0	37.0
	3	48.5	72.2	39.1	58.0	52.0	47.0	46.0	45.0	43.0	40.0	40.0	39.0
	4	48.2	74.6	40.6	58.0	52.0	48.0	46.0	44.0	43.0	42.0	41.0	41.0
	5	51.6	77.5	41.5	63.0	58.0	53.0	49.0	46.0	45.0	43.0	43.0	42.0
	6	57.7	79.4	42.4	71.0	68.0	61.0	58.0	51.0	47.0	44.0	44.0	43.0
	7	58.9	80.9	42.1	70.0	69.0	65.0	63.0	53.0	47.0	43.0	43.0	42.0
Day	8	55.8	78.3	41.1	66.0	65.0	62.0	59.0	50.0	46.0	43.0	43.0	42.0
	9	54.7	79.0	39.4	66.0	63.0	58.0	54.0	50.0	48.0	43.0	41.0	40.0
	10	56.5	80.4	43.6	69.0	67.0	62.0	58.0	49.0	46.0	45.0	44.0	44.0
	11	60.1	82.3	44.3	72.0	69.0	65.0	63.0	53.0	50.0	46.0	45.0	45.0
	12	56.8	80.1	45.0	69.0	65.0	60.0	56.0	49.0	47.0	46.0	46.0	45.0
	13	58.0	77.4	45.1	67.0	66.0	63.0	62.0	57.0	52.0	47.0	47.0	46.0
	14	54.3	74.1	44.0	65.0	62.0	57.0	55.0	53.0	50.0	47.0	47.0	46.0
	15	56.6	81.8	45.6	69.0	64.0	57.0	53.0	51.0	49.0	47.0	47.0	46.0
	16	56.3	75.7	46.6	67.0	65.0	61.0	59.0	53.0	51.0	49.0	48.0	47.0
	17	57.4	82.3	46.2	68.0	66.0	61.0	59.0	54.0	52.0	49.0	49.0	48.0
	18	54.6	76.5	45.4	66.0	63.0	57.0	54.0	52.0	50.0	48.0	47.0	46.0
	19	54.7	79.3	43.6	67.0	63.0	55.0	53.0	50.0	48.0	46.0	45.0	44.0
	20	52.4	73.9	40.6	65.0	61.0	56.0	51.0	46.0	45.0	42.0	42.0	41.0
	21	50.5	74.9	38.8	61.0	55.0	51.0	50.0	45.0	43.0	40.0	40.0	39.0
Night	22	48.8	70.0	40.6	57.0	54.0	52.0	50.0	47.0	46.0	43.0	43.0	42.0
	23	49.4	75.5	37.7	61.0	55.0	48.0	46.0	43.0	41.0	39.0	39.0	39.0

URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

Project Name:	Brodiaea Ave. and Heacock St. Warehouse	*JN:*	11142	*Energy Average Leq*		*24-Hour*
Location:	L8- Located south of the Project site adjacent to March Air Reserve Base and existing industrial uses on Cactus Avenue.	*Analyst:*	A. Wolfe	*Day*	*Night*	*CNEL*
		Date:	9/13/2017	60.2	57.3	64.4

Hourly Leq dBA Readings (unadjusted)



Time Period	*Hour*	*Leq*	*Lmax*	*Lmin*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*
Day	Min	55.5	76.2	42.7	64.0	61.0	59.0	58.0	54.0	51.0	47.0	46.0	44.0
	Max	62.6	91.4	50.6	72.0	70.0	65.0	65.0	63.0	61.0	56.0	55.0	53.0
Energy Average:		60.2	Average:		67.3	65.6	63.1	61.9	59.2	56.9	52.1	50.9	48.9
Night	Min	51.9	69.5	43.6	60.0	58.0	56.0	55.0	52.0	49.0	46.0	46.0	45.0
	Max	60.1	84.7	52.6	65.0	64.0	63.0	62.0	60.0	59.0	56.0	55.0	54.0
Energy Average:		57.3	Average:		62.7	61.6	60.2	59.3	56.8	54.4	51.0	50.4	49.3
Hourly Summary													
Night	0	55.0	75.6	43.9	63.0	61.0	60.0	58.0	55.0	52.0	48.0	47.0	46.0
	1	54.7	69.9	44.8	62.0	61.0	60.0	59.0	55.0	51.0	47.0	47.0	46.0
	2	55.4	71.4	45.2	62.0	61.0	60.0	59.0	56.0	53.0	49.0	48.0	47.0
	3	57.9	69.5	47.8	63.0	63.0	61.0	61.0	59.0	56.0	52.0	51.0	49.0
	4	58.9	70.7	51.3	64.0	63.0	62.0	61.0	59.0	58.0	55.0	54.0	53.0
	5	59.3	82.7	52.6	64.0	63.0	62.0	61.0	60.0	58.0	55.0	55.0	54.0
	6	60.1	75.2	52.2	65.0	64.0	63.0	62.0	60.0	59.0	56.0	55.0	54.0
	7	59.2	84.7	51.2	64.0	63.0	61.0	61.0	59.0	58.0	55.0	54.0	53.0
Day	8	58.6	81.8	45.6	66.0	64.0	62.0	61.0	58.0	56.0	51.0	49.0	47.0
	9	58.4	80.2	42.7	69.0	67.0	63.0	61.0	57.0	54.0	49.0	47.0	44.0
	10	57.1	80.5	42.9	64.0	62.0	60.0	59.0	57.0	54.0	49.0	48.0	46.0
	11	60.2	76.5	44.4	72.0	70.0	64.0	62.0	58.0	56.0	51.0	49.0	48.0
	12	61.8	91.4	45.0	71.0	69.0	65.0	63.0	59.0	57.0	52.0	50.0	48.0
	13	59.6	81.4	45.6	70.0	69.0	64.0	62.0	59.0	56.0	51.0	50.0	48.0
	14	59.6	88.8	47.4	64.0	63.0	62.0	61.0	59.0	57.0	52.0	51.0	49.0
	15	60.2	77.8	47.6	66.0	65.0	64.0	63.0	61.0	58.0	54.0	53.0	51.0
	16	61.4	80.7	47.9	67.0	66.0	64.0	63.0	62.0	60.0	56.0	55.0	52.0
	17	61.8	81.1	50.0	67.0	66.0	65.0	64.0	62.0	60.0	56.0	55.0	53.0
	18	62.6	85.7	50.6	68.0	67.0	65.0	65.0	63.0	61.0	56.0	55.0	53.0
	19	61.4	80.0	49.6	69.0	67.0	65.0	64.0	61.0	59.0	54.0	53.0	52.0
	20	58.7	76.2	46.5	65.0	63.0	62.0	61.0	59.0	57.0	52.0	51.0	49.0
	21	55.5	88.6	43.3	64.0	61.0	59.0	58.0	54.0	51.0	47.0	46.0	45.0
Night	22	53.0	73.2	44.5	60.0	59.0	57.0	56.0	53.0	50.0	47.0	47.0	46.0
	23	51.9	71.2	43.6	60.0	58.0	56.0	55.0	52.0	49.0	46.0	46.0	45.0

URBAN CROSSROADS

APPENDIX 7.1:

OFF-SITE TRAFFIC NOISE CONTOURS

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	Existing Without Project	*Project Name:*	Brodiaea
Road Name:	Gilbert St.	*Job Number:*	11142
Road Segment:	s/o Brodiaea Av.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	408 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	41 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	24 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	39.0 feet
Centerline Dist. to Observer:	39.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	11.6%	19.2%	93.48%
Medium Trucks:	72.2%	3.3%	24.4%	3.28%
Heavy Trucks:	79.8%	3.4%	16.9%	3.24%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	37.443
Medium Trucks:	37.206
Heavy Trucks:	37.229

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	-14.93	1.78	-1.20	*-4.58*	0.000	0.000
Medium Trucks:	75.75	-29.48	1.82	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	81.57	-29.53	1.82	-1.20	*-5.57*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	50.0	47.6	45.8	43.2	50.5	50.9
Medium Trucks:	46.9	44.7	37.3	41.2	48.1	48.2
Heavy Trucks:	52.7	50.9	43.2	45.4	52.9	53.0
Vehicle Noise:	55.2	53.2	48.1	48.4	55.7	55.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	4	9	20	43
CNEL:	4	10	21	45

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	Existing Without Project	*Project Name:*	Brodiaea
Road Name:	Gilbert St.	*Job Number:*	11142
Road Segment:	n/o Cactus Av.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	120 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	12 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	24 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	39.0 feet
Centerline Dist. to Observer:	39.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	11.6%	19.2%	93.48%
Medium Trucks:	72.2%	3.3%	24.4%	3.28%
Heavy Trucks:	79.8%	3.4%	16.9%	3.24%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	37.443
Medium Trucks:	37.206
Heavy Trucks:	37.229

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	-20.25	1.78	-1.20	*-4.58*	0.000	0.000
Medium Trucks:	75.75	-34.80	1.82	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	81.57	-34.85	1.82	-1.20	*-5.57*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	44.6	42.2	40.5	37.9	45.2	45.6
Medium Trucks:	41.6	39.4	32.0	35.9	42.8	42.9
Heavy Trucks:	47.3	45.6	37.8	40.1	47.5	47.7
Vehicle Noise:	49.9	47.9	42.8	43.1	50.4	50.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	2	4	9	19
CNEL:	2	4	9	20

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	Existing Without Project	*Project Name:*	Brodiaea
Road Name:	Heacock St.	*Job Number:*	11142
Road Segment:	n/o Alessandro Bl.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	18,143 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,814 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	11.6%	19.2%	93.48%
Medium Trucks:	72.2%	3.3%	24.4%	3.28%
Heavy Trucks:	79.8%	3.4%	16.9%	3.24%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	44.147
Medium Trucks:	43.947
Heavy Trucks:	43.966

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	0.97	0.71	-1.20	*-4.65*	0.000	0.000
Medium Trucks:	77.72	-13.58	0.74	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	82.99	-13.63	0.73	-1.20	*-5.43*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	67.0	64.6	62.9	60.3	67.5	67.9
Medium Trucks:	63.7	61.5	54.1	58.0	64.9	65.0
Heavy Trucks:	68.9	67.1	59.4	61.6	69.1	69.2
Vehicle Noise:	71.8	69.7	64.9	65.0	72.3	72.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	71	153	330	710
CNEL:	73	158	340	733

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	Existing Without Project	*Project Name:*	Brodiaea
Road Name:	Heacock St.	*Job Number:*	11142
Road Segment:	s/o Alessandro Bl.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	15,349 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,535 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	11.6%	19.2%	93.48%
Medium Trucks:	72.2%	3.3%	24.4%	3.28%
Heavy Trucks:	79.8%	3.4%	16.9%	3.24%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	44.147
Medium Trucks:	43.947
Heavy Trucks:	43.966

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	-0.27	0.71	-1.20	*-4.65*	0.000	0.000
Medium Trucks:	79.45	-14.82	0.74	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-14.87	0.73	-1.20	*-5.43*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	67.7	65.3	63.6	61.0	68.3	68.6
Medium Trucks:	64.2	62.0	54.6	58.5	65.4	65.5
Heavy Trucks:	68.9	67.1	59.4	61.6	69.1	69.2
Vehicle Noise:	72.1	70.1	65.4	65.3	72.6	72.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	75	161	348	749
CNEL:	77	167	359	774

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	Existing Without Project	*Project Name:*	Brodiaea
Road Name:	Heacock St.	*Job Number:*	11142
Road Segment:	n/o Brodiaea Av.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	14,222 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,422 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	11.6%	19.2%	93.48%
Medium Trucks:	72.2%	3.3%	24.4%	3.28%
Heavy Trucks:	79.8%	3.4%	16.9%	3.24%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	44.147
Medium Trucks:	43.947
Heavy Trucks:	43.966

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	-0.60	0.71	-1.20	*-4.65*	0.000	0.000
Medium Trucks:	79.45	-15.15	0.74	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-15.20	0.73	-1.20	*-5.43*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	67.4	65.0	63.3	60.7	67.9	68.3
Medium Trucks:	63.8	61.6	54.3	58.2	65.1	65.2
Heavy Trucks:	68.6	66.8	59.1	61.3	68.8	68.9
Vehicle Noise:	71.8	69.7	65.0	65.0	72.3	72.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	71	153	331	712
CNEL:	74	159	342	736

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	Existing Without Project	*Project Name:*	Brodiaea
Road Name:	Heacock St.	*Job Number:*	11142
Road Segment:	s/o Brodiaea Av.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	13,646 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,365 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	11.6%	19.2%	93.48%
Medium Trucks:	72.2%	3.3%	24.4%	3.28%
Heavy Trucks:	79.8%	3.4%	16.9%	3.24%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	44.147
Medium Trucks:	43.947
Heavy Trucks:	43.966

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	-0.78	0.71	-1.20	*-4.65*	0.000	0.000
Medium Trucks:	79.45	-15.33	0.74	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-15.38	0.73	-1.20	*-5.43*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	67.2	64.8	63.1	60.5	67.7	68.1
Medium Trucks:	63.7	61.4	54.1	58.0	64.9	65.0
Heavy Trucks:	68.4	66.6	58.9	61.1	68.6	68.7
Vehicle Noise:	71.6	69.6	64.9	64.8	72.1	72.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	69	149	322	693
CNEL:	72	154	332	716

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	Existing Without Project	*Project Name:*	Brodiaea
Road Name:	Alessandro Bl.	*Job Number:*	11142
Road Segment:	w/o Heacock St.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	29,558 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,956 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	73 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	55.0 feet
Centerline Dist. to Observer:	55.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	11.6%	19.2%	93.48%
Medium Trucks:	72.2%	3.3%	24.4%	3.28%
Heavy Trucks:	79.8%	3.4%	16.9%	3.24%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	41.446
Medium Trucks:	41.232
Heavy Trucks:	41.253

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	2.58	1.12	-1.20	*-4.67*	0.000	0.000
Medium Trucks:	79.45	-11.98	1.15	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-12.02	1.15	-1.20	*-5.38*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	71.0	68.6	66.8	64.2	71.5	71.9
Medium Trucks:	67.4	65.2	57.9	61.8	68.7	68.8
Heavy Trucks:	72.2	70.4	62.7	64.9	72.4	72.5
Vehicle Noise:	75.4	73.3	68.6	68.6	75.9	76.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	136	293	631	1,359
CNEL:	141	303	652	1,405

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	Existing Without Project	*Project Name:*	Brodiaea
Road Name:	Brodiaea Av.	*Job Number:*	11142
Road Segment:	e/o Gilbert St.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	2,746	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	275	vehicles
Vehicle Speed:	35	mph
Near/Far Lane Distance:	24	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	39.0	feet
Centerline Dist. to Observer:	39.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	11.6%	19.2%	93.48%
Medium Trucks:	72.2%	3.3%	24.4%	3.28%
Heavy Trucks:	79.8%	3.4%	16.9%	3.24%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	37.443
Medium Trucks:	37.206
Heavy Trucks:	37.229

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	-6.65	1.78	-1.20	*-4.58*	0.000	0.000
Medium Trucks:	75.75	-21.20	1.82	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	81.57	-21.25	1.82	-1.20	*-5.57*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	58.2	55.8	54.1	51.5	58.8	59.2
Medium Trucks:	55.2	53.0	45.6	49.5	56.4	56.5
Heavy Trucks:	60.9	59.2	51.4	53.7	61.1	61.3
Vehicle Noise:	63.5	61.5	56.4	56.7	64.0	64.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	15	33	72	155
CNEL:	16	34	74	159

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	Existing Without Project	*Project Name:*	Brodiaea
Road Name:	Cactus Av.	*Job Number:*	11142
Road Segment:	w/o Gilbert St.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	37,521 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,752 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	73 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	55.0 feet
Centerline Dist. to Observer:	55.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	11.6%	19.2%	93.48%
Medium Trucks:	72.2%	3.3%	24.4%	3.28%
Heavy Trucks:	79.8%	3.4%	16.9%	3.24%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	41.446
Medium Trucks:	41.232
Heavy Trucks:	41.253

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	3.15	1.12	-1.20	*-4.67*	0.000	0.000
Medium Trucks:	81.00	-11.40	1.15	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	85.38	-11.45	1.15	-1.20	*-5.38*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	73.3	70.9	69.2	66.6	73.8	74.2
Medium Trucks:	69.6	67.4	60.0	63.9	70.8	70.9
Heavy Trucks:	73.9	72.1	64.4	66.6	74.1	74.2
Vehicle Noise:	77.4	75.3	70.8	70.6	77.9	78.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	185	399	860	1,853
CNEL:	192	413	890	1,918

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	Existing + Project	*Project Name:*	Brodiaea
Road Name:	Gilbert St.	*Job Number:*	11142
Road Segment:	s/o Brodiaea Av.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	652 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	65 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	24 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	39.0 feet
Centerline Dist. to Observer:	39.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	11.6%	19.2%	75.22%
Medium Trucks:	72.2%	3.3%	24.4%	6.65%
Heavy Trucks:	79.8%	3.4%	16.9%	18.13%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	37.443
Medium Trucks:	37.206
Heavy Trucks:	37.229

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	-13.84	1.78	-1.20	*-4.58*	0.000	0.000
Medium Trucks:	75.75	-24.37	1.82	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	81.57	-20.02	1.82	-1.20	*-5.57*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	51.0	48.7	46.9	44.3	51.6	52.0
Medium Trucks:	52.0	49.8	42.5	46.3	53.2	53.3
Heavy Trucks:	62.2	60.4	52.7	54.9	62.4	62.5
Vehicle Noise:	62.9	61.0	54.0	55.8	63.2	63.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	14	30	64	137
CNEL:	14	30	65	140

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	Existing + Project	*Project Name:*	Brodiaea
Road Name:	Gilbert St.	*Job Number:*	11142
Road Segment:	n/o Cactus Av.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	364 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	36 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	24 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	39.0 feet
Centerline Dist. to Observer:	39.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	11.6%	19.2%	60.78%
Medium Trucks:	72.2%	3.3%	24.4%	9.32%
Heavy Trucks:	79.8%	3.4%	16.9%	29.90%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	37.443
Medium Trucks:	37.206
Heavy Trucks:	37.229

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	-17.29	1.78	-1.20	*-4.58*	0.000	0.000
Medium Trucks:	75.75	-25.44	1.82	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	81.57	-20.38	1.82	-1.20	*-5.57*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	47.6	45.2	43.5	40.9	48.1	48.5
Medium Trucks:	50.9	48.7	41.4	45.3	52.2	52.3
Heavy Trucks:	61.8	60.0	52.3	54.5	62.0	62.1
Vehicle Noise:	62.3	60.5	53.1	55.2	62.6	62.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	13	27	58	125
CNEL:	13	28	59	128

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	Existing + Project	*Project Name:*	Brodiaea
Road Name:	Heacock St.	*Job Number:*	11142
Road Segment:	n/o Alessandro Bl.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	18,173 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,817 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	11.6%	19.2%	93.40%
Medium Trucks:	72.2%	3.3%	24.4%	3.29%
Heavy Trucks:	79.8%	3.4%	16.9%	3.31%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	44.147
Medium Trucks:	43.947
Heavy Trucks:	43.966

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	0.97	0.71	-1.20	*-4.65*	0.000	0.000
Medium Trucks:	77.72	-13.55	0.74	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	82.99	-13.54	0.73	-1.20	*-5.43*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	67.0	64.6	62.9	60.3	67.5	67.9
Medium Trucks:	63.7	61.5	54.2	58.0	64.9	65.0
Heavy Trucks:	69.0	67.2	59.5	61.7	69.2	69.3
Vehicle Noise:	71.8	69.8	64.9	65.0	72.3	72.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	72	154	332	716
CNEL:	74	159	343	739

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	Existing + Project	*Project Name:*	Brodiaea
Road Name:	Heacock St.	*Job Number:*	11142
Road Segment:	s/o Alessandro Bl.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	15,436	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,544	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	50.0	feet
Centerline Dist. to Observer:	50.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	11.6%	19.2%	93.31%
Medium Trucks:	72.2%	3.3%	24.4%	3.30%
Heavy Trucks:	79.8%	3.4%	16.9%	3.39%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	44.147
Medium Trucks:	43.947
Heavy Trucks:	43.966

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	-0.25	0.71	-1.20	*-4.65*	0.000	0.000
Medium Trucks:	79.45	-14.76	0.74	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-14.65	0.73	-1.20	*-5.43*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	67.7	65.3	63.6	61.0	68.3	68.7
Medium Trucks:	64.2	62.0	54.7	58.6	65.5	65.6
Heavy Trucks:	69.1	67.4	59.6	61.9	69.3	69.5
Vehicle Noise:	72.2	70.2	65.5	65.5	72.8	73.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	76	164	354	763
CNEL:	79	170	366	788

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	Existing + Project	*Project Name:*	Brodiaea
Road Name:	Heacock St.	*Job Number:*	11142
Road Segment:	n/o Brodiaea Av.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	14,309	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,431	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	50.0	feet
Centerline Dist. to Observer:	50.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	11.6%	19.2%	93.29%
Medium Trucks:	72.2%	3.3%	24.4%	3.31%
Heavy Trucks:	79.8%	3.4%	16.9%	3.40%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	44.147
Medium Trucks:	43.947
Heavy Trucks:	43.966

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	-0.58	0.71	-1.20	*-4.65*	0.000	0.000
Medium Trucks:	79.45	-15.09	0.74	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-14.96	0.73	-1.20	*-5.43*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	67.4	65.0	63.3	60.7	67.9	68.3
Medium Trucks:	63.9	61.7	54.4	58.2	65.1	65.2
Heavy Trucks:	68.8	67.1	59.3	61.5	69.0	69.2
Vehicle Noise:	71.9	69.9	65.1	65.1	72.4	72.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	73	156	337	726
CNEL:	75	162	348	750

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	Existing + Project	*Project Name:*	Brodiaea
Road Name:	Heacock St.	*Job Number:*	11142
Road Segment:	s/o Brodiaea Av.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	13,700	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,370	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	50.0	feet
Centerline Dist. to Observer:	50.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	11.6%	19.2%	93.51%
Medium Trucks:	72.2%	3.3%	24.4%	3.26%
Heavy Trucks:	79.8%	3.4%	16.9%	3.23%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	44.147
Medium Trucks:	43.947
Heavy Trucks:	43.966

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	-0.76	0.71	-1.20	*-4.65*	0.000	0.000
Medium Trucks:	79.45	-15.33	0.74	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-15.38	0.73	-1.20	*-5.43*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	67.2	64.8	63.1	60.5	67.8	68.1
Medium Trucks:	63.7	61.4	54.1	58.0	64.9	65.0
Heavy Trucks:	68.4	66.6	58.9	61.1	68.6	68.7
Vehicle Noise:	71.6	69.6	64.9	64.8	72.1	72.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	69	149	322	693
CNEL:	72	154	333	717

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	Existing + Project	*Project Name:*	Brodiaea
Road Name:	Alessandro Bl.	*Job Number:*	11142
Road Segment:	w/o Heacock St.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	29,602 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,960 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	73 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	55.0 feet
Centerline Dist. to Observer:	55.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	11.6%	19.2%	93.43%
Medium Trucks:	72.2%	3.3%	24.4%	3.29%
Heavy Trucks:	79.8%	3.4%	16.9%	3.28%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	41.446
Medium Trucks:	41.232
Heavy Trucks:	41.253

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	2.58	1.12	-1.20	*-4.67*	0.000	0.000
Medium Trucks:	79.45	-11.96	1.15	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-11.97	1.15	-1.20	*-5.38*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	71.0	68.6	66.9	64.3	71.5	71.9
Medium Trucks:	67.4	65.2	57.9	61.8	68.7	68.8
Heavy Trucks:	72.2	70.5	62.7	65.0	72.4	72.6
Vehicle Noise:	75.4	73.4	68.7	68.6	75.9	76.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	137	294	634	1,366
CNEL:	141	304	655	1,412

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	Existing + Project	*Project Name:*	Brodiaea
Road Name:	Brodiaea Av.	*Job Number:*	11142
Road Segment:	e/o Gilbert St.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	3,031 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	303 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	24 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	39.0 feet
Centerline Dist. to Observer:	39.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	11.6%	19.2%	89.64%
Medium Trucks:	72.2%	3.3%	24.4%	3.96%
Heavy Trucks:	79.8%	3.4%	16.9%	6.40%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	37.443
Medium Trucks:	37.206
Heavy Trucks:	37.229

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	-6.40	1.78	-1.20	*-4.58*	0.000	0.000
Medium Trucks:	75.75	-19.95	1.82	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	81.57	-17.87	1.82	-1.20	*-5.57*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	58.5	56.1	54.4	51.8	59.0	59.4
Medium Trucks:	56.4	54.2	46.9	50.8	57.7	57.8
Heavy Trucks:	64.3	62.5	54.8	57.0	64.5	64.6
Vehicle Noise:	65.8	63.9	58.0	58.9	66.3	66.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	22	47	102	219
CNEL:	23	49	105	225

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	Existing + Project	*Project Name:*	Brodiaea
Road Name:	Cactus Av.	*Job Number:*	11142
Road Segment:	w/o Gilbert St.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	37,765 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,776 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	73 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	55.0 feet
Centerline Dist. to Observer:	55.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	11.6%	19.2%	93.17%
Medium Trucks:	72.2%	3.3%	24.4%	3.34%
Heavy Trucks:	79.8%	3.4%	16.9%	3.50%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	41.446
Medium Trucks:	41.232
Heavy Trucks:	41.253

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	3.17	1.12	-1.20	*-4.67*	0.000	0.000
Medium Trucks:	81.00	-11.29	1.15	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	85.38	-11.09	1.15	-1.20	*-5.38*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	73.3	70.9	69.2	66.6	73.8	74.2
Medium Trucks:	69.7	67.5	60.1	64.0	70.9	71.0
Heavy Trucks:	74.2	72.5	64.7	67.0	74.4	74.6
Vehicle Noise:	77.6	75.5	70.9	70.8	78.1	78.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	190	410	884	1,905
CNEL:	197	424	914	1,969

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	OY 2022 Without Project	*Project Name:*	Brodiaea
Road Name:	Gilbert St.	*Job Number:*	11142
Road Segment:	s/o Brodiaea Av.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	450 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	45 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	24 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	39.0 feet
Centerline Dist. to Observer:	39.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	11.6%	19.2%	93.48%
Medium Trucks:	72.2%	3.3%	24.4%	3.28%
Heavy Trucks:	79.8%	3.4%	16.9%	3.24%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	37.443
Medium Trucks:	37.206
Heavy Trucks:	37.229

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	-14.51	1.78	-1.20	*-4.58*	0.000	0.000
Medium Trucks:	75.75	-29.06	1.82	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	81.57	-29.11	1.82	-1.20	*-5.57*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	50.4	48.0	46.3	43.7	50.9	51.3
Medium Trucks:	47.3	45.1	37.8	41.7	48.6	48.7
Heavy Trucks:	53.1	51.3	43.6	45.8	53.3	53.4
Vehicle Noise:	55.6	53.6	48.5	48.8	56.1	56.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	5	10	21	46
CNEL:	5	10	22	48

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	OY 2022 Without Project	*Project Name:*	Brodiaea
Road Name:	Gilbert St.	*Job Number:*	11142
Road Segment:	n/o Cactus Av.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	132 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	13 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	24 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	39.0 feet
Centerline Dist. to Observer:	39.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	11.6%	19.2%	93.48%
Medium Trucks:	72.2%	3.3%	24.4%	3.28%
Heavy Trucks:	79.8%	3.4%	16.9%	3.24%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	37.443
Medium Trucks:	37.206
Heavy Trucks:	37.229

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	-19.83	1.78	-1.20	*-4.58*	0.000	0.000
Medium Trucks:	75.75	-34.39	1.82	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	81.57	-34.43	1.82	-1.20	*-5.57*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	45.0	42.7	40.9	38.3	45.6	46.0
Medium Trucks:	42.0	39.8	32.4	36.3	43.2	43.3
Heavy Trucks:	47.8	46.0	38.3	40.5	48.0	48.1
Vehicle Noise:	50.3	48.3	43.2	43.5	50.8	51.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	2	4	9	20
CNEL:	2	5	10	21

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	OY 2022 Without Project	*Project Name:*	Brodiaea
Road Name:	Heacock St.	*Job Number:*	11142
Road Segment:	n/o Alessandro Bl.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	21,080	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	2,108	vehicles
Vehicle Speed:	40	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	50.0	feet
Centerline Dist. to Observer:	50.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	11.6%	19.2%	93.48%
Medium Trucks:	72.2%	3.3%	24.4%	3.28%
Heavy Trucks:	79.8%	3.4%	16.9%	3.24%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	44.147
Medium Trucks:	43.947
Heavy Trucks:	43.966

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	1.62	0.71	-1.20	*-4.65*	0.000	0.000
Medium Trucks:	77.72	-12.93	0.74	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	82.99	-12.98	0.73	-1.20	*-5.43*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	67.6	65.2	63.5	60.9	68.2	68.6
Medium Trucks:	64.3	62.1	54.8	58.7	65.6	65.7
Heavy Trucks:	69.5	67.8	60.1	62.3	69.8	69.9
Vehicle Noise:	72.4	70.4	65.5	65.6	72.9	73.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	78	169	364	785
CNEL:	81	175	376	810

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	OY 2022 Without Project	*Project Name:*	Brodiaea
Road Name:	Heacock St.	*Job Number:*	11142
Road Segment:	s/o Alessandro Bl.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	18,906	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,891	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	50.0	feet
Centerline Dist. to Observer:	50.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	11.6%	19.2%	93.48%
Medium Trucks:	72.2%	3.3%	24.4%	3.28%
Heavy Trucks:	79.8%	3.4%	16.9%	3.24%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	44.147
Medium Trucks:	43.947
Heavy Trucks:	43.966

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	0.64	0.71	-1.20	*-4.65*	0.000	0.000
Medium Trucks:	79.45	-13.92	0.74	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-13.96	0.73	-1.20	*-5.43*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.6	66.2	64.5	61.9	69.2	69.5
Medium Trucks:	65.1	62.9	55.5	59.4	66.3	66.4
Heavy Trucks:	69.8	68.0	60.3	62.5	70.0	70.2
Vehicle Noise:	73.0	71.0	66.3	66.3	73.5	73.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	86	185	400	861
CNEL:	89	192	413	890

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	OY 2022 Without Project	*Project Name:*	Brodiaea
Road Name:	Heacock St.	*Job Number:*	11142
Road Segment:	n/o Brodiaea Av.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	16,662 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,666 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	11.6%	19.2%	93.48%
Medium Trucks:	72.2%	3.3%	24.4%	3.28%
Heavy Trucks:	79.8%	3.4%	16.9%	3.24%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	44.147
Medium Trucks:	43.947
Heavy Trucks:	43.966

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	0.09	0.71	-1.20	*-4.65*	0.000	0.000
Medium Trucks:	79.45	-14.47	0.74	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-14.51	0.73	-1.20	*-5.43*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.1	65.7	63.9	61.3	68.6	69.0
Medium Trucks:	64.5	62.3	55.0	58.9	65.8	65.9
Heavy Trucks:	69.3	67.5	59.8	62.0	69.5	69.6
Vehicle Noise:	72.5	70.4	65.7	65.7	73.0	73.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	79	170	367	791
CNEL:	82	176	380	818

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	OY 2022 Without Project	*Project Name:*	Brodiaea
Road Name:	Heacock St.	*Job Number:*	11142
Road Segment:	s/o Brodiaea Av.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	15,978	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,598	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	50.0	feet
Centerline Dist. to Observer:	50.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	11.6%	19.2%	93.48%
Medium Trucks:	72.2%	3.3%	24.4%	3.28%
Heavy Trucks:	79.8%	3.4%	16.9%	3.24%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	44.147
Medium Trucks:	43.947
Heavy Trucks:	43.966

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	-0.10	0.71	-1.20	*-4.65*	0.000	0.000
Medium Trucks:	79.45	-14.65	0.74	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-14.70	0.73	-1.20	*-5.43*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	67.9	65.5	63.8	61.2	68.4	68.8
Medium Trucks:	64.3	62.1	54.8	58.7	65.6	65.7
Heavy Trucks:	69.1	67.3	59.6	61.8	69.3	69.4
Vehicle Noise:	72.3	70.2	65.6	65.5	72.8	73.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	77	166	357	770
CNEL:	80	171	369	795

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	OY 2022 Without Project	*Project Name:*	Brodiaea
Road Name:	Alessandro Bl.	*Job Number:*	11142
Road Segment:	w/o Heacock St.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	34,775	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	3,478	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	73	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	55.0	feet
Centerline Dist. to Observer:	55.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	11.6%	19.2%	93.48%
Medium Trucks:	72.2%	3.3%	24.4%	3.28%
Heavy Trucks:	79.8%	3.4%	16.9%	3.24%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	41.446
Medium Trucks:	41.232
Heavy Trucks:	41.253

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	3.28	1.12	-1.20	*-4.67*	0.000	0.000
Medium Trucks:	79.45	-11.27	1.15	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-11.32	1.15	-1.20	*-5.38*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	71.7	69.3	67.6	65.0	72.2	72.6
Medium Trucks:	68.1	65.9	58.6	62.5	69.4	69.5
Heavy Trucks:	72.9	71.1	63.4	65.6	73.1	73.2
Vehicle Noise:	76.1	74.0	69.3	69.3	76.6	76.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	151	326	703	1,515
CNEL:	157	337	727	1,566

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	OY 2022 Without Project	*Project Name:*	Brodiaea
Road Name:	Brodiaea Av.	*Job Number:*	11142
Road Segment:	e/o Gilbert St.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	3,056 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	306 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	24 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	39.0 feet
Centerline Dist. to Observer:	39.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	11.6%	19.2%	93.48%
Medium Trucks:	72.2%	3.3%	24.4%	3.28%
Heavy Trucks:	79.8%	3.4%	16.9%	3.24%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	37.443
Medium Trucks:	37.206
Heavy Trucks:	37.229

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	-6.19	1.78	-1.20	*-4.58*	0.000	0.000
Medium Trucks:	75.75	-20.74	1.82	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	81.57	-20.79	1.82	-1.20	*-5.57*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	58.7	56.3	54.6	52.0	59.3	59.6
Medium Trucks:	55.6	53.4	46.1	50.0	56.9	57.0
Heavy Trucks:	61.4	59.6	51.9	54.1	61.6	61.7
Vehicle Noise:	64.0	61.9	56.8	57.1	64.4	64.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	17	36	77	166
CNEL:	17	37	79	171

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	OY 2022 Without Project	*Project Name:*	Brodiaea
Road Name:	Cactus Av.	*Job Number:*	11142
Road Segment:	w/o Gilbert St.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	53,421 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	5,342 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	73 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	55.0 feet
Centerline Dist. to Observer:	55.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	11.6%	19.2%	93.48%
Medium Trucks:	72.2%	3.3%	24.4%	3.28%
Heavy Trucks:	79.8%	3.4%	16.9%	3.24%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	41.446
Medium Trucks:	41.232
Heavy Trucks:	41.253

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	4.69	1.12	-1.20	*-4.67*	0.000	0.000
Medium Trucks:	81.00	-9.86	1.15	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	85.38	-9.91	1.15	-1.20	*-5.38*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	74.8	72.4	70.7	68.1	75.4	75.8
Medium Trucks:	71.1	68.9	61.5	65.4	72.3	72.4
Heavy Trucks:	75.4	73.6	65.9	68.1	75.6	75.7
Vehicle Noise:	78.9	76.8	72.3	72.2	79.4	79.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	235	505	1,089	2,346
CNEL:	243	523	1,126	2,427

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	OY 2022 With Project	*Project Name:*	Brodiaea
Road Name:	Gilbert St.	*Job Number:*	11142
Road Segment:	s/o Brodiaea Av.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	694 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	69 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	24 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	39.0 feet
Centerline Dist. to Observer:	39.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	11.6%	19.2%	76.33%
Medium Trucks:	72.2%	3.3%	24.4%	6.45%
Heavy Trucks:	79.8%	3.4%	16.9%	17.23%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	37.443
Medium Trucks:	37.206
Heavy Trucks:	37.229

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	-13.50	1.78	-1.20	*-4.58*	0.000	0.000
Medium Trucks:	75.75	-24.24	1.82	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	81.57	-19.97	1.82	-1.20	*-5.57*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	51.4	49.0	47.3	44.7	51.9	52.3
Medium Trucks:	52.1	49.9	42.6	46.5	53.4	53.5
Heavy Trucks:	62.2	60.4	52.7	54.9	62.4	62.5
Vehicle Noise:	62.9	61.1	54.1	55.9	63.3	63.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	14	30	64	139
CNEL:	14	31	66	142

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	OY 2022 With Project	*Project Name:*	Brodiaea
Road Name:	Gilbert St.	*Job Number:*	11142
Road Segment:	n/o Cactus Av.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	376 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	38 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	24 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	39.0 feet
Centerline Dist. to Observer:	39.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	11.6%	19.2%	61.83%
Medium Trucks:	72.2%	3.3%	24.4%	9.12%
Heavy Trucks:	79.8%	3.4%	16.9%	29.05%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	37.443
Medium Trucks:	37.206
Heavy Trucks:	37.229

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	-17.08	1.78	-1.20	*-4.58*	0.000	0.000
Medium Trucks:	75.75	-25.39	1.82	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	81.57	-20.36	1.82	-1.20	*-5.57*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	47.8	45.4	43.7	41.1	48.4	48.7
Medium Trucks:	51.0	48.8	41.4	45.3	52.2	52.3
Heavy Trucks:	61.8	60.1	52.3	54.5	62.0	62.2
Vehicle Noise:	62.3	60.5	53.2	55.2	62.6	62.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	13	27	58	126
CNEL:	13	28	60	128

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	OY 2022 With Project	*Project Name:*	Brodiaea
Road Name:	Heacock St.	*Job Number:*	11142
Road Segment:	n/o Alessandro Bl.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	21,110 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,111 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	11.6%	19.2%	93.41%
Medium Trucks:	72.2%	3.3%	24.4%	3.29%
Heavy Trucks:	79.8%	3.4%	16.9%	3.30%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	44.147
Medium Trucks:	43.947
Heavy Trucks:	43.966

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	1.62	0.71	-1.20	*-4.65*	0.000	0.000
Medium Trucks:	77.72	-12.91	0.74	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	82.99	-12.90	0.73	-1.20	*-5.43*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	67.6	65.2	63.5	60.9	68.2	68.6
Medium Trucks:	64.3	62.1	54.8	58.7	65.6	65.7
Heavy Trucks:	69.6	67.9	60.1	62.4	69.8	70.0
Vehicle Noise:	72.5	70.4	65.6	65.7	73.0	73.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	79	170	367	790
CNEL:	82	176	379	816

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	OY 2022 With Project	*Project Name:*	Brodiaea
Road Name:	Heacock St.	*Job Number:*	11142
Road Segment:	s/o Alessandro Bl.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	18,993 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,899 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	11.6%	19.2%	93.34%
Medium Trucks:	72.2%	3.3%	24.4%	3.30%
Heavy Trucks:	79.8%	3.4%	16.9%	3.36%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	44.147
Medium Trucks:	43.947
Heavy Trucks:	43.966

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	0.65	0.71	-1.20	*-4.65*	0.000	0.000
Medium Trucks:	79.45	-13.87	0.74	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-13.78	0.73	-1.20	*-5.43*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.6	66.2	64.5	61.9	69.2	69.6
Medium Trucks:	65.1	62.9	55.6	59.5	66.4	66.5
Heavy Trucks:	70.0	68.2	60.5	62.7	70.2	70.3
Vehicle Noise:	73.1	71.1	66.3	66.3	73.6	73.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	87	188	405	874
CNEL:	90	194	419	903

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	OY 2022 With Project	*Project Name:*	Brodiaea
Road Name:	Heacock St.	*Job Number:*	11142
Road Segment:	n/o Brodiaea Av.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	16,749	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,675	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	50.0	feet
Centerline Dist. to Observer:	50.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	11.6%	19.2%	93.32%
Medium Trucks:	72.2%	3.3%	24.4%	3.30%
Heavy Trucks:	79.8%	3.4%	16.9%	3.38%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	44.147
Medium Trucks:	43.947
Heavy Trucks:	43.966

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	0.10	0.71	-1.20	*-4.65*	0.000	0.000
Medium Trucks:	79.45	-14.41	0.74	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-14.31	0.73	-1.20	*-5.43*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.1	65.7	64.0	61.4	68.6	69.0
Medium Trucks:	64.6	62.4	55.0	58.9	65.8	65.9
Heavy Trucks:	69.5	67.7	60.0	62.2	69.7	69.8
Vehicle Noise:	72.6	70.5	65.8	65.8	73.1	73.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	80	173	373	805
CNEL:	83	179	386	831

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	OY 2022 With Project	*Project Name:*	Brodiaea
Road Name:	Heacock St.	*Job Number:*	11142
Road Segment:	s/o Brodiaea Av.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	16,032 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,603 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	11.6%	19.2%	93.50%
Medium Trucks:	72.2%	3.3%	24.4%	3.27%
Heavy Trucks:	79.8%	3.4%	16.9%	3.23%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	44.147
Medium Trucks:	43.947
Heavy Trucks:	43.966

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	-0.08	0.71	-1.20	*-4.65*	0.000	0.000
Medium Trucks:	79.45	-14.65	0.74	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-14.70	0.73	-1.20	*-5.43*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	67.9	65.5	63.8	61.2	68.4	68.8
Medium Trucks:	64.3	62.1	54.8	58.7	65.6	65.7
Heavy Trucks:	69.1	67.3	59.6	61.8	69.3	69.4
Vehicle Noise:	72.3	70.2	65.6	65.5	72.8	73.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	77	166	358	770
CNEL:	80	172	370	796

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	OY 2022 With Project	*Project Name:*	Brodiaea
Road Name:	Alessandro Bl.	*Job Number:*	11142
Road Segment:	w/o Heacock St.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	34,819	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	3,482	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	73	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	55.0	feet
Centerline Dist. to Observer:	55.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	11.6%	19.2%	93.44%
Medium Trucks:	72.2%	3.3%	24.4%	3.28%
Heavy Trucks:	79.8%	3.4%	16.9%	3.27%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	41.446
Medium Trucks:	41.232
Heavy Trucks:	41.253

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	3.29	1.12	-1.20	*-4.67*	0.000	0.000
Medium Trucks:	79.45	-11.25	1.15	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-11.27	1.15	-1.20	*-5.38*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	71.7	69.3	67.6	65.0	72.2	72.6
Medium Trucks:	68.1	65.9	58.6	62.5	69.4	69.5
Heavy Trucks:	72.9	71.2	63.4	65.7	73.1	73.3
Vehicle Noise:	76.1	74.1	69.4	69.3	76.6	76.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	152	328	706	1,521
CNEL:	157	339	730	1,572

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	OY 2022 With Project	*Project Name:*	Brodiaea
Road Name:	Brodiaea Av.	*Job Number:*	11142
Road Segment:	e/o Gilbert St.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	3,341 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	334 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	24 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	39.0 feet
Centerline Dist. to Observer:	39.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	11.6%	19.2%	90.00%
Medium Trucks:	72.2%	3.3%	24.4%	3.90%
Heavy Trucks:	79.8%	3.4%	16.9%	6.11%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	37.443
Medium Trucks:	37.206
Heavy Trucks:	37.229

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	-5.96	1.78	-1.20	*-4.58*	0.000	0.000
Medium Trucks:	75.75	-19.60	1.82	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	81.57	-17.65	1.82	-1.20	*-5.57*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	58.9	56.5	54.8	52.2	59.5	59.9
Medium Trucks:	56.8	54.6	47.2	51.1	58.0	58.1
Heavy Trucks:	64.5	62.8	55.0	57.3	64.7	64.9
Vehicle Noise:	66.1	64.2	58.3	59.2	66.5	66.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	23	49	106	229
CNEL:	24	51	109	235

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	OY 2022 With Project	*Project Name:*	Brodiaea
Road Name:	Cactus Av.	*Job Number:*	11142
Road Segment:	w/o Gilbert St.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	53,665 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	5,366 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	73 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	55.0 feet
Centerline Dist. to Observer:	55.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	11.6%	19.2%	93.26%
Medium Trucks:	72.2%	3.3%	24.4%	3.32%
Heavy Trucks:	79.8%	3.4%	16.9%	3.42%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	41.446
Medium Trucks:	41.232
Heavy Trucks:	41.253

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	4.70	1.12	-1.20	*-4.67*	0.000	0.000
Medium Trucks:	81.00	-9.79	1.15	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	85.38	-9.66	1.15	-1.20	*-5.38*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	74.8	72.4	70.7	68.1	75.4	75.8
Medium Trucks:	71.2	69.0	61.6	65.5	72.4	72.5
Heavy Trucks:	75.7	73.9	66.2	68.4	75.9	76.0
Vehicle Noise:	79.0	77.0	72.4	72.3	79.6	79.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	239	515	1,110	2,391
CNEL:	247	533	1,148	2,473

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	HY 2040 Without Project	*Project Name:*	Brodiaea
Road Name:	Gilbert St.	*Job Number:*	11142
Road Segment:	s/o Brodiaea Av.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	495 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	50 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	24 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	39.0 feet
Centerline Dist. to Observer:	39.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	11.6%	19.2%	93.48%
Medium Trucks:	72.2%	3.3%	24.4%	3.28%
Heavy Trucks:	79.8%	3.4%	16.9%	3.24%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	37.443
Medium Trucks:	37.206
Heavy Trucks:	37.229

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	-14.09	1.78	-1.20	*-4.58*	0.000	0.000
Medium Trucks:	75.75	-28.65	1.82	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	81.57	-28.69	1.82	-1.20	*-5.57*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	50.8	48.4	46.7	44.1	51.3	51.7
Medium Trucks:	47.7	45.5	38.2	42.1	49.0	49.1
Heavy Trucks:	53.5	51.7	44.0	46.2	53.7	53.8
Vehicle Noise:	56.0	54.0	48.9	49.2	56.5	56.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	5	11	23	49
CNEL:	5	11	24	51

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	HY 2040 Without Project	*Project Name:*	Brodiaea
Road Name:	Gilbert St.	*Job Number:*	11142
Road Segment:	n/o Cactus Av.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	146 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	15 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	24 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	39.0 feet
Centerline Dist. to Observer:	39.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	11.6%	19.2%	93.48%
Medium Trucks:	72.2%	3.3%	24.4%	3.28%
Heavy Trucks:	79.8%	3.4%	16.9%	3.24%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	37.443
Medium Trucks:	37.206
Heavy Trucks:	37.229

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	-19.40	1.78	-1.20	*-4.58*	0.000	0.000
Medium Trucks:	75.75	-33.95	1.82	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	81.57	-34.00	1.82	-1.20	*-5.57*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	45.5	43.1	41.4	38.8	46.0	46.4
Medium Trucks:	42.4	40.2	32.9	36.8	43.7	43.8
Heavy Trucks:	48.2	46.4	38.7	40.9	48.4	48.5
Vehicle Noise:	50.7	48.7	43.6	43.9	51.2	51.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	2	5	10	22
CNEL:	2	5	10	23

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	HY 2040 Without Project	*Project Name:*	Brodiaea
Road Name:	Heacock St.	*Job Number:*	11142
Road Segment:	n/o Alessandro Bl.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	23,188 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,319 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	11.6%	19.2%	93.48%
Medium Trucks:	72.2%	3.3%	24.4%	3.28%
Heavy Trucks:	79.8%	3.4%	16.9%	3.24%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	44.147
Medium Trucks:	43.947
Heavy Trucks:	43.966

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	2.03	0.71	-1.20	*-4.65*	0.000	0.000
Medium Trucks:	77.72	-12.52	0.74	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	82.99	-12.57	0.73	-1.20	*-5.43*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.1	65.7	63.9	61.3	68.6	69.0
Medium Trucks:	64.7	62.5	55.2	59.1	66.0	66.1
Heavy Trucks:	70.0	68.2	60.5	62.7	70.2	70.3
Vehicle Noise:	72.8	70.8	65.9	66.1	73.3	73.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	84	180	388	836
CNEL:	86	186	401	863

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	HY 2040 Without Project	*Project Name:*	Brodiaea
Road Name:	Heacock St.	*Job Number:*	11142
Road Segment:	s/o Alessandro Bl.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	20,797 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,080 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	11.6%	19.2%	93.48%
Medium Trucks:	72.2%	3.3%	24.4%	3.28%
Heavy Trucks:	79.8%	3.4%	16.9%	3.24%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	44.147
Medium Trucks:	43.947
Heavy Trucks:	43.966

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	1.05	0.71	-1.20	*-4.65*	0.000	0.000
Medium Trucks:	79.45	-13.50	0.74	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-13.55	0.73	-1.20	*-5.43*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	69.0	66.6	64.9	62.3	69.6	70.0
Medium Trucks:	65.5	63.3	55.9	59.8	66.7	66.8
Heavy Trucks:	70.2	68.5	60.7	63.0	70.4	70.6
Vehicle Noise:	73.4	71.4	66.7	66.7	74.0	74.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	92	198	426	917
CNEL:	95	204	440	948

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	HY 2040 Without Project	*Project Name:*	Brodiaea
Road Name:	Heacock St.	*Job Number:*	11142
Road Segment:	n/o Brodiaea Av.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	18,328 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,833 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	11.6%	19.2%	93.48%
Medium Trucks:	72.2%	3.3%	24.4%	3.28%
Heavy Trucks:	79.8%	3.4%	16.9%	3.24%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	44.147
Medium Trucks:	43.947
Heavy Trucks:	43.966

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	0.50	0.71	-1.20	*-4.65*	0.000	0.000
Medium Trucks:	79.45	-14.05	0.74	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-14.10	0.73	-1.20	*-5.43*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.5	66.1	64.4	61.8	69.0	69.4
Medium Trucks:	64.9	62.7	55.4	59.3	66.2	66.3
Heavy Trucks:	69.7	67.9	60.2	62.4	69.9	70.0
Vehicle Noise:	72.9	70.8	66.1	66.1	73.4	73.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	84	182	391	843
CNEL:	87	188	405	872

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	HY 2040 Without Project	*Project Name:*	Brodiaea
Road Name:	Heacock St.	*Job Number:*	11142
Road Segment:	s/o Brodiaea Av.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	17,576 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,758 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	11.6%	19.2%	93.48%
Medium Trucks:	72.2%	3.3%	24.4%	3.28%
Heavy Trucks:	79.8%	3.4%	16.9%	3.24%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	44.147
Medium Trucks:	43.947
Heavy Trucks:	43.966

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	0.32	0.71	-1.20	*-4.65*	0.000	0.000
Medium Trucks:	79.45	-14.23	0.74	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-14.28	0.73	-1.20	*-5.43*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.3	65.9	64.2	61.6	68.8	69.2
Medium Trucks:	64.8	62.5	55.2	59.1	66.0	66.1
Heavy Trucks:	69.5	67.7	60.0	62.2	69.7	69.8
Vehicle Noise:	72.7	70.7	66.0	65.9	73.2	73.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	82	177	381	820
CNEL:	85	183	393	848

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	HY 2040 Without Project	*Project Name:*	Brodiaea
Road Name:	Alessandro Bl.	*Job Number:*	11142
Road Segment:	w/o Heacock St.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	46,442 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,644 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	73 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	55.0 feet
Centerline Dist. to Observer:	55.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	11.6%	19.2%	93.48%
Medium Trucks:	72.2%	3.3%	24.4%	3.28%
Heavy Trucks:	79.8%	3.4%	16.9%	3.24%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	41.446
Medium Trucks:	41.232
Heavy Trucks:	41.253

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	4.54	1.12	-1.20	*-4.67*	0.000	0.000
Medium Trucks:	79.45	-10.01	1.15	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-10.06	1.15	-1.20	*-5.38*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	72.9	70.5	68.8	66.2	73.5	73.9
Medium Trucks:	69.4	67.2	59.8	63.7	70.6	70.7
Heavy Trucks:	74.1	72.4	64.6	66.9	74.3	74.5
Vehicle Noise:	77.3	75.3	70.6	70.6	77.9	78.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	184	396	853	1,837
CNEL:	190	409	881	1,899

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	HY 2040 Without Project	*Project Name:*	Brodiaea
Road Name:	Brodiaea Av.	*Job Number:*	11142
Road Segment:	e/o Gilbert St.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	3,361 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	336 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	24 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	39.0 feet
Centerline Dist. to Observer:	39.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	11.6%	19.2%	93.48%
Medium Trucks:	72.2%	3.3%	24.4%	3.28%
Heavy Trucks:	79.8%	3.4%	16.9%	3.24%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	37.443
Medium Trucks:	37.206
Heavy Trucks:	37.229

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	-5.77	1.78	-1.20	*-4.58*	0.000	0.000
Medium Trucks:	75.75	-20.33	1.82	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	81.57	-20.37	1.82	-1.20	*-5.57*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	59.1	56.7	55.0	52.4	59.7	60.0
Medium Trucks:	56.0	53.8	46.5	50.4	57.3	57.4
Heavy Trucks:	61.8	60.0	52.3	54.5	62.0	62.1
Vehicle Noise:	64.4	62.4	57.3	57.5	64.8	65.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	18	38	82	177
CNEL:	18	39	85	182

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	HY 2040 Without Project	*Project Name:*	Brodiaea
Road Name:	Cactus Av.	*Job Number:*	11142
Road Segment:	w/o Gilbert St.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	58,763 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	5,876 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	73 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	55.0 feet
Centerline Dist. to Observer:	55.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	11.6%	19.2%	93.48%
Medium Trucks:	72.2%	3.3%	24.4%	3.28%
Heavy Trucks:	79.8%	3.4%	16.9%	3.24%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	41.446
Medium Trucks:	41.232
Heavy Trucks:	41.253

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	5.10	1.12	-1.20	*-4.67*	0.000	0.000
Medium Trucks:	81.00	-9.45	1.15	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	85.38	-9.50	1.15	-1.20	*-5.38*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	75.2	72.8	71.1	68.5	75.8	76.2
Medium Trucks:	71.5	69.3	62.0	65.8	72.8	72.9
Heavy Trucks:	75.8	74.1	66.3	68.6	76.0	76.2
Vehicle Noise:	79.3	77.3	72.7	72.6	79.9	80.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	250	538	1,160	2,499
CNEL:	259	557	1,200	2,586

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	HY 2040 With Project	*Project Name:*	Brodiaea
Road Name:	Gilbert St.	*Job Number:*	11142
Road Segment:	s/o Brodiaea Av.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	739 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	74 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	24 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	39.0 feet
Centerline Dist. to Observer:	39.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	11.6%	19.2%	77.37%
Medium Trucks:	72.2%	3.3%	24.4%	6.25%
Heavy Trucks:	79.8%	3.4%	16.9%	16.37%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	37.443
Medium Trucks:	37.206
Heavy Trucks:	37.229

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	-13.17	1.78	-1.20	*-4.58*	0.000	0.000
Medium Trucks:	75.75	-24.10	1.82	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	81.57	-19.92	1.82	-1.20	*-5.57*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	51.7	49.3	47.6	45.0	52.3	52.7
Medium Trucks:	52.3	50.1	42.7	46.6	53.5	53.6
Heavy Trucks:	62.3	60.5	52.8	55.0	62.5	62.6
Vehicle Noise:	63.0	61.2	54.2	55.9	63.3	63.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	14	30	65	140
CNEL:	14	31	67	144

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	HY 2040 With Project	*Project Name:*	Brodiaea
Road Name:	Gilbert St.	*Job Number:*	11142
Road Segment:	n/o Cactus Av.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	390 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	39 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	24 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	39.0 feet
Centerline Dist. to Observer:	39.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	11.6%	19.2%	62.96%
Medium Trucks:	72.2%	3.3%	24.4%	8.91%
Heavy Trucks:	79.8%	3.4%	16.9%	28.12%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	37.443
Medium Trucks:	37.206
Heavy Trucks:	37.229

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	-16.84	1.78	-1.20	*-4.58*	0.000	0.000
Medium Trucks:	75.75	-25.33	1.82	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	81.57	-20.34	1.82	-1.20	*-5.57*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	48.0	45.6	43.9	41.3	48.6	49.0
Medium Trucks:	51.0	48.8	41.5	45.4	52.3	52.4
Heavy Trucks:	61.8	60.1	52.3	54.6	62.0	62.2
Vehicle Noise:	62.4	60.5	53.2	55.2	62.7	62.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	13	27	59	126
CNEL:	13	28	60	129

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	HY 2040 With Project	*Project Name:*	Brodiaea
Road Name:	Heacock St.	*Job Number:*	11142
Road Segment:	n/o Alessandro Bl.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	23,218 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,322 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	11.6%	19.2%	93.42%
Medium Trucks:	72.2%	3.3%	24.4%	3.29%
Heavy Trucks:	79.8%	3.4%	16.9%	3.29%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	44.147
Medium Trucks:	43.947
Heavy Trucks:	43.966

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	2.04	0.71	-1.20	*-4.65*	0.000	0.000
Medium Trucks:	77.72	-12.50	0.74	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	82.99	-12.49	0.73	-1.20	*-5.43*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.1	65.7	63.9	61.3	68.6	69.0
Medium Trucks:	64.8	62.6	55.2	59.1	66.0	66.1
Heavy Trucks:	70.0	68.3	60.5	62.8	70.2	70.4
Vehicle Noise:	72.9	70.9	66.0	66.1	73.4	73.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	84	181	391	841
CNEL:	87	187	403	869

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	HY 2040 With Project	*Project Name:*	Brodiaea
Road Name:	Heacock St.	*Job Number:*	11142
Road Segment:	s/o Alessandro Bl.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	20,884 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,088 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	11.6%	19.2%	93.35%
Medium Trucks:	72.2%	3.3%	24.4%	3.30%
Heavy Trucks:	79.8%	3.4%	16.9%	3.35%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	44.147
Medium Trucks:	43.947
Heavy Trucks:	43.966

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	1.06	0.71	-1.20	*-4.65*	0.000	0.000
Medium Trucks:	79.45	-13.46	0.74	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-13.39	0.73	-1.20	*-5.43*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	69.0	66.6	64.9	62.3	69.6	70.0
Medium Trucks:	65.5	63.3	56.0	59.9	66.8	66.9
Heavy Trucks:	70.4	68.6	60.9	63.1	70.6	70.7
Vehicle Noise:	73.5	71.5	66.8	66.7	74.0	74.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	93	200	432	930
CNEL:	96	207	446	961

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	HY 2040 With Project	*Project Name:*	Brodiaea
Road Name:	Heacock St.	*Job Number:*	11142
Road Segment:	n/o Brodiaea Av.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	18,415 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,842 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	11.6%	19.2%	93.33%
Medium Trucks:	72.2%	3.3%	24.4%	3.30%
Heavy Trucks:	79.8%	3.4%	16.9%	3.37%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	44.147
Medium Trucks:	43.947
Heavy Trucks:	43.966

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	0.51	0.71	-1.20	*-4.65*	0.000	0.000
Medium Trucks:	79.45	-14.00	0.74	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-13.91	0.73	-1.20	*-5.43*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.5	66.1	64.4	61.8	69.0	69.4
Medium Trucks:	65.0	62.8	55.4	59.3	66.2	66.3
Heavy Trucks:	69.9	68.1	60.4	62.6	70.1	70.2
Vehicle Noise:	73.0	70.9	66.2	66.2	73.5	73.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	86	184	397	856
CNEL:	88	191	411	885

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	HY 2040 With Project	*Project Name:*	Brodiaea
Road Name:	Heacock St.	*Job Number:*	11142
Road Segment:	s/o Brodiaea Av.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	17,630 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,763 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	11.6%	19.2%	93.50%
Medium Trucks:	72.2%	3.3%	24.4%	3.27%
Heavy Trucks:	79.8%	3.4%	16.9%	3.23%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	44.147
Medium Trucks:	43.947
Heavy Trucks:	43.966

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	0.33	0.71	-1.20	*-4.65*	0.000	0.000
Medium Trucks:	79.45	-14.23	0.74	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-14.28	0.73	-1.20	*-5.43*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.3	65.9	64.2	61.6	68.9	69.2
Medium Trucks:	64.8	62.5	55.2	59.1	66.0	66.1
Heavy Trucks:	69.5	67.7	60.0	62.2	69.7	69.8
Vehicle Noise:	72.7	70.7	66.0	65.9	73.2	73.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	82	177	381	821
CNEL:	85	183	394	848

Tuesday, January 09, 2018

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	HY 2040 With Project	*Project Name:*	Brodiaea
Road Name:	Alessandro Bl.	*Job Number:*	11142
Road Segment:	w/o Heacock St.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	46,486 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,649 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	73 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	55.0 feet
Centerline Dist. to Observer:	55.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	11.6%	19.2%	93.45%
Medium Trucks:	72.2%	3.3%	24.4%	3.28%
Heavy Trucks:	79.8%	3.4%	16.9%	3.27%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	41.446
Medium Trucks:	41.232
Heavy Trucks:	41.253

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	4.54	1.12	-1.20	*-4.67*	0.000	0.000
Medium Trucks:	79.45	-10.00	1.15	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-10.02	1.15	-1.20	*-5.38*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	72.9	70.5	68.8	66.2	73.5	73.9
Medium Trucks:	69.4	67.2	59.9	63.7	70.6	70.7
Heavy Trucks:	74.2	72.4	64.7	66.9	74.4	74.5
Vehicle Noise:	77.4	75.3	70.6	70.6	77.9	78.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	184	397	855	1,843
CNEL:	190	410	884	1,905

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	HY 2040 With Project	*Project Name:*	Brodiaea
Road Name:	Brodiaea Av.	*Job Number:*	11142
Road Segment:	e/o Gilbert St.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	3,646 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	365 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	24 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	39.0 feet
Centerline Dist. to Observer:	39.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	11.6%	19.2%	90.29%
Medium Trucks:	72.2%	3.3%	24.4%	3.84%
Heavy Trucks:	79.8%	3.4%	16.9%	5.87%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	37.443
Medium Trucks:	37.206
Heavy Trucks:	37.229

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	-5.57	1.78	-1.20	*-4.58*	0.000	0.000
Medium Trucks:	75.75	-19.28	1.82	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	81.57	-17.44	1.82	-1.20	*-5.57*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	59.3	56.9	55.2	52.6	59.9	60.3
Medium Trucks:	57.1	54.9	47.5	51.4	58.3	58.4
Heavy Trucks:	64.7	63.0	55.2	57.5	64.9	65.1
Vehicle Noise:	66.4	64.4	58.6	59.4	66.8	67.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	24	51	111	238
CNEL:	24	53	114	245

Tuesday, January 09, 2018

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	HY 2040 With Project	*Project Name:*	Brodiaea
Road Name:	Cactus Av.	*Job Number:*	11142
Road Segment:	w/o Gilbert St.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	59,007 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	5,901 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	73 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	55.0 feet
Centerline Dist. to Observer:	55.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	11.6%	19.2%	93.28%
Medium Trucks:	72.2%	3.3%	24.4%	3.31%
Heavy Trucks:	79.8%	3.4%	16.9%	3.41%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	41.446
Medium Trucks:	41.232
Heavy Trucks:	41.253

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	5.11	1.12	-1.20	*-4.67*	0.000	0.000
Medium Trucks:	81.00	-9.38	1.15	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	85.38	-9.26	1.15	-1.20	*-5.38*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	75.2	72.8	71.1	68.5	75.8	76.2
Medium Trucks:	71.6	69.4	62.0	65.9	72.8	72.9
Heavy Trucks:	76.1	74.3	66.6	68.8	76.3	76.4
Vehicle Noise:	79.5	77.4	72.8	72.7	80.0	80.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	254	548	1,181	2,544
CNEL:	263	567	1,221	2,631

Tuesday, January 09, 2018

APPENDIX 9.1:

REFERENCE DISTRIBUTION/WAREHOUSE NOISE SOURCE PHOTOS

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Reference Measurement: Motivational Fulfillment
6810 Bickmore Avenue, Chino

Motivational Fulfillment_01

Motivational Fulfillment_02

Motivational Fulfillment_03

Source_1-1

Source_1-2

Source_1-3

Reference Measurement: Motivational Fulfillment
6810 Bickmore Avenue, Chino

Source_1-4

Source_2-1

Source_2-2

Source_2-3

Source_2-4

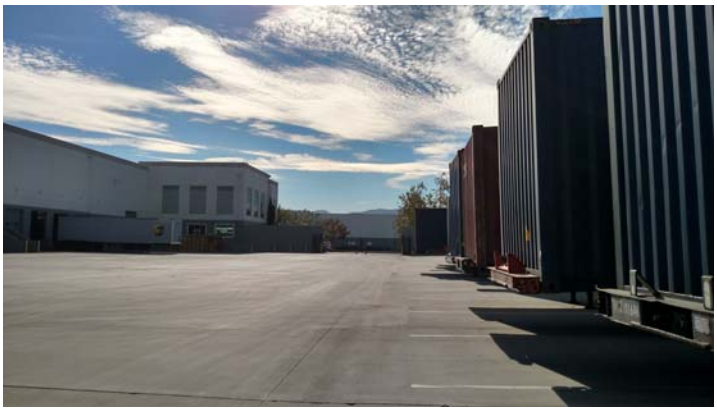
Source_2-5

Reference Measurement: Motivational Fulfillment
6810 Bickmore Avenue, Chino

Source_2-6

Source_2-7

Source_2-8



Source_2-9

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APPENDIX 9.2:

OPERATIONAL STATIONARY-SOURCE NOISE CALCULATIONS

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STATIONARY SOURCE NOISE PREDICTION MODEL

1/10/2018

Observer Location: **R1**
Source: Unloading/Docking Activity
Condition: Operational

Project Name: Brodiaea
Job Number: 11142
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	1,538.0	feet	***Barrier Height:***	**0.0**	**feet**
Noise Distance to Barrier:	1,538.0	feet	*Noise Source Height:*	8.0	feet
Barrier Distance to Observer:	0.0	feet	*Observer Height:*	5.0	feet
Observer Elevation:	0.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0	
Noise Source Elevation:	0.0	feet	*Drop Off Coefficient:*	20.0	
Barrier Elevation:	0.0	feet			

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	1,538.0	-34.2	-34.2	-34.2	-34.2	-34.2	-34.2
Shielding (Barrier Attenuation)	1,538.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		33.0	-34.2	-34.2	-34.2	-34.2	-34.2
60 Minute Hourly Adjustment		**33.0**	**-34.2**	**-34.2**	**-34.2**	**-34.2**	**-34.2**

STATIONARY SOURCE NOISE PREDICTION MODEL

1/10/2018

Observer Location: **R1**
Source: Roof-Top Air Conditioning Unit
Condition: Operational

Project Name: Brodiaea
Job Number: 11142
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	1,663.0	feet	***Barrier Height:***	**0.0**	**feet**
Noise Distance to Barrier:	1,663.0	feet	*Noise Source Height:*	5.0	feet
Barrier Distance to Observer:	0.0	feet	*Observer Height:*	5.0	feet
Observer Elevation:	0.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0	
Noise Source Elevation:	30.0	feet	*Drop Off Coefficient:*	20.0	
Barrier Elevation:	0.0	feet			

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	1,663.0	-50.4	-50.4	-50.4	-50.4	-50.4	-50.4
Shielding (Barrier Attenuation)	1,663.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		26.8	-50.4	-50.4	-50.4	-50.4	-50.4
39 Minute Hourly Adjustment		**24.9**	**-52.3**	**-52.3**	**-52.3**	**-52.3**	**-52.3**

STATIONARY SOURCE NOISE PREDICTION MODEL

1/10/2018

Observer Location: **R1**
Source: Parking Lot Vehicle Movements
Condition: Operational

Project Name: Brodiaea
Job Number: 11142
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	1,523.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	1,523.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	15.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	10.0	52.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	1,523.0	-32.7	-32.7	-32.7	-32.7	-32.7	-32.7
Shielding (Barrier Attenuation)	1,523.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		19.5	-32.7	-32.7	-32.7	-32.7	-32.7
60 Minute Hourly Adjustment		**19.5**	**-32.7**	**-32.7**	**-32.7**	**-32.7**	**-32.7**

STATIONARY SOURCE NOISE PREDICTION MODEL

1/10/2018

Observer Location: **R2**
Source: Unloading/Docking Activity
Condition: Operational

Project Name: Brodiaea
Job Number: 11142
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	1,222.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	1,212.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	10.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	1,222.0	-32.2	-32.2	-32.2	-32.2	-32.2	-32.2
Shielding (Barrier Attenuation)	1,212.0	-5.5	-5.5	-5.5	-5.5	-5.5	-5.5
Raw (Distance + Barrier)		29.5	-37.7	-37.7	-37.7	-37.7	-37.7
60 Minute Hourly Adjustment		**29.5**	**-37.7**	**-37.7**	**-37.7**	**-37.7**	**-37.7**

STATIONARY SOURCE NOISE PREDICTION MODEL

1/10/2018

Observer Location: **R2**
Source: Roof-Top Air Conditioning Unit
Condition: Operational

Project Name: Brodiaea
Job Number: 11142
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	1,146.0 feet		***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	1,136.0 feet		*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	10.0 feet		*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet		*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	30.0 feet		*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	1,146.0	-47.2	-47.2	-47.2	-47.2	-47.2	-47.2
Shielding (Barrier Attenuation)	1,136.0	-5.3	-5.3	-5.3	-5.3	-5.3	-5.3
Raw (Distance + Barrier)		24.7	-52.5	-52.5	-52.5	-52.5	-52.5
39 Minute Hourly Adjustment		**22.8**	**-54.4**	**-54.4**	**-54.4**	**-54.4**	**-54.4**

STATIONARY SOURCE NOISE PREDICTION MODEL

1/10/2018

Observer Location: **R2**
Source: Parking Lot Vehicle Movements
Condition: Operational

Project Name: Brodiaea
Job Number: 11142
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	1,069.0 feet		***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	1,059.0 feet		*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	10.0 feet		*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet		*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet		*Drop Off Coefficient:*	15.0
Barrier Elevation:	0.0 feet		20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	10.0	52.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	1,069.0	-30.4	-30.4	-30.4	-30.4	-30.4	-30.4
Shielding (Barrier Attenuation)	1,059.0	-5.5	-5.5	-5.5	-5.5	-5.5	-5.5
Raw (Distance + Barrier)		16.3	-35.9	-35.9	-35.9	-35.9	-35.9
60 Minute Hourly Adjustment		**16.3**	**-35.9**	**-35.9**	**-35.9**	**-35.9**	**-35.9**

STATIONARY SOURCE NOISE PREDICTION MODEL

1/10/2018

Observer Location: **R3**
Source: Unloading/Docking Activity
Condition: Operational

Project Name: Brodiaea
Job Number: 11142
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	638.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	638.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	638.0	-26.6	-26.6	-26.6	-26.6	-26.6	-26.6
Shielding (Barrier Attenuation)	638.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		40.6	-26.6	-26.6	-26.6	-26.6	-26.6
60 Minute Hourly Adjustment		**40.6**	**-26.6**	**-26.6**	**-26.6**	**-26.6**	**-26.6**

STATIONARY SOURCE NOISE PREDICTION MODEL

1/10/2018

Observer Location: **R3**
Source: Roof-Top Air Conditioning Unit
Condition: Operational

Project Name: Brodiaea
Job Number: 11142
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	583.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	583.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	30.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	583.0	-41.3	-41.3	-41.3	-41.3	-41.3	-41.3
Shielding (Barrier Attenuation)	583.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		35.9	-41.3	-41.3	-41.3	-41.3	-41.3
39 Minute Hourly Adjustment		**34.0**	**-43.2**	**-43.2**	**-43.2**	**-43.2**	**-43.2**

STATIONARY SOURCE NOISE PREDICTION MODEL

1/10/2018

Observer Location: **R3**
Source: Parking Lot Vehicle Movements
Condition: Operational

Project Name: Brodiaea
Job Number: 11142
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	494.0 feet		***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	494.0 feet		*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet		*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet		*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet		*Drop Off Coefficient:*	15.0
Barrier Elevation:	0.0 feet		20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	10.0	52.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	494.0	-25.4	-25.4	-25.4	-25.4	-25.4	-25.4
Shielding (Barrier Attenuation)	494.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		26.8	-25.4	-25.4	-25.4	-25.4	-25.4
60 Minute Hourly Adjustment		**26.8**	**-25.4**	**-25.4**	**-25.4**	**-25.4**	**-25.4**

STATIONARY SOURCE NOISE PREDICTION MODEL

1/10/2018

Observer Location: **R4**
Source: Unloading/Docking Activity
Condition: Operational

Project Name: Brodiaea
Job Number: 11142
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	1,254.0 feet		***Barrier Height:***	**30.0 feet**
Noise Distance to Barrier:	10.0 feet		*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	1,244.0 feet		*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet		*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet		*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	1,254.0	-32.4	-32.4	-32.4	-32.4	-32.4	-32.4
Shielding (Barrier Attenuation)	10.0	-17.6	-17.6	-17.6	-17.6	-17.6	-17.6
Raw (Distance + Barrier)		17.2	-50.0	-50.0	-50.0	-50.0	-50.0
60 Minute Hourly Adjustment		**17.2**	**-50.0**	**-50.0**	**-50.0**	**-50.0**	**-50.0**

STATIONARY SOURCE NOISE PREDICTION MODEL

1/10/2018

Observer Location: **R4**
Source: Roof-Top Air Conditioning Unit
Condition: Operational

Project Name: Brodiaea
Job Number: 11142
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	933.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	923.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	10.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	30.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	933.0	-45.4	-45.4	-45.4	-45.4	-45.4	-45.4
Shielding (Barrier Attenuation)	923.0	-5.2	-5.2	-5.2	-5.2	-5.2	-5.2
Raw (Distance + Barrier)		26.6	-50.6	-50.6	-50.6	-50.6	-50.6
39 Minute Hourly Adjustment		**24.7**	**-52.5**	**-52.5**	**-52.5**	**-52.5**	**-52.5**

STATIONARY SOURCE NOISE PREDICTION MODEL

1/10/2018

Observer Location: **R4**
Source: Parking Lot Vehicle Movements
Condition: Operational

Project Name: Brodiaea
Job Number: 11142
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	868.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	858.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	10.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	15.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	10.0	52.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	868.0	-29.1	-29.1	-29.1	-29.1	-29.1	-29.1
Shielding (Barrier Attenuation)	858.0	-5.5	-5.5	-5.5	-5.5	-5.5	-5.5
Raw (Distance + Barrier)		17.6	-34.6	-34.6	-34.6	-34.6	-34.6
60 Minute Hourly Adjustment		**17.6**	**-34.6**	**-34.6**	**-34.6**	**-34.6**	**-34.6**

STATIONARY SOURCE NOISE PREDICTION MODEL

1/10/2018

Observer Location: **R5**
Source: Unloading/Docking Activity
Condition: Operational

Project Name: Brodiaea
Job Number: 11142
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	604.0	feet	***Barrier Height:***	**30.0**	**feet**
Noise Distance to Barrier:	10.0	feet	*Noise Source Height:*	8.0	feet
Barrier Distance to Observer:	594.0	feet	*Observer Height:*	5.0	feet
Observer Elevation:	0.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0	
Noise Source Elevation:	0.0	feet	*Drop Off Coefficient:*	20.0	
Barrier Elevation:	0.0	feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance		

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	604.0	-26.1	-26.1	-26.1	-26.1	-26.1	-26.1
Shielding (Barrier Attenuation)	10.0	-17.6	-17.6	-17.6	-17.6	-17.6	-17.6
Raw (Distance + Barrier)		23.5	-43.7	-43.7	-43.7	-43.7	-43.7
60 Minute Hourly Adjustment		**23.5**	**-43.7**	**-43.7**	**-43.7**	**-43.7**	**-43.7**

STATIONARY SOURCE NOISE PREDICTION MODEL

1/10/2018

Observer Location: **R5**
Source: Roof-Top Air Conditioning Unit
Condition: Operational

Project Name: Brodiaea
Job Number: 11142
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	265.0	feet	***Barrier Height:***	**6.0**	**feet**
Noise Distance to Barrier:	255.0	feet	*Noise Source Height:*	5.0	feet
Barrier Distance to Observer:	10.0	feet	*Observer Height:*	5.0	feet
Observer Elevation:	0.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0	
Noise Source Elevation:	30.0	feet	*Drop Off Coefficient:*	20.0	
Barrier Elevation:	0.0	feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance		

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	265.0	-34.5	-34.5	-34.5	-34.5	-34.5	-34.5
Shielding (Barrier Attenuation)	255.0	-4.9	-4.9	-4.9	-4.9	-4.9	-4.9
Raw (Distance + Barrier)		37.8	-39.4	-39.4	-39.4	-39.4	-39.4
39 Minute Hourly Adjustment		**35.9**	**-41.3**	**-41.3**	**-41.3**	**-41.3**	**-41.3**

STATIONARY SOURCE NOISE PREDICTION MODEL

1/10/2018

Observer Location: **R5**
Source: Parking Lot Vehicle Movements
Condition: Operational

Project Name: Brodiaea
Job Number: 11142
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	223.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	213.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	10.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	15.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	10.0	52.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	223.0	-20.2	-20.2	-20.2	-20.2	-20.2	-20.2
Shielding (Barrier Attenuation)	213.0	-5.5	-5.5	-5.5	-5.5	-5.5	-5.5
Raw (Distance + Barrier)		26.5	-25.7	-25.7	-25.7	-25.7	-25.7
60 Minute Hourly Adjustment		**26.5**	**-25.7**	**-25.7**	**-25.7**	**-25.7**	**-25.7**

STATIONARY SOURCE NOISE PREDICTION MODEL

1/10/2018

Observer Location: **R6**
Source: Unloading/Docking Activity
Condition: Operational

Project Name: Brodiaea
Job Number: 11142
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	607.0 feet	***Barrier Height:***	**30.0 feet**
Noise Distance to Barrier:	10.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	597.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	607.0	-26.1	-26.1	-26.1	-26.1	-26.1	-26.1
Shielding (Barrier Attenuation)	10.0	-17.6	-17.6	-17.6	-17.6	-17.6	-17.6
Raw (Distance + Barrier)		23.5	-43.7	-43.7	-43.7	-43.7	-43.7
60 Minute Hourly Adjustment		**23.5**	**-43.7**	**-43.7**	**-43.7**	**-43.7**	**-43.7**

STATIONARY SOURCE NOISE PREDICTION MODEL

1/10/2018

Observer Location: **R6**
Source: Roof-Top Air Conditioning Unit
Condition: Operational

Project Name: Brodiaea
Job Number: 11142
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	249.0 feet		***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	239.0 feet		*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	10.0 feet		*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet		*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	30.0 feet		*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	249.0	-33.9	-33.9	-33.9	-33.9	-33.9	-33.9
Shielding (Barrier Attenuation)	239.0	-4.9	-4.9	-4.9	-4.9	-4.9	-4.9
Raw (Distance + Barrier)		38.4	-38.8	-38.8	-38.8	-38.8	-38.8
39 Minute Hourly Adjustment		**36.5**	**-40.7**	**-40.7**	**-40.7**	**-40.7**	**-40.7**

STATIONARY SOURCE NOISE PREDICTION MODEL

1/10/2018

Observer Location: **R6**
Source: Parking Lot Vehicle Movements
Condition: Operational

Project Name: Brodiaea
Job Number: 11142
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	202.0 feet		***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	192.0 feet		*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	10.0 feet		*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet		*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet		*Drop Off Coefficient:*	15.0
Barrier Elevation:	0.0 feet		20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	10.0	52.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	202.0	-19.6	-19.6	-19.6	-19.6	-19.6	-19.6
Shielding (Barrier Attenuation)	192.0	-5.5	-5.5	-5.5	-5.5	-5.5	-5.5
Raw (Distance + Barrier)		27.1	-25.1	-25.1	-25.1	-25.1	-25.1
60 Minute Hourly Adjustment		**27.1**	**-25.1**	**-25.1**	**-25.1**	**-25.1**	**-25.1**

STATIONARY SOURCE NOISE PREDICTION MODEL

1/10/2018

Observer Location: **R7**
Source: Unloading/Docking Activity
Condition: Operational

Project Name: Brodiaea
Job Number: 11142
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	698.0	feet	***Barrier Height:***	**30.0**	**feet**
Noise Distance to Barrier:	10.0	feet	*Noise Source Height:*	8.0	feet
Barrier Distance to Observer:	688.0	feet	*Observer Height:*	5.0	feet
Observer Elevation:	0.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0	
Noise Source Elevation:	0.0	feet	*Drop Off Coefficient:*	20.0	
Barrier Elevation:	0.0	feet			

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	698.0	-27.3	-27.3	-27.3	-27.3	-27.3	-27.3
Shielding (Barrier Attenuation)	10.0	-17.6	-17.6	-17.6	-17.6	-17.6	-17.6
Raw (Distance + Barrier)		22.3	-44.9	-44.9	-44.9	-44.9	-44.9
60 Minute Hourly Adjustment		**22.3**	**-44.9**	**-44.9**	**-44.9**	**-44.9**	**-44.9**

STATIONARY SOURCE NOISE PREDICTION MODEL

1/10/2018

Observer Location: **R7**
Source: Roof-Top Air Conditioning Unit
Condition: Operational

Project Name: Brodiaea
Job Number: 11142
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	347.0	feet	***Barrier Height:***	**0.0**	**feet**
Noise Distance to Barrier:	347.0	feet	*Noise Source Height:*	5.0	feet
Barrier Distance to Observer:	0.0	feet	*Observer Height:*	5.0	feet
Observer Elevation:	0.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0	
Noise Source Elevation:	30.0	feet	*Drop Off Coefficient:*	20.0	
Barrier Elevation:	0.0	feet			

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	347.0	-36.8	-36.8	-36.8	-36.8	-36.8	-36.8
Shielding (Barrier Attenuation)	347.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		40.4	-36.8	-36.8	-36.8	-36.8	-36.8
39 Minute Hourly Adjustment		**38.5**	**-38.7**	**-38.7**	**-38.7**	**-38.7**	**-38.7**

STATIONARY SOURCE NOISE PREDICTION MODEL

1/10/2018

Observer Location:	**R7**	*Project Name:*	Brodiaea
Source:	Parking Lot Vehicle Movements	*Job Number:*	11142
Condition:	Operational	*Analyst:*	A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	273.0	feet	***Barrier Height:***	**0.0**	**feet**
Noise Distance to Barrier:	273.0	feet	*Noise Source Height:*	5.0	feet
Barrier Distance to Observer:	0.0	feet	*Observer Height:*	5.0	feet
Observer Elevation:	0.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0	
Noise Source Elevation:	0.0	feet	*Drop Off Coefficient:*	15.0	
Barrier Elevation:	0.0	feet			

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	10.0	52.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	273.0	-21.5	-21.5	-21.5	-21.5	-21.5	-21.5
Shielding (Barrier Attenuation)	273.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		30.7	-21.5	-21.5	-21.5	-21.5	-21.5
60 Minute Hourly Adjustment		**30.7**	**-21.5**	**-21.5**	**-21.5**	**-21.5**	**-21.5**

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BRODIAEA COMMERCE CENTER
TRAFFIC IMPACT ANALYSIS
CITY OF MORENO VALLEY

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JANUARY 3, 2018

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LIST OF ABBREVIATED TERMS

(1)	Reference
ADT	Average Daily Traffic
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
CMP	Congestion Management Program
DIF	Development Impact Fee
E+P	Existing Plus Project
FHWA	Federal Highway Administration
HCM	Highway Capacity Manual
ITE	Institute of Transportation Engineers
LOS	Level of Service
MUTCD	Manual on Uniform Traffic Control Devices
N/A	Not Applicable
NCHRP	National Cooperative Highway Research Program
NP	No Project (or Without Project)
PCE	Passenger Car Equivalents
PHF	Peak Hour Factor
Project	Brodiaea Commerce Center
RCTC	Riverside County Transportation Commission
RivTAM	Riverside County Transportation Analysis Model
RTA	Riverside Transit Authority
RTP	Regional Transportation Plan
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCS	Sustainable Communities Strategy
sf	Square Feet
TIA	Traffic Impact Analysis
TSF	Thousand Square Feet
TUMF	Transportation Uniform Mitigation Fee
WP	With Project
WRCOG	Western Riverside Council of Governments
V/C	Volume to Capacity

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1 INTRODUCTION

This report presents the results of the traffic impact analysis (TIA) for the proposed Brodiaea Commerce Center development ("Project") located on the northwest corner of Heacock Street and Brodiaea Avenue in the City of Moreno Valley as shown on Exhibit 1-1.

The purpose of this traffic impact analysis is to evaluate the potential circulation system deficiencies that may result from the development of the proposed Project, and to recommend improvements to achieve acceptable circulation system operational conditions. This traffic study has been prepared in accordance with the City of Moreno Valley Transportation Engineering Division's *Traffic Impact Analysis Preparation Guide* (August 2007) and consultation with City of Moreno Valley staff during the scoping process. (1) The approved Project Traffic Study Scoping agreement is provided in Appendix 1.1 of this TIA.

1.1 PROJECT OVERVIEW

The Project is proposed to consist of up to 262,398 square feet (sf) High-Cube Warehouse / Distribution Center use within a single building. The current site plan shows a total square footage of 261,807 sf, however, the higher square footage was evaluated for the purposes of this analysis in an effort to conduct a conservative analysis. Per the City's traffic study guidelines, the Opening Year will have a 5-year minimum horizon from baseline conditions. As such, the Opening Year analysis will assess 2022 traffic conditions.

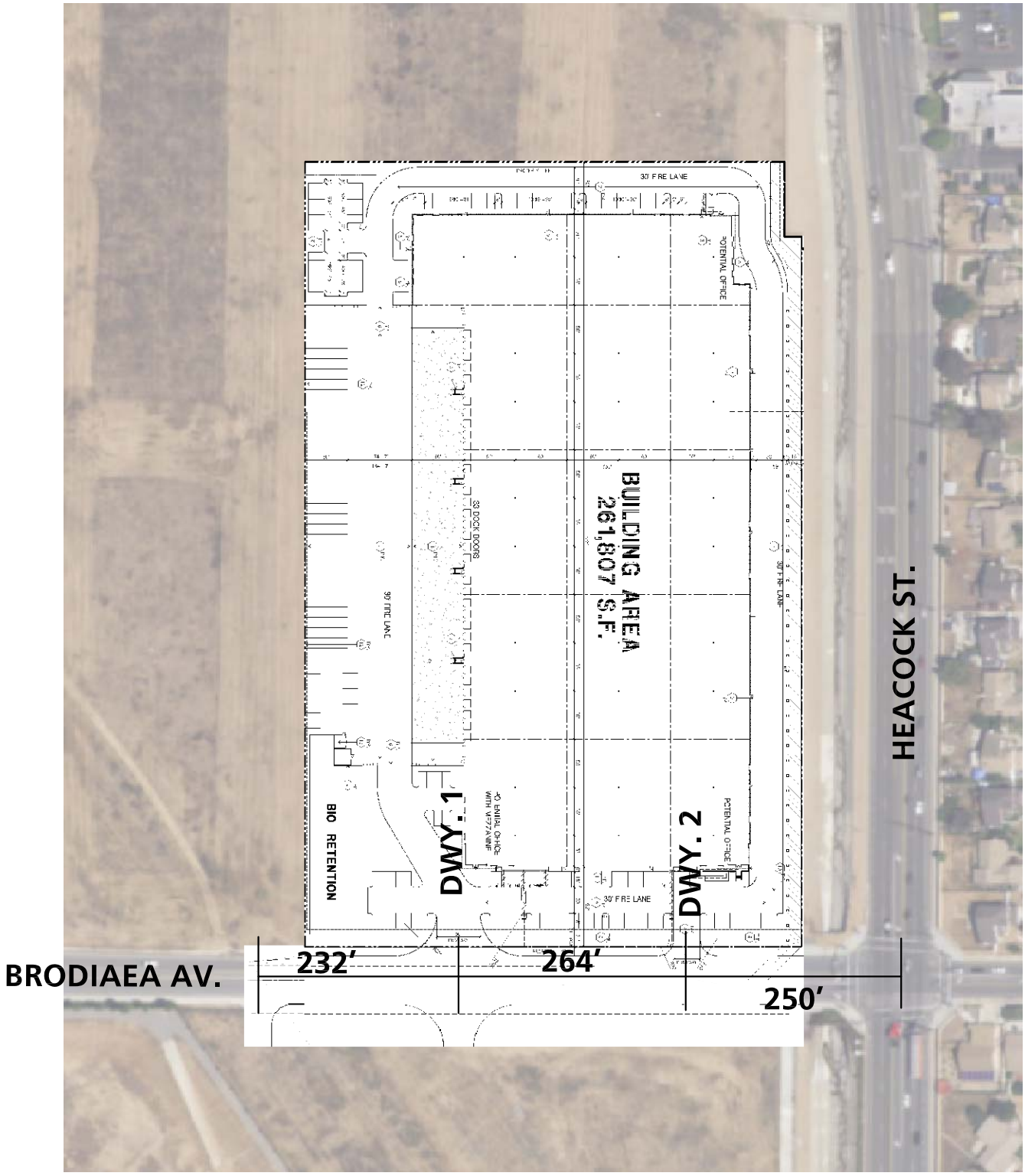
Vehicular and truck traffic access will be provided via the following driveways (see Exhibit 1-1):

- Driveway 1 / Brodiaea Avenue– Full access driveway providing access to trucks only.
- Driveway 2 / Brodiaea Avenue – Full access driveway providing access to passenger cars only.

Regional access to the Project site is provided via the I-215 Freeway at Alessandro Boulevard and Cactus Avenue interchanges.

Trips generated by the Project's proposed land uses have been estimated based on trip generation rates collected by the Institute of Transportation Engineers (ITE) Trip Generation Manual, 9th Edition, 2012. (2) The Project is estimated to generate a net total of 689 passenger-car-equivalent (PCE) trip-ends per day on a typical weekday with approximately 40 net AM PCE peak hour trips and 47 net PM PCE peak hour trips. The assumptions and methods used to estimate the Project's trip generation characteristics are discussed in greater detail in Section 4.1 *Project Trip Generation* of this report.

EXHIBIT 1-1: PRELIMINARY SITE PLAN



1.2 ANALYSIS SCENARIOS

For the purposes of this traffic study, potential impacts to traffic and circulation have been assessed for each of the following conditions:

- Existing (2017) (1 scenario)
- Existing plus Project (E+P) (1 scenario)
- Opening Year Cumulative (2022), Without and With Project (2 scenarios)
- Horizon Year (2040), Without and With Project (2 scenarios)

1.2.1 EXISTING (2017) CONDITIONS

Information for Existing (2017) conditions is disclosed to represent the baseline traffic conditions as they existed at the time this report was prepared.

1.2.2 EXISTING PLUS PROJECT CONDITIONS

The Existing plus Project (E+P) analysis determines circulation system deficiencies that would occur on the existing roadway system in the scenario of the Project being placed upon Existing conditions.

1.2.3 OPENING YEAR CUMULATIVE (2022) CONDITIONS

To account for growth in traffic between Existing Conditions (2017) and the Project Opening Year Cumulative (2022), a compounded annual traffic growth rate of 2 percent was assumed (10.41 percent aggregate growth in background traffic for the period 2017—2022).

The 2 percent annual growth rate is intended to capture non-specific ambient traffic growth. Conservatively, the TIA estimates area-wide traffic growth, then add traffic generated by other known or probable related projects. These related projects are at least in part already accounted for in the assumed annual 2 percent ambient growth in traffic noted above; and in some instances, these related projects would likely not be implemented and operational within the 2022 Opening Year time frame assumed for the Project. The resulting traffic growth rate used in the TIA (2 percent compounded annual ambient growth + traffic generated by related projects) would therefore tend to overstate rather than understate background cumulative traffic impacts under 2022 traffic conditions

1.2.3 HORIZON YEAR (2040) CONDITIONS

The Horizon Year (2040) Without Project traffic conditions were derived from the Riverside County Transportation Analysis Model (RivTAM) using accepted procedures for model forecast refinement and smoothing. The traffic forecasts reflect the area-wide growth anticipated between Existing conditions and Horizon Year conditions. The Horizon Year With Project traffic forecasts were determined by adding project-related traffic to the Horizon Year Without Project traffic forecasts from the RivTAM model. The Horizon Year traffic forecasts used in the traffic analysis were refined with existing peak hour traffic count data collected at intersection analysis locations. The initial estimate of the future peak hour turning movements has, therefore, been

reviewed for reasonableness. The reasonableness checks performed include a review of traffic flow conservation in addition to a comparison with the Existing and Opening Year Cumulative (2022) traffic volumes to ensure adequate growth. Where necessary, the Horizon Year volumes have been adjusted to achieve flow conservation, reasonable growth, and reasonable diversion between parallel routes.

In context, the TIA's assumed 2 percent compounded annual growth rate is considered a reasonable approximation of future traffic growth when compared to demographic projections reflected in other local and regional growth modeling efforts. More specifically, the Southern California Association of Governments (SCAG) 2016—2040 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) growth forecasts for the City of Moreno Valley assume the City population to increase from 197,400 in 2012 to 256,600 by the year 2040, or an approximate 0.94 percent annual growth rate, compounded annually. The RTP/SCS assumed growth in households over the same 28-year period reflects an increase from 51,800 households to 73,000 households; a rate of 1.23 percent compounded annually. At the upper end of assumed RTP/SCS growth rates, employment over the same 28-year period is projected to increase from 31,400 jobs to 83,200 jobs; a rate of approximately 3.54 percent compounded annually. (3) The 2 percent compounded annual traffic growth rate used in the TIA reflects the fact that not all persons comprising population growth, household growth, or employment growth would translate on a one-to-one basis as a new vehicle trip in the region; and establishes a judicious midrange estimate lying between the RTP/SCS assumed regional population growth rate (0.94 percent) and the RTP/SCS assumed regional employment growth rate (3.54 percent).

The Horizon Year Without and With Project traffic conditions analyses will be utilized to determine if improvements funded through regional transportation mitigation fee programs, such as the Transportation Uniform Mitigation Fee (TUMF) and Development Impact Fee (DIF) programs, or other approved funding mechanism can accommodate the long-range cumulative traffic at the target level of service (LOS) identified in the County of Riverside General Plan. (4) If the "funded" improvements can provide the target LOS, then the Project's payment into TUMF and/or DIF will be considered as long-range cumulative mitigation through the conditions of approval. Other improvements needed beyond the "funded" improvements (such as localized improvements to non-TUMF facilities) are identified as such. Post-processing worksheets for Horizon Year (2040) Without Project traffic conditions are provided in Appendix 4.1.

1.3 STUDY AREA

To ensure that this TIA satisfies the City of Moreno Valley's traffic study requirements, Urban Crossroads, Inc. prepared a project traffic study scoping package for review by City of Moreno Valley staff prior to the preparation of this report. The scoping agreement provides an outline of the Project study area, trip generation, trip distribution, and analysis methodology and is included in Appendix 1.1.

1.3.1 INTERSECTIONS

The 6 study area intersections shown on Exhibit 1-2 and listed on Table 1-1 were selected for this TIA based on the City of Moreno Valley's Traffic Study Guidelines and in consultation with City of

Moreno Valley staff. Pursuant to the Traffic Study Guidelines, the City requires analysis of intersections where the Project would contribute 50 or more peak hour trips.[1] Although the Project is anticipated to contribute less than 50 peak hour trips to the study area intersections, the study area shown on Exhibit 1-2 has been developed based on direction from City staff. (1) In an effort to conduct a conservative analysis, the PCE trip generation for the proposed Project has been utilized to determine if the 50 peak hour trip criteria has been met at the study area intersections.

TABLE 1-1: INTERSECTION ANALYSIS LOCATIONS

ID	Intersection Location	Jurisdiction	CMP?
1	Gilbert Street / Brodiaea Avenue	Moreno Valley	No
2	Gilbert Street / Cactus Avenue	Moreno Valley	No
3	Driveway 1 / Brodiaea Avenue – Future Intersection	Moreno Valley	No
4	Driveway 2 / Brodiaea Avenue – Future Intersection	Moreno Valley	No
5	Heacock Street / Alessandro Boulevard	Moreno Valley	No
6	Heacock Street / Brodiaea Avenue	Moreno Valley	No

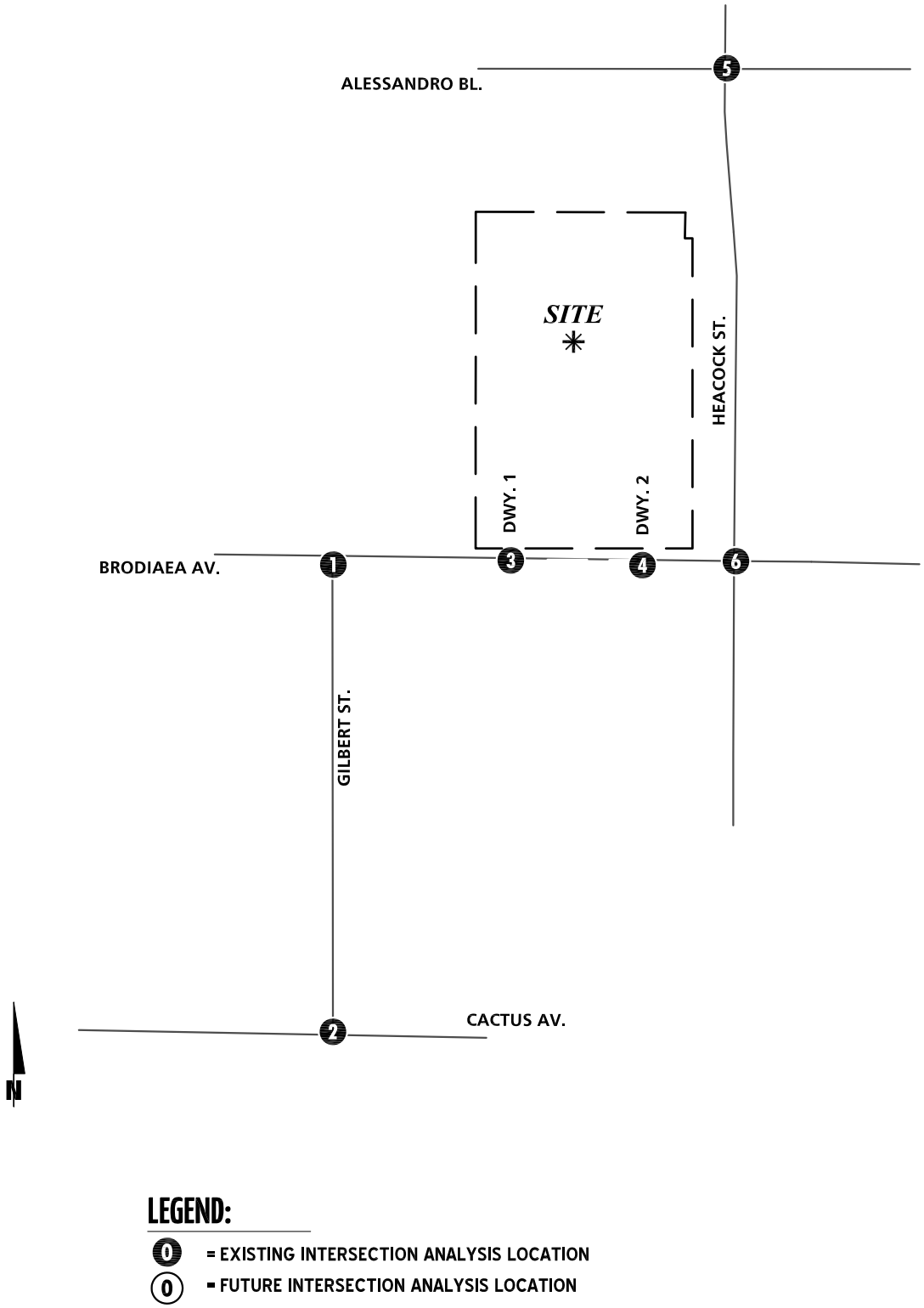
The intent of a Congestion Management Program (CMP) is to more directly link land use, transportation, and air quality, thereby prompting reasonable growth management programs that will effectively utilize new transportation funds, alleviate traffic congestion and related impacts, and improve air quality. Counties within California have developed CMPs with varying methods and strategies to meet the intent of the CMP legislation. The County of Riverside CMP became effective with the passage of Proposition 111 in 1990 and updated most recently in 2011. The Riverside County Transportation Commission (RCTC) adopted the 2011 CMP for the County of Riverside in December 2011. (4) There are currently no CMP intersections in this study area.

1.3.2 ROADWAY SEGMENTS

No roadway segments will be evaluated as the Project is anticipated to contribute fewer than 50 peak hour trips on all roadway segments adjacent to intersection analysis locations. In an effort to conduct a conservative analysis, the PCE trip generation for the proposed Project has been utilized to determine if the 50 peak hour trip criteria has been met on the study area roadway segments.

[1] The "50 or more peak hour trips" intersection analytic protocol stipulated in the City's Traffic Study Guidelines is consistent with standard industry practice. It is noted further that the 50 peak hour trip threshold is employed by other agencies throughout southern California including Caltrans, County of Riverside, County of San Bernardino, and the County of Orange.

EXHIBIT 1-2: LOCATION MAP



1.4 SUMMARY OF INTERSECTION ANALYSIS

A summary of the operationally deficient study area intersections and recommended improvements required to achieve acceptable circulation system operational conditions are described in detail within Section 3.0 *Existing Conditions*, Section 5.0 *E+P Traffic Conditions*, Section 6.0 *Opening Year Cumulative (2022) Traffic Conditions*, and Section 7.0 *Horizon Year (2040) Traffic Conditions* of this report. The study area intersections are anticipated to operate at acceptable LOS for all analysis scenarios, with the exception of Heacock Street and Alessandro Boulevard under Horizon Year (2040) traffic conditions.

1.5 LOCAL AND REGIONAL FUNDING MECHANISMS

Transportation improvements throughout the City of Moreno Valley are funded through a combination of project mitigation, fair share contributions or development impact fee programs, such as TUMF program or the City's DIF program.

1.5.1 TRANSPORTATION UNIFORM MITIGATION FEE (TUMF) PROGRAM

The Western Riverside Council of Governments (WRCOG) is responsible for establishing and updating Transportation Uniform Mitigation Fee (TUMF) rates. The County may grant to developers a credit against the specific components of fees for the dedication of land or the construction of facilities identified in the list of improvements funded by each of these fee programs. Fees are based upon projected land uses and a related transportation need to address growth based upon a 2009 Nexus study.

TUMF is an ambitious regional program created to address cumulative impacts of growth throughout western Riverside County. Program guidelines are being handled on an iterative basis. Exemptions, credits, reimbursements and local administration are being deferred to primary agencies. The County of Riverside serves this function for the proposed Project. Fees submitted to the County are passed on to the WRCOG as the ultimate program administrator.

TUMF guidelines empower a local zone committee to prioritize and arbitrate certain projects. The Project is located in the Central Zone. The zone has developed a 5-year capital improvement program to prioritize public construction of certain roads. TUMF is focused on improvements necessitated by regional growth. The Perris Boulevard is designated TUMF roadways/facilities within the Project's traffic study area. The TUMF Transportation Improvement Program map for Moreno Valley is included in Appendix 1.2.

1.5.2 City of Moreno Valley Development Impact Fee (DIF) Program

The City of Moreno Valley has created its own local Development Impact Fee (DIF) program to impose and collect fees from new residential, commercial and industrial development for the purpose of funding roadways and intersections necessary to accommodate City growth as identified in the City's General Plan Circulation Element. The City's DIF program includes facilities that are not part of, or which may exceed improvements identified and covered by the TUMF program. As a result, the pairing of the regional and local fee programs provides a more comprehensive funding and implementation plan to ensure an adequate and interconnected transportation system. Under the City's DIF program, the City may grant to developers a credit against specific components of fees when those developers construct certain facilities and landscaped medians identified in the list of improvements funded by the DIF program.

The timing to use the DIF fees is established through periodic capital improvement programs which are overseen by the City's Public Works Department. Periodic traffic counts, review of traffic accidents, and a review of traffic trends throughout the City are also periodically performed by City staff and consultants. The City uses this data to determine the timing of implementing the improvements listed in its facilities list.

The Project Applicant would pay requisite DIF pursuant to incumbent City ordinance requirements. Payment of requisite DIF would satisfy the Applicant's mitigation responsibilities for potentially significant impacts affecting DIF-funded facilities.

1.5.3 Fair Share Fees

The Project Applicant's mitigation responsibilities may also be may be fulfilled through payment of fair-share fees. Fair share fees would be paid in instances where required traffic facilities are not otherwise funded by TUMF and/or DIF programs noted above. Fair share calculations have not been provided as they are not applicable.

1.6 Project Impacts and Mitigation Measures

Based on the assessment of E+P traffic conditions, there were no study area intersections that were found to be impacted by the Project. Section 5 *E+P Traffic Analysis* includes the detailed analysis results.

1.7 Cumulative Impacts and Mitigation measures

E+P and Opening Year Cumulative (2022) conditions did not result in any deficient peak hour intersection operations. However, the intersection of Heacock Street and Alessandro Boulevard is anticipated to operate at an unacceptable LOS under Horizon Year (2040) traffic conditions. The Project is anticipated to contribute less than 50 peak hour trips to this intersection and would change the pre-project delay by less than 1.0 second. As such, the impact is considered less than significant. There are also queuing issues anticipated for the intersection of Heacock Street and Alessandro Boulevard under Opening Year Cumulative (2022) conditions based on the existing turn pocket storage lengths. As such, improvements have been recommended to provide adequate stacking distances.

1.8 SITE ADJACENT ROADWAY AND SITE ACCESS IMPROVEMENTS

This section summarizes Project site access and on-site circulation recommendations. The Project is proposed to have full access on Brodiaea Avenue via Driveway 1 and Driveway 2. Driveway 1 is proposed to serve only trucks and Driveway 2 is proposed to serve only passenger cars. Regional access to the project site is provided via the I-215 Freeway at Alessandro Boulevard and Cactus Avenue interchanges.

1.8.1 SITE ADJACENT ROADWAY IMPROVEMENTS

The recommended site-adjacent roadway improvements for the Project are described below. These improvements need to be incorporated into the project description prior to Project approval or imposed as conditions of approval as part of the Project approval. Exhibit 1-3 illustrates the site-adjacent roadway improvement recommendations.

Brodiaea Avenue – Brodiaea Avenue is an east-west oriented roadway located along the Project's southern boundary. Construct Brodiaea Avenue from the Project's western boundary to Heacock Street at its ultimate half section width as an Industrial Collector (78-foot right-of-way) in compliance with applicable City of Moreno Valley standards.

1.8.2 SITE ACCESS IMPROVEMENTS

The recommended site access driveway improvements for the Project are described below. Exhibit 1-3 also illustrates the on-site and site adjacent recommended roadway lane improvements. Construction of on-site and site adjacent improvements are recommended to occur in conjunction with adjacent Project development activity or as needed for Project access purposes.

Driveway 1 / Brodiaea Avenue – Install a stop control on the southbound approach, and construct the intersection with the following geometrics:

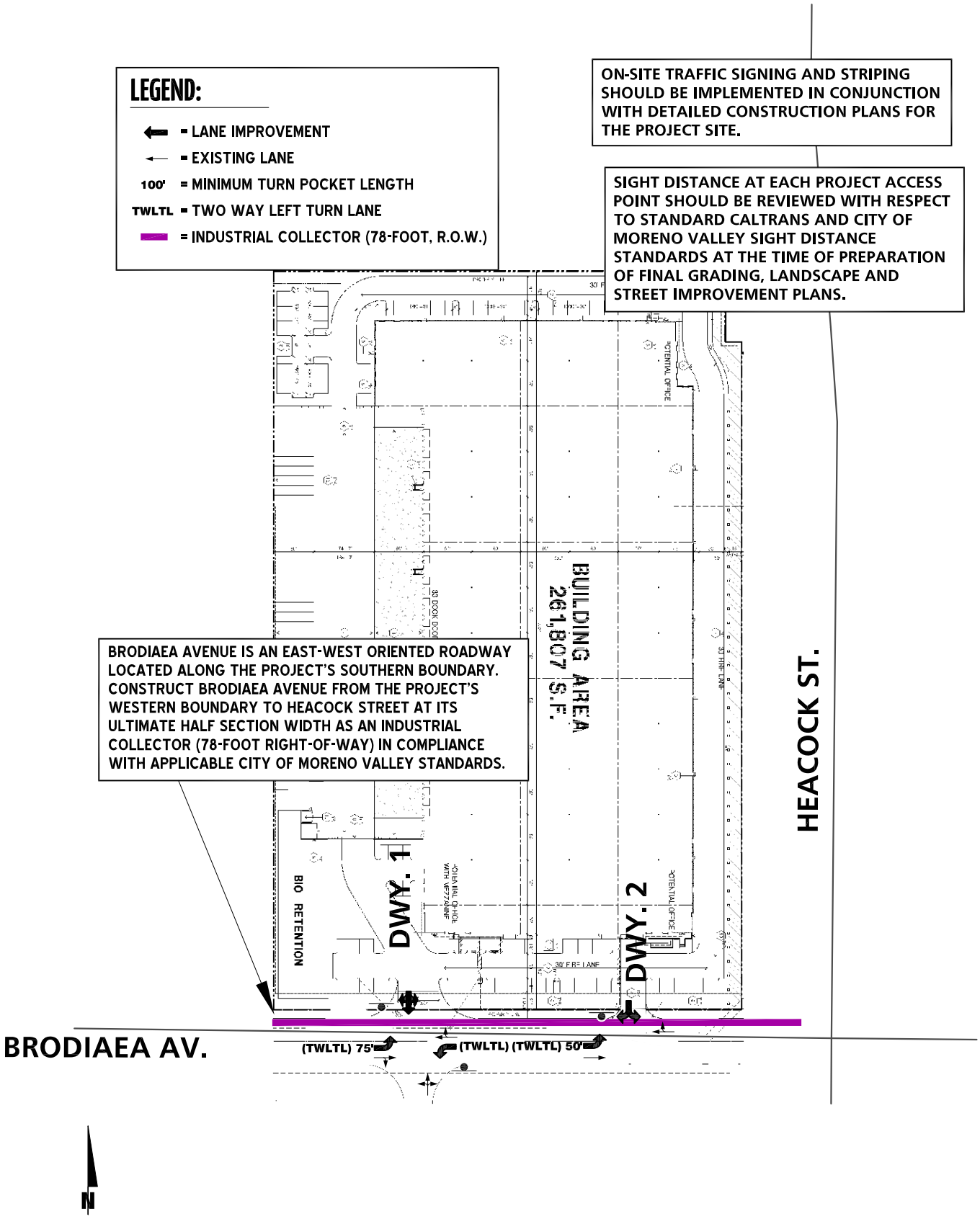
Northbound Approach: One shared left-through-right turn lane.

Southbound Approach: One shared left-through-right turn lane.

Eastbound Approach: One left turn lane and one through lane. The westbound left turn should provide a minimum of 75-feet of storage.

Westbound Approach: One left turn lane and one shared through-right turn lane.

EXHIBIT 1-3: SITE ADJACENT ROADWAY AND SITE ACCESS RECOMMENDATIONS



Driveway 2 / Brodiaea Avenue – Install a stop control on the southbound approach, and construct the intersection with the following geometrics:

Northbound Approach: Not Applicable (N/A)

Southbound Approach: One shared left-right turn lane.

Eastbound Approach: One left turn lane and one through lane. The westbound left turn should provide a minimum of 50-feet of storage.

Westbound Approach: One shared through-right turn lane.

1.8.3 QUEUING ANALYSIS AT THE PROJECT DRIVEWAYS

A queuing analysis was conducted for the Project driveways for Horizon Year (2040) traffic conditions to determine the turn pocket lengths necessary to accommodate near-term 95th percentile queues. The analysis was conducted for the weekday AM and weekday PM peak hours for all analysis scenarios.

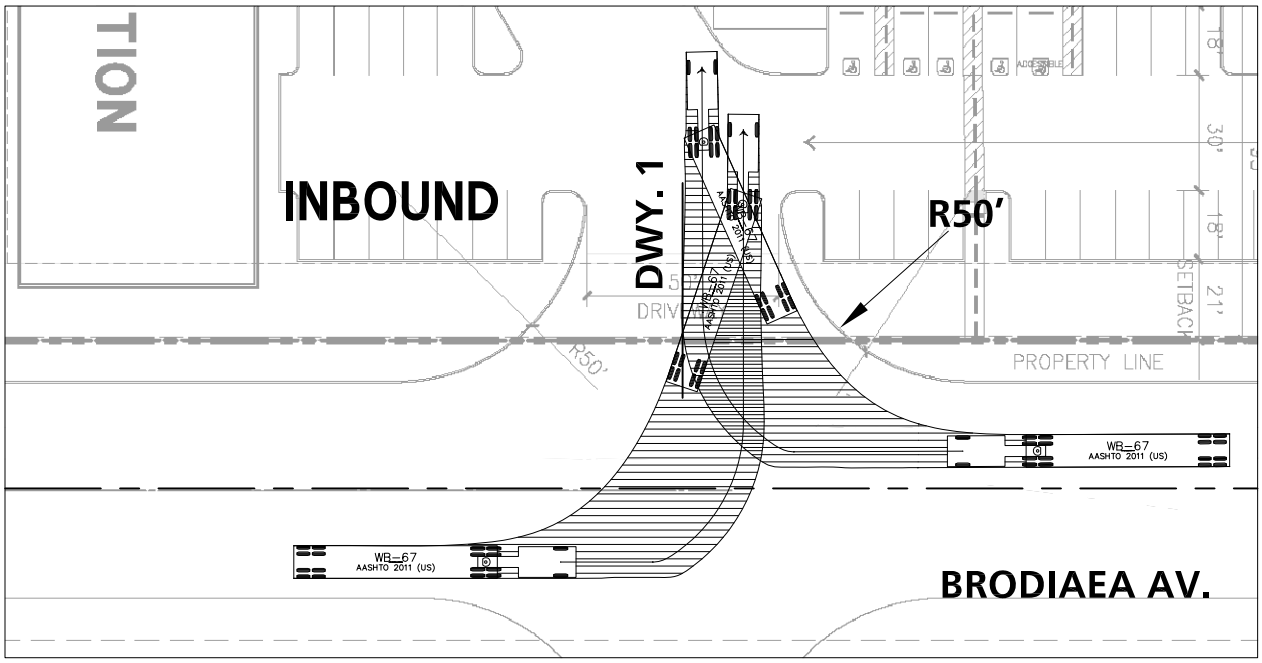
The queuing analysis indicates that 50 feet of storage length can accommodate the 95th percentile queues anticipated for the eastbound left turn lanes on both driveways for all analysis scenarios. However, consistent with the City's minimum storage length requirements for driveways serving heavy trucks, a 75-foot eastbound left turn lane has been recommended at Driveway 1 on Brodiaea Avenue. Queuing worksheets are included in Appendix 1.3.

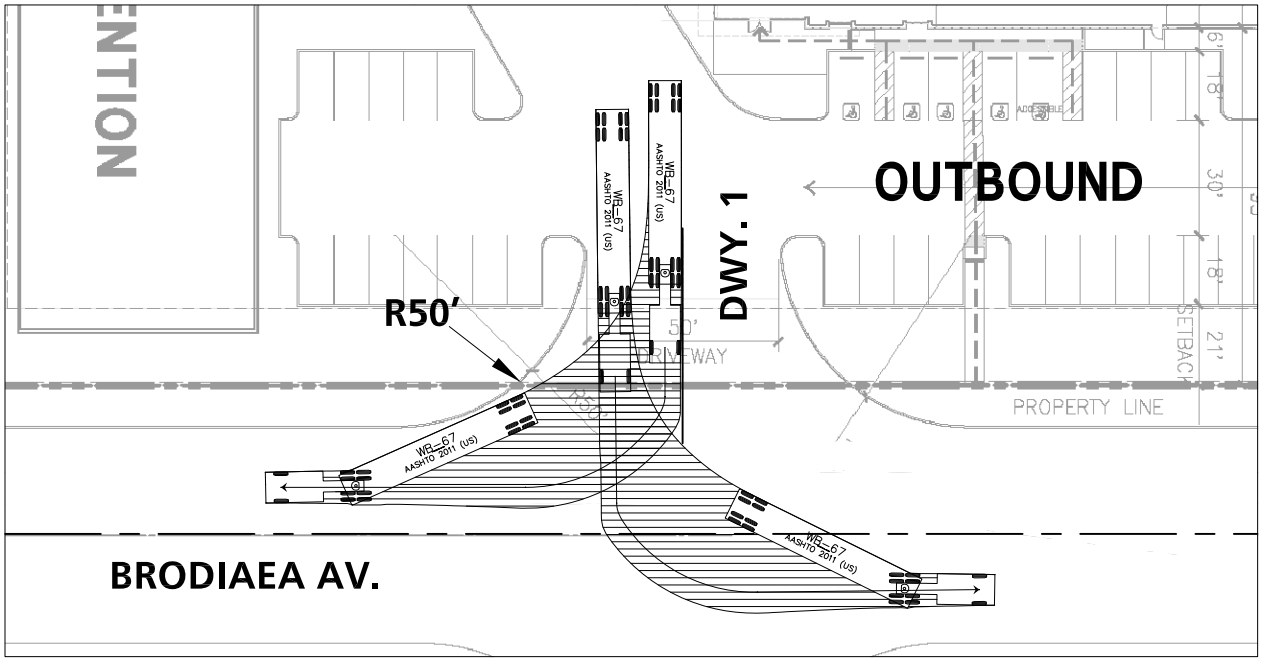
1.9 TRUCK ACCESS AND CIRCULATION

A truck turning template has been overlaid on the site plan at Driveway 1, which is anticipated to be utilized by heavy trucks, in order to determine appropriate curb radii and to verify that trucks will have sufficient space to execute turning maneuvers. For the purposes of this evaluation, the WB-67 class truck template has been utilized. WB-67 class trucks are approximately 73.5 feet in length.

Exhibit 1-4 illustrates the proposed truck access for the site and circulation for Driveway 1. As shown on Exhibit 1-4, the proposed curb radii at the intersection of Driveway 1 at Brodiaea Avenue are anticipated to accommodate outbound and inbound trucks.

EXHIBIT 1-4: TRUCK ACCESS





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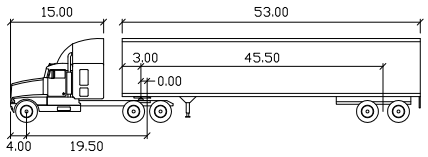


WB-67 feet

Tractor Width	: 8.00	Lock to Lock Time	: 6.0
Trailer Width	: 8.50	Steering Angle	: 28.4
Tractor Track	: 8.00	Articulating Angle	: 75.0
Trailer Track	: 8.50		

2 METHODOLOGIES

This section of the report presents the methodologies used to perform the traffic analyses summarized in this report. The methodologies described are consistent with City of Moreno Valley's traffic study guidelines. (1)

2.1 LEVEL OF SERVICE

Traffic operations of roadway facilities are described using the term "Level of Service" (LOS). LOS is a qualitative description of traffic flow based on several factors such as speed, travel time, delay, and freedom to maneuver. Six levels are typically defined ranging from LOS A, representing completely free-flow conditions, to LOS F, representing breakdown in flow resulting in stop-and-go conditions. LOS E represents operations at or near capacity, an unstable level where vehicles are operating with the minimum spacing for maintaining uniform flow.

2.2 INTERSECTION CAPACITY ANALYSIS

The definitions of LOS for interrupted traffic flow (flow restrained by the existence of traffic signals and other traffic control devices) differ slightly depending on the type of traffic control. The LOS is typically dependent on the quality of traffic flow at the intersections along a roadway. The Highway Capacity Manual (HCM) methodology expresses the LOS at an intersection in terms of delay time for the various intersection approaches. (5) The HCM uses different procedures depending on the type of intersection control.

2.2.1 SIGNALIZED INTERSECTIONS

City of Moreno Valley

The City of Moreno Valley requires signalized intersection operations analysis based on the methodology described in the HCM. (5) Intersection LOS operations are based on an intersection's average control delay. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. For signalized intersections, LOS is directly related to the average control delay per vehicle and is correlated to a LOS designation as described in Table 2-1. Study area intersections have been evaluated using the Synchro (Version 9.1) analysis software package.

Synchro is a macroscopic traffic software program that is based on the signalized intersection capacity analysis as specified in the HCM. Macroscopic level models represent traffic in terms of aggregate measures for each movement at the study intersections. Equations are used to determine measures of effectiveness such as delay and queue length. The level of service and capacity analysis performed by Synchro takes into consideration optimization and coordination of signalized intersections within a network.

TABLE 2-1: SIGNALIZED INTERSECTION LOS THRESHOLDS

Description	Average Control Delay (Seconds), V/C ≤ 1.0	Level of Service, V/C ≤ 1.0	Level of Service, V/C > 1.0
Operations with very low delay occurring with favorable progression and/or short cycle length.	0 to 10.00	A	F
Operations with low delay occurring with good progression and/or short cycle lengths.	10.01 to 20.00	B	F
Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	20.01 to 35.00	C	F
Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop and individual cycle failures are noticeable.	35.01 to 55.00	D	F
Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences. This is considered to be the limit of acceptable delay.	55.01 to 80.00	E	F
Operation with delays unacceptable to most drivers occurring due to over saturation, poor progression, or very long cycle lengths	80.01 and up	F	F

Source: HCM 2010

The peak hour traffic volumes have been adjusted using a peak hour factor (PHF) to reflect peak 15 minute volumes. Common practice for LOS analysis is to use a peak 15-minute rate of flow. However, flow rates are typically expressed in vehicles per hour. The PHF is the relationship between the peak 15-minute flow rate and the full hourly volume (e.g. PHF = [Hourly Volume] / [4 x Peak 15-minute Flow Rate]). The use of a 15-minute PHF produces a more detailed analysis as compared to analyzing vehicles per hour. Existing PHFs have been used for all analysis scenarios. Per the HCM, PHF values over 0.95 often are indicative of high traffic volumes with capacity constraints on peak hour flows, while lower PHF values are indicative of greater variability of flow during the peak hour. (5)

2.2.2 UNSIGNALIZED INTERSECTIONS

The unsignalized intersections in the study area are located within the City of Moreno Valley. The City of Moreno Valley require the operations of unsignalized intersections be evaluated using the methodology described the HCM. (5) The LOS rating is based on the weighted average control delay expressed in seconds per vehicle (see Table 2-2).

TABLE 2-2: UNSIGNALIZED INTERSECTION LOS THRESHOLDS

Description	Average Control Delay Per Vehicle (Seconds)	Level of Service, V/C ≤ 1.0	Level of Service, V/C > 1.0
Little or no delays.	0 to 10.00	A	F
Short traffic delays.	10.01 to 15.00	B	F
Average traffic delays.	15.01 to 25.00	C	F
Long traffic delays.	25.01 to 35.00	D	F
Very long traffic delays.	35.01 to 50.00	E	F
Extreme traffic delays with intersection capacity exceeded.	> 50.00	F	F

Source: HCM 2010

At two-way or side-street stop-controlled intersections, LOS is calculated for each controlled movement and for the left turn movement from the major street, as well as for the intersection as a whole. For approaches composed of a single lane, the delay is computed as the average of all movements in that lane. For all-way stop controlled intersections, LOS is computed for the intersection as a whole.

2.3 TRAFFIC SIGNAL WARRANT ANALYSIS METHODOLOGY

The term "signal warrants" refers to the list of established criteria used by the California Department of Transportation (Caltrans) and other public agencies to quantitatively justify or ascertain the potential need for installation of a traffic signal at an otherwise unsignalized intersection. This TIA uses the signal warrant criteria presented in the latest edition of the Federal Highway Administration's (FHWA) *Manual on Uniform Traffic Control Devices (MUTCD)*, as amended by *the MUTCD 2014 California Supplement*, for all study area intersections. (6)

The signal warrant criteria for Existing study area intersections are based upon several factors, including volume of vehicular and pedestrian traffic, frequency of accidents, and location of school areas. Both the FHWA's *MUTCD* and the *MUTCD 2014 California Supplement* indicate that the installation of a traffic signal should be considered if one or more of the signal warrants are met. (6) Specifically, this TIA utilizes the Peak Hour Volume-based Warrant 3 as the appropriate representative traffic signal warrant analysis for existing traffic conditions. Warrant 3 criteria are basically identical for both the FHWA's *MUTCD* and the *MUTCD 2014 California Supplement*. Warrant 3 is appropriate to use for this TIA because it provides specialized warrant criteria for intersections with rural characteristics (e.g. located in communities with populations of less than 10,000 persons or with adjacent major streets operating above 40 miles per hour). For the purposes of this study, the speed limit was the basis for determining whether Urban or Rural warrants were used for a given intersection.

Future unsignalized intersections, that currently do not exist, have also been assessed regarding the potential need for new traffic signals based on future average daily traffic (ADT) volumes, using the Caltrans planning level ADT-based signal warrant analysis worksheets.

As shown on Table 2-4, traffic signal warrant analyses were performed for the following unsignalized study area intersections during the peak weekday conditions wherein the Project is anticipated to contribute the highest trips:

TABLE 2-4: TRAFFIC SIGNAL WARRANT ANALYSIS LOCATIONS

ID	Intersection Location	Jurisdiction
2	Gilbert Street / Cactus Avenue	Moreno Valley
3	Driveway 1 / Brodiaea Avenue – Future Intersection	Moreno Valley
4	Driveway 2 / Brodiaea Avenue – Future Intersection	Moreno Valley

The Existing conditions traffic signal warrant analysis is presented in the subsequent section, Section 3 *Area Conditions* of this report. The traffic signal warrant analyses for future conditions are presented in Section 5 *E+P Traffic Analysis,* Section 6 *Opening Year Cumulative (2022) Traffic Analysis,* and Section 7 *Horizon Year (2040) Traffic Analysis* of this report.

It is important to note that a signal warrant defines the minimum condition under which the installation of a traffic signal might be warranted. Meeting this threshold condition does not require that a traffic control signal be installed at a particular location, but rather, that other traffic factors and conditions be evaluated in order to determine whether the signal is truly justified. It should also be noted that signal warrants do not necessarily correlate with LOS. An intersection may satisfy a signal warrant condition and operate at or above acceptable LOS or operate below acceptable LOS and not meet a signal warrant.

2.4 QUEUING ANALYSIS

A queuing analysis was conducted for all study area intersections for, E+P, and Opening Year Cumulative (2022) traffic conditions in an effort to determine the turn pocket lengths necessary to accommodate 95th percentile queues. The analysis was conducted for both the weekday AM and weekday PM peak hours.

The traffic modeling and signal timing optimization software package Synchro (Version 9.1) has been utilized to assess queues. Synchro is a macroscopic traffic software program that is based on the signalized and unsignalized intersection capacity analyses as specified in the Highway Capacity Manual (HCM). Macroscopic level models represent traffic in terms of aggregate measures for each movement at the study intersections. Equations are used to determine measures of effectiveness such as delay and queue length in Synchro. The LOS and capacity analysis performed by Synchro takes into consideration optimization and coordination of signalized intersections within a network.

SimTraffic is designed to model networks of signalized and unsignalized intersections, with the primary purpose of checking and fine-tuning signal operations. SimTraffic uses the input parameters from Synchro to generate random simulations. SimTraffic has been utilized to assess peak hour queuing for both E+P and Opening Year Cumulative With Project traffic conditions. The random simulations generated by SimTraffic have been utilized to determine the 50th and 95th percentile queue lengths observed for each turn lane. A SimTraffic simulation has been recorded up to 5 times, during the weekday AM and weekday PM peak hours, and has been seeded for 60-minute periods with 60-minute recording intervals.

A vehicle is considered queued whenever it is traveling at less than 10 feet/second. A vehicle will only become queued when it is either at the stop bar or behind another queued vehicle. Although only the 95th percentile queue has been utilized for purposes of determining the necessary turn pocket storage lengths, the 50th percentile queues are also reported. The 50th percentile queue is the maximum back of queue on a typical cycle during the peak hour, while the 95th percentile queue is the maximum back of queue with 95th percentile traffic volumes during the peak hour. In other words, if traffic were observed for 100 cycles, the 95th percentile queue would be the queue experienced with the 95th busiest cycle (or 5% of the time). The 50th percentile, or average, queue represents the typical queue length for peak hour traffic conditions, while the 95th percentile queue is derived from the average queue plus 1.65 standard deviations. The 95th percentile queue is not necessarily ever observed; it is simply based on statistical calculations. However, many jurisdictions utilize the 95th percentile queues for design purposes. The maximum back of queue observed for every two-minute period is recorded by SimTraffic.

2.5 MINIMUM LEVEL OF SERVICE (LOS)

The definition of an intersection deficiency in the City of Moreno Valley is based on the City of Moreno Valley General Plan Circulation Element. The City of Moreno Valley General Plan states that target LOS C or LOS D be maintained along City roads (including intersections) wherever possible. Exhibit 2-1 depicts the level of service standards within the City.

2.6 THRESHOLDS OF SIGNIFICANCE

This section outlines the methodology used in this analysis related to identifying circulation system deficiencies. To determine whether the addition of project traffic (as defined through the comparison of Existing traffic conditions to E+P traffic conditions) at a study intersection would result in a direct project-specific traffic impact, the following will be utilized:

- When the pre-Project condition is at or better than LOS D (or LOS E for CMP intersections and intersections located in the City of Moreno Valley) (i.e., acceptable LOS), and project-generated traffic, as measured by 50 or more peak hour trips, causes deterioration below LOS D/LOS E (i.e., unacceptable LOS), a deficiency is deemed to occur.

However, when the pre-Project condition is already below LOS D/LOS E (i.e., unacceptable LOS), the Project will be responsible for mitigating its impact to a level of service equal to or better than it was without the Project for intersections that receive 50 or more peak hour project-related trips. This is a standard protocol in many urban jurisdictions because to require a Project to mitigate to LOS D/LOS E or better would in effect force the Project to mitigate beyond its Project impacts, which is prohibited under California law. Thus, for intersections currently operating at unacceptable LOS during either the AM and/or PM peak hour under Existing traffic conditions, improvements have been identified to mitigate the impacts of the Project to an intersection LOS that is equal to or better than pre-Project conditions.

Cumulative traffic impacts are created as a result of a combination of the proposed Project together with other future developments contributing to the overall traffic impacts requiring

additional improvements to maintain acceptable level of service operations with or without the Project. A Project's contribution to a significant cumulative impact can be reduced to less than significant if the Project is required to implement or fund its fair share of improvements designed to alleviate its cumulatively considerable contribution to the impact. Cumulatively considerable is defined as the addition of 50 or more peak hour trips.

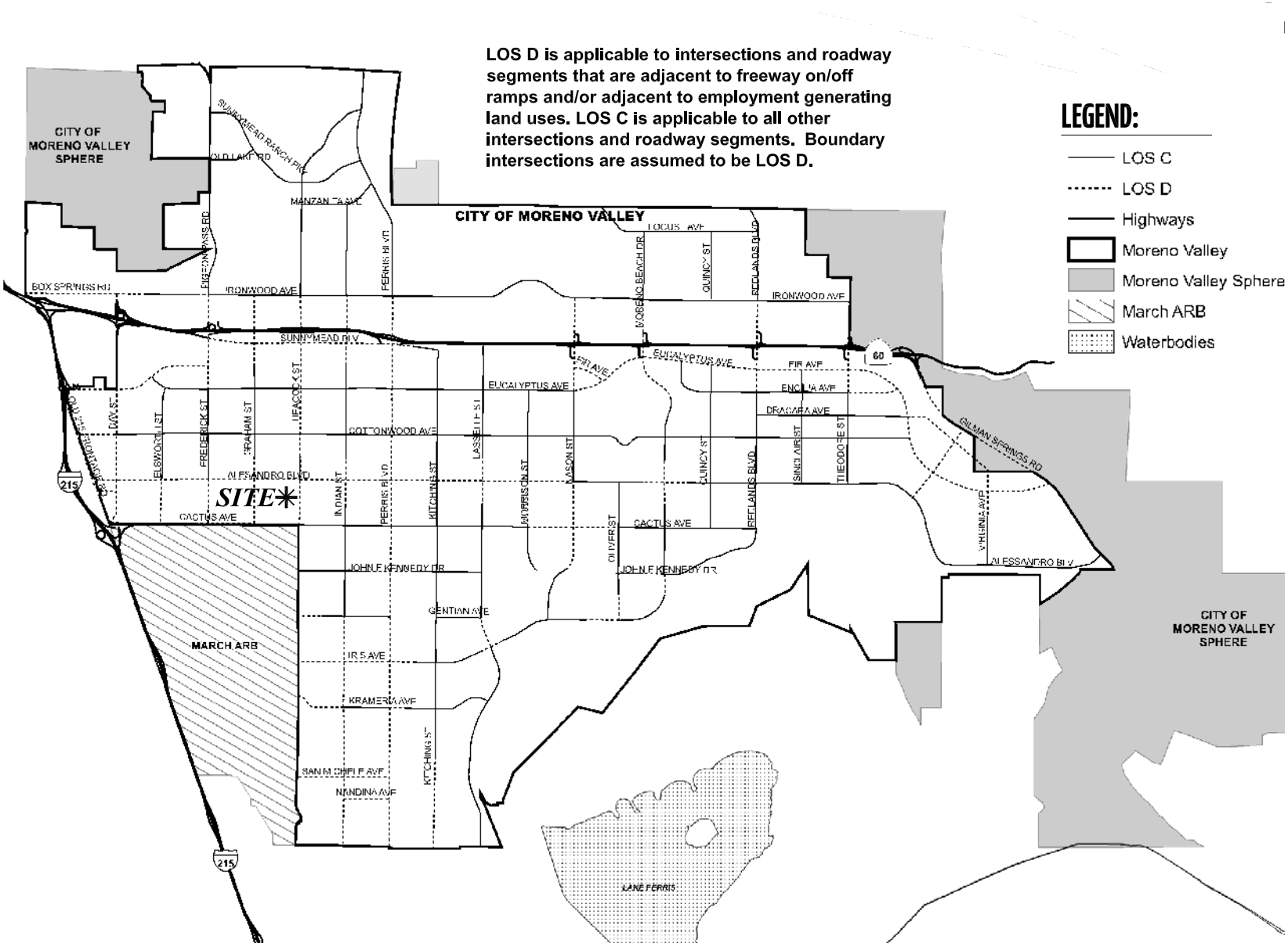
In the event that an intersection is operating at or is forecast to operate at a deficient LOS, the CMP guidelines have defined a series of steps to be completed to determine the Project's contribution to the deficiency of intersections, which has been applied to both CMP and non-CMP study area intersections. The steps are as follows:

- Determine the mitigation measures necessary to achieve an acceptable service level,
- Calculate the Project's share in the future traffic volume projections for the peak hours,
- Estimate the cost to implement recommended mitigation measures, and
- Calculate the Project's fair-share contribution to mitigate the Project's traffic impacts

Although the City of Moreno Valley does not have a delay based significance threshold for peak hour intersection operations, a 1.0 second delay has been utilized for the purposes of this analysis. Since the Project is not anticipated to contribute 50 or more peak hour trips to any of the study area intersection, the delay based criteria was utilized to identify significant impacts. Most other agencies that use a delay based significance threshold use a delay based criteria of 1.0 to 5.0 seconds. In other words, a significant impact is identified if the addition of Project traffic results in an increase to the delay by 1.0 second or more over the pre-project condition.

Lastly, the City of Moreno Valley also does not have a significance threshold for peak hour queues. For the purposes of this analysis, if the addition of Project traffic is found to have a less than significant impact to the peak hour operations, then a less than significant impact has also been identified for the peak hour queues at the same intersection.

EXHIBIT 2-1: CITY OF MORENO VALLEY LEVEL OF SERVICE (LOS) STANDARDS



URBAN CROSSROADS

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3 AREA CONDITIONS

This section provides a summary of the existing circulation network, the City of Moreno Valley General Plan Circulation Network, and a review of existing peak hour intersection operations and traffic signal warrant analyses.

3.1 EXISTING CIRCULATION NETWORK

Pursuant to the scoping agreement with City of Moreno Valley staff (Appendix 1.1), the study area includes a total of 8 existing and future intersections as shown previously on Exhibit 1-2 where the Project is anticipated to contribute 50 or more peak hour trips, or have been evaluated at the request of City staff. Exhibit 3-1 illustrates the study area intersections located near the proposed Project and identifies the number of through traffic lanes for existing roadways and intersection traffic controls.

3.2 CITY OF MORENO VALLEY GENERAL PLAN CIRCULATION ELEMENT

The roadway classifications and planned (ultimate) roadway cross-sections of the major roadways within the study area, as identified on the City of Moreno Valley General Plan Circulation Element, are described subsequently. Exhibit 3-2 shows the City of Moreno Valley General Plan Circulation Element, and Exhibit 3-3 illustrates the City of Moreno Valley General Plan roadway cross-sections.

3.3 TRUCK ROUTES

While the City of Moreno Valley's General Plan recognizes the trucking industry and the importance of the region's role in the movement of goods, there are no truck routes defined within the County. Exhibit 3-4 shows the existing truck routes throughout the City of Moreno Valley. Based on the exhibit, Heacock Street, Alessandro Boulevard, and Cactus Avenue are roadways within the study area identified as truck routes.

3.4 TRANSIT SERVICE

The study area is currently served by the Riverside Transit Authority (RTA), a public transit agency serving the unincorporated Riverside County region. As shown on Exhibit 3-5, RTA Route 11 serves Heacock Street north of Alessandro Boulevard and Alessandro Boulevard, east of Heacock Street. RTA Route 20 serves Alessandro Boulevard within the study area.

Transit service is reviewed and updated by RTA periodically to address ridership, budget, and community demands Changes in land use can affect these periodic adjustments which may lead to either enhanced or reduced service where appropriate.

EXHIBIT 3-1: EXISTING NUMBER OF THROUGH LANES AND INTERSECTION CONTROLS

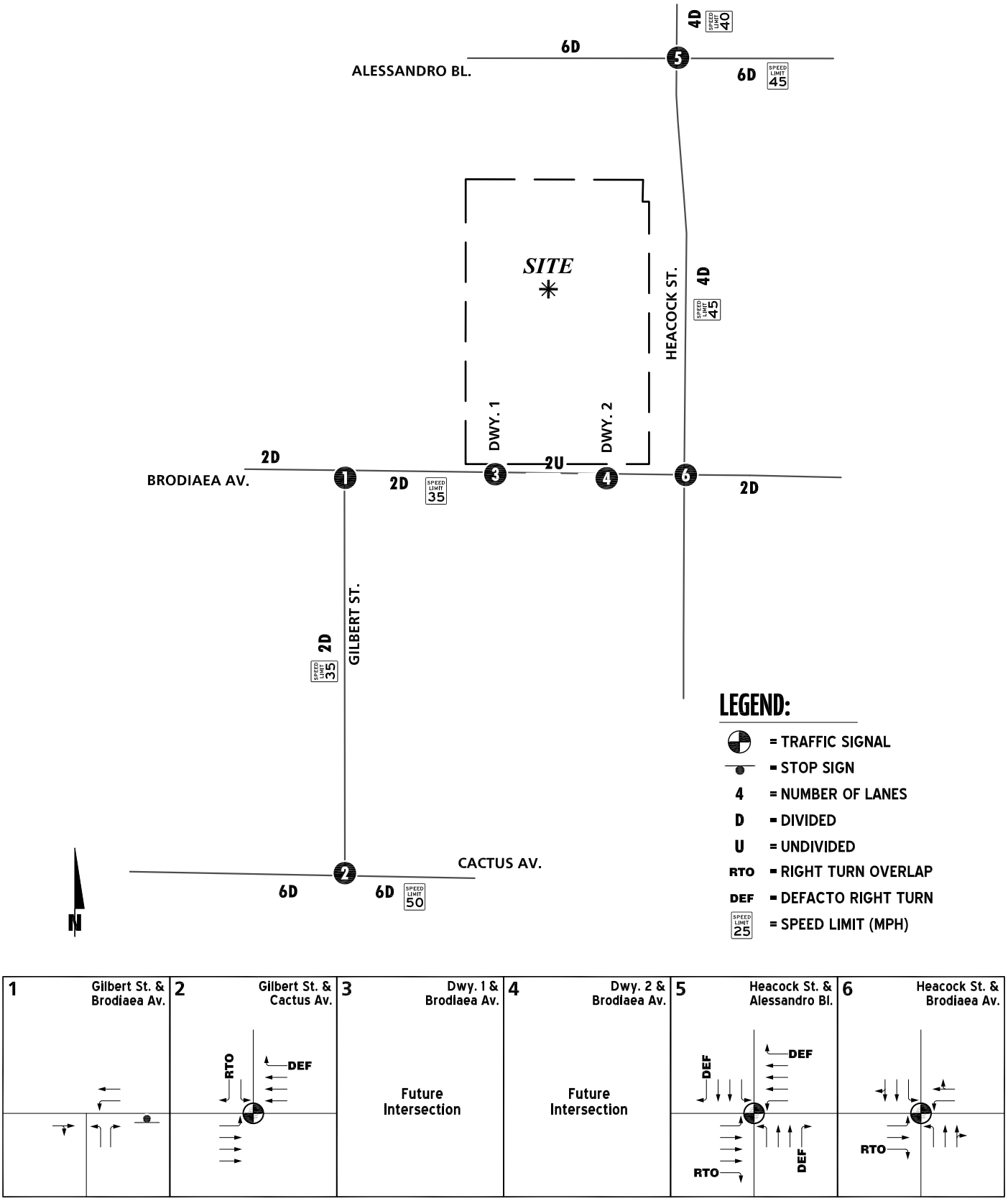

EXHIBIT 3-2: CITY OF MORENO VALLEY GENERAL PLAN CIRCULATION ELEMENT

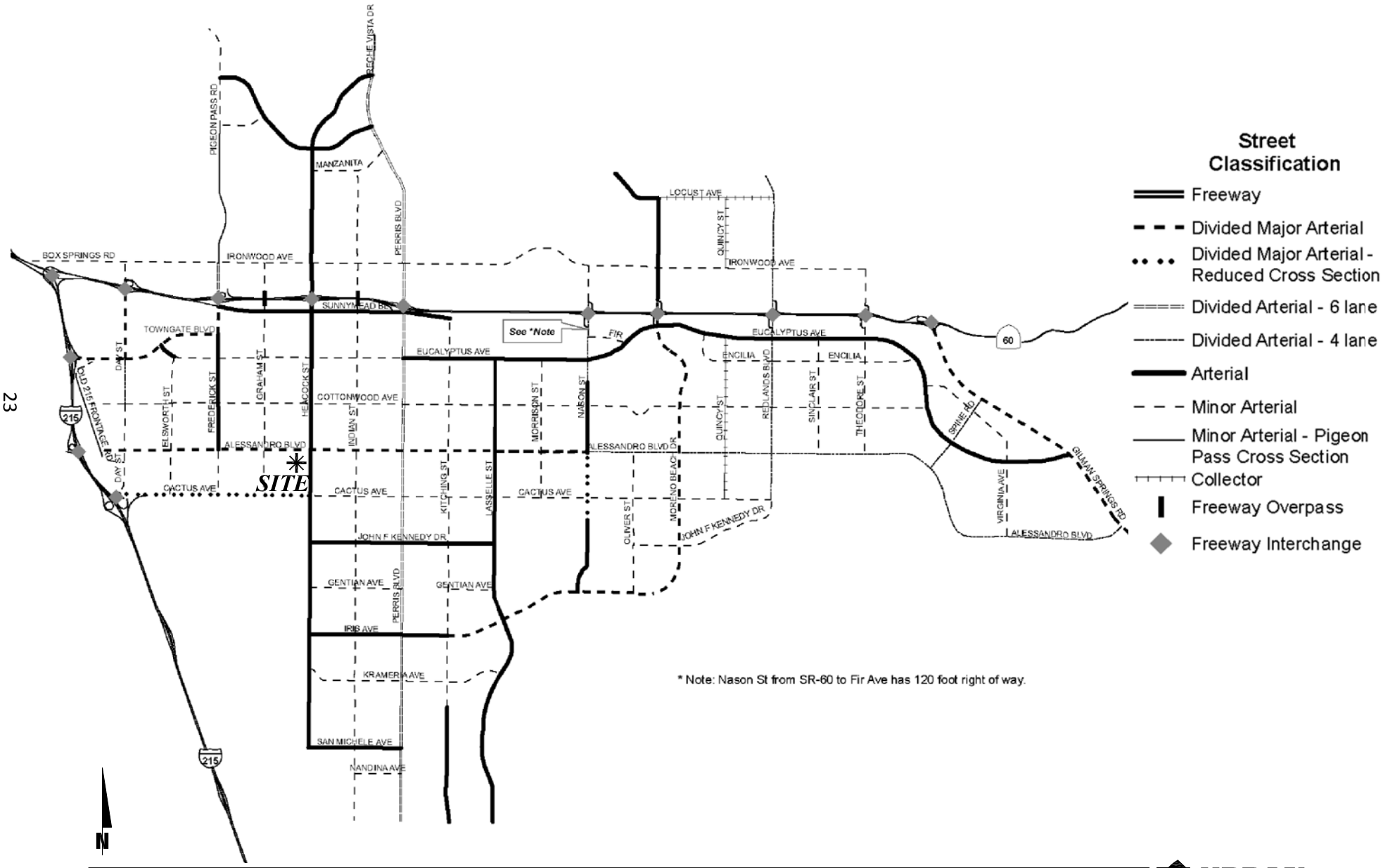

EXHIBIT 3-3: CITY OF MORENO VALLEY GENERAL PLAN ROADWAY CROSS-SECTIONS

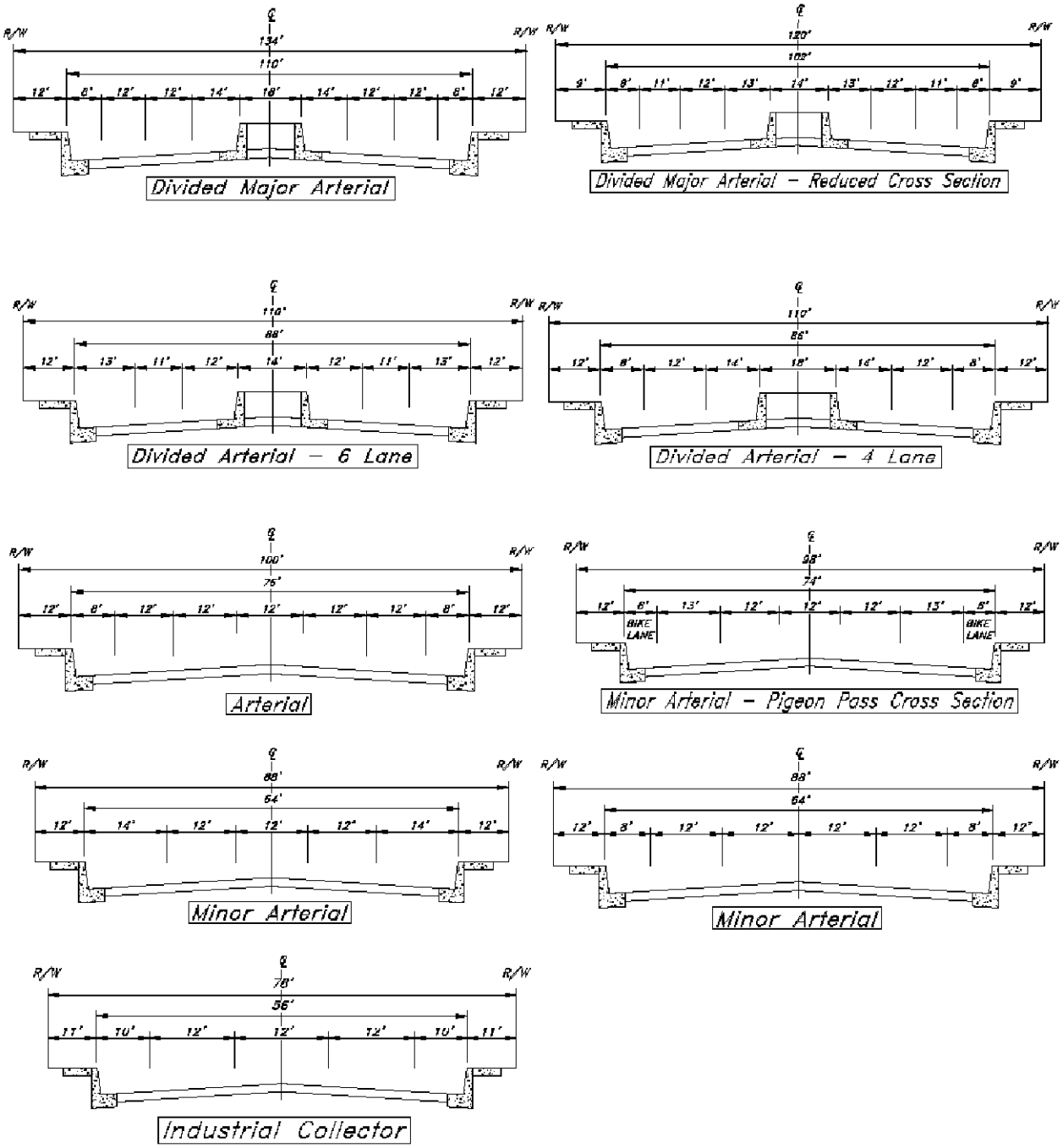

EXHIBIT 3-4: EXISTING TRUCK ROUTES

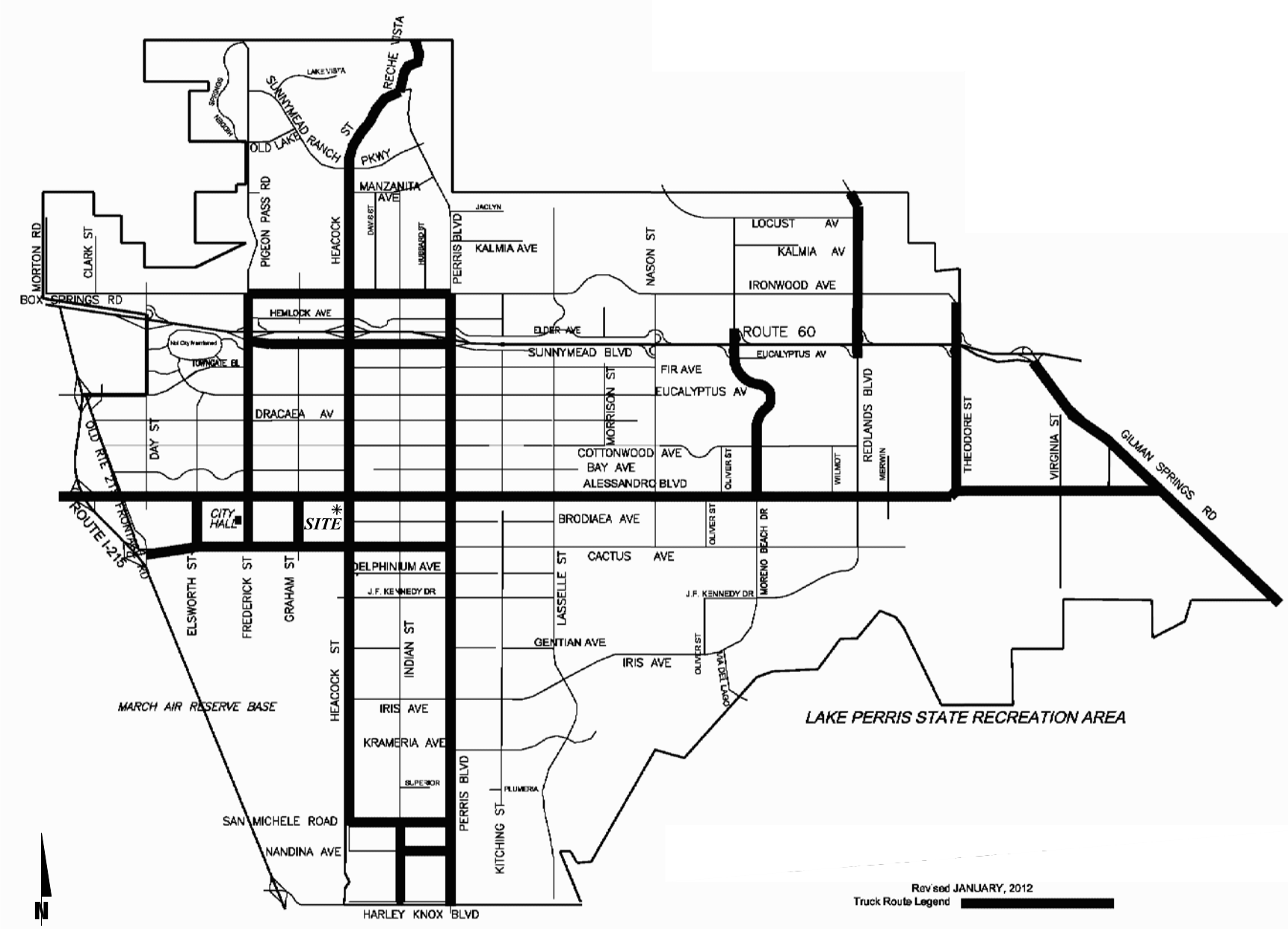

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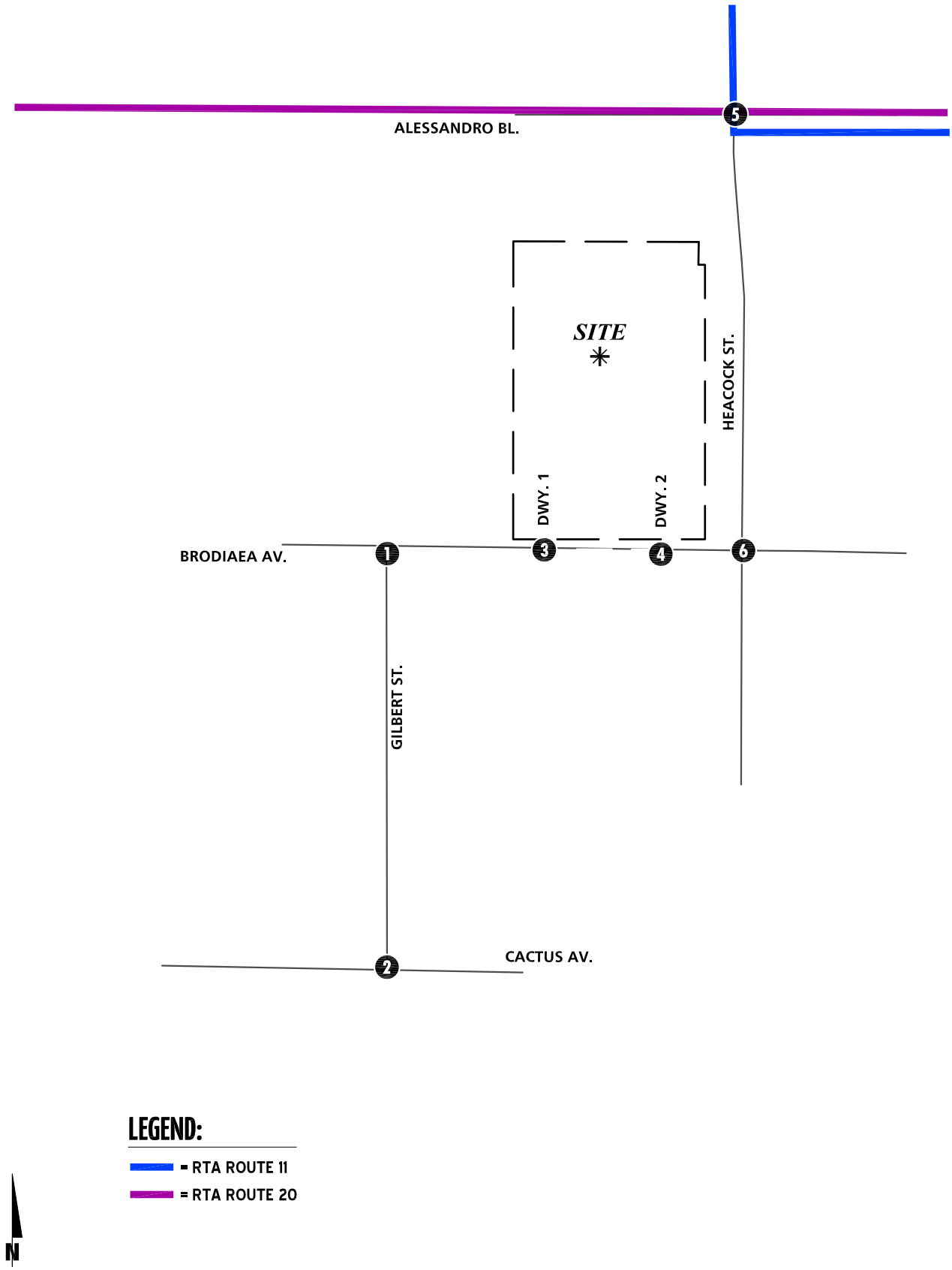
EXHIBIT 3-5: EXISTING TRANSIT ROUTES



3.5 BICYCLE & PEDESTRIAN FACILITIES

In an effort to promote alternative modes of transportation, the City of Moreno Valley General Plan also includes a trails and bikeway system. The City of Moreno Valley trails and bikeway system are shown on Exhibit 3-6 and Exhibit 3-7. The Juan Bautista de Anza Class I Multi-Use Trail (previously the Aqueduct Multi-Use Trail) is located to the east of the Project and runs in the north-south direction along Heacock Street. There are currently Class II bike lanes along Alessandro Boulevard, Heacock Street, and Cactus Avenue. Field observations conducted in September 2017 indicate nominal pedestrian and bicycle activity within the study area. Exhibit 3-8 illustrates the existing pedestrian facilities, including sidewalks and crosswalk locations, and the Class I trail and Class II bike lanes within the study area.

3.6 EXISTING (2017) TRAFFIC COUNTS

The intersection LOS analysis is based on the traffic volumes observed during the peak hour conditions using traffic count data collected in September 2017. The following peak hours were selected for analysis:

- Weekday AM Peak Hour (peak hour between 7:00 AM and 9:00 AM)
- Weekday PM Peak Hour (peak hour between 4:00 PM and 6:00 PM)

The weekday AM and weekday PM peak hour count data is representative of typical weekday peak hour traffic conditions in the study area. There were no observations made in the field that would indicate atypical traffic conditions on the count dates, such as construction activity or detour routes and near-by schools were in session and operating on normal schedules.

The raw manual peak hour turning movement traffic count data sheets are included in Appendix 3.1. These raw turning volumes have been flow conserved between intersections with limited access, no access, and where there are currently no uses generating traffic (e.g., between ramp-to-arterial intersections, etc.). The traffic counts collected in September 2017 include the vehicle classifications as shown below:

- Passenger Cars
- 2-Axle Trucks
- 3-Axle Trucks
- 4 or More Axle Trucks

EXHIBIT 3-6: CITY OF MORENO VALLEY MASTER PLAN OF TRAILS

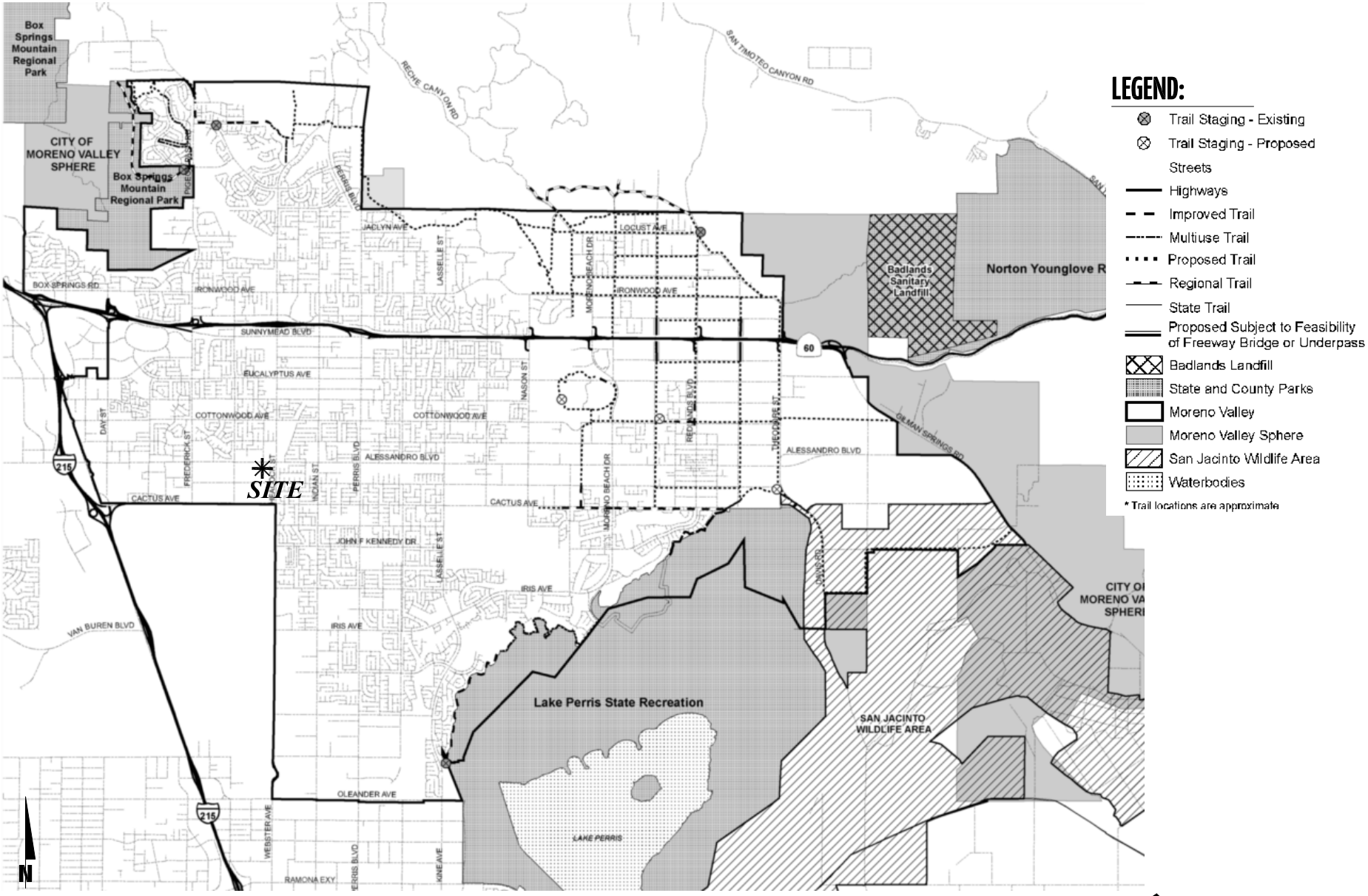


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EXHIBIT 3-7: CITY OF MORENO VALLEY BIKE PLAN

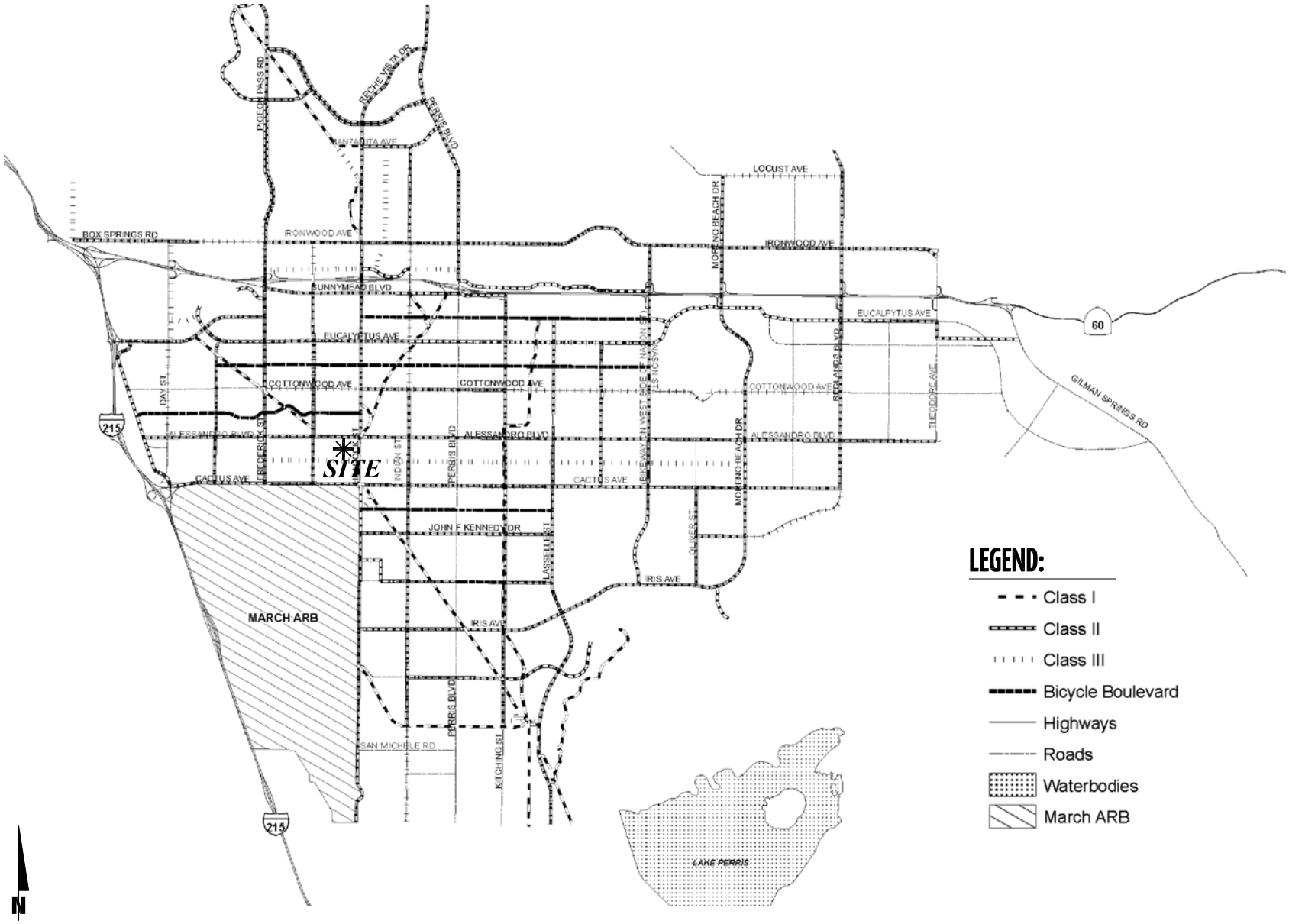

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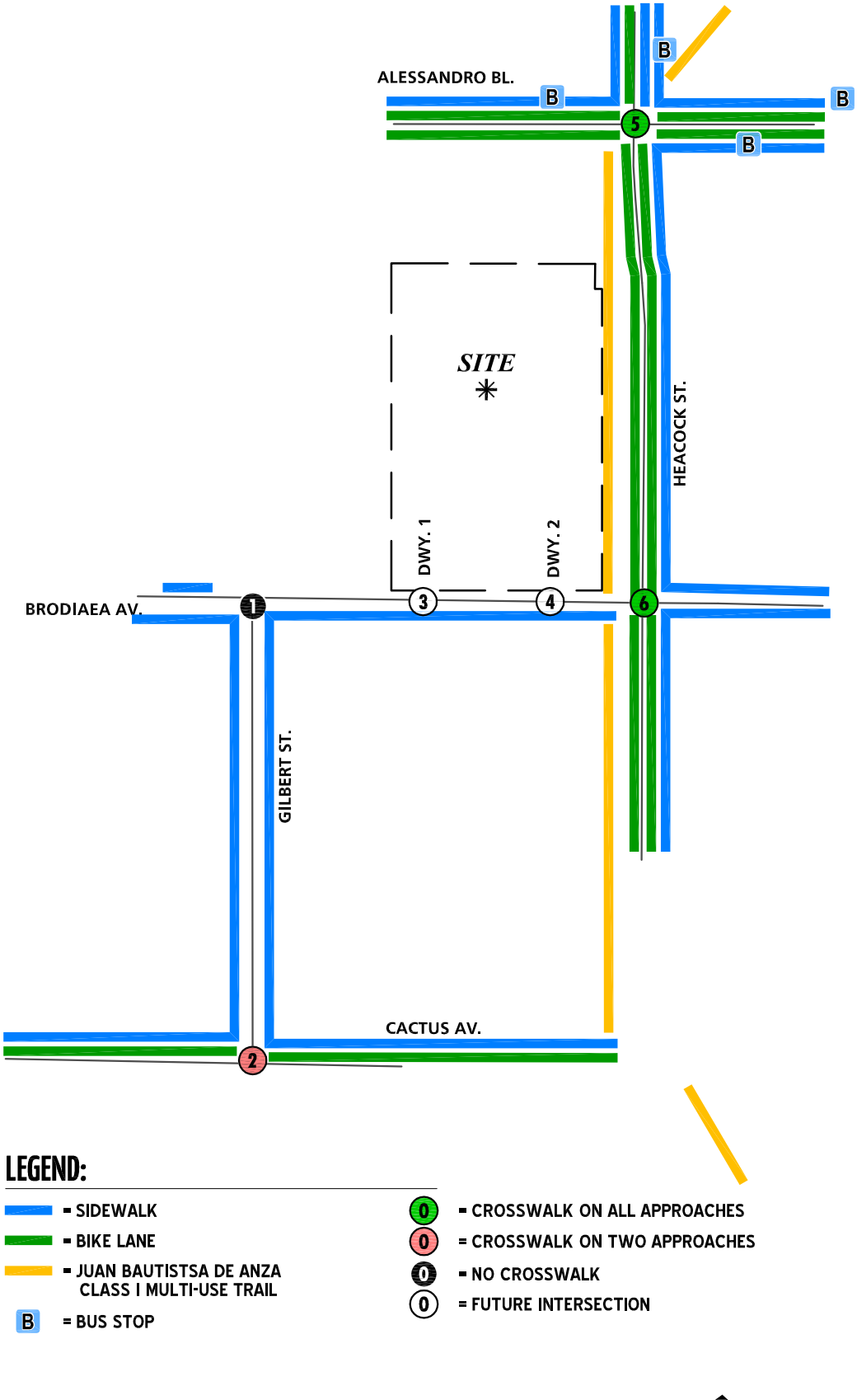
EXHIBIT 3-8: EXISTING PEDESTRIAN FACILITIES



To represent the impact large trucks, buses, and recreational vehicles have on traffic flow, all trucks were converted into PCEs. By their size alone, these vehicles occupy the same space as two or more passenger cars. In addition, the time it takes for them to accelerate and slow-down is also much longer than for passenger cars and varies depending on the type of vehicle and number of axles. For the purpose of this analysis, a PCE factor of 1.5 has been applied to 2-axle trucks, 2.0 for 3-axle trucks, and 3.0 for 4+-axle trucks to estimate each turning movement. These factors are consistent with the values recommended for use in the San Bernardino County CMP and are in excess of the factor recommended for use in the County of Riverside traffic study guidelines. (7) Although the County of Riverside has a recommended PCE factor of 2.0, the San Bernardino County CMP PCE factors have been utilized in an effort to conduct a more conservative analysis.

Existing weekday average daily traffic (ADT) volumes on arterial highways throughout the study area are shown on Exhibit 3-9. Where actual 24-hour tube count data was not available, Existing ADT volumes were based upon factored intersection peak hour counts collected by Urban Crossroads, Inc. using the following formula for each intersection leg:

Weekday PM Peak Hour (Approach Volume + Exit Volume) x 11.3942 = Leg Volume

A comparison of the PM peak hour and daily traffic volumes of various roadway segments within the study area indicated that the peak-to-daily relationship is approximately 8.78 percent. As such, the above equation utilizing a factor of 11.3942 estimates the ADT volumes on the study area roadway segments assuming a peak-to-daily relationship of approximately 8.78 percent (i.e., 1/0.0878 = 11.3942) and was assumed to sufficiently estimate average daily traffic (ADT) volumes for planning-level analyses. Existing weekday AM and weekday PM peak hour intersection volumes (in PCE) are also shown on Exhibit 3-9.

3.7 INTERSECTION OPERATIONS ANALYSIS

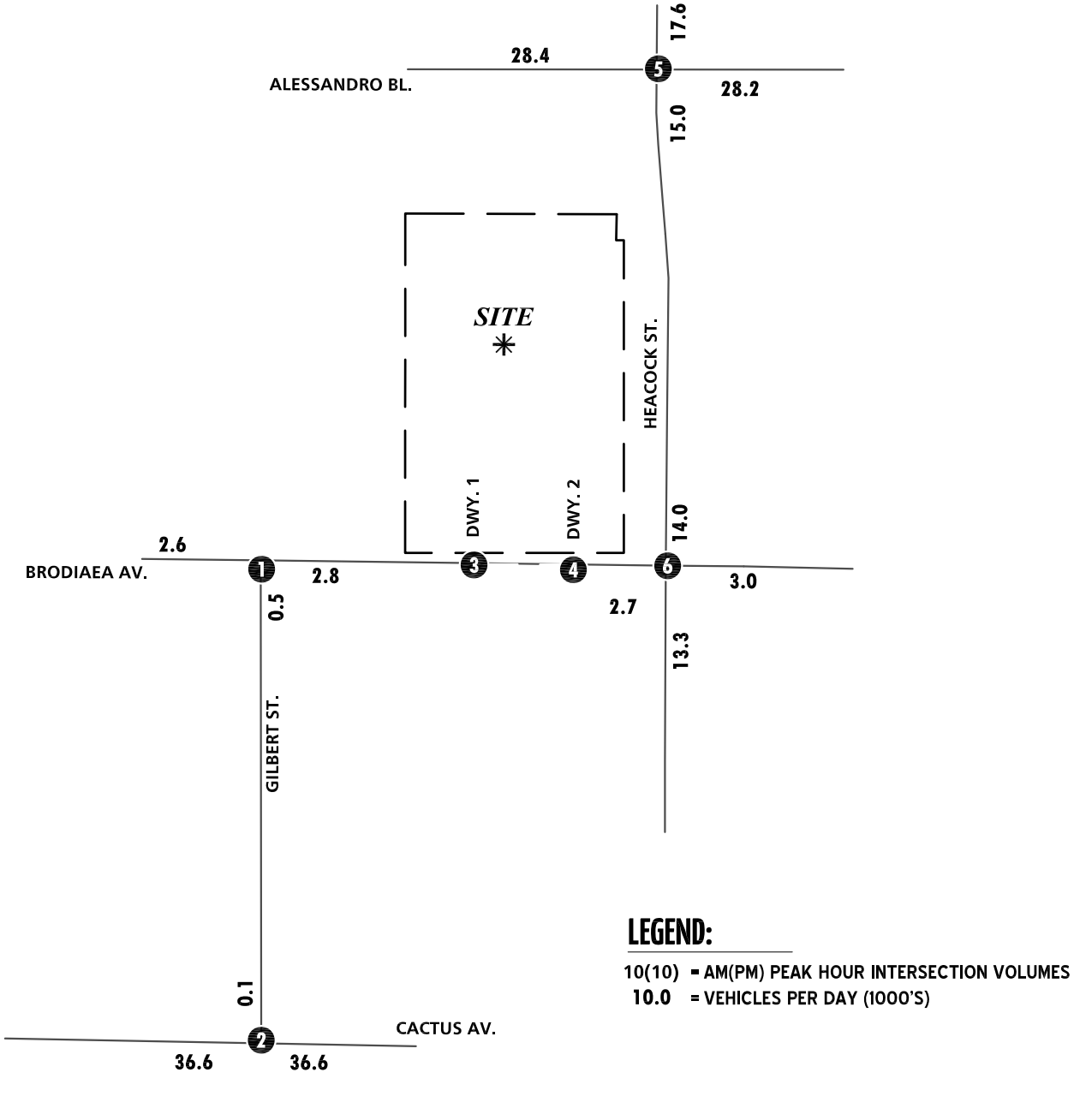
Existing peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2.2 *Intersection Capacity Analysis* of this report. The intersection operations analysis results are summarized in Table 3-1 which indicates that the existing study area intersections are currently operating at an acceptable LOS during the peak hours (i.e., LOS D or better).

Consistent with Table 3-1, a summary of the peak hour intersection LOS for Existing conditions are shown on Exhibit 3-10. The intersection operations analysis worksheets are included in Appendix 3.2 of this TIA.

3.8 TRAFFIC SIGNAL WARRANTS ANALYSIS

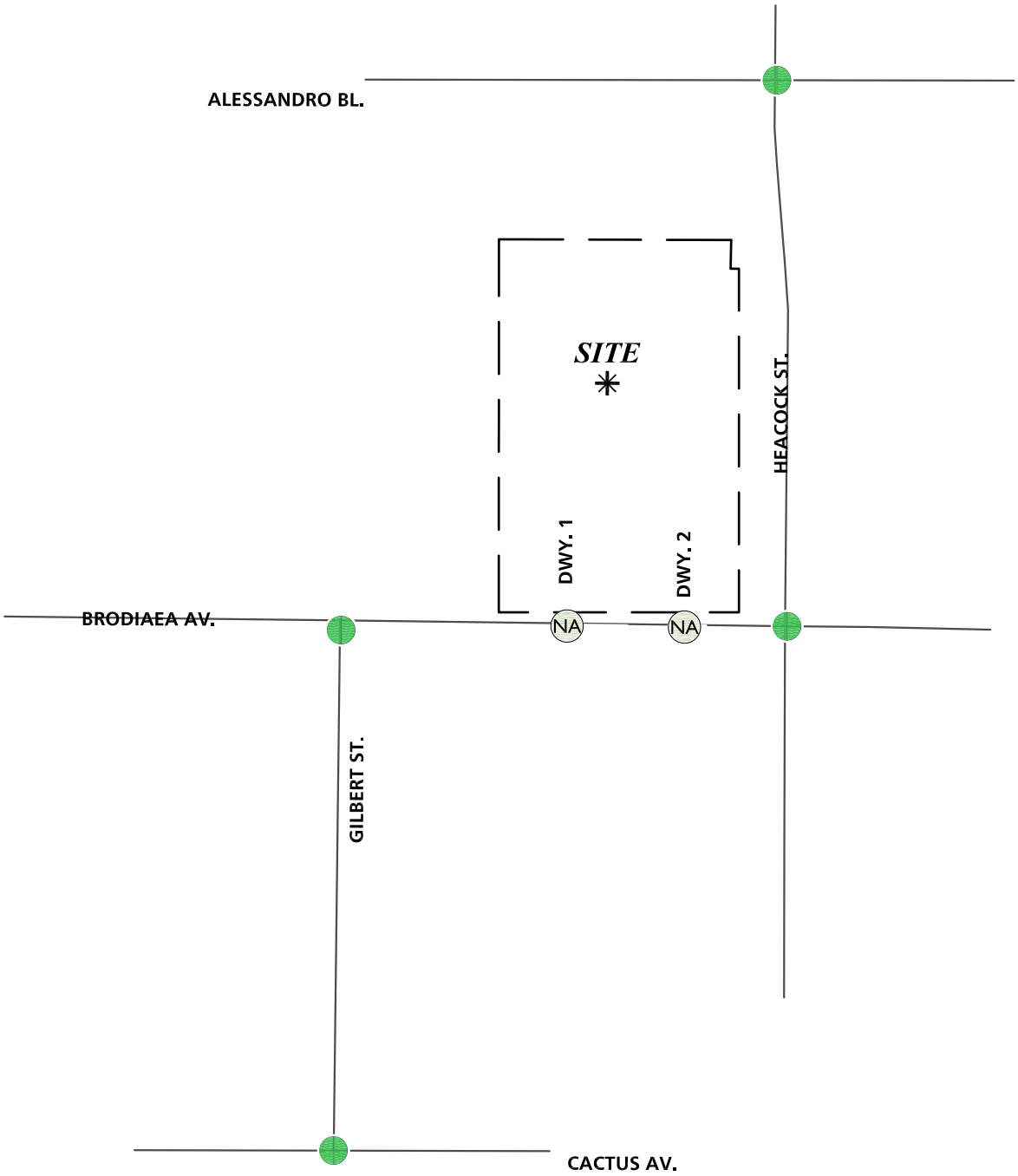
Traffic signal warrants for Existing traffic conditions are based on existing peak hour intersection turning volumes. No study area intersections currently warrant a traffic signal for Existing traffic conditions (see Appendix 3.3).

EXHIBIT 3-9: EXISTING (2017) TRAFFIC VOLUMES (IN PCE)



1 Gilbert St. & Brodiaea Av.	2 Gilbert St. & Cactus Av.	3 Dwy. 1 & Brodiaea Av.	4 Dwy. 2 & Brodiaea Av.	5 Heacock St. & Alessandro Bl.	6 Heacock St. & Brodiaea Av.
←147(103) ←8(12)	20(3) 13(2) ←11(2) ←1938(1013)	Future Intersection	Future Intersection	174(146) 321(481) 120(251) ←138(159) ←1238(740) ←42(47)	18(29) 362(586) 16(49) ←39(34) ←99(66) ←12(19)
41(111)→ 6(8)→ 15(8) 18(16)	24(3)→ 1044(2195)→			70(114)→ 381(1189)→ 57(128)→ 157(177) 475(398) 41(88)	18(26)→ 23(79)→ 18(22)→ 39(20) 632(503) 13(19)

EXHIBIT 3-10: EXISTING (2017) SUMMARY OF LOS



LEGEND:

- = AM PEAK HOUR ACCEPTABLE LOS
- = AM PEAK HOUR DEFICIENT LOS
- = PM PEAK HOUR ACCEPTABLE LOS
- = PM PEAK HOUR DEFICIENT LOS
- NA = NOT AN ANALYSIS LOCATION FOR THIS SCENARIO

N

Table 3-1

Intersection Analysis for Existing (2017) Conditions

#	Intersection	Traffic Control[3]	Intersection Approach Lanes[1]												Delay (secs.)[2]		Level of Service	
			Northbound			Southbound			Eastbound			Westbound						
			L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM
1	Gilbert St. / Brodiaea Av.	CSS	1	0	1	0	0	0	0	1	0	1	1	0	10.2	10.1	B	B
2	Gilbert St. / Cactus Av.	TS	0	0	0	1	0	1>	1	3	0	0	3	d	6.9	5.0	A	A
3	Dwy. 1 / Brodiaea Av.		Future Intersection															
4	Dwy. 2 / Brodiaea Av.		Future Intersection															
5	Heacock St. / Alessandro Bl.	TS	1	2	d	1	2	d	1	3	1>	1	3	d	25.4	29.0	C	C
6	Heacock St. / Brodiaea Av.	TS	1	2	0	1	2	0	1	1	1>	1	1	0	14.9	15.3	B	B

[1] When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.

L = Left; T = Through; R = Right; > = Right Turn Overlap Phasing; d = Defacto Right Turn Lane

[2] Per the 2010 Highway Capacity Manual (HCM), overall average intersection delay and level of service are shown for intersections with a traffic signal. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown. LOS calculated using Synchro (Version 9.1).

[3] CSS = Cross-street Stop; TS = Traffic Signal

3.9 QUEUING ANALYSIS

A queuing analysis was conducted for all study area intersections to determine if the turn pocket lengths necessary to accommodate near-term 95th percentile queues. The analysis was conducted for the weekday AM and weekday PM peak hours. The queuing analysis results are summarized on Table 3-2 for Existing (2017) traffic conditions. Queuing worksheets are included in Appendix 3.4.

3.10 RECOMMENDED IMPROVEMENTS

All study area intersections are currently operating at acceptable LOS (LOS C or better) for Existing (2017) traffic conditions. As such, no intersection improvements have been recommended.

Table 3-2

Peak Hour Queuing Summary for Existing (2017) Conditions

Intersection	Movement	Available Stacking Distance (Feet)	95th Percentile Queue (Feet)		Acceptable? [1]	
			AM	PM	AM	PM
Gilbert St. / Brodiaea Av.	NBL	145	37	25	Yes	Yes
	WBL	155	8	11	Yes	Yes
Gilbert St. / Cactus Av.	SBL	150	31	10	Yes	Yes
	EBL	150	49	20	Yes	Yes
Brodiaea Av. / Driveway 1	EBL	100	Future Intersection			
Brodiaea Av. / Driveway 2	EBL	100	Future Intersection			
Heacock St. / Alessandro Bl.	NBL	145	158	185	**No**	**No**
	SBL	250	127	236	Yes	Yes
	EBL	400	88	153	Yes	Yes
	EBR	105	105	104	Yes	Yes
	WBL	120	153	133	**No**	Yes
Heacock St. / Brodiaea Av.	NBL	150	58	35	Yes	Yes
	SBL	100	40	79	Yes	Yes
	EBL	150	46	50	Yes	Yes
	EBR	150	34	35	Yes	Yes
	WBL	90	33	38	Yes	Yes

[1] Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided. An additional 15 feet of stacking which is assumed to be provided in the transition for turn pockets is reflected in the stacking distance shown on this table, where applicable.

4 PROJECTED FUTURE TRAFFIC

This section presents the traffic volumes estimated to be generated by the Project, as well as the Project's trip assignment, onto the study area roadway network. The Project is proposed to consist of up to 262,398 sf High-Cube Warehouse / Distribution Center use within a single building. The current site plan shows a total square footage of 261,807 sf, however, the higher square footage was evaluated for the purposes of this analysis in an effort to conduct a conservative analysis. Per the City's traffic study guidelines, the Opening Year will have a 5-year minimum horizon from baseline conditions. As such, the Opening Year analysis will assess 2022 traffic conditions.

The Project is proposed to have full access on Brodiaea Avenue via Driveway 1 and Driveway 2. Driveway 1 is proposed to serve trucks only and Driveway 2 is proposed to serve only passenger cars. Regional access to the project site is provided via the I-215 Freeway at Alessandro Boulevard and Cactus Avenue interchanges.

4.1 PROJECT TRIP GENERATION

Trip generation represents the amount of traffic which is both attracted to and produced by a development. Determining traffic generation for a specific project is therefore based upon forecasting the amount of traffic that is expected to be both attracted to and produced by the specific land uses being proposed for a given development. The ITE Trip Generation Manual is a nationally recognized source for estimating site-specific trip generation. ITE's most current version of the Trip Generation Manual is based on more than 4,800 trip generation studies submitted to ITE by public agencies, consulting firms, universities/colleges, developers, associations, and local sections/districts/student chapters of ITE. (2)

4.1.1 HIGH-CUBE WAREHOUSE/DISTRIBUTION CENTER LAND USE

High-cube warehouse/distribution centers (ITE Land Use Code 152) are a unique land use type within the larger, more generalized industrial land use category. ITE's most recent edition of the Trip Generation manual (ITE 9th Edition), published in 2012, defines "high-cube warehouses" as *"…used for storage of materials, goods and merchandise prior to their distribution to retail outlets, distribution centers or other warehouses. These facilities are typically characterized by ceiling heights of at least 24 feet with small employment counts due to a high level of mechanization."*

The ITE Trip Generation Manual includes data regarding the types of vehicles that are generated (passenger cars and trucks), but provides no guidance on vehicle mix (different sizes of trucks). While trucks, as a percentage of total traffic, has been based on the ITE Trip Generation Manual, data regarding the vehicle mix has been obtained from a separate report: The South Coast Air Quality Management District's (SCAQMD) recent Warehouse Truck Trip Study. (8) (9) The SCAQMD is currently recommending the use of the ITE Trip Generation Manual l in conjunction with their truck mix by axle-type to better quantify trip rates associated with local warehouse and distribution projects, as truck emission represent more than 90 percent of air quality impacts

from these projects. This recommended procedure has been utilized for the purposes of this analysis in effort to be consistent with other technical studies prepared for the Project.

As noted on Table 4-1, refinements to the raw trip generation estimates have been made to provide a more detailed breakdown of trips between passenger cars and trucks. The percentage of trucks has been determined from the table shown on page 267 of the ITE Trip Generation Manual. As shown on page 267, the truck trip generation rate for weekday daily traffic is 0.64, or 38.1%, of the total traffic. Similarly, the truck trip generation rate for the weekday AM peak hour is 0.03 (27.3% of the total traffic) and 0.04 (or 33.3% of the total traffic) for the weekday PM peak hour.

Trip generation for heavy trucks was further broken down by truck type (or axle type). The total truck percentage is comprised of 3 different truck types: 2-axle, 3-axle, and 4+-axle trucks. For the purposes of this analysis, the percentage of trucks, by axle type, were obtained from the SCAQMD interim recommended truck mix. The SCAQMD has recently performed surveys of existing facilities and compiled the data to provide interim guidance on the mix of heavy trucks for these types of high-cube warehousing/distribution facilities. Based on this interim guidance from the SCAQMD, the following truck fleet mix was utilized for the purposes of estimating the truck trip generation for the site: 22.0% of the total trucks as 2-axle trucks, 17.7% of the total trucks as 3-axle trucks, and 60.3% of the total trucks as 4+-axle trucks. Lastly, PCE factors were applied to the trip generation rates for heavy trucks (large 2-axles, 3-axles, 4+-axles). PCE factors are consistent with the recommended PCE factors in Appendix B of the San Bernardino County CMP, 2016 Update (i.e., 1.5 for 2-axle trucks, 2.0 for 3-axle trucks, and 3.0 for 4+-axle trucks). Although the County of Riverside has a recommended PCE factor of 2.0, the San Bernardino County CMP PCE factors have been utilized in an effort to conduct a more conservative analysis as the resulting PCE trip generation is higher.

4.1.2 PROJECT TRIP GENERATION

Trip generation rates used to estimate Project traffic are shown in Table 4-1 for PCE and Table 4-2 for actual vehicles. A summary of the Project's trip generation is also shown on Table 4-1 for PCE and Table 4-2 for actual vehicles. For purposes of this analysis, ITE land use code 152 (High-Cube Warehousing) has been used to derive site specific trip generation estimates. In order to accurately reflect the impact that heavy trucks would have on the street system, Project trips have been further broken down between passenger cars and trucks for each of the peak hours and weekday daily trip generation.

As directed by the City of Moreno Valley and consistent with standard traffic engineering practice in Southern California, PCE factors have been utilized due to the expected heavy truck component for the proposed Project uses. PCEs allow the typical "real-world" mix of vehicle types to be represented as a single, standardized unit, such as the passenger car, to be used for the purposes of capacity and level of service analyses. These PCE factors are consistent with the values recommended by the San Bernardino County CMP and are accepted factors in the City of Moreno Valley. (7) A PCE factor of 1.5 has been applied to 2-axle trucks, 2.0 for 3-axle trucks, and 3.0 for 4+-axle trucks.

Table 4-1

Project Trip Generation Summary (In PCE)

Land Use	Units[2]	ITE LU Code	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	Daily
Trip Generation Rates[1]									
High-Cube Warehouse[3,4]	TSF	152	0.076	0.034	0.110	0.037	0.083	0.120	1.680
Passenger Cars			0.055	0.025	0.080	0.025	0.055	0.080	1.040
2-Axle Trucks (PCE = 1.5)			0.007	0.003	0.010	0.004	0.009	0.013	0.211
3-Axle Trucks (PCE = 2.0)			0.007	0.003	0.011	0.004	0.010	0.014	0.226
4-Axle+ Trucks (PCE = 3.0)			0.037	0.017	0.054	0.022	0.050	0.072	1.158

Land Use	Quantity	Units[2]	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	Daily
Passenger Car Equivalent (PCE) Trip Generation Summary									
High-Cube Warehouse[5]	262.398	TSF							
Passenger Cars:			14	7	21	7	14	21	273
Truck Trips:									
2-axle:			2	1	3	1	2	3	55
3-axle:			2	1	3	1	3	4	59
4+-axle:			10	4	14	6	13	19	304
- Net Truck Trips (PCE)			*14*	*6*	*20*	*8*	*18*	*26*	*418*
TOTAL NET TRIPS (PCE)[6]			***28***	***13***	***41***	***15***	***32***	***47***	***691***

[1] Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, Ninth Edition (2012).

[2] TSF = Thousand Square Feet

[3] Vehicle Mix Source: "Vehicle Mix and Enter/Exit Splits by Land Use Category (Heavy Warehouse)" - City of Fontana Truck Trip Generation Study (2003) 79.57% passenger cars, 3.46% 2-Axle trucks, 4.64% 3-Axle trucks, 12.33% 4-Axle trucks

[4] PCE rates are per SANBAG as PCE factors are not readily available. They are 1.5 for 2-axle trucks, 2.0 for 3-axle trucks, and 3.0 for 4+-axle trucks.

[5] The current site plan shows a total square footage of 261,807 sf, however, the higher square footage was evaluated for the purposes of this analysis in an effort to conduct a conservative analysis.

[6] TOTAL NET TRIPS (PCE) = Passenger Cars + Net Truck Trips (PCE).

Table 4-2

Project Trip Generation Summary (In Actual Vehicles)

Land Use	Units[2]	ITE LU Code	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	Daily
Trip Generation Rates[1]									
High-Cube Warehouse[3]	TSF	152	0.076	0.034	0.110	0.037	0.083	0.120	1.680
Passenger Cars			0.055	0.025	0.080	0.025	0.055	0.080	1.040
2-Axle Trucks			0.005	0.002	0.007	0.003	0.006	0.009	0.141
3-Axle Trucks			0.004	0.002	0.005	0.002	0.005	0.007	0.113
4-Axle+ Trucks			0.012	0.006	0.018	0.007	0.017	0.024	0.386

Land Use	Quantity	Units[1]	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	Daily
Actual Vehicles Trip Generation Summary									
High-Cube Warehouse[4]	262.398	TSF							
Passenger Cars:			14	7	21	7	14	21	273
Truck Trips:									
2-axle:			1	1	2	1	2	2	37
3-axle:			1	0	1	1	1	2	30
4+-axle:			3	1	5	2	4	6	101
- Net Truck Trips (Actual Trucks)			*5*	*2*	*8*	*3*	*7*	*10*	*168*
TOTAL NET TRIPS (Actual Vehicles)[5]			***20***	***9***	***29***	***10***	***22***	***31***	***441***

[1] Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, Ninth Edition (2012).

[2] TSF = Thousand Square Feet

[3] Vehicle Mix Source: "Vehicle Mix and Enter/Exit Splits by Land Use Category (Heavy Warehouse)" - City of Fontana Truck Trip Generation Study (2003) 79.57% passenger cars, 3.46% 2-Axle trucks, 4.64% 3-Axle trucks, 12.33% 4-Axle trucks

[4] The current site plan shows a total square footage of 261,807 sf, however, the higher square footage was evaluated for the purposes of this analysis in an effort to conduct a conservative analysis.

[5] TOTAL NET TRIPS (Actual Vehicles) = Passenger Cars + Net Truck Trips (Actual Trucks).

As shown on Table 4-1, the proposed Project is anticipated to generate a net total of 689 PCE trip-ends per day with 40 net PCE AM peak hour trips and 47 net PCE PM peak hour trips.

4.2 PROJECT TRIP DISTRIBUTION

Trip distribution is the process of identifying the probable destinations, directions, or traffic routes that will be utilized by Project traffic. The potential interaction between the planned land uses and surrounding regional access routes are considered to identify the route where the Project traffic would distribute.

The Project trip distribution was developed based on anticipated travel patterns to and from the Project site for both passenger cars and truck traffic. The truck trip distribution patterns have been developed based on the anticipated travel patterns for the high-cube warehousing trucks. The Project trip distribution patterns for both passenger cars and trucks were developed based on an understanding of existing travel patterns in the area, the geographical location of the site, and the site's proximity to the regional arterial and state highway system.

The passenger car trip distributions utilized for the purposes of this analysis are shown on Exhibit 4-1, and truck trip distributions are shown on Exhibit 4-2. In an effort to conduct a conservative analysis, the PCE trip generation for the proposed Project has been utilized to determine if the 50 peak hour trip criteria has been met at the study area intersections.

4.3 MODAL SPLIT

The traffic reducing potential of public transit, walking, or bicycling have not been considered in this TIA. Essentially, the traffic projections are "conservative" in that these alternative travel modes might be able to reduce the forecasted traffic volumes (employee trips only).

4.4 PROJECT TRIP ASSIGNMENT

The assignment of traffic from the Project area to the adjoining roadway system is based upon the Project trip generation, trip distribution, and the arterial highway and local street system improvements that would be in place by the time of initial occupancy of the Project. Based on the identified Project traffic generation and trip distribution patterns, Project ADT and peak hour intersection turning movement volumes are shown on Exhibit 4-3 in PCE.

4.5 BACKGROUND TRAFFIC

To account for growth in traffic between Existing Conditions (2017) and the Project Opening Year Cumulative (2022), a compounded annual traffic growth rate of 2 percent was assumed (10.41 percent aggregate growth in background traffic for the period 2017—2022). The 2 percent annual growth rate is intended to capture non-specific ambient traffic growth.

EXHIBIT 4-1: PROJECT (PASSENGER CARS) TRIP DISTRIBUTION

LEGEND:

10 = PERCENT TO/FROM PROJECT

N

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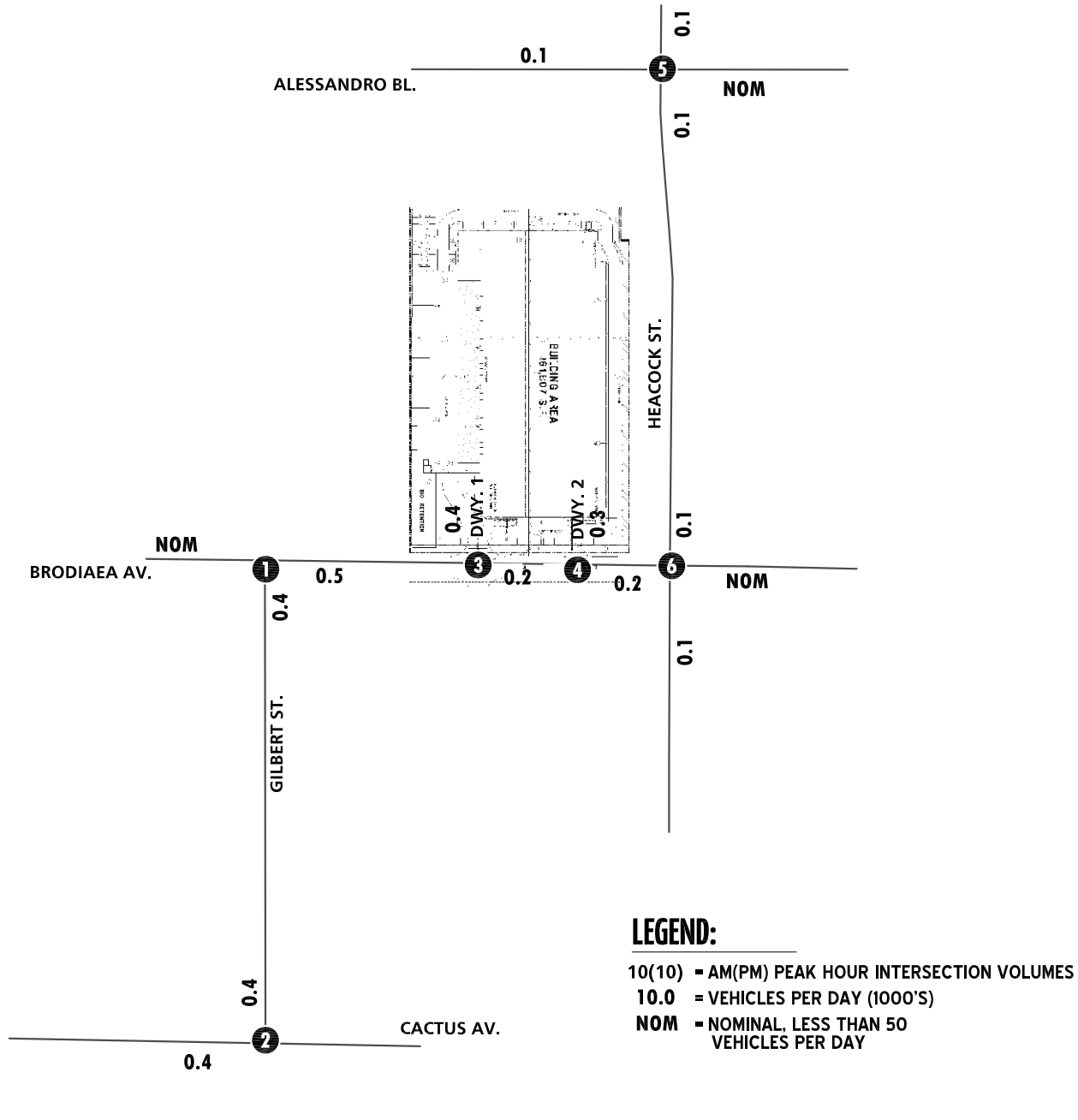
EXHIBIT 4-2: PROJECT (TRUCKS) TRIP DISTRIBUTION

LEGEND:

10 = PERCENT TO/FROM PROJECT

N

EXHIBIT 4-3: PROJECT ONLY TRAFFIC VOLUMES (IN PCE)



1 Gilbert St. & Brodiaea Av.	2 Gilbert St. & Cactus Av.	3 Dwy. 1 & Brodiaea Av.	4 Dwy. 2 & Brodiaea Av.	5 Heacock St. & Alessandro Bl.	6 Heacock St. & Brodiaea Av.
1(2) 7(20)	7(20) 0(0) 0(0) 0(0)	5(14) 1(4) 3(2) 3(8)	3(8) 3(6) 6(3) 3(2)	0(0) 2(1) 0(0) 0(0) 0(0) 1(0)	6(3) 0(0) 0(0) 0(0) 1(0) 0(0)
2(1) 0(0) 0(0) 17(9)	17(9) 0(0)	11(6) 8(4)	8(4) 1(4)	0(0) 0(0) 3(2) 1(3) 1(3) 0(1)	2(6) 0(1) 1(3) 3(1) 0(0) 0(0)

In context, the TIA's assumed 2 percent compounded annual growth rate is considered a reasonable approximation of future traffic growth when compared to demographic projections reflected in other local and regional growth modeling efforts. More specifically, the SCAG 2016—2040 RTP/SCS growth forecasts for the City of Moreno Valley assume the City population to increase from 197,400 in 2012 to 256,600 by the year 2040, or an approximate 0.94 percent growth rate compounded annually. The RTP/SCS assumed growth in households over the same 28-year period reflects an increase from 51,800 households to 73,000 households; a rate of 1.23 percent compounded annually. At the upper end of assumed RTP/SCS growth rates, employment over the same 28-year period is projected to increase from 31,400 jobs to 83,200 jobs; a rate of approximately 3.54 percent compounded annually. (3) The 2 percent compounded annual traffic growth rate used in the TIA reflects the fact that not all persons comprising population growth, household growth, or employment growth would translate on a one-to-one basis as a new vehicle trip in the region; and establishes a judicious midrange estimate lying between the RTP/SCS assumed regional population growth rate (0.94 percent) and the RTP/SCS assumed regional employment growth rate (3.54 percent).

Conservatively, the TIA estimates of area traffic growth then add traffic generated by other known or probable related projects. These related projects are at least in part already accounted for in the assumed annual 2 percent ambient growth in traffic noted above; and in some instances these related projects would likely not be implemented and functional within the 2022 Opening Year time frame assumed for the Project. The resulting traffic growth rate used in the TIA (2 percent annual ambient growth + traffic generated by related projects) would therefore tend to overstate rather than understate background cumulative traffic impacts under 2022 conditions.

4.6 CUMULATIVE DEVELOPMENT TRAFFIC

CEQA guidelines require that other reasonably foreseeable development projects which are either approved or being processed concurrently in the study area also be included as part of a cumulative analysis scenario. A cumulative project list was developed for the purposes of this analysis through consultation with planning and engineering staff from the City of Moreno Valley. The cumulative project list includes known and foreseeable projects that are anticipated to contribute traffic to the study area intersections. Adjacent jurisdictions of the County of Riverside and the City of Perris have also been contacted to obtain the most current list of cumulative projects from their respective jurisdictions.

Where applicable, cumulative projects anticipated to contribute measurable traffic (i.e. 50 or more peak hour trips) to study area intersections have been manually added to the study area network to generate Opening Year Cumulative forecasts. In other words, this list of cumulative development projects has been reviewed to determine which projects would likely contribute measurable traffic through the study area intersections (e.g., those cumulative projects in close proximity to the proposed Project). For the purposes of this analysis, the cumulative projects that were determined to affect one or more of the study area intersections are shown on Exhibit 4-4, listed on Table 4-3, and have been considered for inclusion.

EXHIBIT 4-4: CUMULATIVE DEVELOPMENT LOCATION MAP

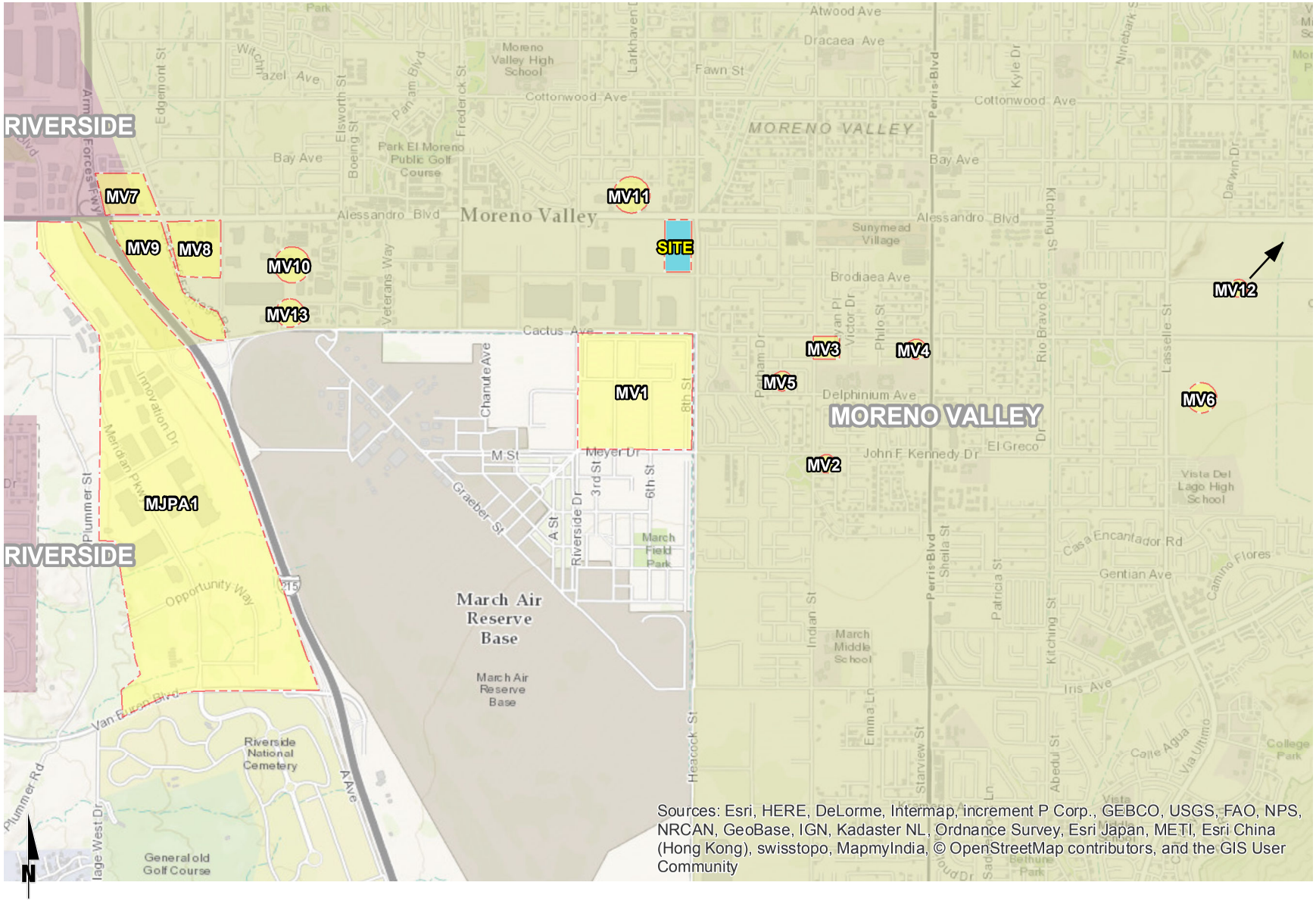


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Table 4-3

Cumulative Development Land Use Summary

ID	Project Name	Land Use[1]	Quantity	Units[2]
MV1	March Lifecare Campus Specific Plan[3]	Medical Offices	190.000	TSF
		Commercial Retail	210.000	TSF
		Research & Education	200.000	TSF
		Hospital	50	Beds
		Institutional Residential	660	Beds
MV2	O'Reilly Automotive	Automobile Parts Sale	7.500	TSF
	PA15-004	Retail/Restaurant/Fast Food	2.973	TSF
MV3	TM 33417	Condo/Townhomes	60	DU
MV4	TM 33607	Condo/Townhomes	52	DU
MV5	32711 Isaac Genah	SFDR	9	DU
MV6	a Moreno Medical Campus	Medical Offices	80.000	TSF
	b Aqua Bella Specific Plan	SFDR	2,922	DU
	c TR 34329 (Granite Capitol)	SFDR	90	DU
	d Cresta Bella	General Office	30.000	TSF
MV7	P07-0102; and P09-0416, -0418, -0419	General Light Industrial	652.018	TSF
	Alessandro Bl. (APN 263-091-008; 263-100-019; 263-100-005; P14-0841 to 0848)	Commercial and Industrial Complex	101.580	TSF
MV8	Alessandro Metrolink Station	Light Rail Transit Station	300	SP
MV9	Freeway Business Center	High-Cube Warehouse	709.083	TSF
MV10	PA 08-0047-0052 (Komar Cactus Plaza)[3]	Hotel	110	Rooms
		Fast Food w/Drive Thru	8.000	TSF
		Commercial	42.400	TSF
MV11	PA 09-0031	Gas Station	12	VFP
MV12	Prologis	High-Cube Warehouse	1,916.190	TSF
		High-Cube Warehouse	328.448	TSF
	World Logistics Center	High-Cube Warehouse	41,400.000	TSF
		Warehousing	200.000	TSF
		Gas Station w/ Market	12	VFP
		Existing SFDR	7	DU
MV13	Moreno Valley Cactus Center (PEN16-0131)	Warehouse	36.950	TSF
		Fast Food w/Drive Thru	7.900	TSF
		Gas Station w/Car Wash	28	VFP
MJPA1	Meridian Business Park North	Industrial Park	5,985.000	TSF

[1] SFDR = Single Family Detached Residential

[2] DU = Dwelling Units; TSF = Thousand Square Feet; SP = Spaces; VFP = Vehicle Fueling Positions

Although it is unlikely that these cumulative projects would be fully built and occupied by Year 2022, they have been included in an effort to conduct a conservative analysis and overstate as opposed to understate potential traffic impacts.

Any other cumulative projects that are not expected to contribute measurable traffic to study area intersections have not been included since the traffic would dissipate due to the distance from the Project site and study area intersections. Any additional traffic generated by other projects not on the cumulative projects list is accounted for through background ambient growth factors that have been applied to the peak hour volumes at study area intersections as discussed in Section 4.5 *Background Traffic*. Cumulative development project ADT and peak hour intersection turning movement volumes are shown on Exhibit 4-5.

4.7 NEAR-TERM TRAFFIC FORECASTS

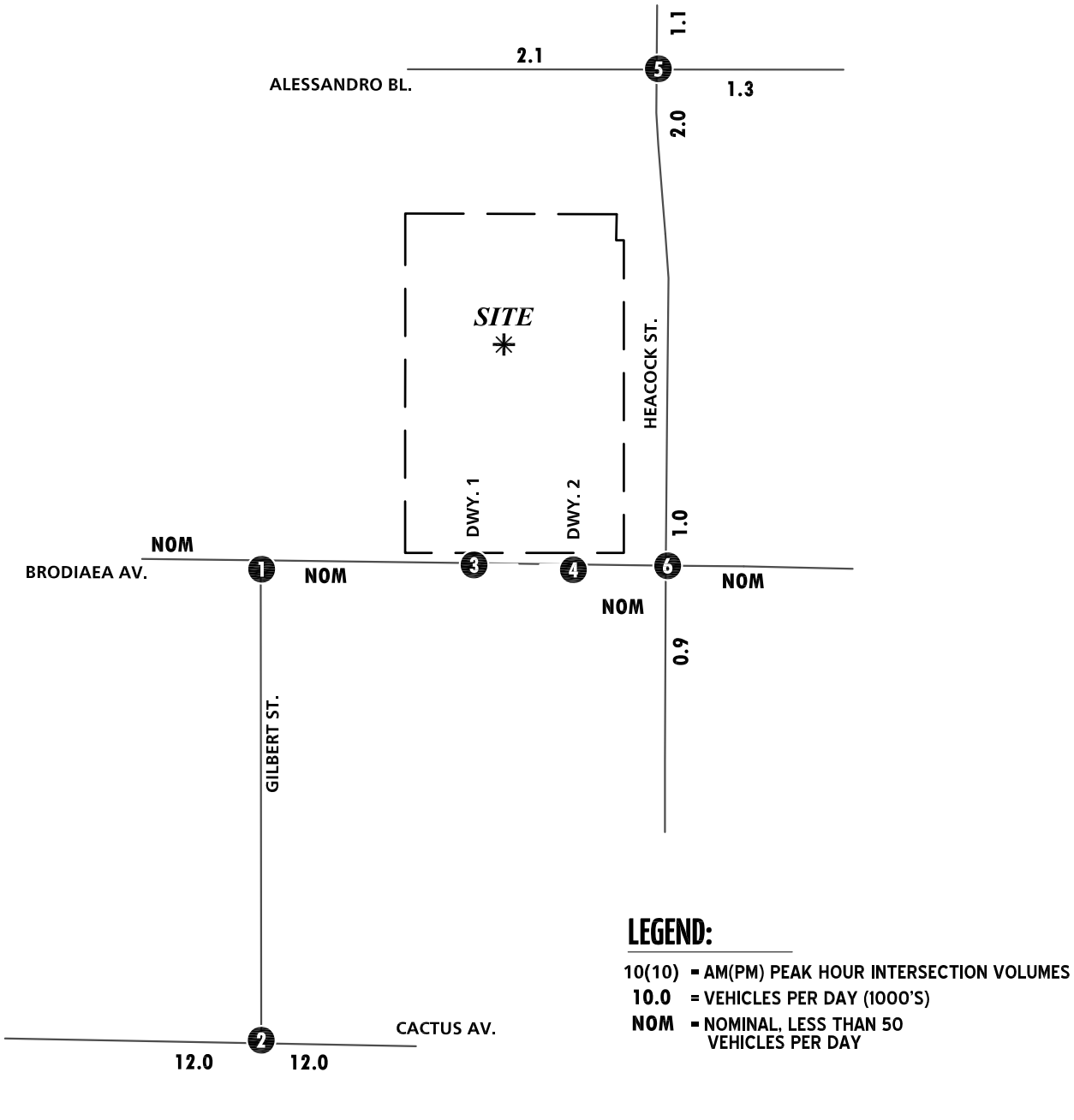
To provide a comprehensive assessment of potential transportation network deficiencies, a "buildup" analysis was performed in support of this work effort. The "buildup" method was used to approximate the Opening Year Cumulative traffic forecasts, and is intended to identify the cumulative impacts on both the existing and planned near-term circulation system. The Opening Year Cumulative traffic forecasts include background traffic, traffic generated by other cumulative development projects within the study area, and the traffic generated by the proposed Project.

The "buildup" approach combines existing traffic counts with a background ambient growth factor to forecast the near-term 2022 traffic conditions. An ambient growth factor of 10.41% (2022) accounts for background (area-wide) traffic increases that occur over time, up to the year 2022 from the year 2017 (compounded two percent per year growth over a 5-year period). Traffic volumes generated by the Project are then added to assess the Opening Year Cumulative traffic conditions. The 2022 roadway network is similar to the existing conditions roadway network with the exception of future roadways and intersections proposed to be developed by the Project.

As noted previously, an analysis of the proposed Project at various development tiers has been assessed for the purposes of this traffic study. The near-term traffic analysis includes the following traffic conditions, with the various traffic components:

- Opening Year Cumulative (2022) Without Project
    - Existing 2017 counts
    - Ambient growth traffic (10.41%)
    - Cumulative Development Project traffic
- Opening Year Cumulative (2022) With Project
    - Existing 2017 counts
    - Ambient growth traffic (10.41%)
    - Cumulative Development Project traffic
    - Project traffic

EXHIBIT 4-5: CUMULATIVE DEVELOPMENT TRAFFIC VOLUMES (IN PCE)



1 Gilbert St. & Brodiaea Av.	2 Gilbert St. & Cactus Av.	3 Dwy. 1 & Brodiaea Av.	4 Dwy. 2 & Brodiaea Av.	5 Heacock St. & Alessandro Bl.	6 Heacock St. & Brodiaea Av.
1(1) 0(0)	0(0) 0(0) 0(0) 842(842)	Future Intersection	Future Intersection	42(42) 83(83) 0(0) 0(0) 84(84) 28(28)	0(0) 139(139) 0(0) 0(0) 0(0) 0(0)
1(1) 0(0) 0(0) 0(0)	0(0) 648(648)			15(15) 30(30) 28(28) 56(56) 168(168) 56(56)	0(0) 0(0) 0(0) 0(0) 280(280) 0(0)

4.8 HORIZON YEAR (2040) VOLUME DEVELOPMENT

The Horizon Year (2040) With Project traffic conditions were derived from the Riverside County Transportation Analysis Model (RivTAM) using accepted procedures for model forecast refinement and smoothing. The traffic forecasts reflect the area-wide growth anticipated between Existing conditions and Horizon Year conditions.

In most instances, the traffic model zone structure is not designed to provide accurate turning movements along arterial roadways unless refinement and reasonableness checking is performed. Therefore, the Horizon Year With Project peak hour forecasts were refined using the model derived long-range forecasts, along with existing peak hour traffic count data collected at each analysis location in April 2017. Future estimated peak hour traffic data was used for new intersections and intersections with an anticipated change in travel patterns to further refine the Horizon Year With Project peak hour forecasts.

The refined future peak hour approach and departure volumes obtained from the model output data are then entered into a spreadsheet program consistent with the National Cooperative Highway Research Program (NCHRP Report 255), along with initial estimates of turning movement proportions. A linear programming algorithm is used to calculate individual turning movements which match the known directional roadway segment forecast volumes computed in the previous step. This program computes a likely set of intersection turning movements from intersection approach counts and the initial turning proportions from each approach leg.

Typically, the model growth is prorated and is subsequently added to the existing (base validation) traffic volumes to represent Long Range traffic conditions. However, review of the resulting model growth indicates negative growth for several study area intersections. In an effort to conduct a conservative analysis, reductions to traffic forecasts from either Existing or Opening Year Cumulative (2022) traffic conditions were not assumed as part of this analysis. As such, in conjunction with the addition of cumulative projects that are not consistent with the General Plan, additional growth has also been applied on a movement-by-movement basis, where applicable, to estimate reasonable Horizon Year forecasts. Horizon Year turning volumes were compared to Opening Year Cumulative (2022) volumes in order to ensure a minimum growth as a part of the refinement process. The minimum growth includes any additional growth between Opening Year Cumulative (2022) and Horizon Year traffic conditions that is not accounted for by the traffic generated by cumulative development projects and ambient growth rates assumed between Existing (2017) and Opening Year Cumulative (2022) traffic conditions. Future estimated peak hour traffic data was used for new intersections and intersections with an anticipated change in travel patterns to further refine the Horizon Year peak hour forecasts.

The future Horizon Year without Project peak hour turning movements were then reviewed by Urban Crossroads for reasonableness, and in some cases, were adjusted to achieve flow conservation, reasonable growth, and reasonable diversion between parallel routes. Flow conservation checks ensure that traffic flow between two closely spaced intersections, such as two freeway ramp locations, is verified in order to make certain that vehicles leaving one intersection are entering the adjacent intersection and that there is no unexplained loss of vehicles. The result

of this traffic forecasting procedure is a series of traffic volumes which are suitable for traffic operations analysis.

The truck component of RivTAM has data that is unusually low. As such, in an effort to conduct a conservative analysis, the presence of trucks has been accounted for based on the manual volume adjustments made to demonstrate growth above Opening Year Cumulative (2022) traffic forecasts, which are presented and evaluated in PCE (see *Section 3.6 Existing (2017) Traffic Counts* for discussion on PCE). As such, the Horizon Year forecasts are also assumed to be in PCE for the purposes of this analysis. Post-processing worksheets for Horizon Year Without Project traffic conditions are provided in Appendix 4.1.

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5 E+P TRAFFIC CONDITIONS

This section discusses the traffic forecasts for Existing plus Project (E+P) conditions and the resulting intersection operations and traffic signal warrant analyses.

5.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for E+P conditions are consistent with those shown previously on Exhibit 3-1, with the exception of the following:

- Project driveways and those facilities assumed to be constructed by the Project to provide site access are also assumed to be in place for E+P conditions only (e.g., intersection and roadway improvements at the Project's frontage and driveways).

5.2 E+P TRAFFIC VOLUME FORECASTS

This scenario includes Existing traffic volumes plus Project traffic. Exhibit 5-1 shows the ADT and peak hour intersection turning movement volumes (in PCE), which can be expected for E+P traffic conditions.

5.3 INTERSECTION OPERATIONS ANALYSIS

E+P peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2 *Methodologies* of this TIA. The intersection analysis results are summarized in Table 5-1, which indicate that the study area intersections are anticipated to continue to operate at an acceptable LOS during the peak hours, consistent with Existing traffic conditions. Exhibit 5-2 summarizes the weekday AM and PM peak hour study area intersection LOS under E+P traffic conditions, consistent with the summary provided in Table 5-1. The intersection operations analysis worksheets are included in Appendix 5.1 of this TIA.

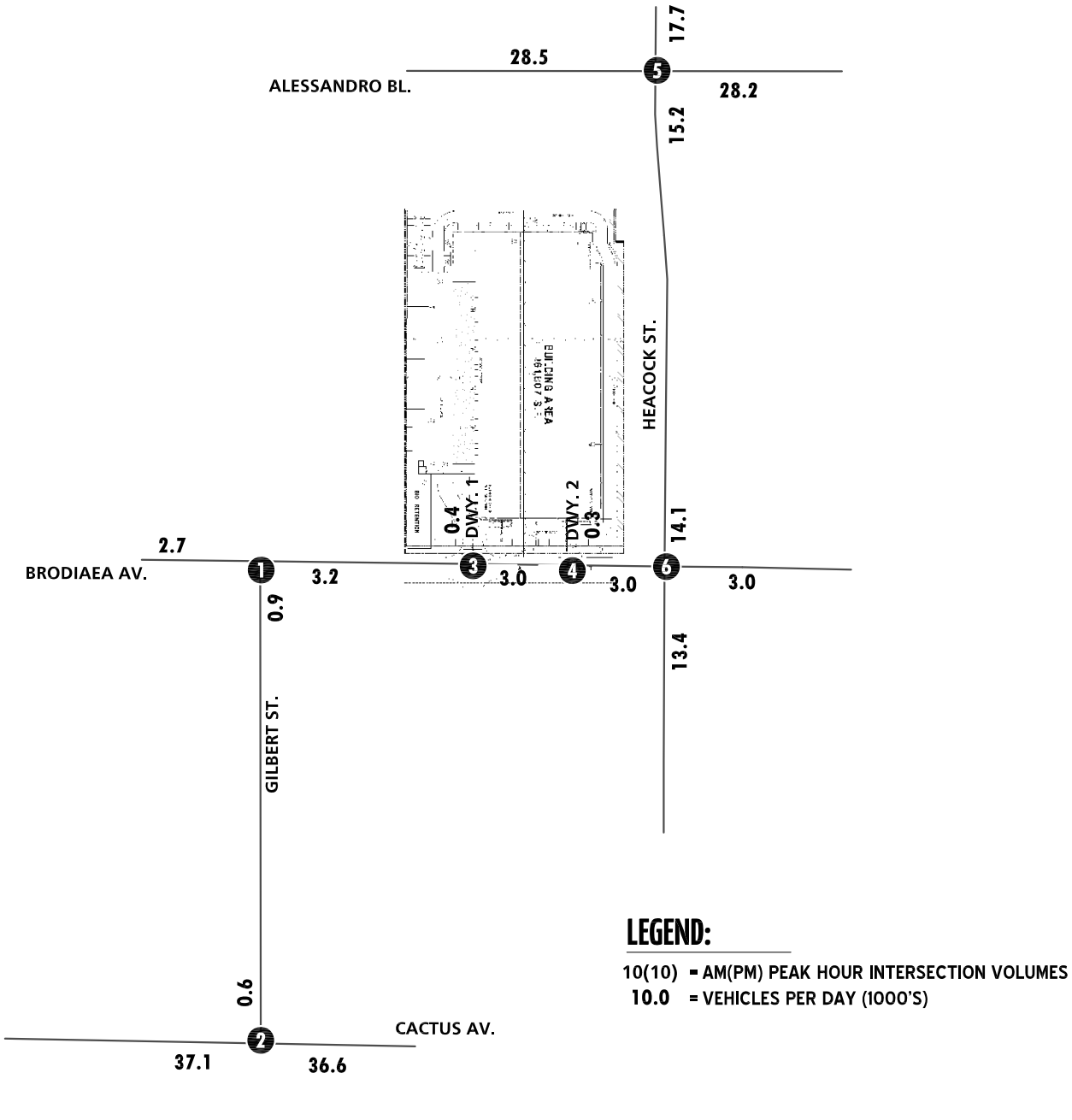
5.4 TRAFFIC SIGNAL WARRANTS ANALYSIS

There are no study area intersections anticipated to meet either peak hour or planning level (ADT) volume based traffic signal warrants under E+P traffic conditions (see Appendix 5.2).

5.5 QUEUING ANALYSIS

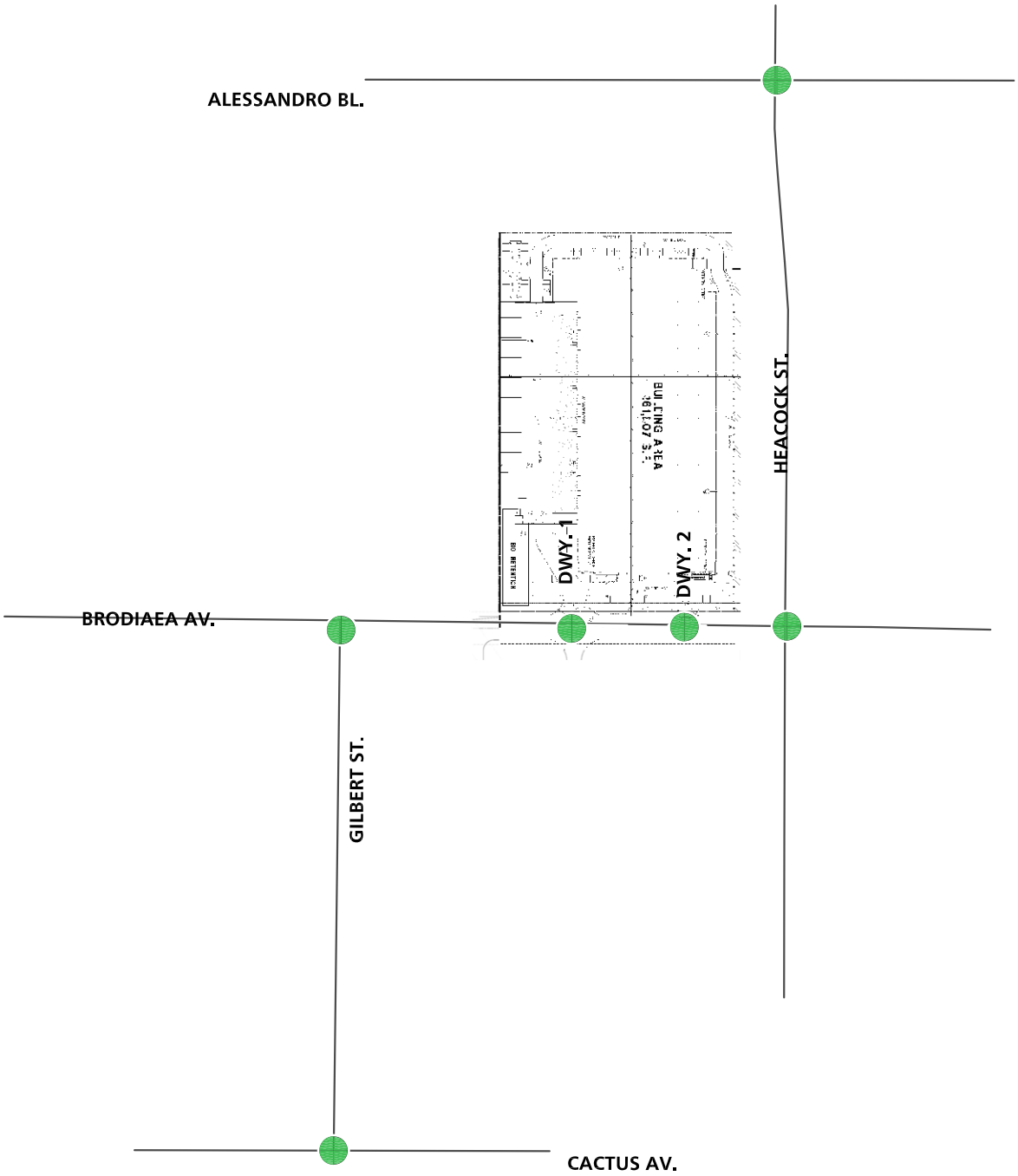
A queuing analysis was conducted for all study area intersections to determine if the turn pocket lengths necessary to accommodate near-term 95th percentile queues. The analysis was conducted for the weekday AM and weekday PM peak hours. The queuing analysis results are summarized on Table 5-2 for E+P traffic conditions. Queuing worksheets are included in Appendix 5.3.

EXHIBIT 5-1: E+P TRAFFIC VOLUMES (IN PCE)



1 Gilbert St. & Brodiaea Av.	2 Gilbert St. & Cactus Av.	3 Dwy. 1 & Brodiaea Av.	4 Dwy. 2 & Brodiaea Av.	5 Heacock St. & Alessandro Bl.	6 Heacock St. & Brodiaea Av.
←148(105) ←15(32)	27(23) 13(2) ←11(2) ←1938(1013)	5(14) 1(4) ←3(2) ←158(123)	3(8) 3(6) ←6(3) ←158(117)	174(146) 323(482) 120(251) ←138(159) ←1238(740) ←43(47)	24(32) 362(586) 16(49) ←39(34) ←100(66) ←12(19)
43(112)→ 6(8)→ 15(8) 35(25)	41(12)→ 1044(2195)→	11(6)→ 67(131)→	8(4)→ 60(131)→	70(114)→ 381(1189)→ 60(130)→ 158(180) 476(401) 41(89)	20(32)→ 23(80)→ 19(25)→ 42(21) 632(503) 13(19)

EXHIBIT 5-2: E+P SUMMARY OF LOS



LEGEND:

- = AM PEAK HOUR ACCEPTABLE LOS
- = AM PEAK HOUR DEFICIENT LOS
- = PM PEAK HOUR ACCEPTABLE LOS
- = PM PEAK HOUR DEFICIENT LOS

N

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Table 5-1

Intersection Analysis for E+P Conditions

#	Intersection	Traffic Control[2]	Existing (2017) Delay[1] (secs.) AM	Existing (2017) Delay[1] (secs.) PM	Existing (2017) Level of Service AM	Existing (2017) Level of Service PM	E+P Delay[1] (secs.) AM	E+P Delay[1] (secs.) PM	E+P Level of Service AM	E+P Level of Service PM
1	Gilbert St. / Brodiaea Av.	CSS	10.2	10.1	B	B	10.3	10.4	B	B
2	Gilbert St. / Cactus Av.	TS	6.9	5.0	A	A	7.4	5.3	A	A
3	Dwy. 1 / Brodiaea Av.	**CSS**	Future Intersection				9.3	9.3	A	A
4	Dwy. 2 / Brodiaea Av.	**CSS**	Future Intersection				9.5	9.4	A	A
5	Heacock St. / Alessandro Bl.	TS	25.4	29.0	C	C	25.5	29.0	C	C
6	Heacock St. / Brodiaea Av.	TS	14.9	15.3	B	B	15.0	15.6	B	B

[1] Per the 2010 Highway Capacity Manual (HCM), overall average intersection delay and level of service are shown for intersections with a traffic signal. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown. LOS calculated using Synchro (Version 9.1).

[2] TS = Traffic Signal; CSS = Cross-street Stop; **CSS** = Improvement

Table 5-2

Peak Hour Queuing Summary for E+P Conditions

Intersection	Movement	Available Stacking Distance (Feet)	Existing (2017)				E+P			
			95th Percentile Queue (Feet)		Acceptable?[1]		95th Percentile Queue (Feet)		Acceptable?[1]	
			AM	PM	AM	PM	AM	PM	AM	PM
Gilbert St. / Brodiaea Av.	NBL	145	37	25	Yes	Yes	39	28	Yes	Yes
	WBL	155	8	11	Yes	Yes	11	17	Yes	Yes
Gilbert St. / Cactus Av.	SBL	150	31	10	Yes	Yes	30	7	Yes	Yes
	EBL	150	49	20	Yes	Yes	56	36	Yes	Yes
Brodiaea Av. / Driveway 1	EBL	100	Future Intersection				11	10	Yes	Yes
Brodiaea Av. / Driveway 2	EBL	100	Future Intersection				10	6	Yes	Yes
Heacock St. / Alessandro Bl.	NBL	145	158	185	**No**	**No**	163	188	**No**	**No**
	SBL	250	127	236	Yes	Yes	150	265	Yes	Yes
	EBL	400	88	153	Yes	Yes	111	155	Yes	Yes
	EBR	105	105	104	Yes	Yes	23	115	Yes	Yes
	WBL	120	153	133	**No**	**No**	158	147	**No**	**No**
Heacock St. / Brodiaea Av.	NBL	150	58	35	Yes	Yes	49	39	Yes	Yes
	SBL	100	40	79	Yes	Yes	38	79	Yes	Yes
	EBL	150	46	50	Yes	Yes	46	55	Yes	Yes
	EBR	150	34	35	Yes	Yes	35	35	Yes	Yes
	WBL	90	33	38	Yes	Yes	29	38	Yes	Yes

[1] Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided. An additional 15 feet of stacking which is assumed to be provided in the transition for turn pockets is reflected in the stacking distance shown on this table, where applicable.

5.6 RECOMMENDED IMPROVEMENTS

All study area intersections are anticipated to operate at an acceptable LOS (LOS C or better) for E+P traffic conditions. As the Project is anticipated to contribute less than 50 peak hour trips and the increase to the pre-project delay is less than 1.0 second, it is anticipated that the addition of Project traffic would result in a less than significant impact at the study area intersections. As such, no intersection improvements have been recommended to address peak hour operations or potential queuing issues.

6 OPENING YEAR CUMULATIVE (2022) TRAFFIC CONDITIONS

This section discusses the methods used to develop Opening Year Cumulative (2022) traffic forecasts and the resulting intersection operations and traffic signal warrant analyses.

6.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for Opening Year Cumulative (2022) conditions are consistent with those shown previously on Exhibit 3-1, with the exception of the following:

- Project driveways and those facilities assumed to be constructed by the Project to provide site access are also assumed to be in place for Opening Year Cumulative conditions only (e.g., intersection and roadway improvements along the Project's frontage and driveways).
- Driveways and those facilities assumed to be constructed by cumulative developments to provide site access are also assumed to be in place for Opening Year Cumulative conditions only (e.g., intersection and roadway improvements along the cumulative development's frontages and driveways).

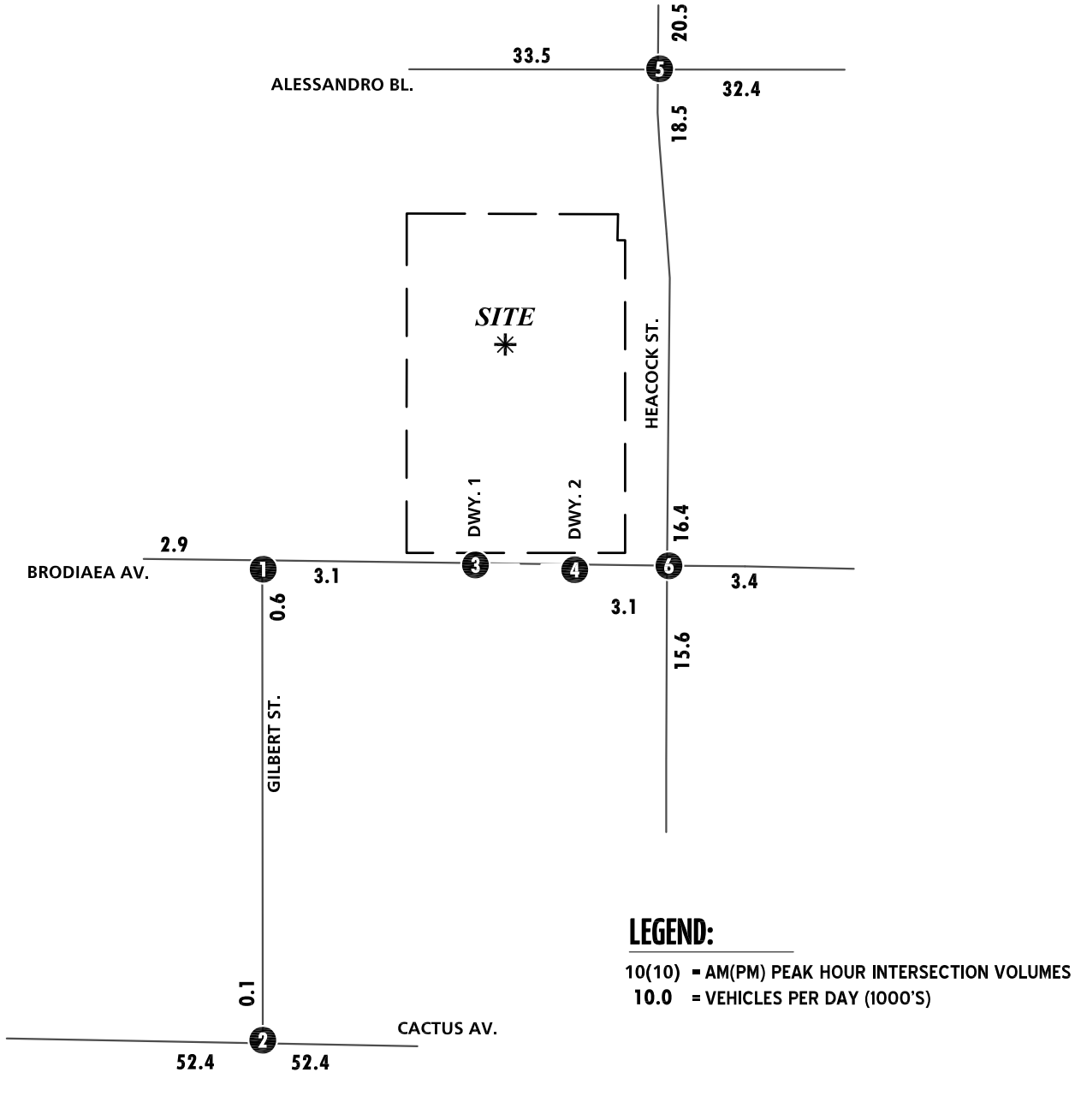
6.2 OPENING YEAR CUMULATIVE (2022) WITHOUT PROJECT TRAFFIC VOLUME FORECASTS

To account for background traffic, other known cumulative development projects in the study area were included in addition to 10.41% of ambient growth for Opening Year Cumulative traffic conditions. The weekday ADT and weekday AM and PM peak hour volumes (in PCE) which can be expected for Opening Year Cumulative (2022) Without Project traffic conditions are shown on Exhibit 6-1.

6.3 OPENING YEAR CUMULATIVE (2022) WITH PROJECT TRAFFIC VOLUME FORECASTS

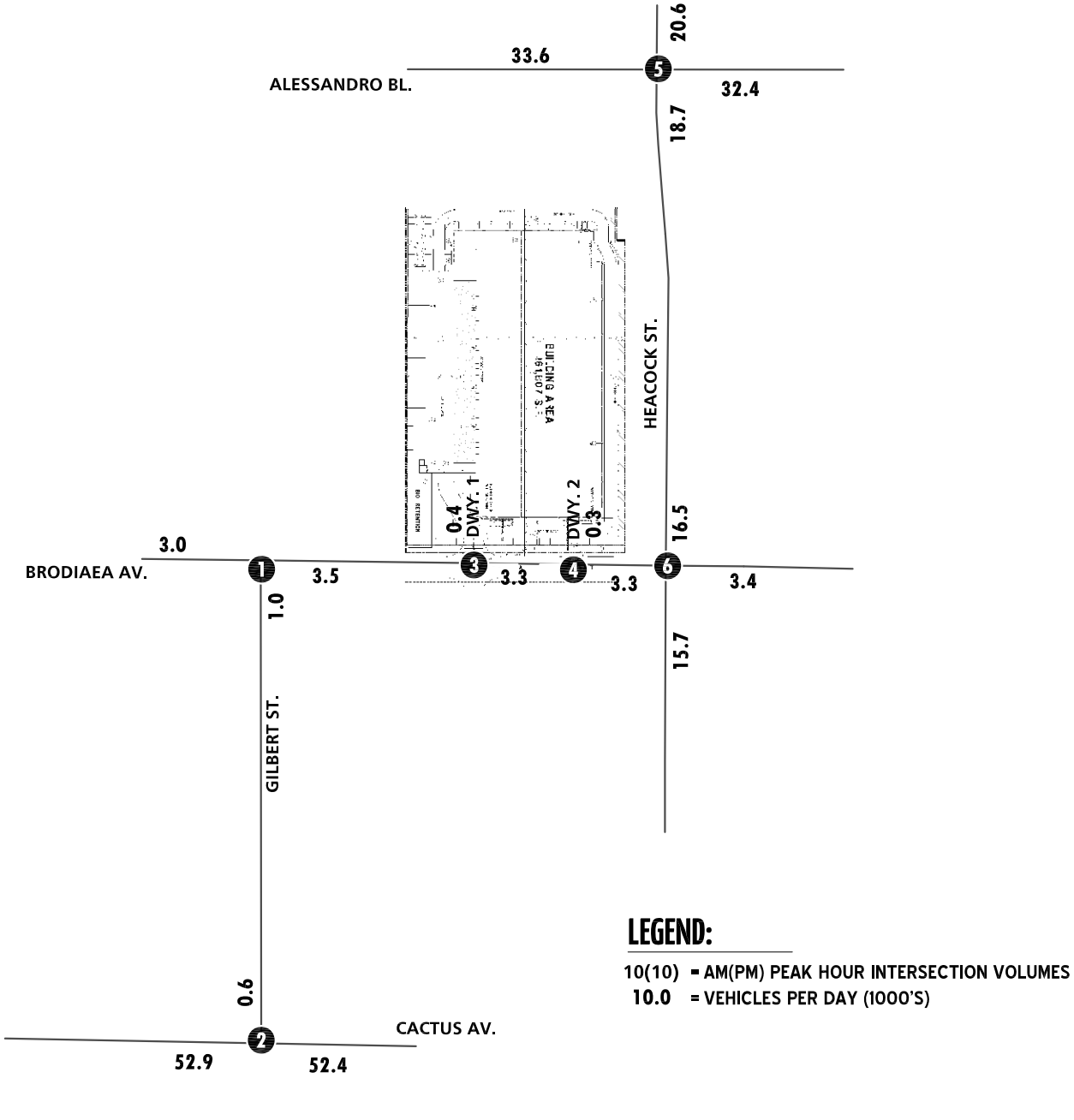
To account for background traffic, other known cumulative development projects in the study area were included in addition to 10.41% of ambient growth for Opening Year Cumulative traffic conditions in conjunction with traffic associated with the proposed Project. The weekday ADT and weekday AM and PM peak hour volumes (in PCE) which can be expected for Opening Year Cumulative (2022) With Project traffic conditions are shown on Exhibit 6-2.

EXHIBIT 6-1: OPENING YEAR CUMULATIVE (2022) WITHOUT PROJECT TRAFFIC VOLUMES (IN PCE)



1 Gilbert St. & Brodiaea Av.	2 Gilbert St. & Cactus Av.	3 Dwy. 1 & Brodiaea Av.	4 Dwy. 2 & Brodiaea Av.	5 Heacock St. & Alessandro Bl.	6 Heacock St. & Brodiaea Av.
←163(114) ←9(13)	22(3) 14(2) ←12(2) ←2982(1710)	Future Intersection	Future Intersection	234(178) 437(689) 132(277) ←152(176) ←1450(850) ←74(104)	20(32) 538(909) 18(54) ←43(37) ←109(72) ←13(21)
46(123)→ 6(9)→ 17(9) 20(18)	26(3)→ 1801(3586)→			92(167)→ 451(1397)→ 91(193)→ 229(242) 692(582) 101(144)	20(29)→ 25(87)→ 20(24)→ 43(22) 977(792) 14(21)

EXHIBIT 6-2: OPENING YEAR CUMULATIVE (2022) WITH PROJECT TRAFFIC VOLUMES (IN PCE)



1 Gilbert St. & Brodiaea Av.	2 Gilbert St. & Cactus Av.	3 Dwy. 1 & Brodiaea Av.	4 Dwy. 2 & Brodiaea Av.	5 Heacock St. & Alessandro Bl.	6 Heacock St. & Brodiaea Av.
164(116) 16(33)	29(23) 14(2) 12(2) 2982(1710)	5(14) 1(4) 3(2) 174(134)	3(8) 3(6) 6(3) 174(128)	234(178) 439(690) 132(277) 152(176) 1450(850) 75(104)	26(35) 538(909) 18(54) 43(37) 110(72) 13(21)
48(124) 6(9) 17(9) 37(27)	43(12) 1801(3586)	11(6) 73(144)	8(4) 66(144)	92(167) 451(1397) 94(195) 230(245) 693(585) 101(145)	22(35) 25(88) 21(27) 46(23) 977(792) 14(21)

6.4 INTERSECTION OPERATIONS ANALYSIS

LOS calculations were conducted for the study intersections to evaluate their operations under Opening Year Cumulative conditions with roadway and intersection geometrics consistent with Section 6.1 *Roadway Improvements*. As shown in Table 6-1, the study area intersections are anticipated to operate at an acceptable LOS during the peak hours under Opening Year Cumulative (2022) Without Project traffic conditions.

The study area intersections are anticipated to continue operate at an acceptable LOS with the addition of Project traffic. A summary of the peak hour intersection LOS for Opening Year Cumulative (2022) Without Project conditions are shown on Exhibit 6-3 and on Exhibit 6-4 for Opening Year Cumulative (2022) With Project traffic conditions. The intersection operations analysis worksheets for Opening Year Cumulative (2022) Without and With Project traffic conditions are included in Appendix 6.1 and Appendix 6.2 of this TIA, respectively. Measures to address near-term cumulative deficiencies for Opening Year Cumulative traffic conditions are discussed in Section 6.7 *Opening Year Cumulative Deficiencies and Recommended Improvements.*

6.5 TRAFFIC SIGNAL WARRANTS ANALYSIS

There are no study area intersections that are anticipated to meet either peak hour or planning level (ADT) volume based traffic signal warrants for Opening Year Cumulative traffic conditions (see Appendix 6.3 and Appendix 6.4).

6.6 QUEUING ANALYSIS

A queuing analysis was conducted for all study area intersections for Opening Year Cumulative (2022) traffic conditions to determine the turn pocket lengths necessary to accommodate near-term 95th percentile queues. The analysis was conducted for the weekday AM and weekday PM peak hours. The queuing analysis results are summarized on Table 6-2 indicates for Opening Year Cumulative (2022) With Project traffic conditions. Queuing worksheets are included in Appendix 6.5 and Appendix 6.6 for Opening Year Cumulative (2022) Without and With Project traffic conditions, respectively.

6.7 OPENING YEAR CUMULATIVE DEFICIENCIES AND RECOMMENDED IMPROVEMENTS

All study area intersections are anticipated to operate at an acceptable LOS (LOS D or better) for Opening Year Cumulative (2022) traffic conditions. As the Project is anticipated to contribute less than 50 peak hour trips and the increase to the pre-project delay is less than 1.0 second, it is anticipated that the addition of Project traffic would result in a less than significant impact at the study area intersections. As such, no intersection improvements have been recommended to address peak hour operations or potential queuing issues.

Table 6-1

Intersection Analysis for Opening Year Cumulative (2022) Conditions

#	Intersection	Traffic Control[2]	2022 Without Project				2022 With Project			
			Delay[1] (secs.)		Level of Service		Delay[1] (secs.)		Level of Service	
			AM	PM	AM	PM	AM	PM	AM	PM
1	Gilbert St. / Brodiaea Av.	CSS	10.3	10.2	B	B	10.5	10.6	B	B
2	Gilbert St. / Cactus Av.	TS	20.6	20.4	C	C	24.2	20.5	C	C
3	Dwy. 1 / Brodiaea Av.	**CSS**	Future Intersection				9.4	9.3	A	A
4	Dwy. 2 / Brodiaea Av.	**CSS**	Future Intersection				9.6	9.5	A	A
5	Heacock St. / Alessandro Bl.	TS	36.3	44.3	D	D	36.4	44.7	D	D
6	Heacock St. / Brodiaea Av.	TS	17.0	17.0	B	B	17.1	17.3	B	B

[1] Per the 2010 Highway Capacity Manual (HCM), overall average intersection delay and level of service are shown for intersections with a traffic signal. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown. LOS calculated using Synchro (Version 9.1).

[2] TS = Traffic Signal; CSS = Cross-street Stop; **CSS** = Improvement

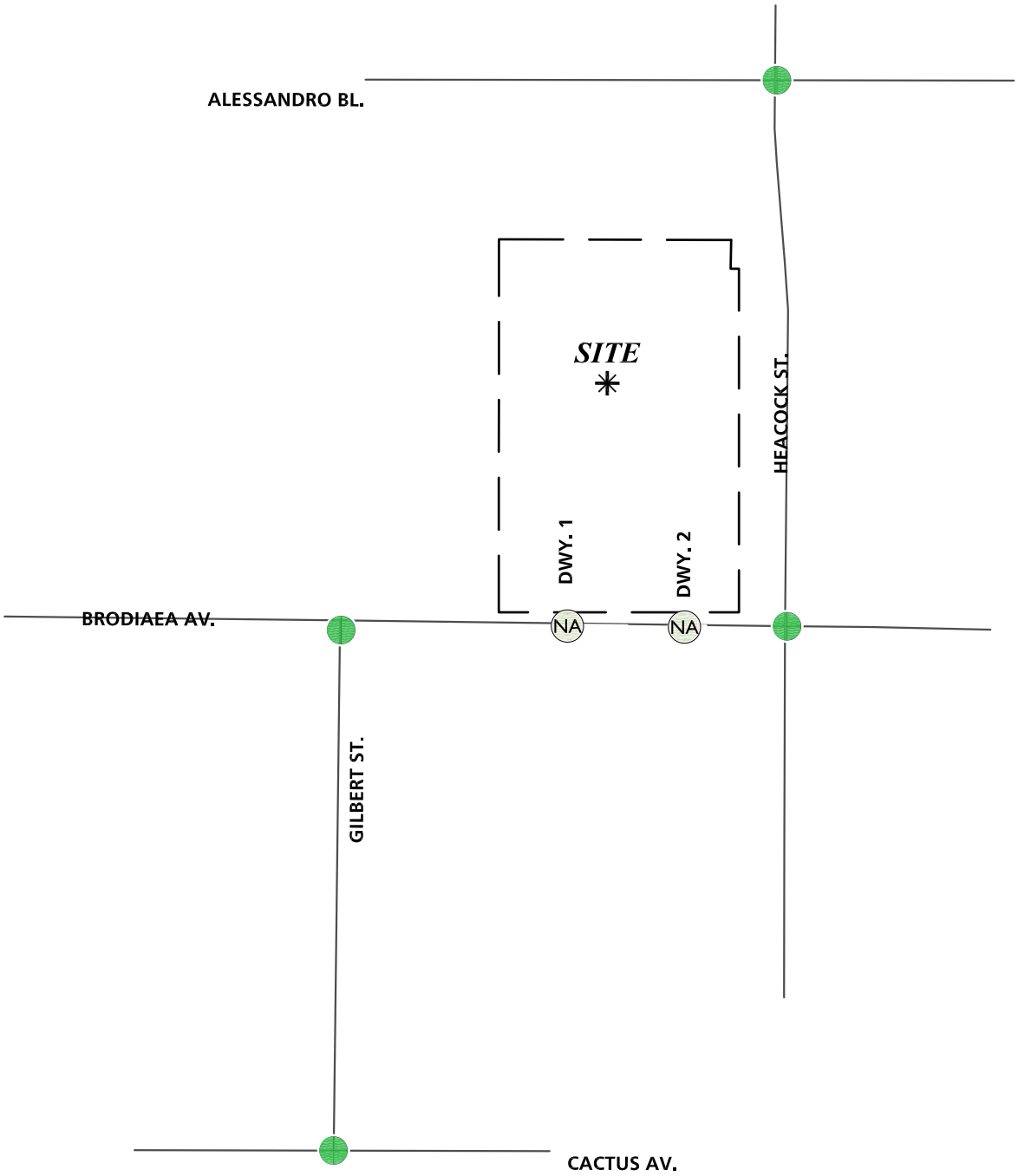
Table 6-2

Peak Hour Queuing Summary for Opening Year Cumulative (2022) Conditions

Intersection	Movement	Available Stacking Distance (Feet)	Without Project				With Project			
			95th Percentile Queue (Feet)		Acceptable?[1]		95th Percentile Queue (Feet)		Acceptable?[1]	
			AM	PM	AM	PM	AM	PM	AM	PM
Gilbert St. / Brodiaea Av.	NBL	145	41	28	Yes	Yes	38	29	Yes	Yes
	WBL	155	6	10	Yes	Yes	10	22	Yes	Yes
Gilbert St. / Cactus Av.	SBL	150	31	9	Yes	Yes	32	7	Yes	Yes
	EBL	150	57	68	Yes	Yes	65	125	Yes	Yes
Brodiaea Av. / Driveway 1	EBL	100	Future Intersection				13	6	Yes	Yes
Brodiaea Av. / Driveway 2	EBL	100	Future Intersection				9	4	Yes	Yes
Heacock St. / Alessandro Bl.	NBL	145	225	224	**No**	**No**	219	219	**No**	**No**
	SBL	250	167	282	Yes	**No**	174	301	Yes	**No**
	EBL	400	121	423	Yes	**No**	126	491	Yes	**No**
	EBR	105	32	202	Yes	**No**	30	202	Yes	**No**
	WBL	120	203	219	**No**	**No**	205	216	**No**	**No**
Heacock St. / Brodiaea Av.	NBL	150	59	37	Yes	Yes	53	39	Yes	Yes
	SBL	100	49	90	Yes	Yes	51	87	Yes	Yes
	EBL	150	45	59	Yes	Yes	47	60	Yes	Yes
	EBR	150	34	36	Yes	Yes	34	39	Yes	Yes
	WBL	90	33	39	Yes	Yes	31	37	Yes	Yes

[1] Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided. An additional 15 feet of stacking which is assumed to be provided in the transition for turn pockets is reflected in the stacking distance shown on this table, where applicable.

EXHIBIT 6-3: OPENING YEAR CUMULATIVE (2022) WITHOUT PROJECT SUMMARY OF LOS

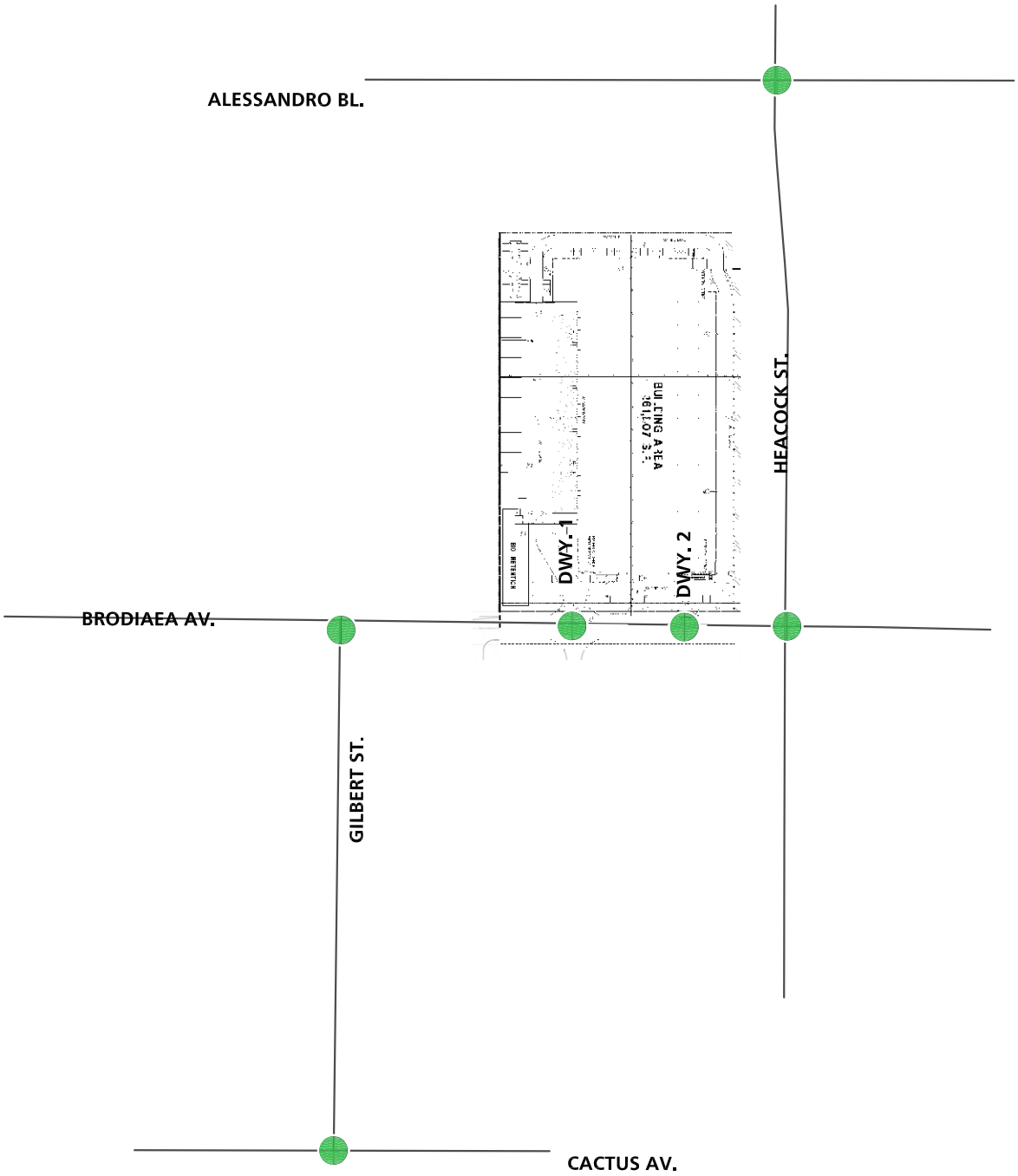


LEGEND:

- = AM PEAK HOUR ACCEPTABLE LOS
- = AM PEAK HOUR DEFICIENT LOS
- = PM PEAK HOUR ACCEPTABLE LOS
- = PM PEAK HOUR DEFICIENT LOS
- NA = NOT AN ANALYSIS LOCATION FOR THIS SCENARIO

N

EXHIBIT 6-4: OPENING YEAR CUMULATIVE (2022) WITH PROJECT SUMMARY OF LOS



LEGEND:

- = AM PEAK HOUR ACCEPTABLE LOS
- = AM PEAK HOUR DEFICIENT LOS
- = PM PEAK HOUR ACCEPTABLE LOS
- = PM PEAK HOUR DEFICIENT LOS

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URBAN CROSSROADS

7 HORIZON YEAR (2040) TRAFFIC CONDITIONS

This section discusses the methods used to develop Horizon Year (2040) Without and With Project traffic forecasts, and the resulting intersection operations and traffic signal warrant analyses.

7.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for Horizon Year conditions are consistent with those shown previously on Exhibit 3-1, with the exception of the following:

- Project driveways and those facilities assumed to be constructed by the Project to provide site access are also assumed to be in place for Horizon Year conditions only (e.g., intersection and roadway improvements along the Project's frontage and driveways).
- Driveways and those facilities assumed to be constructed by cumulative developments to provide site access are also assumed to be in place for Horizon Year conditions only (e.g., intersection and roadway improvements along the cumulative development's frontages and driveways).

7.2 HORIZON YEAR (2040) WITHOUT PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes the refined post-processed volumes obtained from the RivTAM. For additional information on the development of the Horizon Year Without Project traffic forecasts, see Section 4.8 *Horizon Year (2040) Volume Development* of this TIA. The weekday ADT and weekday AM and PM peak hour volumes which can be expected for Horizon Year Without Project traffic conditions are shown on Exhibit 7-1.

7.3 HORIZON YEAR (2040) WITH PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes the refined post-processed volumes obtained from the RivTAM, plus Project traffic. The weekday ADT and weekday AM and PM peak hour volumes which can be expected for Horizon Year With Project traffic conditions are shown on Exhibit 7-2.

7.4 INTERSECTION OPERATIONS ANALYSIS

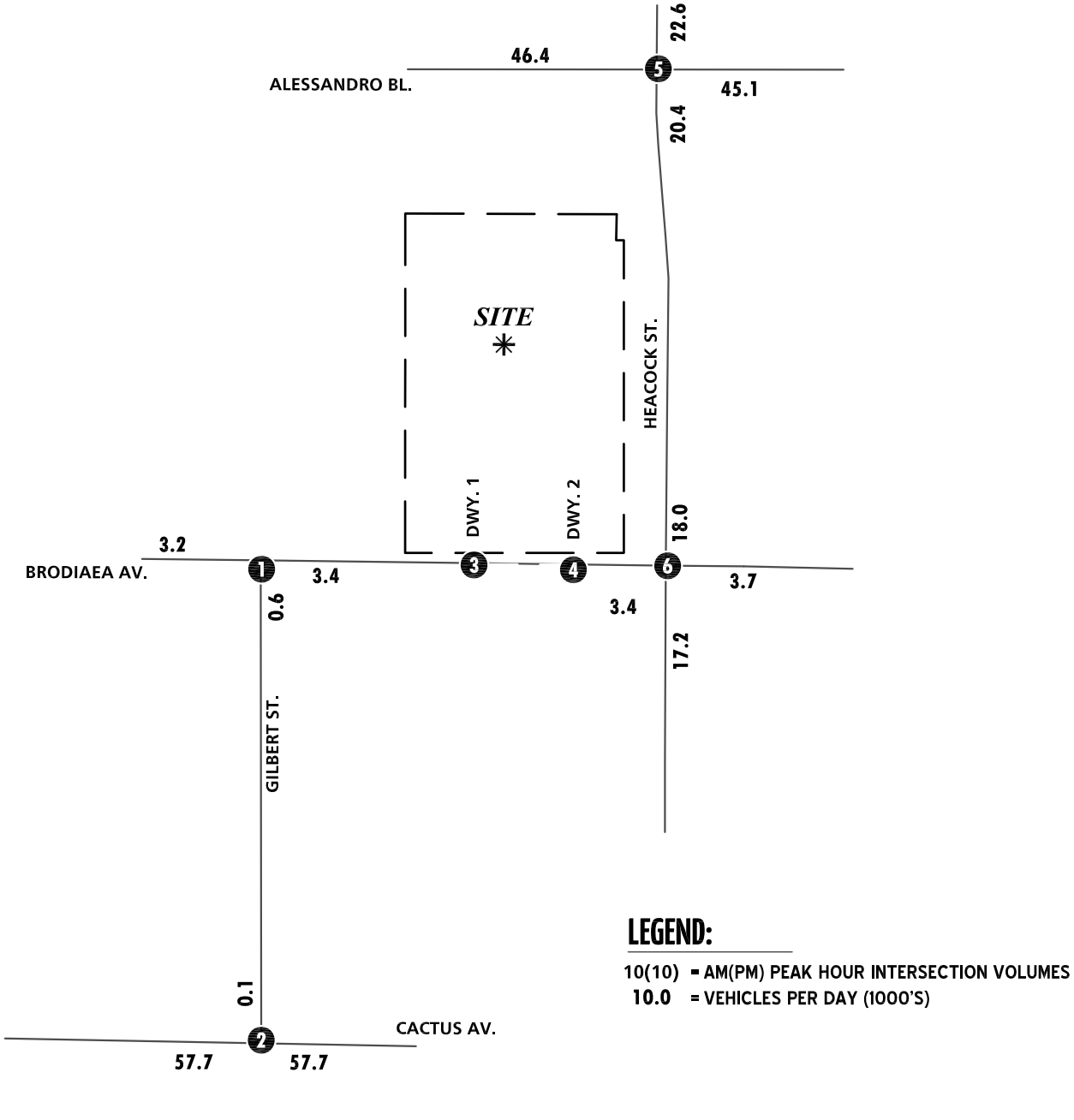
7.4.1 HORIZON YEAR WITHOUT PROJECT TRAFFIC CONDITIONS

LOS calculations were conducted for the study intersections to evaluate their operations under Horizon Year Without Project conditions with roadway and intersection geometrics consistent with Section 7.1 *Roadway Improvements*. As shown in Table 7-1, the study area intersections are anticipated to operate at acceptable levels of service, with the exception of the following:

- Heacock Street and Alessandro Boulevard (# 5) – LOS F AM and PM peak hours

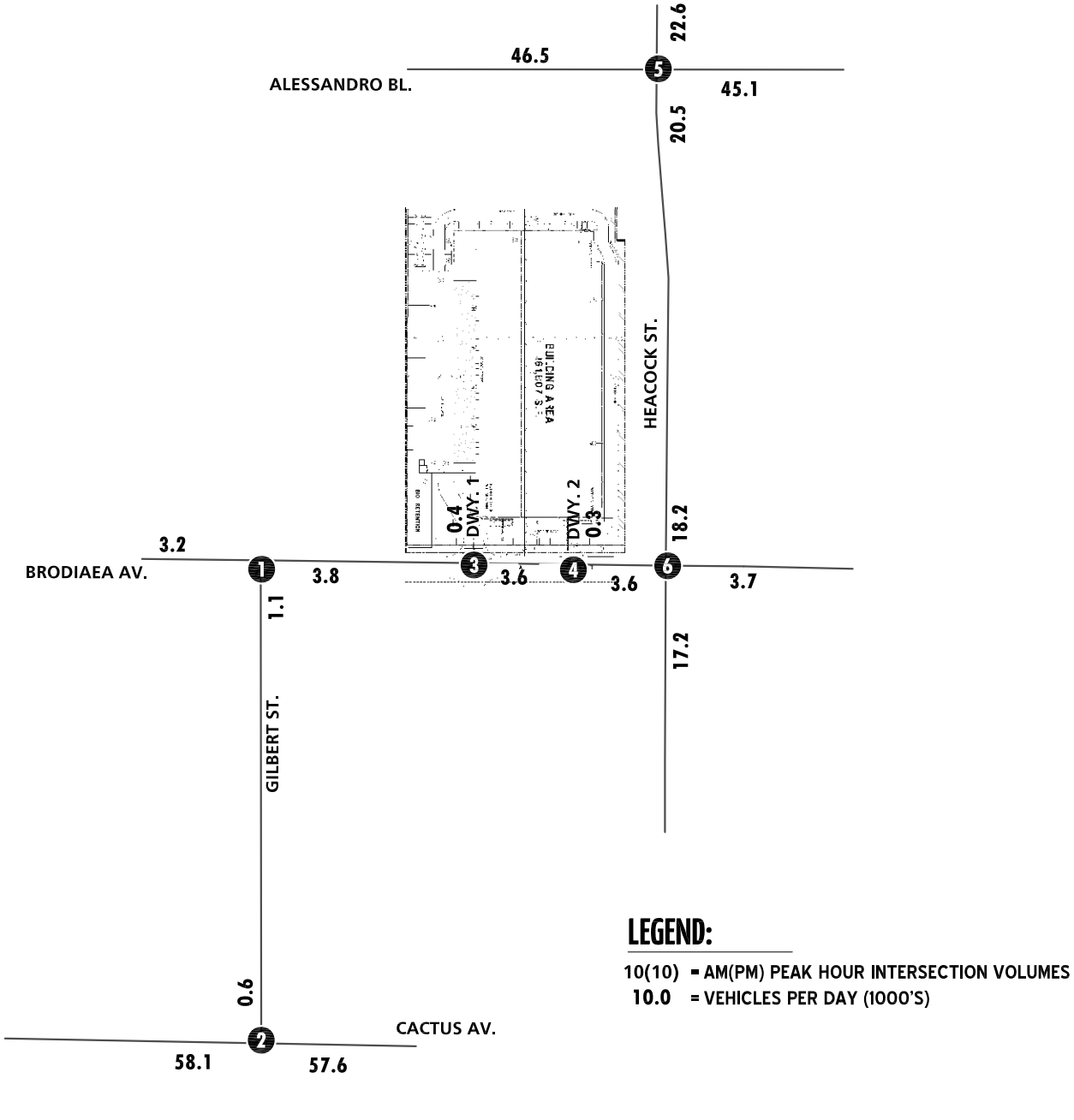
A summary of the peak hour intersection LOS for Horizon Year Without Project conditions are shown on Exhibit 7-3. The intersection operations analysis worksheets for Horizon Year Without Project traffic conditions are included in Appendix 7.1.

EXHIBIT 7-1: HORIZON YEAR (2040) WITHOUT PROJECT TRAFFIC VOLUMES (IN PCE)



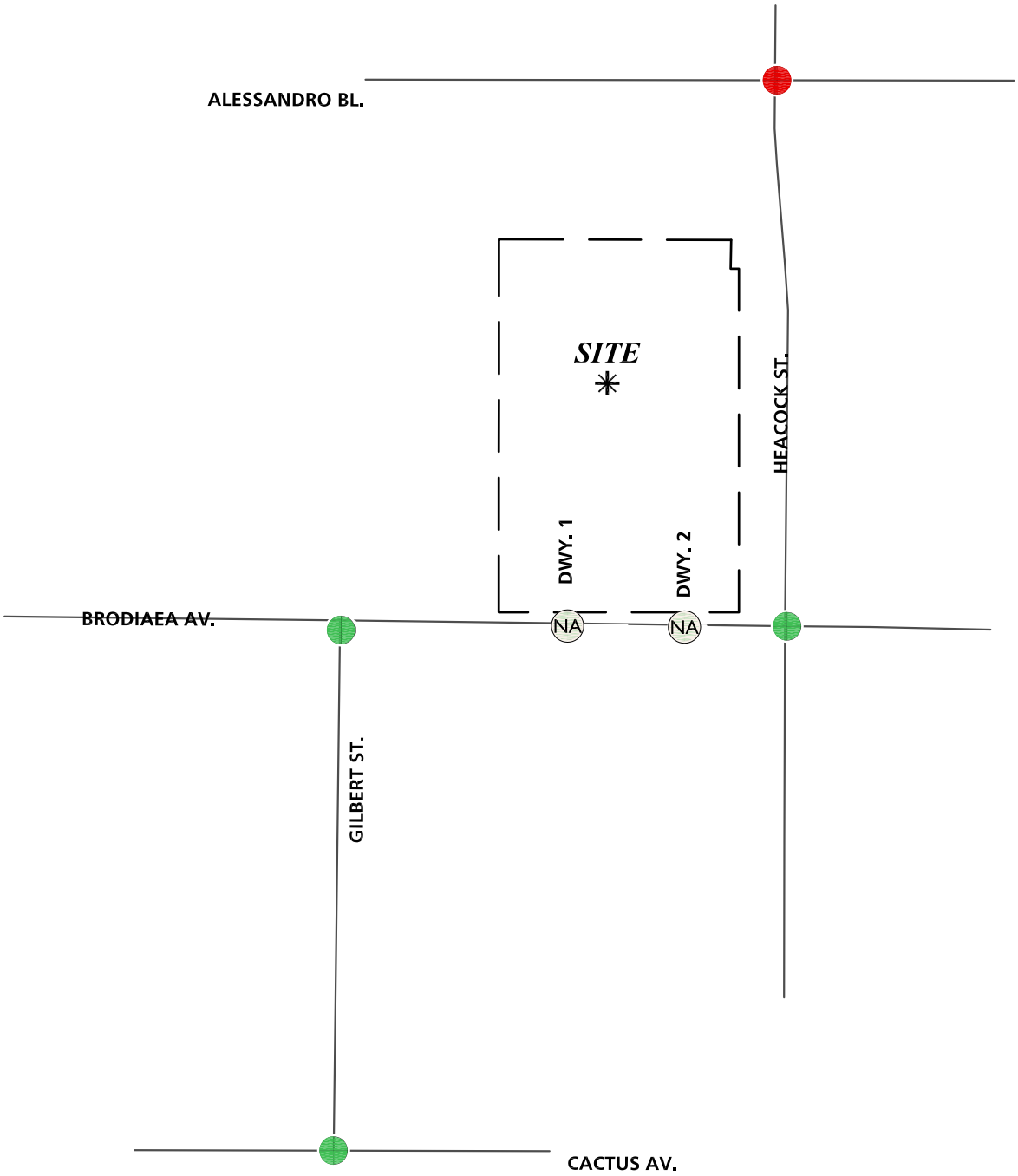
1 Gilbert St. & Brodiaea Av.	2 Gilbert St. & Cactus Av.	3 Dwy. 1 & Brodiaea Av.	4 Dwy. 2 & Brodiaea Av.	5 Heacock St. & Alessandro Bl.	6 Heacock St. & Brodiaea Av.
←180(126) ←10(15)	24(10) 15(10) ←13(10) ←3280(1881)	Future Intersection	Future Intersection	258(195) 481(758) 282(425) ←295(354) ←1959(1452) ←81(114)	23(35) 592(1000) 19(59) ←47(41) ←120(80) ←15(23)
51(135)→ 10(10)→ 18(10) 22(19)	29(10)→ 1981(3945)→			126(184)→ 902(1987)→ 100(213)→ 252(266) 762(640) 111(158)	23(32)→ 28(96)→ 22(26)→ 47(26) 1075(872) 15(23)

EXHIBIT 7-2: HORIZON YEAR (2040) WITH PROJECT TRAFFIC VOLUMES (IN PCE)



1 Gilbert St. & Brodiaea Av.	2 Gilbert St. & Cactus Av.	3 Dwy. 1 & Brodiaea Av.	4 Dwy. 2 & Brodiaea Av.	5 Heacock St. & Alessandro Bl.	6 Heacock St. & Brodiaea Av.
←181(128) ←17(35)	31(30) 15(10) ←13(10) ←3280(1881)	5(14) 1(4) ←3(2) ←193(149)	3(8) 3(6) ←6(3) ←193(143)	258(195) 483(759) 282(425) ←295(354) ←1959(1452) ←82(114)	29(38) 592(1000) 19(59) ←47(41) ←121(80) ←15(23)
53(136)→ 10(10)→ 18(10) 39(28)	46(19)→ 1981(3945)→	11(6)→ 80(158)→	8(4)→ 73(158)→	126(184)→ 902(1987)→ 103(215)→ 253(269) 763(643) 111(159)	25(38)→ 28(97)→ 23(29)→ 50(27) 1075(872) 15(23)

EXHIBIT 7-3: HORIZON YEAR (2040) WITHOUT PROJECT SUMMARY OF LOS



LEGEND:

- = AM PEAK HOUR ACCEPTABLE LOS
- = AM PEAK HOUR DEFICIENT LOS
- = PM PEAK HOUR ACCEPTABLE LOS
- = PM PEAK HOUR DEFICIENT LOS
- NA = NOT AN ANALYSIS LOCATION FOR THIS SCENARIO

N

Table 7-1

Intersection Analysis for Horizon Year (2040) Conditions

#	Intersection	Traffic Control[2]	2040 Without Project				2040 With Project			
			Delay[1] (secs.)		Level of Service		Delay[1] (secs.)		Level of Service	
			AM	PM	AM	PM	AM	PM	AM	PM
1	Gilbert St. / Brodiaea Av.	CSS	10.5	10.4	B	B	10.7	10.8	B	B
2	Gilbert St. / Cactus Av.	TS	44.1	46.3	D	D	49.2	46.4	D	D
3	Dwy. 1 / Brodiaea Av.	**CSS**	Future Intersection				9.5	9.4	A	A
4	Dwy. 2 / Brodiaea Av.	**CSS**	Future Intersection				9.8	9.6	A	A
5	Heacock St. / Alessandro Bl.	TS	**96.7**	**128.0**	**F**	**F**	**96.8**	**128.2**	**F**	**F**
6	Heacock St. / Brodiaea Av.	TS	18.9	18.7	B	B	19.1	19.0	B	B

BOLD = LOS does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

[1] Per the 2010 Highway Capacity Manual (HCM), overall average intersection delay and level of service are shown for intersections with a traffic signal. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown. LOS calculated using Synchro (Version 9.1).

[2] TS = Traffic Signal; CSS = Cross-street Stop; **CSS** = Improvement

7.4.2 HORIZON YEAR WITH PROJECT TRAFFIC CONDITIONS

As shown on Table 7-1 and illustrated on Exhibit 7-4, there are no additional study area intersections anticipated to experience unacceptable LOS (LOS E or worse) with the addition of Project traffic during one or more peak hours in addition to those previously identified under Horizon Year Without Project conditions. The intersection operations analysis worksheets for Horizon Year With Project traffic conditions are included in Appendix 7.2 of this TIA.

7.5 TRAFFIC SIGNAL WARRANTS ANALYSIS

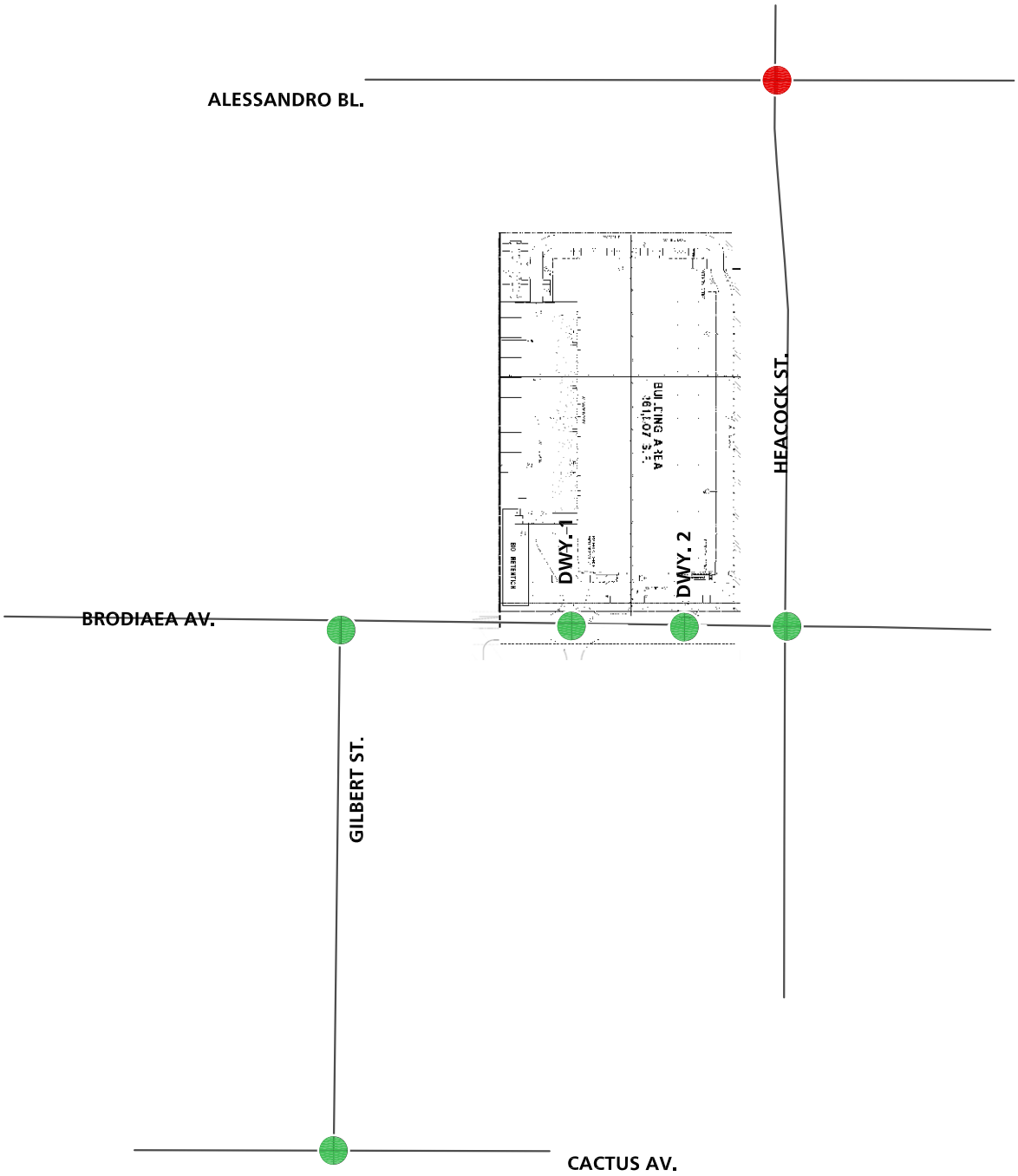
There are no study area intersections that are anticipated to meet either peak hour or planning level (ADT) volume based traffic signal warrants for Horizon Year Without Project or With Project traffic conditions (see Appendix 7.3 and 7.4).

7.7 HORIZON YEAR DEFICIENCIES AND RECOMMENDED IMPROVEMENTS

Although Heacock Street and Alessandro Boulevard is anticipated to operate at an unacceptable LOS during the peak hours for Horizon Year (2040) traffic conditions, the Project is anticipated to contribute less than 50 peak hour trips and would change the pre-project delay by less than 1.0 second. As such, the impact is less than significant at this location and no improvements have been recommended.

The Project Applicant shall participate in the funding of off-site improvements, including traffic signals that are needed to serve cumulative traffic conditions through the payment of TUMF and City of Moreno Valley DIF fees (if the improvements are included in the TUMF or DIF programs) or on a fair share basis (if the improvements are not included in the TUMF or DIF programs). These fees shall be collected by the City of Moreno Valley, with the proceeds solely used as part of a funding mechanism aimed at ensuring that regional highways and arterial expansions keep pace with the projected population increases. There are no other applicable pre-existing funding programs for the study area aside from TUMF and DIF.

EXHIBIT 7-4: HORIZON YEAR (2040) WITH PROJECT SUMMARY OF LOS



LEGEND:

- = AM PEAK HOUR ACCEPTABLE LOS
- = AM PEAK HOUR DEFICIENT LOS
- = PM PEAK HOUR ACCEPTABLE LOS
- = PM PEAK HOUR DEFICIENT LOS

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8 REFERENCES

1. **City of Moreno Valley Transportation Engineering Division.** *Traffic Impact Analysis Preparation Guide.* Moreno Valley : s.n., August 2007.
2. **Institute of Transportation Engineers.** *Trip Generation.* 9th Edition. 2012.
3. **Southern California Association of Governments.** *2016 Regional Transportation Plan/Sustainable Communities Strategy.* April 2016.
4. **Riverside County Transportation Commission.** *2011 Riverside County Congestion Management Program.* County of Riverside : RCTC, December 14, 2011.
5. **Transportation Research Board.** *Highway Capacity Manual (HCM).* s.l. : National Academy of Sciences, 2010.
6. **Federal Highway Administration.** Manual on Uniform Traffic Control Devices (MUTCD). [book auth.] California Department of Transportation. *California Manual on Uniform Traffic Control Devices (CAMUTCD).* 2014.
7. **San Bernardino Associated Governments.** *Congestion Management Program for County of San Bernardino.* County of San Bernardino : s.n., Updated June 2016.
8. **South Coast Air Quality Managment District.** *Warehouse Truck Trip Study.* [Powerpoint Presentation] July 17, 2014.
9. **South Coast Air Quality Managment District (SCAQMD).** *Warehouse Truck Trip Study Data Results and Usage.* June 2014.

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APPENDIX 1.1:

APPROVED TRAFFIC STUDY SCOPING AGREEMENT

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Date: September 5, 2017 (Revised)

This letter acknowledges the City of Moreno Valley Transportation Engineering Division requirements for the traffic impact analysis of the following project:

Case No.	
Project Name:	Brodiaea Commerce Center
Project Address:	Northwest corner of Heacock Avenue and Brodiaea Avenue
Project Description:	Total building is 262,000 square feet of High-Cube Warehouse/Distribution Center use
Related Cases:	

	Consultant	Developer Representative
Name:	URBAN CROSSROADS, INC. Attn: Aric Evatt	T&B Planning, Inc. Attn: Tracy Zinn
Address:	260 E. Baker Street, Suite 200 Costa Mesa, CA 92626	17542 E. 17th Street Suite 100 Tustin, CA 92780
Telephone:	949-336-5978	714-505-6360

I. Background

The proposed Brodiaea Commerce Center development (referred to as "Project") is located north of Brodiaea Avenue and west of Heacock Avenue in the City of Moreno Valley. The Project is proposed to consist of a total of 262,000 square feet of High-Cube Warehouse / Distribution Center use within a single building.

The Project is anticipated to be built in a single phase and the opening year of 2022 will be evaluated for the purposes of this analysis (minimum five-year opening year per Moreno Valley traffic study guidelines). In addition, Horizon Year (2040) traffic conditions will also be evaluated as the site is currently zoned for BPX which limits warehouse developments to 50,000 square feet of less. See preliminary site plan on **Exhibit 1**. **Exhibit 2** illustrates the study area and proposed existing and opening year intersection analysis locations.

II. Trip Geographic Distribution and Assignment

The project trip distribution patterns were developed based on an understanding of existing travel patterns in the area, the geographical location of the site, the site's proximity to the local arterial and regional state highway system:

- **Exhibit 3:** Project (Passenger Cars) Trip Distribution
- **Exhibit 4:** Project (Trucks) Trip Distribution

III. Site Trip Generation Forecast

A. Source for trip generation rates: Institute of Transportation Engineers (ITE) *Trip Generation Manual* 9th Edition (2012) for ITE Land Use Code 152 (High-Cube Warehousing) using SCAQMD recommended vehicle mix.

B. Weekday AM Peak: 7:00-9:00 AM

C. Weekday PM Peak: 4:00-6:00 PM

D. Intersection and link acceptable Level of Service D for some intersections and links and Level of Service C for others based upon the current City policy. (Use Highway Capacity Manual 2010 operations procedures; parameters per County of Riverside Traffic Impact Analysis Guidelines)

Proposed Use Rates (1) (See attached **Table 1**)

High-Cube Warehouse
(per TSF) Daily: 1.680 AM: 0.110 PM: 0.120

Internal Trip Allowance: Yes: _____ No: X Percentage: _____

Pass-by Trip Allowance: Yes: _____ No: X Percentage: _____

(1) Institute of Transportation Engineers 9th Edition *Trip Generation Manual* (2012).

E. As noted on **Table 1**, refinements to raw trip generation estimates have been made to provide a more detailed breakdown of trips by vehicle type. Trip generation rates for both Manufacturing and High-Cube Warehouse were obtained from the ITE's most current *Trip Generation* manual.

High Cube Warehouse: Total vehicle mix percentages were obtained from the ITE Trip Generation manual in conjunction with the South Coast Air Quality Management District's (SCAQMD) recommended truck mix, by axle type for High Cube Warehouse/Distribution Center use. PCE factors were applied to the trip generation rates for heavy trucks (large 2-axles, 3-axles, 4+-axles). PCE factors are consistent with the recommended PCE factors in Appendix B of the San Bernardino County Congestion Management Program (CMP), 2016

Update.

F. As shown on **Table 1**, the proposed Project is anticipated to generate a net total of 689 PCE trip-ends per day with 40 PCE AM peak hour trips and 47 PCE PM peak hour trips. Table 2 also shows the Project trip generation based on actual vehicles. Consistent with other studies prepared for projects in the City, the PCE trip generation will be utilized for the purposes of the peak hour intersection operations analysis.

IV. Specific Project Issues to be Analyzed

A. The traffic study will address the adequacy of site access and identify specific near-term circulation improvements required at study area intersections and roadways to maintain acceptable peak hour and daily levels of service (LOS).

B. The traffic study shall address the project traffic impacts at all study intersections listed in Section VI and provide appropriate mitigation measures if applicable. Peak-hour traffic signal warrants shall be evaluated for all intersections that are not currently signalized.

C. Qualitative assessment of existing and planned non-motorized facilities (e.g., pedestrians, bike routes, trails, etc.) within the study area.

D. The turn pocket lengths will be determined through peak hour traffic simulations developed using SimTraffic software in an effort to identify the required storage capacity for the left turn lane of all study area intersections.

E. The traffic study shall provide a detail analysis of each driveway location based on Table 9.11.080-14 of the City of Moreno Valley Municipal Code - Design Guidelines, by preparing a table or an exhibit to show the required minimum spacing distance and whether each proposed driveway location can meet this minimum distance.

F. The traffic study will include fair share calculations for any potentially impacted study area intersection.

G. The traffic study shall provide a Queuing Analysis section to determine the 95th percentile queues for the Project driveways and at all study area intersections based on forecasted E+P and Opening Year Cumulative (2022) traffic volumes using the Synchro software. If there is not sufficient queuing storage length available, the traffic study shall provide mitigation measures to resolve such issue.

V. Study Analysis Scenarios

A. Existing (2017)

B. Existing (2017) Plus Project

C. Opening Year Cumulative (2022) Without Project (existing to opening year-2022, assuming a growth rate of 2% per year and includes the traffic from other cumulative development projects in the vicinity)

D. Opening Year Cumulative (2022) With Project

E. Horizon Year (2040) Without Project

F. Horizon Year (2040) With Project

VI. Facilities to be Studied

A. Analysis Locations: (See **Exhibit 2**)

1. Gilbert Street & Brodiaea Avenue
2. Gilbert Street & Cactus Avenue

3. Driveway 1 & Brodiaea Avenue – Future Intersection
4. Driveway 2 & Brodiaea Avenue – Future Intersection
5. Heacock Avenue & Alessandro Boulevard
6. Heacock Avenue & Brodiaea Avenue

B. Roadway Segments:
No roadway segments will be evaluated as the Project is anticipated to contribute fewer than 50 peak hour trips on all roadway segments adjacent to intersection analysis locations.

VII. Open Items

A. **Cumulative Development Projects:** There is a list of cumulative projects provided on **Table 3** (also shown graphically on **Exhibit 5**) and is consistent with the cumulative lists on other recent projects. It is requested that the list of cumulative development projects be reviewed by the City and projects be removed/added, where applicable.

B. **Signal Timing:** It is requested that the City provide us with the existing signal timing for use in the traffic impact analysis for the applicable study area intersections.

VIII. Deliverables

a. Draft traffic impact studies (2 hard copies plus PDF)
b. Final traffic impact studies (4 hard copies plus PDF)

All draft and final traffic impact studies shall be delivered with the appropriate review fee to the Permit Technician, Land Development Division - Moreno Valley City Hall, 14177 Frederick Street, Moreno Valley, CA 92552. Please contact the Land Development Division at 951-413-3110 prior to the delivery of the traffic study.

A review fee of $1,177 will be required upon submittal of the traffic study. **A signed copy of this *Scoping Agreement* must be included in the submitted draft and final traffic impact studies.** If you have any questions regarding this *Scoping Agreement*, please contact Eric Lewis at 951-413-3140.

Recommended By:

Aric Evatt, PTP
President
Urban Crossroads, Inc.

Approved By:

Eric Lewis, City of Moreno Valley

* NOTE: This scoping agreement was reviewed and approved based on the information submitted by Urban Crossroads, Inc. on 9/5/2017. Urban Crossroads and the Project Applicant acknowledge that any changes to the Project (zoning, size, type of use, number or location of access points, etc.) after 9/5/2017 may require this scoping agreement to be revised and resubmitted for review and approval by the City of Moreno Valley.

EXHIBIT 1: PRELIMINARY SITE PLAN

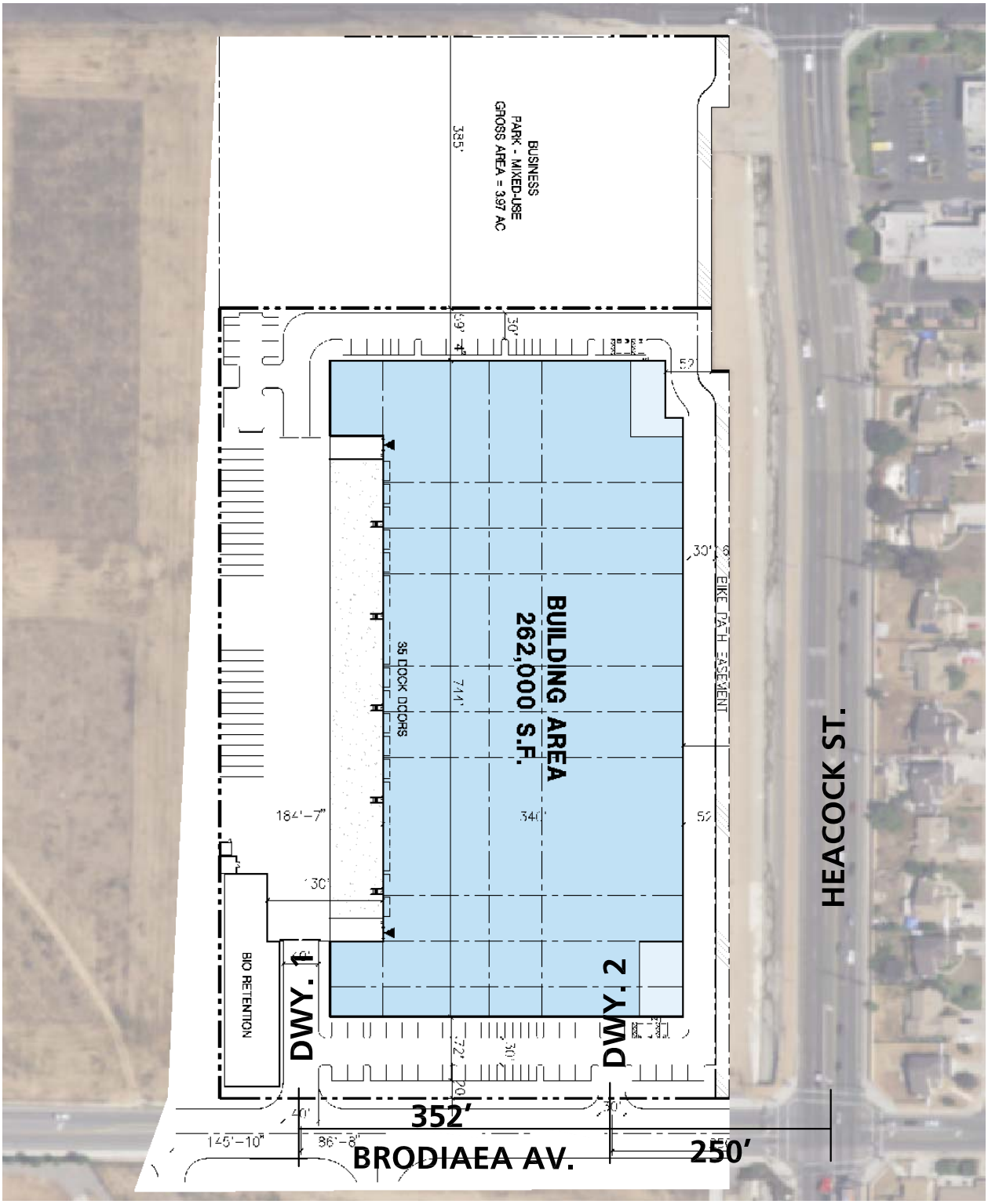
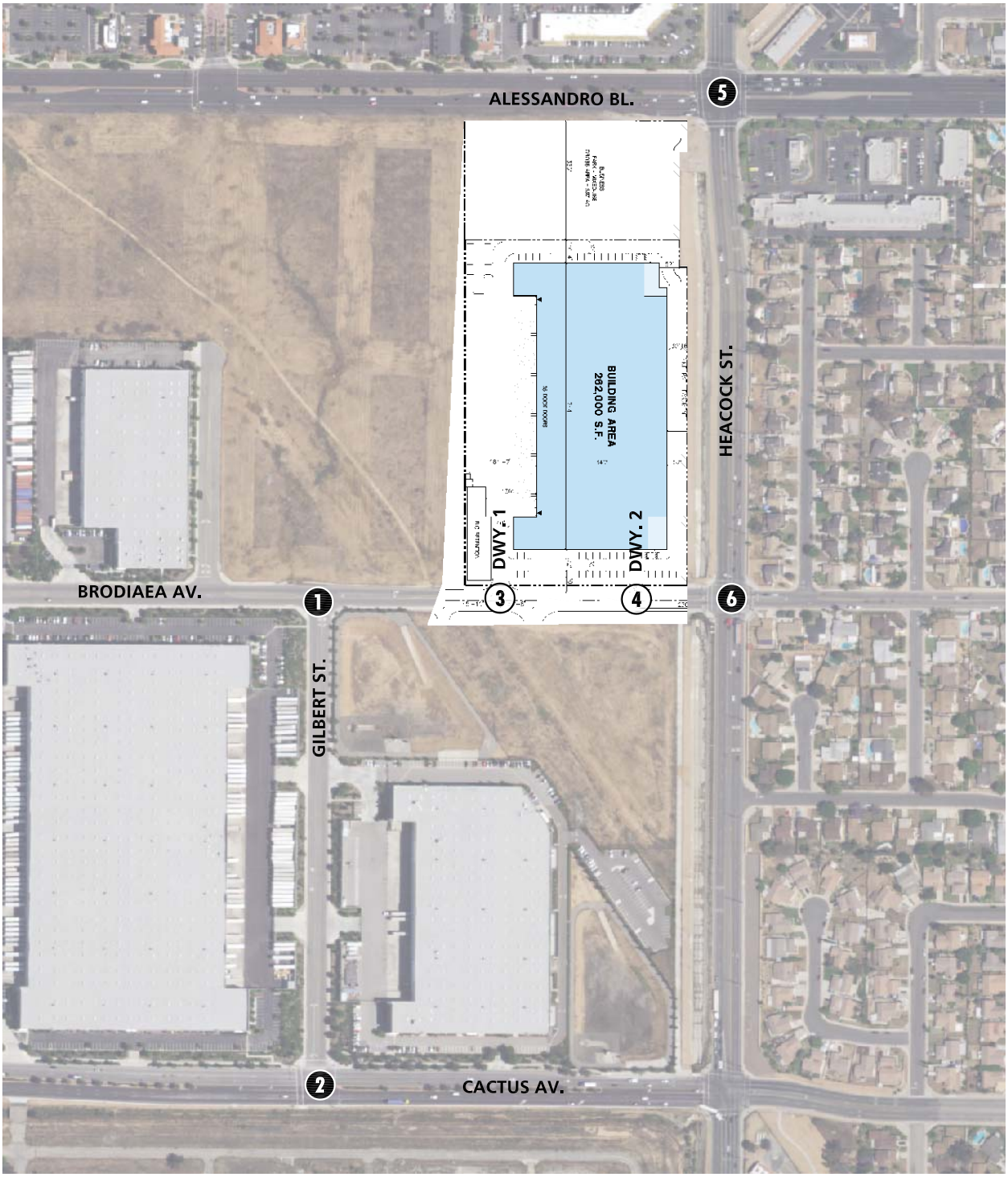


EXHIBIT 2: LOCATION MAP



LEGEND:

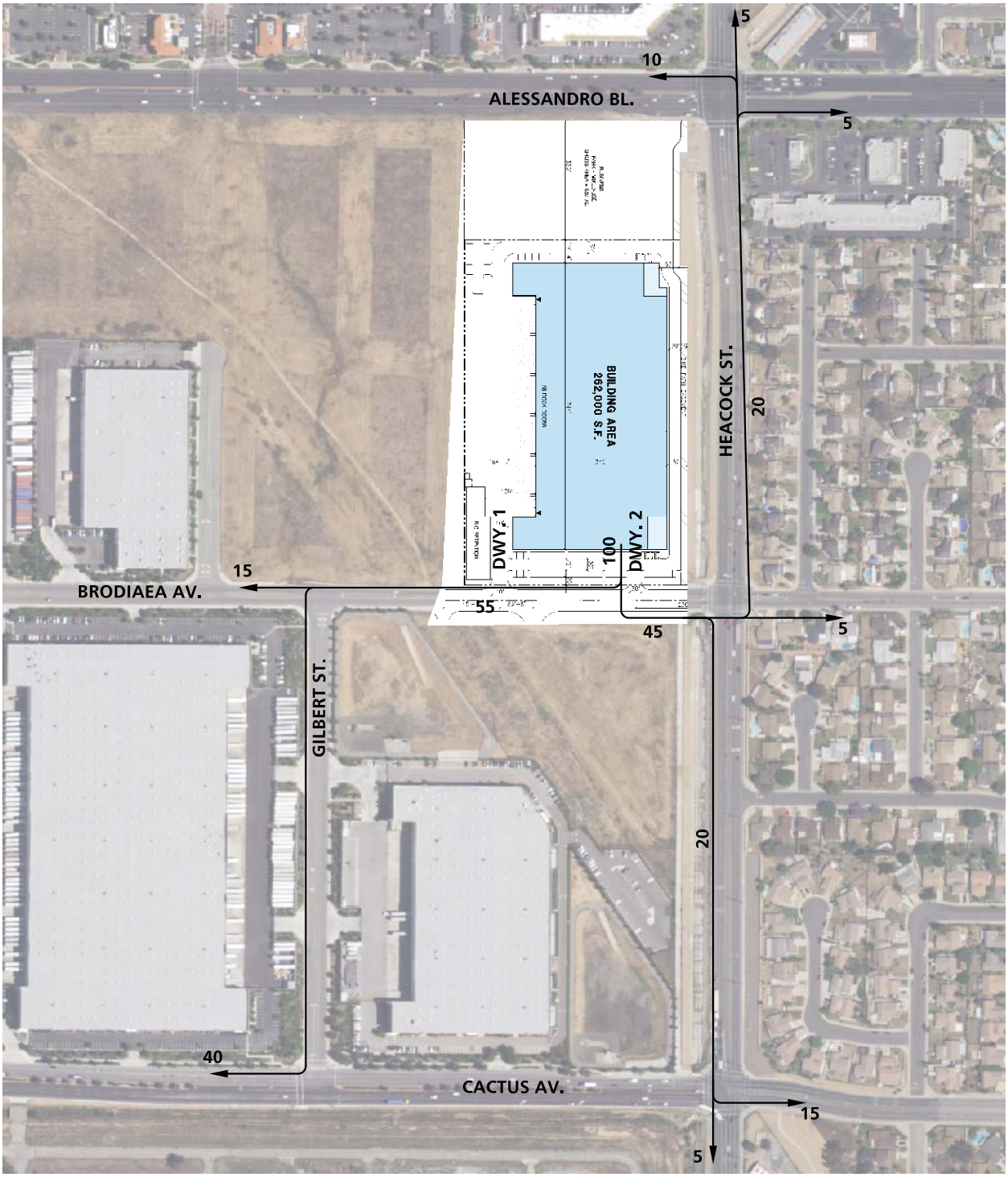
- 0 = EXISTING INTERSECTION ANALYSIS LOCATION
- 0 = FUTURE INTERSECTION ANALYSIS LOCATION

N

11140 - locmap.dwg

URBAN CROSSROADS

EXHIBIT 3: PROJECT (PASSENGER CARS) TRIP DISTRIBUTION



LEGEND:

10 = PERCENT TO/FROM PROJECT

N

11140 - trip.dwg

URBAN CROSSROADS

EXHIBIT 4: PROJECT (TRUCKS) TRIP DISTRIBUTION

LEGEND:

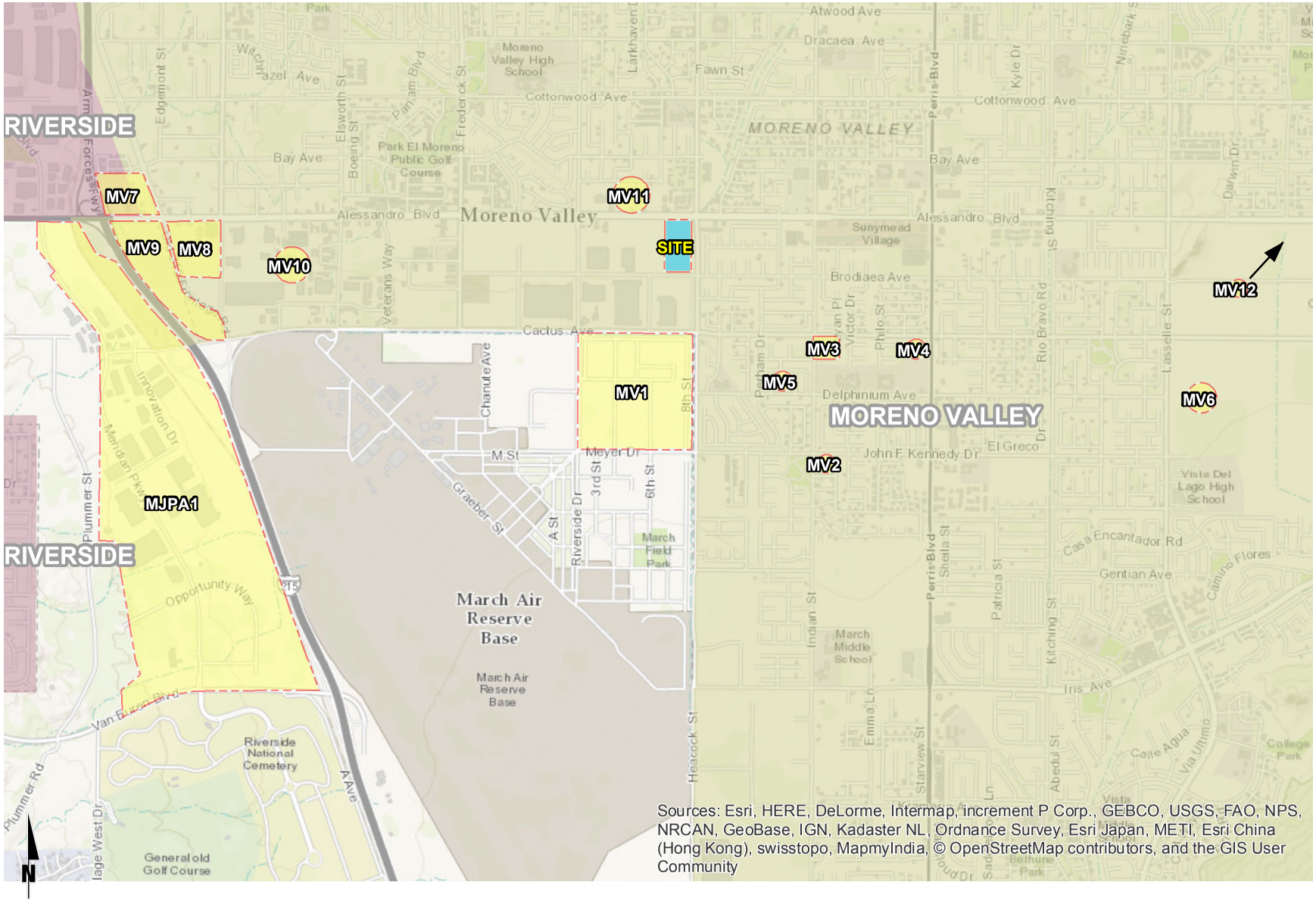
10 = PERCENT TO/FROM PROJECT

N

11140 - trip.dwg

URBAN CROSSROADS

EXHIBIT 5: CUMULATIVE DEVELOPMENT LOCATION MAP



URBAN CROSSROADS

Table 1

Project Trip Generation Summary (In PCE)

Land Use	Units[2]	ITE LU Code	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	Daily
Trip Generation Rates[1]									
High-Cube Warehouse[3,4]	TSF	152	0.076	0.034	0.110	0.037	0.083	0.120	1.680
Passenger Cars			0.055	0.025	0.080	0.025	0.055	0.080	1.040
2-Axle Trucks (PCE = 1.5)			0.007	0.003	0.010	0.004	0.009	0.013	0.211
3-Axle Trucks (PCE = 2.0)			0.007	0.003	0.011	0.004	0.010	0.014	0.226
4-Axle+ Trucks (PCE = 3.0)			0.037	0.017	0.054	0.022	0.050	0.072	1.158

Land Use	Quantity	Units[2]	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	Daily
Passenger Car Equivalent (PCE) Trip Generation Summary									
High-Cube Warehouse	262.000	TSF							
Passenger Cars:			14	6	20	7	14	21	272
Truck Trips:									
2-axle:			2	1	3	1	2	3	55
3-axle:			2	1	3	1	3	4	59
4+-axle:			10	4	14	6	13	19	303
- Net Truck Trips (PCE)			*14*	*6*	*20*	*8*	*18*	*26*	*417*
TOTAL NET TRIPS (PCE)[5]			***28***	***12***	***40***	***15***	***32***	***47***	***689***

[1] Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, Ninth Edition (2012).

[2] TSF = Thousand Square Feet

[3] Vehicle Mix Source: "Vehicle Mix and Enter/Exit Splits by Land Use Category (Heavy Warehouse)" - City of Fontana Truck Trip Generation Study (2003)
79.57% passenger cars, 3.46% 2-Axle trucks, 4.64% 3-Axle trucks, 12.33% 4-Axle trucks

[4] PCE rates are per SANBAG as PCE factors are not readily available. They are 1.5 for 2-axle trucks, 2.0 for 3-axle trucks, and 3.0 for 4+-axle trucks.

[5] TOTAL NET TRIPS (PCE) = Passenger Cars + Net Truck Trips (PCE).

Table 2

Project Trip Generation Summary (In Actual Vehicles)

Land Use	Units[2]	ITE LU Code	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	Daily
Trip Generation Rates[1]									
High-Cube Warehouse[3]	TSF	152	0.076	0.034	0.110	0.037	0.083	0.120	1.680
Passenger Cars			0.055	0.025	0.080	0.025	0.055	0.080	1.040
2-Axle Trucks			0.005	0.002	0.007	0.003	0.006	0.009	0.141
3-Axle Trucks			0.004	0.002	0.005	0.002	0.005	0.007	0.113
4-Axle+ Trucks			0.012	0.006	0.018	0.007	0.017	0.024	0.386

Land Use	Quantity	Units[1]	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	Daily
Actual Vehicles Trip Generation Summary									
High-Cube Warehouse	262.000	TSF							
Passenger Cars:			14	6	21	7	14	21	272
Truck Trips:									
2-axle:			1	1	2	1	2	2	37
3-axle:			1	0	1	1	1	2	30
4+-axle:			3	1	5	2	4	6	101
- Net Truck Trips (Actual Trucks)			*5*	*2*	*8*	*3*	*7*	*10*	*168*
TOTAL NET TRIPS (Actual Vehicles) [4]			***20***	***9***	***29***	***10***	***22***	***31***	***440***

[1] Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, Ninth Edition (2012).

[2] TSF = Thousand Square Feet

[3] Vehicle Mix Source: "Vehicle Mix and Enter/Exit Splits by Land Use Category (Heavy Warehouse)" - City of Fontana Truck Trip Generation Study (2003)
79.57% passenger cars, 3.46% 2-Axle trucks, 4.64% 3-Axle trucks, 12.33% 4-Axle trucks

[4] TOTAL NET TRIPS (Actual Vehicles) = Passenger Cars + Net Truck Trips (Actual Trucks).

Table 3

Cumulative Development Land Use Summary

ID	Project Name	Land Use[1]	Quantity	Units[2]
MV1	March Lifecare Campus Specific Plan[3]	Medical Offices	190.000	TSF
		Commercial Retail	210.000	TSF
		Research & Education	200.000	TSF
		Hospital	50	Beds
		Institutional Residential	660	Beds
MV2	O'Reilly Automotive	Automobile Parts Sale	7.500	TSF
	PA15-004	Retail/Restaurant/Fast Food	2.973	TSF
MV3	TM 33417	Condo/Townhomes	60	DU
MV4	TM 33607	Condo/Townhomes	52	DU
MV5	32711 Isaac Genah	SFDR	9	DU
MV6	a Moreno Medical Campus	Medical Offices	80.000	TSF
	b Aqua Bella Specific Plan	SFDR	2,922	DU
	c TR 34329 (Granite Capitol)	SFDR	90	DU
	d Cresta Bella	General Office	30.000	TSF
MV7	P07-0102; and P09-0416, -0418, -0419	General Light Industrial	652.018	TSF
	Alessandro Bl. (APN 263-091-008; 263-100-019; 263-100-005; P14-0841 to 0848)	Commercial and Industrial Complex	101.580	TSF
MV8	Alessandro Metrolink Station	Light Rail Transit Station	300	SP
MV9	Freeway Business Center	High-Cube Warehouse	709.083	TSF
MV10	PA 08-0047-0052 (Komar Cactus Plaza)[3]	Hotel	110	Rooms
		Fast Food w/Drive Thru	8.000	TSF
		Commercial	42.400	TSF
MV11	PA 09-0031	Gas Station	12	VFP
MV12	Prologis	High-Cube Warehouse	1,916.190	TSF
		High-Cube Warehouse	328.448	TSF
	World Logistics Center	High-Cube Warehouse	41,400.000	TSF
		Warehousing	200.000	TSF
		Gas Station w/ Market	12	VFP
		Existing SFDR	7	DU
MJPA1	Meridian Business Park North	Industrial Park	5,985.000	TSF

[1] SFDR = Single Family Detached Residential

[2] DU = Dwelling Units; TSF = Thousand Square Feet; SP = Spaces; VFP = Vehicle Fueling Positions

APPENDIX 1.2:

TUMF TRANSPORTATION IMPROVEMENT PROGRAM FOR MORENO VALLEY

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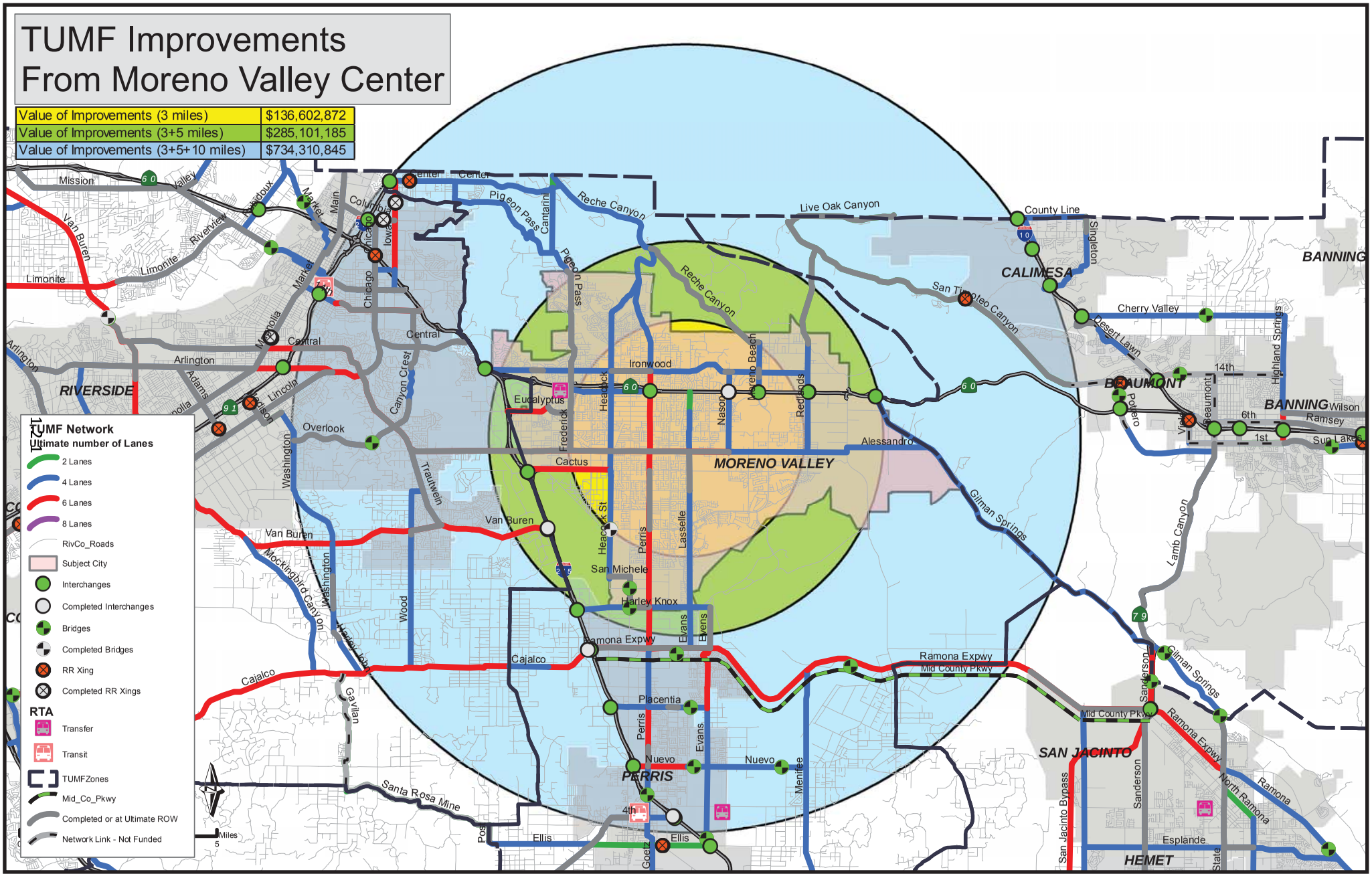
TUMF Improvements From Moreno Valley Center

Value of Improvements (3 miles)	$136,602,872
Value of Improvements (3+5 miles)	$285,101,185
Value of Improvements (3+5+10 miles)	$734,310,845



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APPENDIX 1.3:

SITE ADJACENT QUEUING ANALYSIS

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Intersection: 3: Brodiaea Av. & Dwy. 1

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (ft)	31	30
Average Queue (ft)	2	6
95th Queue (ft)	15	25
Link Distance (ft)		217
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	100	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: Brodiaea Av. & Dwy. 2

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (ft)	25	35
Average Queue (ft)	1	5
95th Queue (ft)	11	24
Link Distance (ft)		126
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	100	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Brodiaea Av. & Dwy. 1

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (ft)	12	36
Average Queue (ft)	0	15
95th Queue (ft)	6	40
Link Distance (ft)		217
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	100	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: Brodiaea Av. & Dwy. 2

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (ft)	6	30
Average Queue (ft)	0	11
95th Queue (ft)	6	34
Link Distance (ft)		126
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	100	
Storage Blk Time (%)		
Queuing Penalty (veh)		

APPENDIX 3.1:

EXISTING TRAFFIC COUNTS – SEPTEMBER 2017

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Counts Unlimited
PO Box 1178
Corona, CA 92878
(951) 268-6268

City of Moreno Valley
N/S: Gilbert Street
E/W: Brodiaea Avenue
Weather: Clear

File Name : 01_MRV_GIBI AM
Site Code : 05117597
Start Date : 9/12/2017
Page No : 1

Groups Printed- Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks

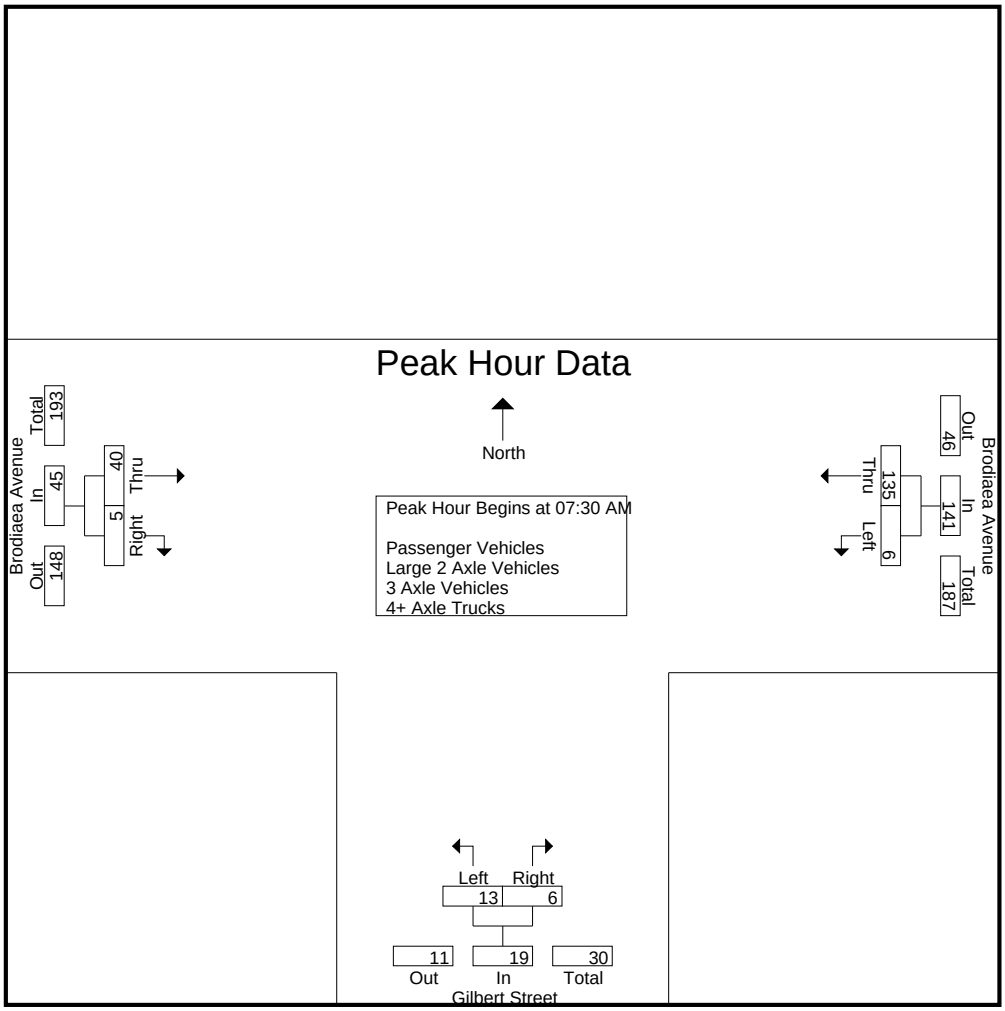
	Brodiaea Avenue Westbound				Gilbert Street Northbound				Brodiaea Avenue Eastbound						
Start Time	Left	Thru	RTOR	App. Total	Left	Right	RTOR	App. Total	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	3	23	0	26	4	2	0	6	4	0	0	4	0	36	36
07:15 AM	2	31	0	33	2	0	0	2	4	2	0	6	0	41	41
07:30 AM	3	29	0	32	1	1	0	2	6	3	0	9	0	43	43
07:45 AM	2	44	0	46	4	1	0	5	16	1	0	17	0	68	68
Total	10	127	0	137	11	4	0	15	30	6	0	36	0	188	188
08:00 AM	1	34	0	35	5	1	0	6	7	1	0	8	0	49	49
08:15 AM	0	28	0	28	3	3	0	6	11	0	0	11	0	45	45
08:30 AM	0	18	0	18	1	2	0	3	5	0	0	5	0	26	26
08:45 AM	3	19	0	22	0	0	0	0	7	1	0	8	0	30	30
Total	4	99	0	103	9	6	0	15	30	2	0	32	0	150	150
Grand Total	14	226	0	240	20	10	0	30	60	8	0	68	0	338	338
Apprch %	5.8	94.2			66.7	33.3			88.2	11.8					
Total %	4.1	66.9		71	5.9	3		8.9	17.8	2.4		20.1	0	100	
Passenger Vehicles	11	216		227	16	2		18	57	5		62	0	0	307
% Passenger Vehicles	78.6	95.6	0	94.6	80	20	0	60	95	62.5	0	91.2	0	0	90.8
Large 2 Axle Vehicles	0	5		5	0	0		0	0	2		2	0	0	7
% Large 2 Axle Vehicles	0	2.2	0	2.1	0	0	0	0	0	25	0	2.9	0	0	2.1
3 Axle Vehicles	0	4		4	0	0		0	3	0		3	0	0	7
% 3 Axle Vehicles	0	1.8	0	1.7	0	0	0	0	5	0	0	4.4	0	0	2.1
4+ Axle Trucks	3	1		4	4	8		12	0	1		1	0	0	17
% 4+ Axle Trucks	21.4	0.4	0	1.7	20	80	0	40	0	12.5	0	1.5	0	0	5

	Brodiaea Avenue Westbound			Gilbert Street Northbound			Brodiaea Avenue Eastbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:30 AM										
07:30 AM	**3**	29	32	1	1	2	6	**3**	9	43
07:45 AM	2	**44**	**46**	4	1	5	**16**	1	**17**	**68**
08:00 AM	1	34	35	**5**	1	**6**	7	1	8	49
08:15 AM	0	28	28	3	**3**	6	11	0	11	45
Total Volume	6	135	141	13	6	19	40	5	45	205
% App. Total	4.3	95.7		68.4	31.6		88.9	11.1		
PHF	.500	.767	.766	.650	.500	.792	.625	.417	.662	.754

Counts Unlimited
PO Box 1178
Corona, CA 92878
(951) 268-6268

City of Moreno Valley
N/S: Gilbert Street
E/W: Brodiaea Avenue
Weather: Clear

File Name : 01_MRV_GIBI AM
Site Code : 05117597
Start Date : 9/12/2017
Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:15 AM			07:45 AM			07:30 AM		
+0 mins.	2	31	33	4	1	5	6	**3**	9
+15 mins.	**3**	29	32	**5**	1	**6**	**16**	1	**17**
+30 mins.	2	**44**	**46**	3	**3**	6	7	1	8
+45 mins.	1	34	35	1	2	3	11	0	11
Total Volume	8	138	146	13	7	20	40	5	45
% App. Total	5.5	94.5		65	35		88.9	11.1	
PHF	.667	.784	.793	.650	.583	.833	.625	.417	.662

Counts Unlimited
PO Box 1178
Corona, CA 92878
(951) 268-6268

City of Moreno Valley
N/S: Gilbert Street
E/W: Brodiaea Avenue
Weather: Clear

File Name : 01_MRV_GIBI AM
Site Code : 05117597
Start Date : 9/12/2017
Page No : 1

Groups Printed- Passenger Vehicles

	Brodiaea Avenue Westbound				Gilbert Street Northbound				Brodiaea Avenue Eastbound						
Start Time	Left	Thru	RTOR	App. Total	Left	Right	RTOR	App. Total	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	2	22	0	24	3	1	0	4	4	0	0	4	0	32	32
07:15 AM	1	31	0	32	1	0	0	1	3	0	0	3	0	36	36
07:30 AM	2	28	0	30	1	0	0	1	6	3	0	9	0	40	40
07:45 AM	2	41	0	43	4	0	0	4	16	0	0	16	0	63	63
Total	7	122	0	129	9	1	0	10	29	3	0	32	0	171	171
08:00 AM	1	33	0	34	4	0	0	4	7	1	0	8	0	46	46
08:15 AM	0	27	0	27	3	0	0	3	10	0	0	10	0	40	40
08:30 AM	0	18	0	18	0	1	0	1	4	0	0	4	0	23	23
08:45 AM	3	16	0	19	0	0	0	0	7	1	0	8	0	27	27
Total	4	94	0	98	7	1	0	8	28	2	0	30	0	136	136
Grand Total	11	216	0	227	16	2	0	18	57	5	0	62	0	307	307
Apprch %	4.8	95.2			88.9	11.1			91.9	8.1					
Total %	3.6	70.4		73.9	5.2	0.7		5.9	18.6	1.6		20.2	0	100	

	Brodiaea Avenue Westbound			Gilbert Street Northbound			Brodiaea Avenue Eastbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:30 AM										
07:30 AM	**2**	28	30	1	0	1	6	**3**	9	40
07:45 AM	2	**41**	**43**	**4**	0	**4**	**16**	0	**16**	**63**
08:00 AM	1	33	34	4	0	4	7	1	8	46
08:15 AM	0	27	27	3	0	3	10	0	10	40
Total Volume	5	129	134	12	0	12	39	4	43	189
% App. Total	3.7	96.3		100	0		90.7	9.3		
PHF	.625	.787	.779	.750	.000	.750	.609	.333	.672	.750

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City of Moreno Valley
N/S: Gilbert Street
E/W: Brodiaea Avenue
Weather: Clear

File Name : 01_MRV_GIBI AM
Site Code : 05117597
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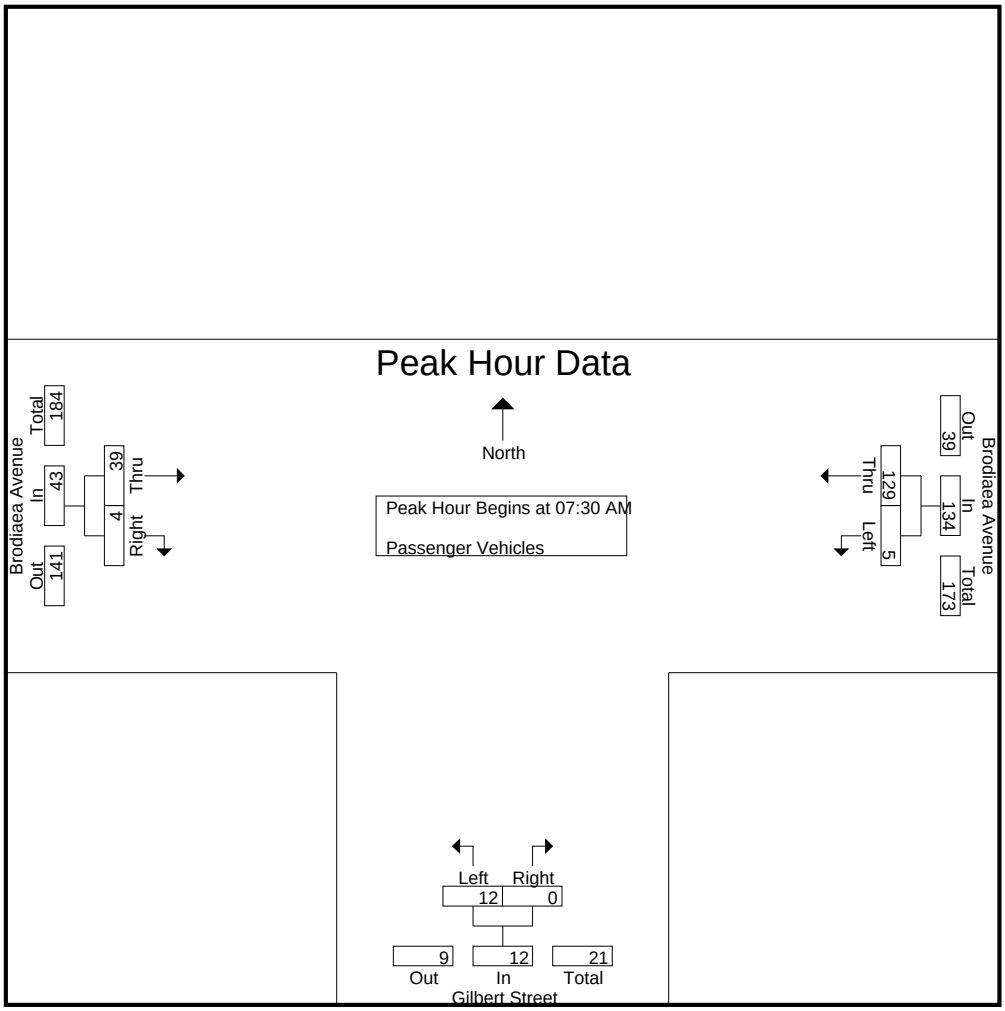

Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM			07:30 AM			07:30 AM		
+0 mins.	**2**	28	30	1	0	1	6	**3**	9
+15 mins.	2	**41**	**43**	**4**	0	**4**	**16**	0	**16**
+30 mins.	1	33	34	4	0	4	7	1	8
+45 mins.	0	27	27	3	0	3	10	0	10
Total Volume	5	129	134	12	0	12	39	4	43
% App. Total	3.7	96.3		100	0		90.7	9.3	
PHF	.625	.787	.779	.750	.000	.750	.609	.333	.672

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Groups Printed- Large 2 Axle Vehicles

	Brodiaea Avenue Westbound				Gilbert Street Northbound				Brodiaea Avenue Eastbound						
Start Time	Left	Thru	RTOR	App. Total	Left	Right	RTOR	App. Total	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	1	0	1	0	1	1
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	3	0	3	0	0	0	0	0	1	0	1	0	4	4
Total	0	3	0	3	0	0	0	0	0	2	0	2	0	5	5
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	1	0	1	0	0	0	0	0	0	0	0	0	1	1
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	1	0	1	0	0	0	0	0	0	0	0	0	1	1
Total	0	2	0	2	0	0	0	0	0	0	0	0	0	2	2
Grand Total	0	5	0	5	0	0	0	0	0	2	0	2	0	7	7
Apprch %	0	100			0	0			0	100					
Total %	0	71.4		71.4	0	0		0	0	28.6		28.6	0	100	

	Brodiaea Avenue Westbound			Gilbert Street Northbound			Brodiaea Avenue Eastbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:30 AM										
07:30 AM	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	**3**	**3**	0	0	0	0	**1**	**1**	**4**
08:00 AM	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	1	1	0	0	0	0	0	0	1
Total Volume	0	4	4	0	0	0	0	1	1	5
% App. Total	0	100		0	0		0	100		
PHF	.000	.333	.333	.000	.000	.000	.000	.250	.250	.313

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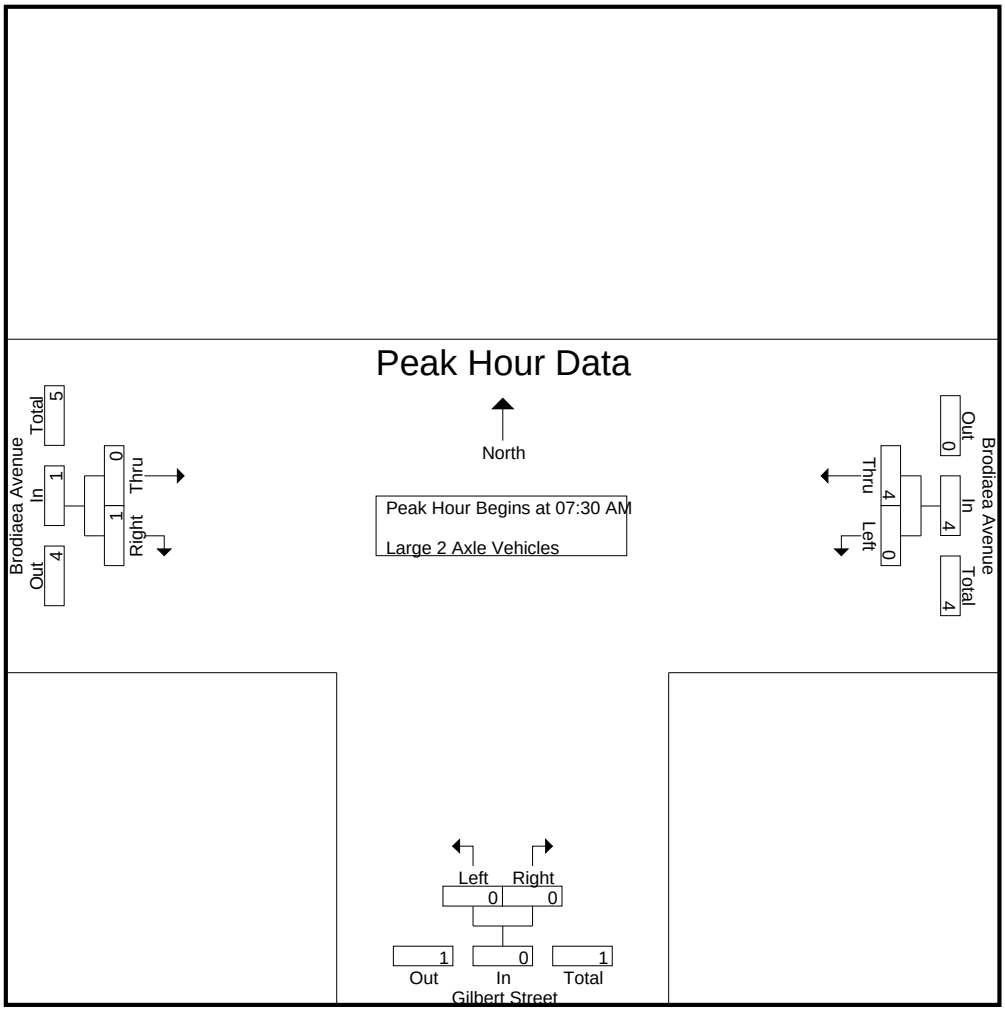

Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM			07:30 AM			07:30 AM		
+0 mins.	0	0	0	0	0	0	0	0	0
+15 mins.	0	**3**	**3**	0	0	0	0	**1**	**1**
+30 mins.	0	0	0	0	0	0	0	0	0
+45 mins.	0	1	1	0	0	0	0	0	0
Total Volume	0	4	4	0	0	0	0	1	1
% App. Total	0	100		0	0		0	100	
PHF	.000	.333	.333	.000	.000	.000	.000	.250	.250

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Groups Printed- 3 Axle Vehicles

	Brodiaea Avenue Westbound				Gilbert Street Northbound				Brodiaea Avenue Eastbound						
Start Time	Left	Thru	RTOR	App. Total	Left	Right	RTOR	App. Total	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	1	0	1	0	0	0	0	0	0	0	0	0	1	1
07:15 AM	0	0	0	0	0	0	0	0	1	0	0	1	0	1	1
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	1	0	1	0	0	0	0	1	0	0	1	0	2	2
08:00 AM	0	1	0	1	0	0	0	0	0	0	0	0	0	1	1
08:15 AM	0	0	0	0	0	0	0	0	1	0	0	1	0	1	1
08:30 AM	0	0	0	0	0	0	0	0	1	0	0	1	0	1	1
08:45 AM	0	2	0	2	0	0	0	0	0	0	0	0	0	2	2
Total	0	3	0	3	0	0	0	0	2	0	0	2	0	5	5
Grand Total	0	4	0	4	0	0	0	0	3	0	0	3	0	7	7
Apprch %	0	100			0	0			100	0					
Total %	0	57.1		57.1	0	0		0	42.9	0		42.9	0	100	

	Brodiaea Avenue Westbound			Gilbert Street Northbound			Brodiaea Avenue Eastbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:30 AM										
07:30 AM	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	**1**	**1**	0	0	0	0	0	0	**1**
08:15 AM	0	0	0	0	0	0	**1**	0	**1**	1
Total Volume	0	1	1	0	0	0	1	0	1	2
% App. Total	0	100		0	0		100	0		
PHF	.000	.250	.250	.000	.000	.000	.250	.000	.250	.500

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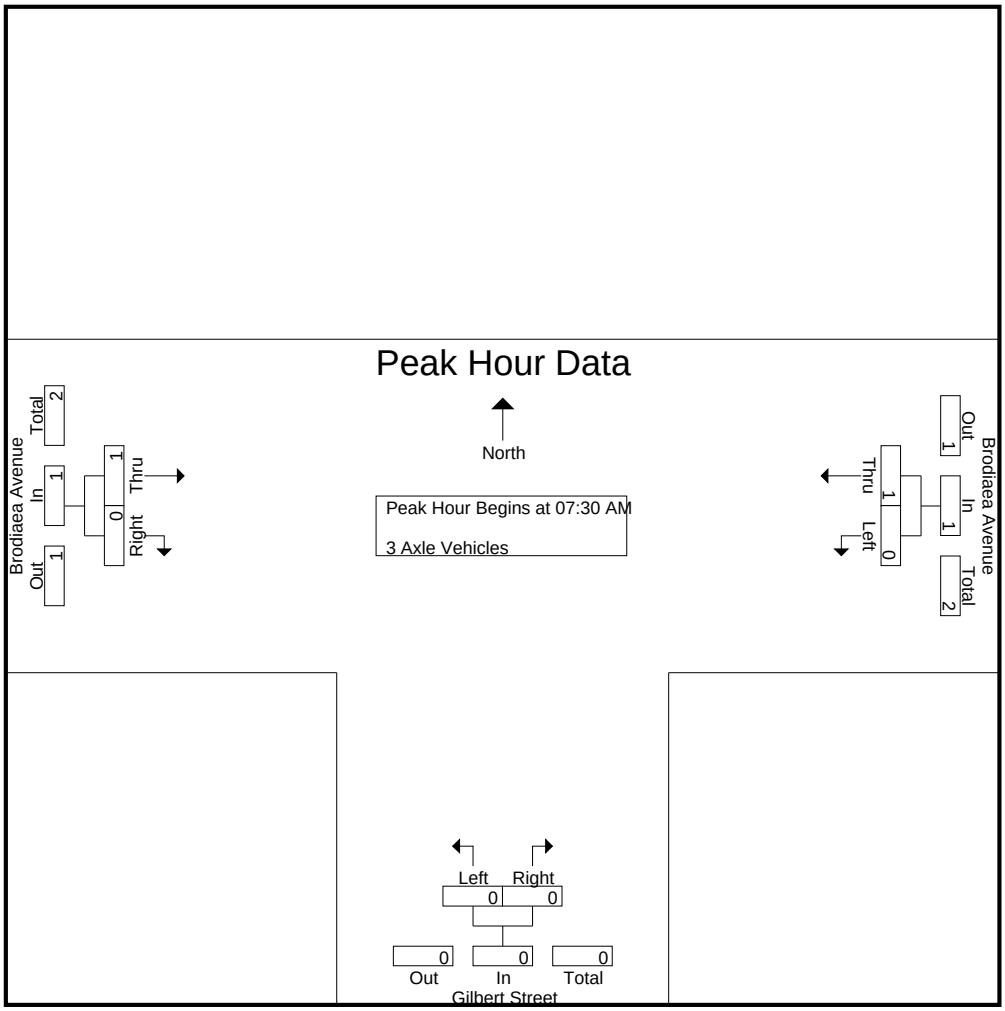

Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM			07:30 AM			07:30 AM		
+0 mins.	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0
+30 mins.	0	**1**	**1**	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	**1**	0	**1**
Total Volume	0	1	1	0	0	0	1	0	1
% App. Total	0	100		0	0		100	0	
PHF	.000	.250	.250	.000	.000	.000	.250	.000	.250

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Groups Printed- 4+ Axle Trucks

	Brodiaea Avenue Westbound				Gilbert Street Northbound				Brodiaea Avenue Eastbound						
Start Time	Left	Thru	RTOR	App. Total	Left	Right	RTOR	App. Total	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	1	0	0	1	1	1	0	2	0	0	0	0	0	3	3
07:15 AM	1	0	0	1	1	0	0	1	0	1	0	1	0	3	3
07:30 AM	1	1	0	2	0	1	0	1	0	0	0	0	0	3	3
07:45 AM	0	0	0	0	0	1	0	1	0	0	0	0	0	1	1
Total	3	1	0	4	2	3	0	5	0	1	0	1	0	10	10
08:00 AM	0	0	0	0	1	1	0	2	0	0	0	0	0	2	2
08:15 AM	0	0	0	0	0	3	0	3	0	0	0	0	0	3	3
08:30 AM	0	0	0	0	1	1	0	2	0	0	0	0	0	2	2
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	2	5	0	7	0	0	0	0	0	7	7
Grand Total	3	1	0	4	4	8	0	12	0	1	0	1	0	17	17
Apprch %	75	25			33.3	66.7			0	100					
Total %	17.6	5.9		23.5	23.5	47.1		70.6	0	5.9		5.9	0	100	

	Brodiaea Avenue Westbound			Gilbert Street Northbound			Brodiaea Avenue Eastbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:30 AM										
07:30 AM	**1**	**1**	**2**	0	1	1	0	0	0	**3**
07:45 AM	0	0	0	0	1	1	0	0	0	1
08:00 AM	0	0	0	**1**	1	2	0	0	0	2
08:15 AM	0	0	0	0	**3**	**3**	0	0	0	3
Total Volume	1	1	2	1	6	7	0	0	0	9
% App. Total	50	50		14.3	85.7		0	0		
PHF	.250	.250	.250	.250	.500	.583	.000	.000	.000	.750

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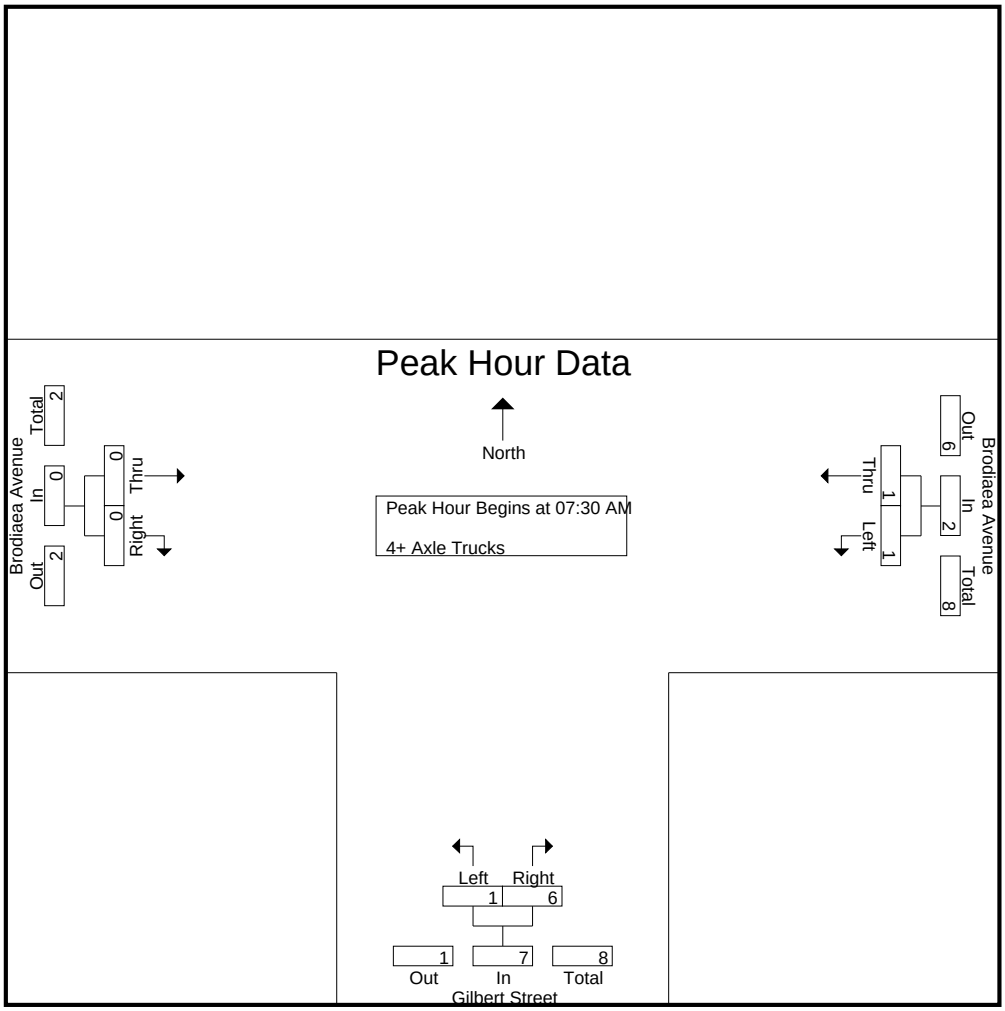

Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM			07:30 AM			07:30 AM		
+0 mins.	**1**	**1**	**2**	0	1	1	0	0	0
+15 mins.	0	0	0	0	1	1	0	0	0
+30 mins.	0	0	0	**1**	1	2	0	0	0
+45 mins.	0	0	0	0	**3**	**3**	0	0	0
Total Volume	1	1	2	1	6	7	0	0	0
% App. Total	50	50		14.3	85.7		0	0	
PHF	.250	.250	.250	.250	.500	.583	.000	.000	.000

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Groups Printed- Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks

	Brodiaea Avenue Westbound				Gilbert Street Northbound				Brodiaea Avenue Eastbound						
Start Time	Left	Thru	RTOR	App. Total	Left	Right	RTOR	App. Total	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	2	20	0	22	1	1	0	2	20	0	0	20	0	44	44
04:15 PM	0	16	0	16	1	2	0	3	23	0	0	23	0	42	42
04:30 PM	1	20	0	21	1	4	0	5	23	1	0	24	0	50	50
04:45 PM	3	28	0	31	3	2	0	5	20	4	0	24	0	60	60
Total	6	84	0	90	6	9	0	15	86	5	0	91	0	196	196
05:00 PM	1	20	0	21	0	2	0	2	36	1	0	37	0	60	60
05:15 PM	3	23	0	26	1	2	0	3	18	0	0	18	0	47	47
05:30 PM	1	25	0	26	4	5	0	9	36	2	0	38	0	73	73
05:45 PM	4	28	0	32	1	1	0	2	24	1	0	25	0	59	59
Total	9	96	0	105	6	10	0	16	114	4	0	118	0	239	239
Grand Total	15	180	0	195	12	19	0	31	200	9	0	209	0	435	435
Apprch %	7.7	92.3			38.7	61.3			95.7	4.3					
Total %	3.4	41.4		44.8	2.8	4.4		7.1	46	2.1		48	0	100	
Passenger Vehicles	11	172		183	11	13		24	197	7		204	0	0	411
% Passenger Vehicles	73.3	95.6	0	93.8	91.7	68.4	0	77.4	98.5	77.8	0	97.6	0	0	94.5
Large 2 Axle Vehicles	0	7		7	1	0		1	2	2		4	0	0	12
% Large 2 Axle Vehicles	0	3.9	0	3.6	8.3	0	0	3.2	1	22.2	0	1.9	0	0	2.8
3 Axle Vehicles	0	0		0	0	1		1	1	0		1	0	0	2
% 3 Axle Vehicles	0	0	0	0	0	5.3	0	3.2	0.5	0	0	0.5	0	0	0.5
4+ Axle Trucks	4	1		5	0	5		5	0	0		0	0	0	10
% 4+ Axle Trucks	26.7	0.6	0	2.6	0	26.3	0	16.1	0	0	0	0	0	0	2.3

	Brodiaea Avenue Westbound			Gilbert Street Northbound			Brodiaea Avenue Eastbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:45 PM										
04:45 PM	**3**	**28**	**31**	3	2	5	20	**4**	24	60
05:00 PM	1	20	21	0	2	2	**36**	1	37	60
05:15 PM	3	23	26	1	2	3	18	0	18	47
05:30 PM	1	25	26	**4**	**5**	**9**	36	2	**38**	**73**
Total Volume	8	96	104	8	11	19	110	7	117	240
% App. Total	7.7	92.3		42.1	57.9		94	6		
PHF	.667	.857	.839	.500	.550	.528	.764	.438	.770	.822

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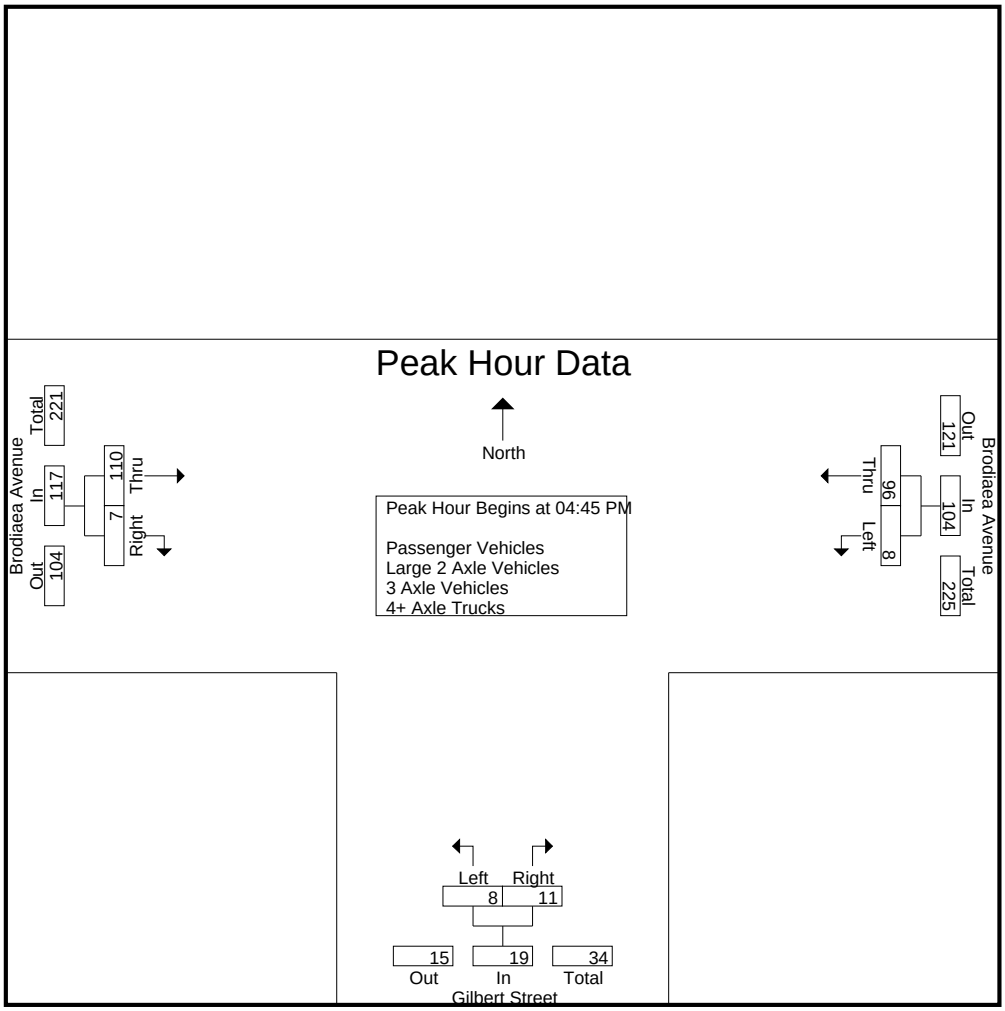

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	05:00 PM			04:45 PM			05:00 PM		
+0 mins.	1	20	21	3	2	5	**36**	1	37
+15 mins.	3	23	26	0	2	2	18	0	18
+30 mins.	1	25	26	1	2	3	36	**2**	**38**
+45 mins.	**4**	**28**	**32**	**4**	**5**	**9**	24	1	25
Total Volume	9	96	105	8	11	19	114	4	118
% App. Total	8.6	91.4		42.1	57.9		96.6	3.4	
PHF	.563	.857	.820	.500	.550	.528	.792	.500	.776

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Groups Printed- Passenger Vehicles

	Brodiaea Avenue Westbound				Gilbert Street Northbound				Brodiaea Avenue Eastbound						
Start Time	Left	Thru	RTOR	App. Total	Left	Right	RTOR	App. Total	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	1	18	0	19	0	0	0	0	18	0	0	18	0	37	37
04:15 PM	0	14	0	14	1	1	0	2	23	0	0	23	0	39	39
04:30 PM	1	19	0	20	1	4	0	5	23	1	0	24	0	49	49
04:45 PM	3	27	0	30	3	1	0	4	20	3	0	23	0	57	57
Total	5	78	0	83	5	6	0	11	84	4	0	88	0	182	182
05:00 PM	0	20	0	20	0	1	0	1	36	1	0	37	0	58	58
05:15 PM	2	23	0	25	1	2	0	3	18	0	0	18	0	46	46
05:30 PM	1	24	0	25	4	4	0	8	35	1	0	36	0	69	69
05:45 PM	3	27	0	30	1	0	0	1	24	1	0	25	0	56	56
Total	6	94	0	100	6	7	0	13	113	3	0	116	0	229	229
Grand Total	11	172	0	183	11	13	0	24	197	7	0	204	0	411	411
Apprch %	6	94			45.8	54.2			96.6	3.4					
Total %	2.7	41.8		44.5	2.7	3.2		5.8	47.9	1.7		49.6	0	100	

	Brodiaea Avenue Westbound			Gilbert Street Northbound			Brodiaea Avenue Eastbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:45 PM										
04:45 PM	**3**	**27**	**30**	3	1	4	20	**3**	23	57
05:00 PM	0	20	20	0	1	1	**36**	1	**37**	58
05:15 PM	2	23	25	1	2	3	18	0	18	46
05:30 PM	1	24	25	**4**	**4**	**8**	35	1	36	**69**
Total Volume	6	94	100	8	8	16	109	5	114	230
% App. Total	6	94		50	50		95.6	4.4		
PHF	.500	.870	.833	.500	.500	.500	.757	.417	.770	.833

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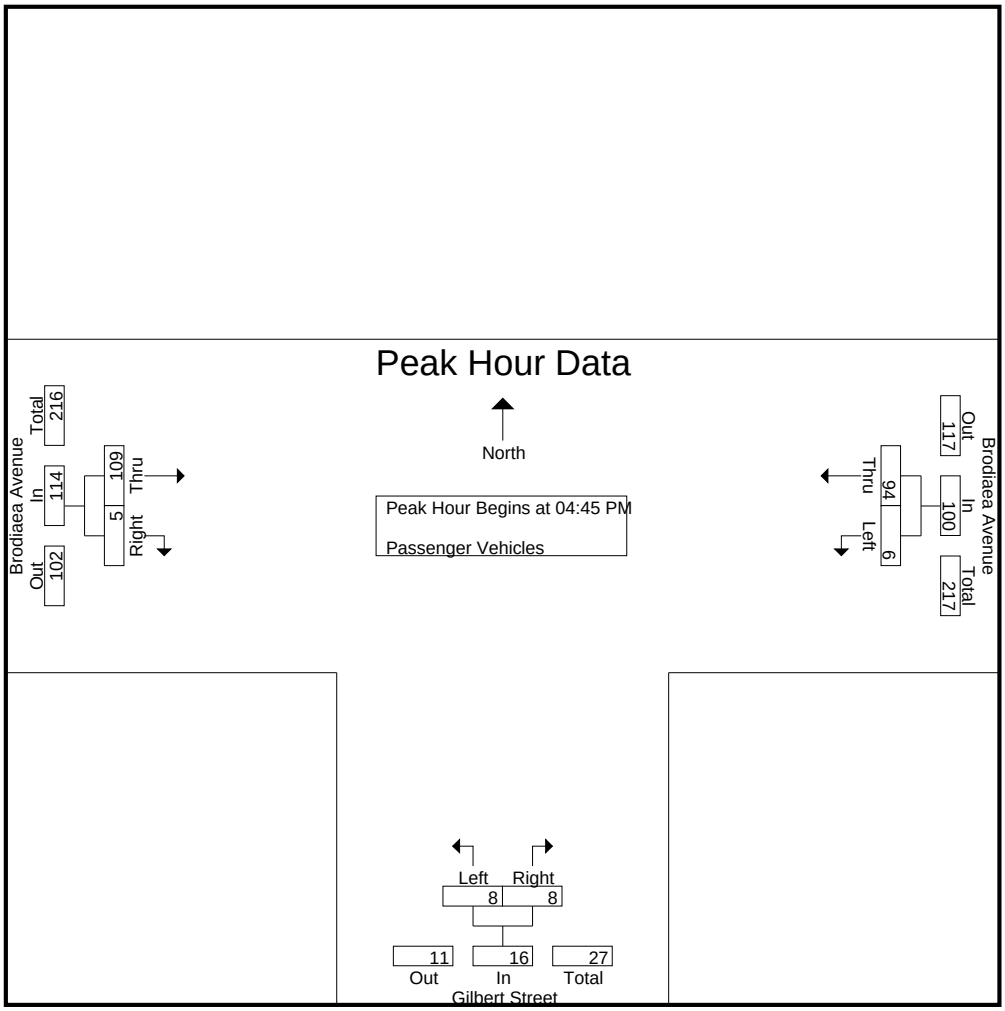

Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:45 PM			04:45 PM			04:45 PM		
+0 mins.	**3**	**27**	**30**	3	1	4	20	**3**	23
+15 mins.	0	20	20	0	1	1	**36**	1	**37**
+30 mins.	2	23	25	1	2	3	18	0	18
+45 mins.	1	24	25	**4**	**4**	**8**	35	1	36
Total Volume	6	94	100	8	8	16	109	5	114
% App. Total	6	94		50	50		95.6	4.4	
PHF	.500	.870	.833	.500	.500	.500	.757	.417	.770

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City of Moreno Valley
N/S: Gilbert Street
E/W: Brodiaea Avenue
Weather: Clear

File Name : 01_MRV_GIBI PM
Site Code : 05117597
Start Date : 9/12/2017
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Groups Printed- Large 2 Axle Vehicles

	Brodiaea Avenue Westbound				Gilbert Street Northbound				Brodiaea Avenue Eastbound						
Start Time	Left	Thru	RTOR	App. Total	Left	Right	RTOR	App. Total	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	2	0	2	1	0	0	1	1	0	0	1	0	4	4
04:15 PM	0	2	0	2	0	0	0	0	0	0	0	0	0	2	2
04:30 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	1	1
04:45 PM	0	1	0	1	0	0	0	0	0	1	0	1	0	2	2
Total	0	6	0	6	1	0	0	1	1	1	0	2	0	9	9
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	1	1	0	2	0	2	2
05:45 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	1	1
Total	0	1	0	1	0	0	0	0	1	1	0	2	0	3	3
Grand Total	0	7	0	7	1	0	0	1	2	2	0	4	0	12	12
Apprch %	0	100			100	0			50	50					
Total %	0	58.3		58.3	8.3	0		8.3	16.7	16.7		33.3	0	100	

	Brodiaea Avenue Westbound			Gilbert Street Northbound			Brodiaea Avenue Eastbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:45 PM										
04:45 PM	0	**1**	**1**	0	0	0	0	**1**	1	**2**
05:00 PM	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	**1**	1	**2**	2
Total Volume	0	1	1	0	0	0	1	2	3	4
% App. Total	0	100		0	0		33.3	66.7		
PHF	.000	.250	.250	.000	.000	.000	.250	.500	.375	.500

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City of Moreno Valley
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Weather: Clear

File Name : 01_MRV_GIBI PM
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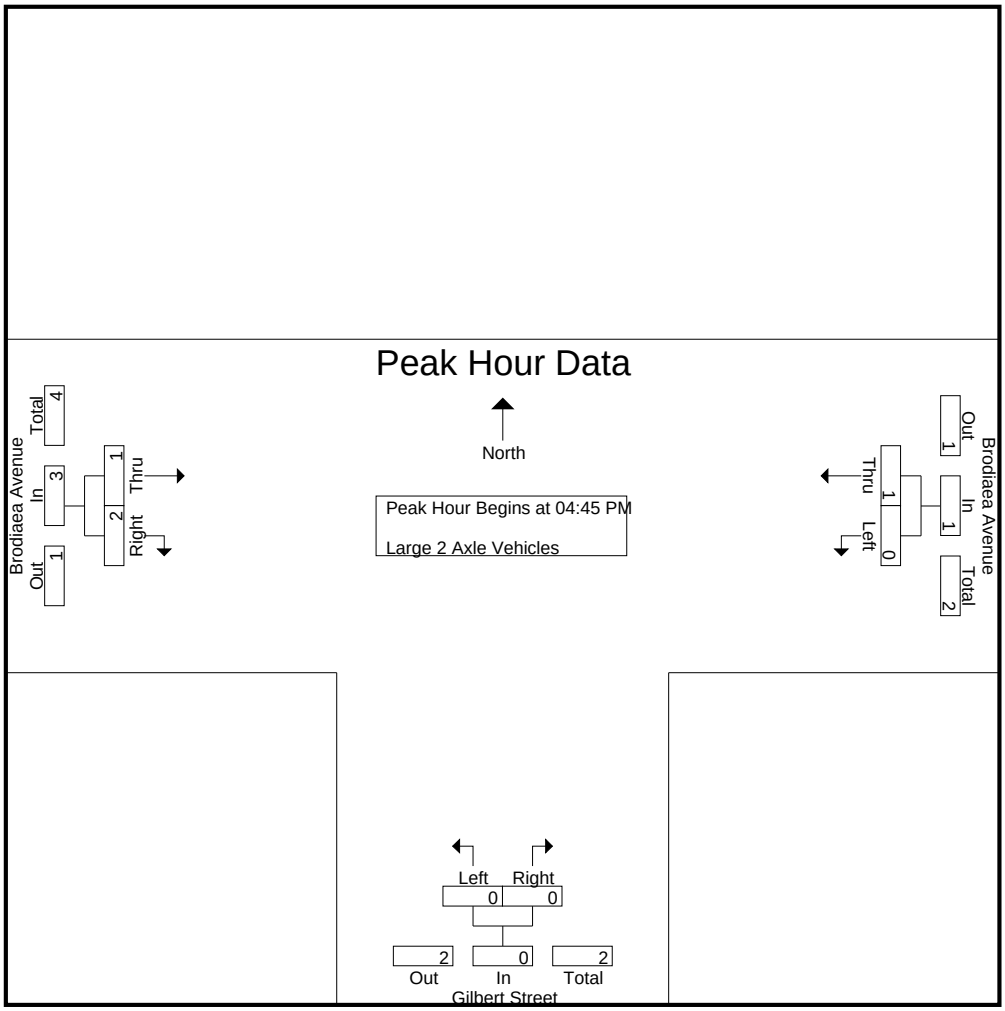

Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:45 PM			04:45 PM			04:45 PM		
+0 mins.	0	**1**	**1**	0	0	0	0	**1**	1
+15 mins.	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	**1**	1	**2**
Total Volume	0	1	1	0	0	0	1	2	3
% App. Total	0	100		0	0		33.3	66.7	
PHF	.000	.250	.250	.000	.000	.000	.250	.500	.375

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E/W: Brodiaea Avenue
Weather: Clear

File Name : 01_MRV_GIBI PM
Site Code : 05117597
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Groups Printed- 3 Axle Vehicles

	Brodiaea Avenue Westbound				Gilbert Street Northbound				Brodiaea Avenue Eastbound						
Start Time	Left	Thru	RTOR	App. Total	Left	Right	RTOR	App. Total	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	1	0	0	1	0	1	1
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	1	1
Total	0	0	0	0	0	1	0	1	1	0	0	1	0	2	2
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	1	0	1	1	0	0	1	0	2	2
Apprch %	0	0			0	100			100	0					
Total %	0	0		0	0	50		50	50	0		50	0	100	

	Brodiaea Avenue Westbound			Gilbert Street Northbound			Brodiaea Avenue Eastbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:45 PM										
04:45 PM	0	0	0	0	**1**	**1**	0	0	0	**1**
05:00 PM	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	1	1	0	0	0	1
% App. Total	0	0		0	100		0	0		
PHF	.000	.000	.000	.000	.250	.250	.000	.000	.000	.250

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City of Moreno Valley
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E/W: Brodiaea Avenue
Weather: Clear

File Name : 01_MRV_GIBI PM
Site Code : 05117597
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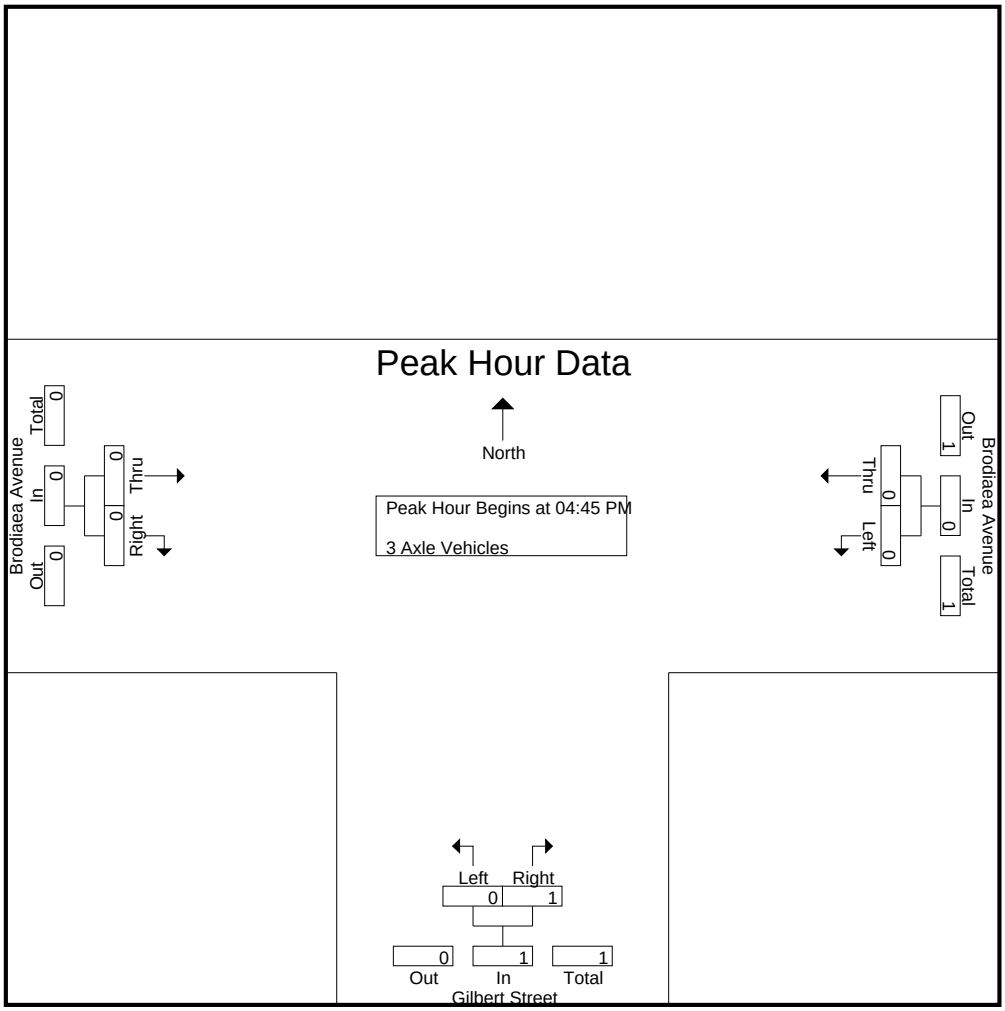

Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:45 PM			04:45 PM			04:45 PM		
+0 mins.	0	0	0	0	**1**	**1**	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	1	1	0	0	0
% App. Total	0	0		0	100		0	0	
PHF	.000	.000	.000	.000	.250	.250	.000	.000	.000

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City of Moreno Valley
N/S: Gilbert Street
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File Name : 01_MRV_GIBI PM
Site Code : 05117597
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Groups Printed- 4+ Axle Trucks

	Brodiaea Avenue Westbound				Gilbert Street Northbound				Brodiaea Avenue Eastbound						
Start Time	Left	Thru	RTOR	App. Total	Left	Right	RTOR	App. Total	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	1	0	0	1	0	1	0	1	0	0	0	0	0	2	2
04:15 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	1	1
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	1	0	0	1	0	2	0	2	0	0	0	0	0	3	3
05:00 PM	1	0	0	1	0	1	0	1	0	0	0	0	0	2	2
05:15 PM	1	0	0	1	0	0	0	0	0	0	0	0	0	1	1
05:30 PM	0	1	0	1	0	1	0	1	0	0	0	0	0	2	2
05:45 PM	1	0	0	1	0	1	0	1	0	0	0	0	0	2	2
Total	3	1	0	4	0	3	0	3	0	0	0	0	0	7	7
Grand Total	4	1	0	5	0	5	0	5	0	0	0	0	0	10	10
Apprch %	80	20			0	100			0	0					
Total %	40	10		50	0	50		50	0	0		0	0	100	

	Brodiaea Avenue Westbound			Gilbert Street Northbound			Brodiaea Avenue Eastbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:45 PM										
04:45 PM	0	0	0	0	0	0	0	0	0	0
05:00 PM	**1**	0	**1**	0	**1**	**1**	0	0	0	**2**
05:15 PM	1	0	1	0	0	0	0	0	0	1
05:30 PM	0	**1**	1	0	1	1	0	0	0	2
Total Volume	2	1	3	0	2	2	0	0	0	5
% App. Total	66.7	33.3		0	100		0	0		
PHF	.500	.250	.750	.000	.500	.500	.000	.000	.000	.625

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City of Moreno Valley
N/S: Gilbert Street
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Weather: Clear

File Name : 01_MRV_GIBI PM
Site Code : 05117597
Start Date : 9/12/2017
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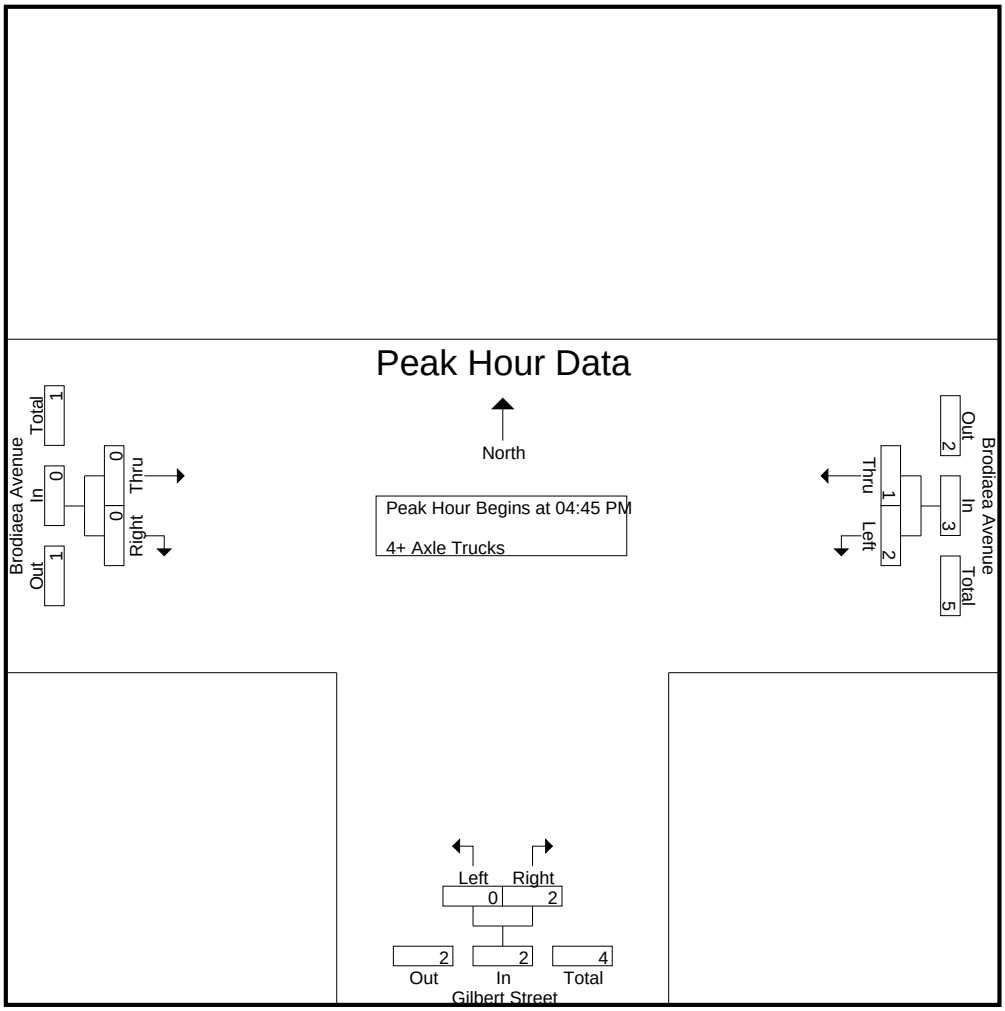

Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:45 PM			04:45 PM			04:45 PM		
+0 mins.	0	0	0	0	0	0	0	0	0
+15 mins.	**1**	0	**1**	0	**1**	**1**	0	0	0
+30 mins.	1	0	1	0	0	0	0	0	0
+45 mins.	0	**1**	1	0	1	1	0	0	0
Total Volume	2	1	3	0	2	2	0	0	0
% App. Total	66.7	33.3		0	100		0	0	
PHF	.500	.250	.750	.000	.500	.500	.000	.000	.000

Location: Moreno Valley
N/S: Gilbert Street
E/W: Brodiaea Avenue

Date: 9/12/2017
Day: Tuesday

PEDESTRIANS

	North Leg Dead End	East Leg Brodiaea Avenue	South Leg Gilbert Street	West Leg Brodiaea Avenue	TOTAL
7:00 AM	0	0	1	0	1
7:15 AM	0	0	0	0	0
7:30 AM	0	0	2	0	2
7:45 AM	0	0	0	0	0
8:00 AM	0	0	1	0	1
8:15 AM	0	0	0	0	0
8:30 AM	0	0	1	0	1
8:45 AM	0	0	0	0	0
TOTAL VOLUMES:	0	0	5	0	5

	North Leg Dead End	East Leg Brodiaea Avenue	South Leg Gilbert Street	West Leg Brodiaea Avenue	TOTAL
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
TOTAL VOLUMES:	0	0	0	0	0

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Location: Moreno Valley
N/S: Gilbert Street
E/W: Brodiaea Avenue

Date: 9/12/2017
Day: Tuesday

BICYCLES

	North Leg Dead End	East Leg Brodiaea Avenue	South Leg Gilbert Street	West Leg Brodiaea Avenue	TOTAL
7:00 AM	0	0	0	0	0
7:15 AM	2	0	0	0	2
7:30 AM	0	0	0	0	0
7:45 AM	0	0	0	0	0
8:00 AM	0	0	0	0	0
8:15 AM	0	0	0	0	0
8:30 AM	0	0	0	0	0
8:45 AM	0	0	0	0	0
TOTAL VOLUMES:	2	0	0	0	2

	North Leg Dead End	East Leg Brodiaea Avenue	South Leg Gilbert Street	West Leg Brodiaea Avenue	TOTAL
4:00 PM	0	0	1	0	1
4:15 PM	0	0	0	0	0
4:30 PM	0	0	1	0	1
4:45 PM	0	0	0	0	0
5:00 PM	1	0	0	0	1
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
TOTAL VOLUMES:	1	0	2	0	3

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City of Moreno Valley
N/S: Gilbert Street
E/W: Cactus Avenue
Weather: Clear

File Name : 02_MRV_GICA AM
Site Code : 05117597
Start Date : 9/12/2017
Page No : 1

Groups Printed- Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks

	Gilbert Street Southbound				Cactus Avenue Westbound				Cactus Avenue Eastbound						
Start Time	Left	Right	RTOR	App. Total	Thru	Right	RTOR	App. Total	Left	Thru	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	4	2	4	518	2	0	520	3	192	0	195	2	719	721
07:15 AM	2	3	2	5	461	1	0	462	3	269	0	272	2	739	741
07:30 AM	4	3	2	7	473	1	0	474	2	252	0	254	2	735	737
07:45 AM	2	1	1	3	423	3	0	426	3	281	0	284	1	713	714
Total	8	11	7	19	1875	7	0	1882	11	994	0	1005	7	2906	2913
08:00 AM	1	1	1	2	405	2	0	407	2	237	0	239	1	648	649
08:15 AM	0	0	0	0	383	2	0	385	2	238	0	240	0	625	625
08:30 AM	0	1	0	1	310	1	0	311	3	201	0	204	0	516	516
08:45 AM	0	4	4	4	261	2	0	263	1	190	0	191	4	458	462
Total	1	6	5	7	1359	7	0	1366	8	866	0	874	5	2247	2252
Grand Total	9	17	12	26	3234	14	0	3248	19	1860	0	1879	12	5153	5165
Apprch %	34.6	65.4			99.6	0.4			1	99					
Total %	0.2	0.3		0.5	62.8	0.3		63	0.4	36.1		36.5	0.2	99.8	
Passenger Vehicles	5	10		23	3143	12		3155	8	1773		1781	0	0	4959
% Passenger Vehicles	55.6	58.8	66.7	60.5	97.2	85.7	0	97.1	42.1	95.3	0	94.8	0	0	96
Large 2 Axle Vehicles	1	1		3	37	0		37	1	34		35	0	0	75
% Large 2 Axle Vehicles	11.1	5.9	8.3	7.9	1.1	0	0	1.1	5.3	1.8	0	1.9	0	0	1.5
3 Axle Vehicles	0	0		0	11	0		11	0	11		11	0	0	22
% 3 Axle Vehicles	0	0	0	0	0.3	0	0	0.3	0	0.6	0	0.6	0	0	0.4
4+ Axle Trucks	3	6		12	43	2		45	10	42		52	0	0	109
% 4+ Axle Trucks	33.3	35.3	25	31.6	1.3	14.3	0	1.4	52.6	2.3	0	2.8	0	0	2.1

	Gilbert Street Southbound			Cactus Avenue Westbound			Cactus Avenue Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:00 AM										
07:00 AM	0	**4**	4	**518**	2	**520**	**3**	192	195	719
07:15 AM	2	3	5	461	1	462	3	269	272	**739**
07:30 AM	**4**	3	**7**	473	1	474	2	252	254	735
07:45 AM	2	1	3	423	**3**	426	3	**281**	**284**	713
Total Volume	8	11	19	1875	7	1882	11	994	1005	2906
% App. Total	42.1	57.9		99.6	0.4		1.1	98.9		
PHF	.500	.688	.679	.905	.583	.905	.917	.884	.885	.983

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City of Moreno Valley
N/S: Gilbert Street
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File Name : 02_MRV_GICA AM
Site Code : 05117597
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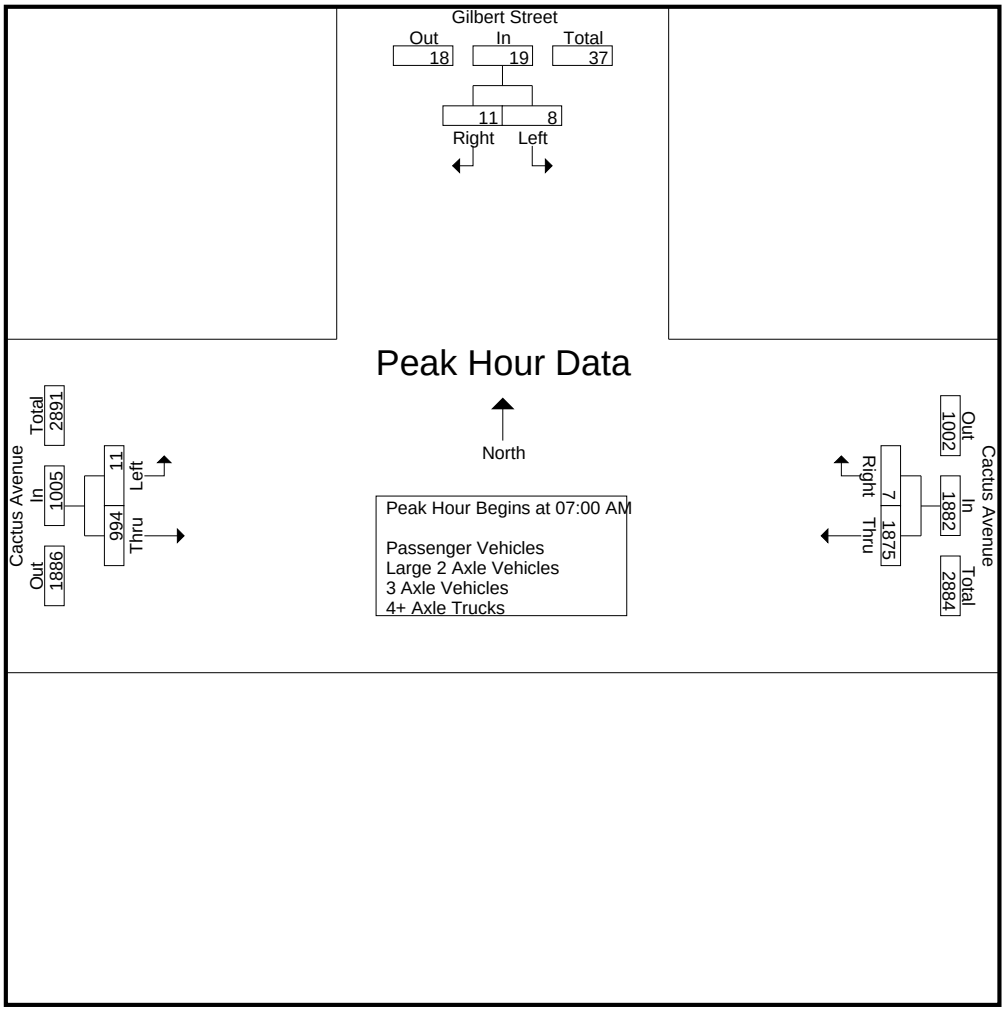

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:00 AM			07:00 AM			07:15 AM		
+0 mins.	0	**4**	4	**518**	2	**520**	**3**	269	272
+15 mins.	2	3	5	461	1	462	2	252	254
+30 mins.	**4**	3	**7**	473	1	474	3	**281**	**284**
+45 mins.	2	1	3	423	**3**	426	2	237	239
Total Volume	8	11	19	1875	7	1882	10	1039	1049
% App. Total	42.1	57.9		99.6	0.4		1	99	
PHF	.500	.688	.679	.905	.583	.905	.833	.924	.923

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City of Moreno Valley
N/S: Gilbert Street
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Weather: Clear

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Groups Printed- Passenger Vehicles

	Gilbert Street Southbound				Cactus Avenue Westbound				Cactus Avenue Eastbound						
Start Time	Left	Right	RTOR	App. Total	Thru	Right	RTOR	App. Total	Left	Thru	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	3	2	3	513	1	0	514	2	177	0	179	2	696	698
07:15 AM	1	1	0	2	452	1	0	453	1	259	0	260	0	715	715
07:30 AM	2	1	1	3	458	0	0	458	1	244	0	245	1	706	707
07:45 AM	2	1	1	3	404	3	0	407	0	273	0	273	1	683	684
Total	5	6	4	11	1827	5	0	1832	4	953	0	957	4	2800	2804
08:00 AM	0	1	1	1	392	2	0	394	2	230	0	232	1	627	628
08:15 AM	0	0	0	0	369	2	0	371	1	225	0	226	0	597	597
08:30 AM	0	0	0	0	304	1	0	305	1	191	0	192	0	497	497
08:45 AM	0	3	3	3	251	2	0	253	0	174	0	174	3	430	433
Total	0	4	4	4	1316	7	0	1323	4	820	0	824	4	2151	2155
Grand Total	5	10	8	15	3143	12	0	3155	8	1773	0	1781	8	4951	4959
Apprch %	33.3	66.7			99.6	0.4			0.4	99.6					
Total %	0.1	0.2		0.3	63.5	0.2		63.7	0.2	35.8		36	0.2	99.8	

	Gilbert Street Southbound			Cactus Avenue Westbound			Cactus Avenue Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:00 AM										
07:00 AM	0	**3**	**3**	**513**	1	**514**	**2**	177	179	696
07:15 AM	1	1	2	452	1	453	1	259	260	**715**
07:30 AM	**2**	1	3	458	0	458	1	244	245	706
07:45 AM	2	1	3	404	**3**	407	0	**273**	**273**	683
Total Volume	5	6	11	1827	5	1832	4	953	957	2800
% App. Total	45.5	54.5		99.7	0.3		0.4	99.6		
PHF	.625	.500	.917	.890	.417	.891	.500	.873	.876	.979

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Weather: Clear

File Name : 02_MRV_GICA AM
Site Code : 05117597
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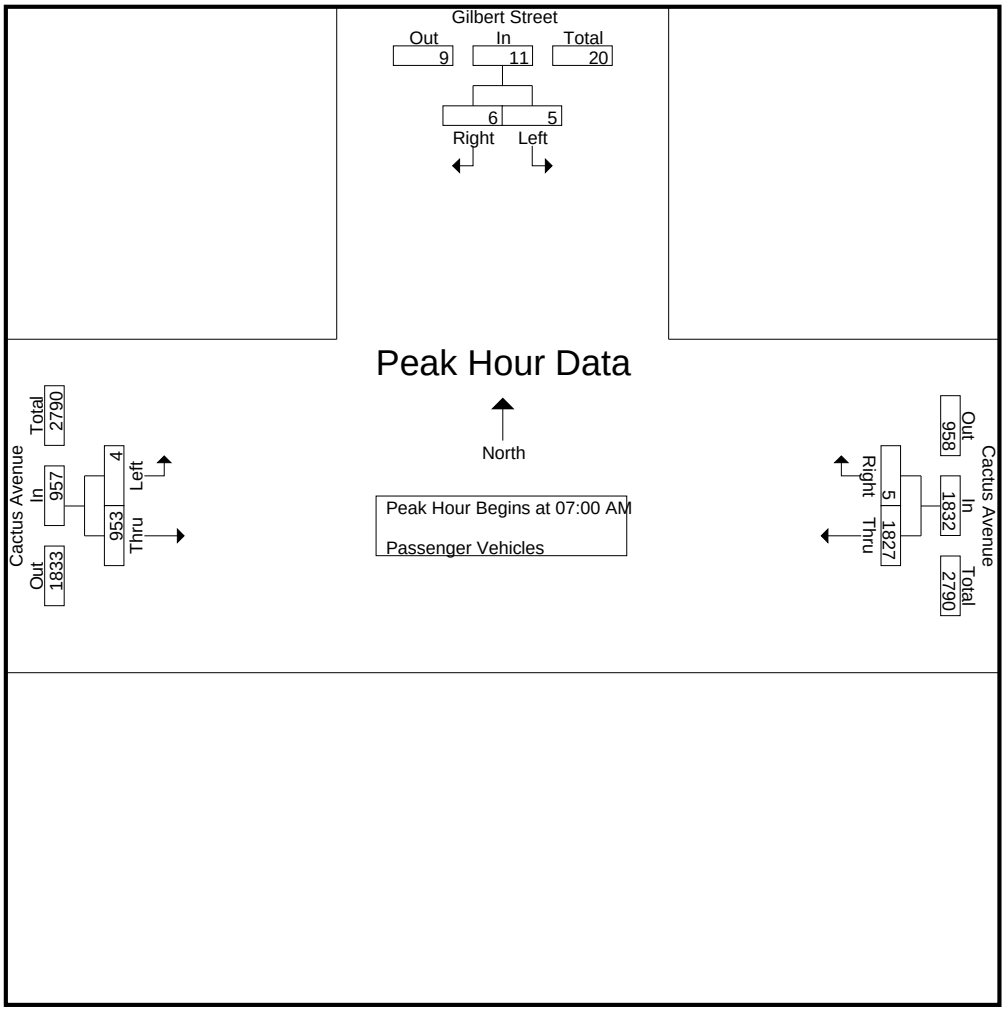

Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:00 AM			07:00 AM			07:00 AM		
+0 mins.	0	**3**	**3**	**513**	1	**514**	**2**	177	179
+15 mins.	1	1	2	452	1	453	1	259	260
+30 mins.	**2**	1	3	458	0	458	1	244	245
+45 mins.	2	1	3	404	**3**	407	0	**273**	**273**
Total Volume	5	6	11	1827	5	1832	4	953	957
% App. Total	45.5	54.5		99.7	0.3		0.4	99.6	
PHF	.625	.500	.917	.890	.417	.891	.500	.873	.876

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City of Moreno Valley
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E/W: Cactus Avenue
Weather: Clear

File Name : 02_MRV_GICA AM
Site Code : 05117597
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Groups Printed- Large 2 Axle Vehicles

	Gilbert Street Southbound				Cactus Avenue Westbound				Cactus Avenue Eastbound						
Start Time	Left	Right	RTOR	App. Total	Thru	Right	RTOR	App. Total	Left	Thru	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	0	0	0	3	0	0	3	1	8	0	9	0	12	12
07:15 AM	0	1	1	1	4	0	0	4	0	5	0	5	1	10	11
07:30 AM	1	0	0	1	3	0	0	3	0	3	0	3	0	7	7
07:45 AM	0	0	0	0	8	0	0	8	0	2	0	2	0	10	10
Total	1	1	1	2	18	0	0	18	1	18	0	19	1	39	40
08:00 AM	0	0	0	0	6	0	0	6	0	1	0	1	0	7	7
08:15 AM	0	0	0	0	6	0	0	6	0	3	0	3	0	9	9
08:30 AM	0	0	0	0	4	0	0	4	0	5	0	5	0	9	9
08:45 AM	0	0	0	0	3	0	0	3	0	7	0	7	0	10	10
Total	0	0	0	0	19	0	0	19	0	16	0	16	0	35	35
Grand Total	1	1	1	2	37	0	0	37	1	34	0	35	1	74	75
Apprch %	50	50			100	0			2.9	97.1					
Total %	1.4	1.4		2.7	50	0		50	1.4	45.9		47.3	1.3	98.7	

	Gilbert Street Southbound			Cactus Avenue Westbound			Cactus Avenue Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:00 AM										
07:00 AM	0	0	0	3	0	3	**1**	**8**	**9**	**12**
07:15 AM	0	**1**	**1**	4	0	4	0	5	5	10
07:30 AM	**1**	0	1	3	0	3	0	3	3	7
07:45 AM	0	0	0	**8**	0	**8**	0	2	2	10
Total Volume	1	1	2	18	0	18	1	18	19	39
% App. Total	50	50		100	0		5.3	94.7		
PHF	.250	.250	.500	.563	.000	.563	.250	.563	.528	.813

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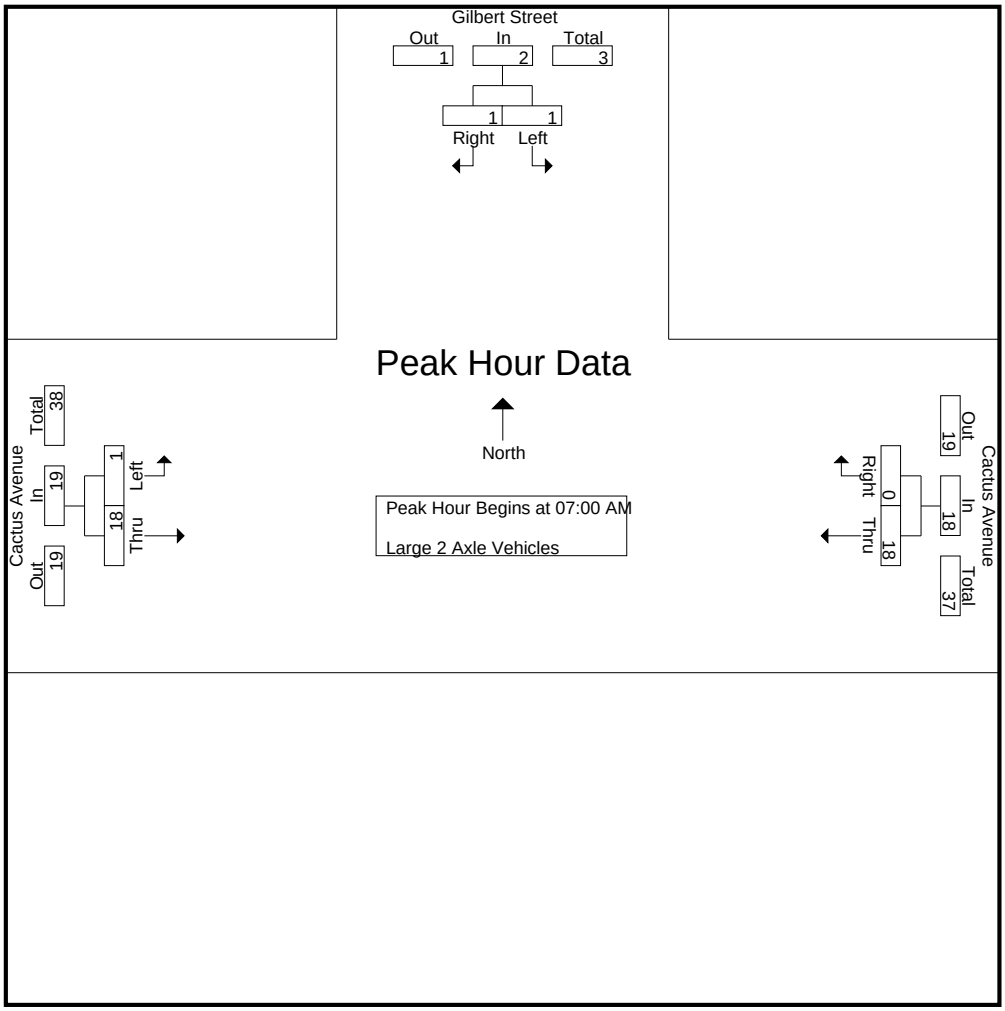

Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:00 AM			07:00 AM			07:00 AM		
+0 mins.	0	0	0	3	0	3	**1**	**8**	**9**
+15 mins.	0	**1**	**1**	4	0	4	0	5	5
+30 mins.	**1**	0	1	3	0	3	0	3	3
+45 mins.	0	0	0	**8**	0	**8**	0	2	2
Total Volume	1	1	2	18	0	18	1	18	19
% App. Total	50	50		100	0		5.3	94.7	
PHF	.250	.250	.500	.563	.000	.563	.250	.563	.528

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Groups Printed- 3 Axle Vehicles

	Gilbert Street Southbound				Cactus Avenue Westbound				Cactus Avenue Eastbound						
Start Time	Left	Right	RTOR	App. Total	Thru	Right	RTOR	App. Total	Left	Thru	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	2	0	2	0	2	2
07:15 AM	0	0	0	0	2	0	0	2	0	1	0	1	0	3	3
07:30 AM	0	0	0	0	3	0	0	3	0	1	0	1	0	4	4
07:45 AM	0	0	0	0	1	0	0	1	0	1	0	1	0	2	2
Total	0	0	0	0	6	0	0	6	0	5	0	5	0	11	11
08:00 AM	0	0	0	0	0	0	0	0	0	1	0	1	0	1	1
08:15 AM	0	0	0	0	2	0	0	2	0	2	0	2	0	4	4
08:30 AM	0	0	0	0	1	0	0	1	0	1	0	1	0	2	2
08:45 AM	0	0	0	0	2	0	0	2	0	2	0	2	0	4	4
Total	0	0	0	0	5	0	0	5	0	6	0	6	0	11	11
Grand Total	0	0	0	0	11	0	0	11	0	11	0	11	0	22	22
Apprch %	0	0			100	0			0	100					
Total %	0	0		0	50	0		50	0	50		50	0	100	

	Gilbert Street Southbound			Cactus Avenue Westbound			Cactus Avenue Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:00 AM										
07:00 AM	0	0	0	0	0	0	0	**2**	**2**	2
07:15 AM	0	0	0	2	0	2	0	1	1	3
07:30 AM	0	0	0	**3**	0	**3**	0	1	1	**4**
07:45 AM	0	0	0	1	0	1	0	1	1	2
Total Volume	0	0	0	6	0	6	0	5	5	11
% App. Total	0	0		100	0		0	100		
PHF	.000	.000	.000	.500	.000	.500	.000	.625	.625	.688

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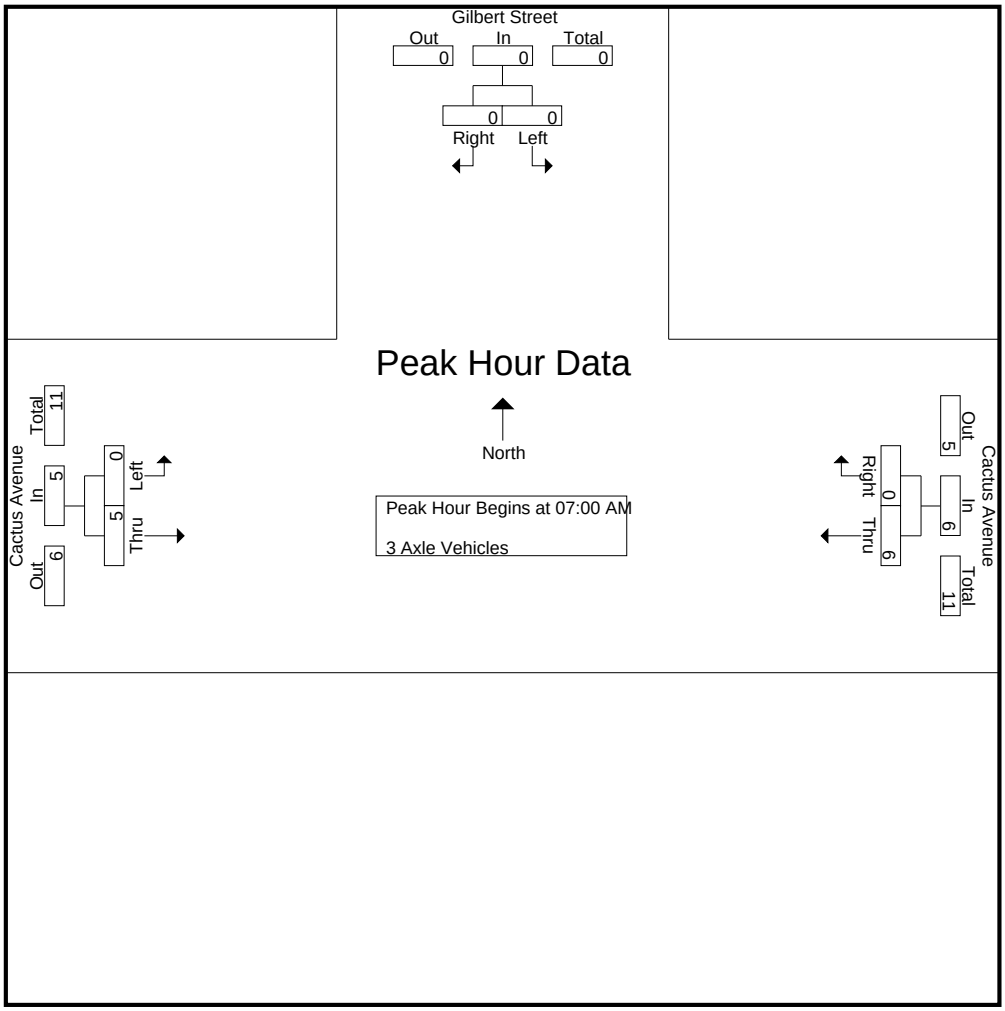

Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:00 AM			07:00 AM			07:00 AM		
+0 mins.	0	0	0	0	0	0	0	**2**	**2**
+15 mins.	0	0	0	2	0	2	0	1	1
+30 mins.	0	0	0	**3**	0	**3**	0	1	1
+45 mins.	0	0	0	1	0	1	0	1	1
Total Volume	0	0	0	6	0	6	0	5	5
% App. Total	0	0		100	0		0	100	
PHF	.000	.000	.000	.500	.000	.500	.000	.625	.625

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Groups Printed- 4+ Axle Trucks

	Gilbert Street Southbound				Cactus Avenue Westbound				Cactus Avenue Eastbound						
Start Time	Left	Right	RTOR	App. Total	Thru	Right	RTOR	App. Total	Left	Thru	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	1	0	1	2	1	0	3	0	5	0	5	0	9	9
07:15 AM	1	1	1	2	3	0	0	3	2	4	0	6	1	11	12
07:30 AM	1	2	1	3	9	1	0	10	1	4	0	5	1	18	19
07:45 AM	0	0	0	0	10	0	0	10	3	5	0	8	0	18	18
Total	2	4	2	6	24	2	0	26	6	18	0	24	2	56	58
08:00 AM	1	0	0	1	7	0	0	7	0	5	0	5	0	13	13
08:15 AM	0	0	0	0	6	0	0	6	1	8	0	9	0	15	15
08:30 AM	0	1	0	1	1	0	0	1	2	4	0	6	0	8	8
08:45 AM	0	1	1	1	5	0	0	5	1	7	0	8	1	14	15
Total	1	2	1	3	19	0	0	19	4	24	0	28	1	50	51
Grand Total	3	6	3	9	43	2	0	45	10	42	0	52	3	106	109
Apprch %	33.3	66.7			95.6	4.4			19.2	80.8					
Total %	2.8	5.7		8.5	40.6	1.9		42.5	9.4	39.6		49.1	2.8	97.2	

	Gilbert Street Southbound			Cactus Avenue Westbound			Cactus Avenue Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:00 AM										
07:00 AM	0	1	1	2	**1**	3	0	**5**	5	9
07:15 AM	**1**	1	2	3	0	3	2	4	6	11
07:30 AM	1	**2**	**3**	9	1	**10**	1	4	5	**18**
07:45 AM	0	0	0	**10**	0	10	**3**	5	**8**	18
Total Volume	2	4	6	24	2	26	6	18	24	56
% App. Total	33.3	66.7		92.3	7.7		25	75		
PHF	.500	.500	.500	.600	.500	.650	.500	.900	.750	.778

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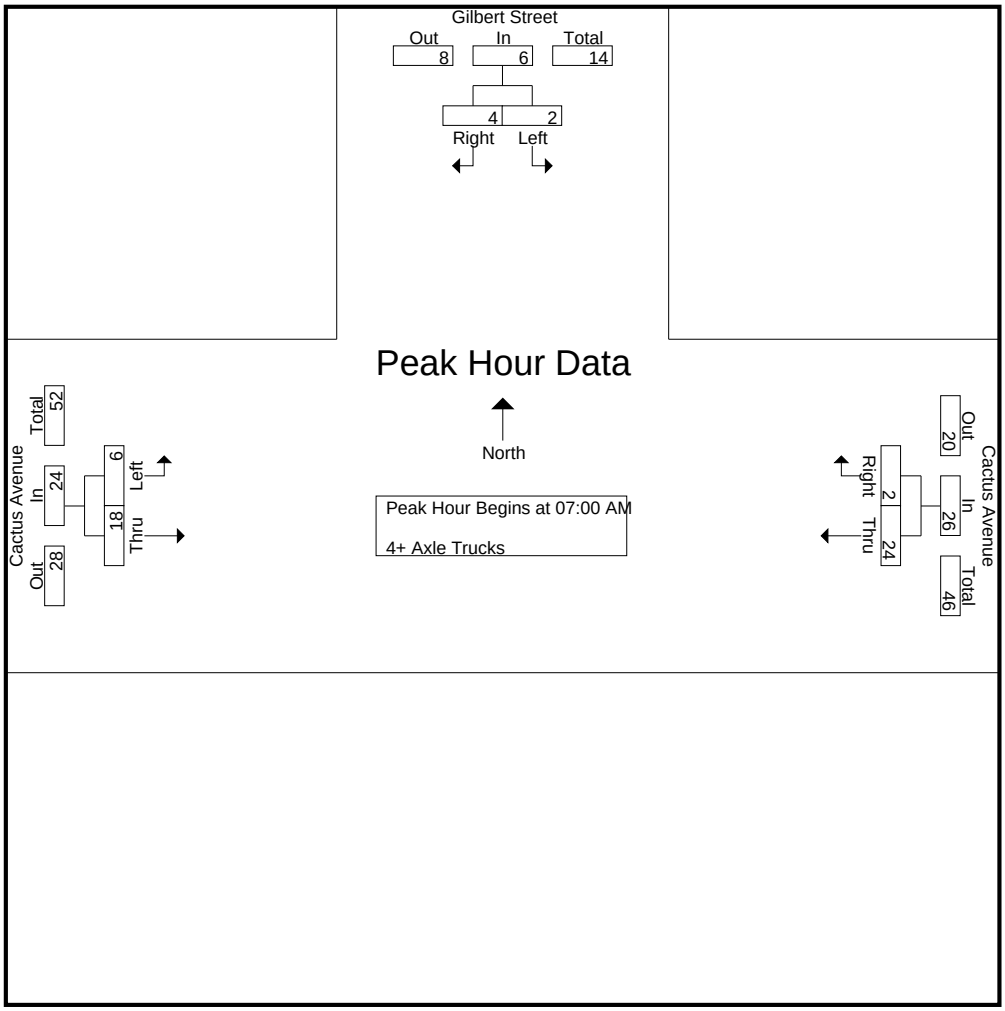

Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:00 AM			07:00 AM			07:00 AM		
+0 mins.	0	1	1	2	**1**	3	0	**5**	5
+15 mins.	**1**	1	2	3	0	3	2	4	6
+30 mins.	1	**2**	**3**	9	1	**10**	1	4	5
+45 mins.	0	0	0	**10**	0	10	**3**	5	**8**
Total Volume	2	4	6	24	2	26	6	18	24
% App. Total	33.3	66.7		92.3	7.7		25	75	
PHF	.500	.500	.500	.600	.500	.650	.500	.900	.750

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Groups Printed- Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks

	Gilbert Street Southbound				Cactus Avenue Westbound				Cactus Avenue Eastbound						
Start Time	Left	Right	RTOR	App. Total	Thru	Right	RTOR	App. Total	Left	Thru	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	1	1	1	242	1	0	243	0	463	0	463	1	707	708
04:15 PM	1	1	1	2	243	2	0	245	1	463	0	464	1	711	712
04:30 PM	0	2	2	2	299	1	0	300	0	464	0	464	2	766	768
04:45 PM	0	4	4	4	257	3	0	260	2	461	0	463	4	727	731
Total	1	8	8	9	1041	7	0	1048	3	1851	0	1854	8	2911	2919
05:00 PM	0	0	0	0	244	0	0	244	1	549	0	550	0	794	794
05:15 PM	0	1	1	1	224	0	0	224	0	561	0	561	1	786	787
05:30 PM	2	0	1	2	260	1	1	261	2	550	0	552	2	815	817
05:45 PM	0	2	1	2	248	1	0	249	0	487	0	487	1	738	739
Total	2	3	3	5	976	2	1	978	3	2147	0	2150	4	3133	3137
Grand Total	3	11	11	14	2017	9	1	2026	6	3998	0	4004	12	6044	6056
Apprch %	21.4	78.6			99.6	0.4			0.1	99.9					
Total %	0	0.2		0.2	33.4	0.1		33.5	0.1	66.1		66.2	0.2	99.8	
Passenger Vehicles	3	11		24	1959	7		1967	6	3910		3916	0	0	5907
% Passenger Vehicles	100	100	90.9	96	97.1	77.8	100	97	100	97.8	0	97.8	0	0	97.5
Large 2 Axle Vehicles	0	0		1	24	1		25	0	41		41	0	0	67
% Large 2 Axle Vehicles	0	0	9.1	4	1.2	11.1	0	1.2	0	1	0	1	0	0	1.1
3 Axle Vehicles	0	0		0	9	0		9	0	18		18	0	0	27
% 3 Axle Vehicles	0	0	0	0	0.4	0	0	0.4	0	0.5	0	0.4	0	0	0.4
4+ Axle Trucks	0	0		0	25	1		26	0	29		29	0	0	55
% 4+ Axle Trucks	0	0	0	0	1.2	11.1	0	1.3	0	0.7	0	0.7	0	0	0.9

	Gilbert Street Southbound			Cactus Avenue Westbound			Cactus Avenue Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 05:00 PM										
05:00 PM	0	0	0	244	0	244	1	549	550	794
05:15 PM	0	1	1	224	0	224	0	**561**	**561**	786
05:30 PM	**2**	0	**2**	**260**	**1**	**261**	**2**	550	552	**815**
05:45 PM	0	**2**	2	248	1	249	0	487	487	738
Total Volume	2	3	5	976	2	978	3	2147	2150	3133
% App. Total	40	60		99.8	0.2		0.1	99.9		
PHF	.250	.375	.625	.938	.500	.937	.375	.957	.958	.961

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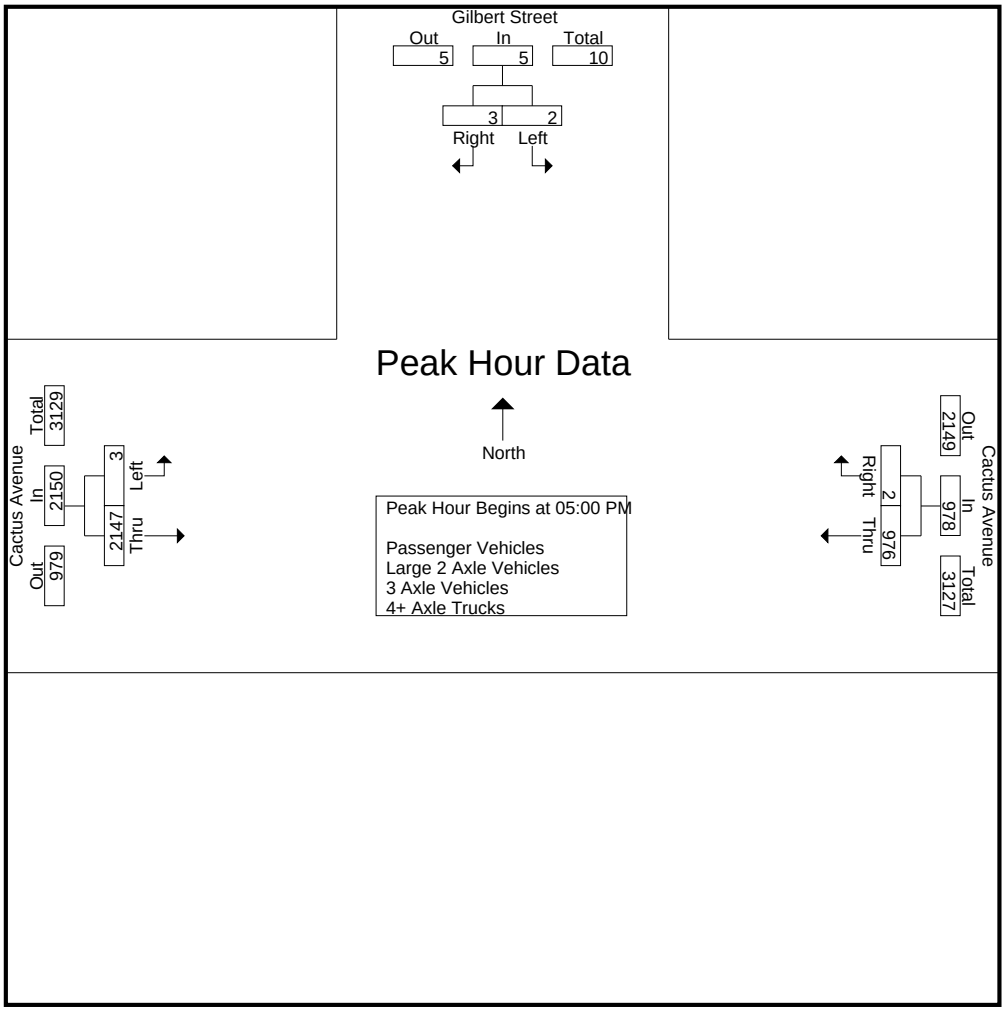

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:00 PM			04:15 PM			05:00 PM		
+0 mins.	0	1	1	243	2	245	1	549	550
+15 mins.	**1**	1	2	**299**	1	**300**	0	**561**	**561**
+30 mins.	0	2	2	257	**3**	260	**2**	550	552
+45 mins.	0	**4**	**4**	244	0	244	0	487	487
Total Volume	1	8	9	1043	6	1049	3	2147	2150
% App. Total	11.1	88.9		99.4	0.6		0.1	99.9	
PHF	.250	.500	.563	.872	.500	.874	.375	.957	.958

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Groups Printed- Passenger Vehicles

	Gilbert Street Southbound				Cactus Avenue Westbound				Cactus Avenue Eastbound						
Start Time	Left	Right	RTOR	App. Total	Thru	Right	RTOR	App. Total	Left	Thru	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	1	1	1	234	0	0	234	0	452	0	452	1	687	688
04:15 PM	1	1	1	2	232	2	0	234	1	452	0	453	1	689	690
04:30 PM	0	2	2	2	292	1	0	293	0	451	0	451	2	746	748
04:45 PM	0	4	4	4	253	2	0	255	2	450	0	452	4	711	715
Total	1	8	8	9	1011	5	0	1016	3	1805	0	1808	8	2833	2841
05:00 PM	0	0	0	0	236	0	0	236	1	539	0	540	0	776	776
05:15 PM	0	1	1	1	216	0	0	216	0	550	0	550	1	767	768
05:30 PM	2	0	0	2	255	1	1	256	2	542	0	544	1	802	803
05:45 PM	0	2	1	2	241	1	0	242	0	474	0	474	1	718	719
Total	2	3	2	5	948	2	1	950	3	2105	0	2108	3	3063	3066
Grand Total	3	11	10	14	1959	7	1	1966	6	3910	0	3916	11	5896	5907
Apprch %	21.4	78.6			99.6	0.4			0.2	99.8					
Total %	0.1	0.2		0.2	33.2	0.1		33.3	0.1	66.3		66.4	0.2	99.8	

	Gilbert Street Southbound			Cactus Avenue Westbound			Cactus Avenue Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 05:00 PM										
05:00 PM	0	0	0	236	0	236	1	539	540	776
05:15 PM	0	1	1	216	0	216	0	**550**	**550**	767
05:30 PM	**2**	0	**2**	**255**	**1**	**256**	**2**	542	544	**802**
05:45 PM	0	**2**	2	241	1	242	0	474	474	718
Total Volume	2	3	5	948	2	950	3	2105	2108	3063
% App. Total	40	60		99.8	0.2		0.1	99.9		
PHF	.250	.375	.625	.929	.500	.928	.375	.957	.958	.955

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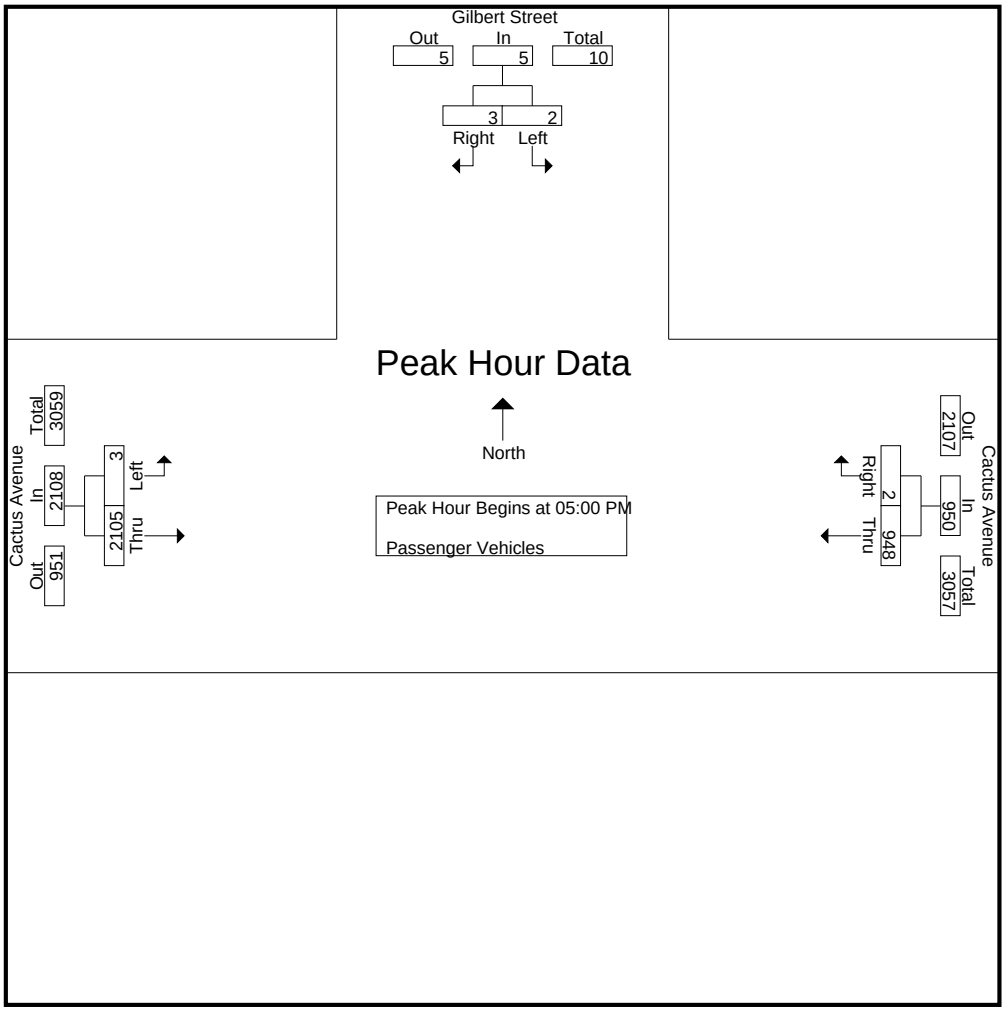

Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	05:00 PM			05:00 PM			05:00 PM		
+0 mins.	0	0	0	236	0	236	1	539	540
+15 mins.	0	1	1	216	0	216	0	**550**	**550**
+30 mins.	**2**	0	**2**	**255**	**1**	**256**	**2**	542	544
+45 mins.	0	**2**	2	241	1	242	0	474	474
Total Volume	2	3	5	948	2	950	3	2105	2108
% App. Total	40	60		99.8	0.2		0.1	99.9	
PHF	.250	.375	.625	.929	.500	.928	.375	.957	.958

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Groups Printed- Large 2 Axle Vehicles

	Gilbert Street Southbound				Cactus Avenue Westbound				Cactus Avenue Eastbound						
Start Time	Left	Right	RTOR	App. Total	Thru	Right	RTOR	App. Total	Left	Thru	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	0	0	0	4	1	0	5	0	7	0	7	0	12	12
04:15 PM	0	0	0	0	5	0	0	5	0	3	0	3	0	8	8
04:30 PM	0	0	0	0	4	0	0	4	0	7	0	7	0	11	11
04:45 PM	0	0	0	0	2	0	0	2	0	6	0	6	0	8	8
Total	0	0	0	0	15	1	0	16	0	23	0	23	0	39	39
05:00 PM	0	0	0	0	2	0	0	2	0	5	0	5	0	7	7
05:15 PM	0	0	0	0	4	0	0	4	0	5	0	5	0	9	9
05:30 PM	0	0	1	0	1	0	0	1	0	3	0	3	1	4	5
05:45 PM	0	0	0	0	2	0	0	2	0	5	0	5	0	7	7
Total	0	0	1	0	9	0	0	9	0	18	0	18	1	27	28
Grand Total	0	0	1	0	24	1	0	25	0	41	0	41	1	66	67
Apprch %	0	0			96	4			0	100					
Total %	0	0		0	36.4	1.5		37.9	0	62.1		62.1	1.5	98.5	

	Gilbert Street Southbound			Cactus Avenue Westbound			Cactus Avenue Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 05:00 PM										
05:00 PM	0	0	0	2	0	2	0	**5**	**5**	7
05:15 PM	0	0	0	**4**	0	**4**	0	5	5	**9**
05:30 PM	0	0	0	1	0	1	0	3	3	4
05:45 PM	0	0	0	2	0	2	0	5	5	7
Total Volume	0	0	0	9	0	9	0	18	18	27
% App. Total	0	0		100	0		0	100		
PHF	.000	.000	.000	.563	.000	.563	.000	.900	.900	.750

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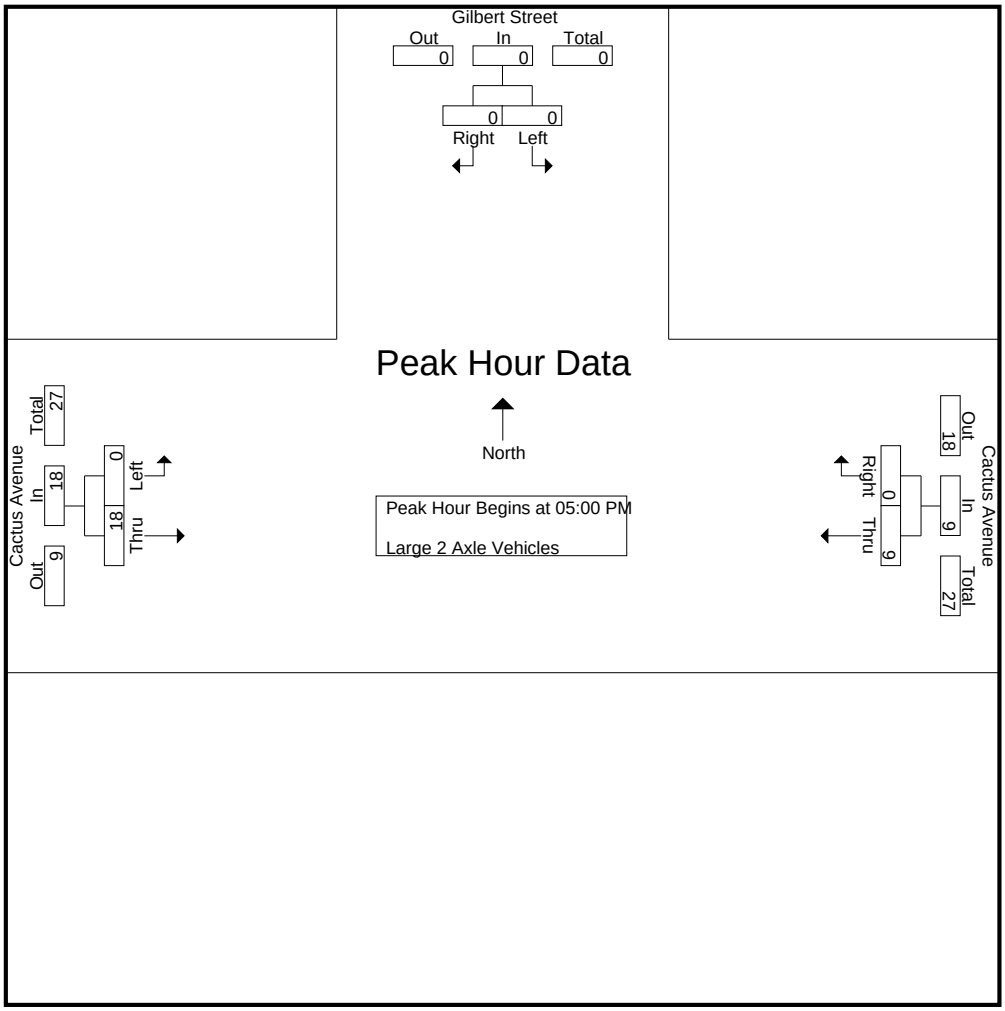
City of Moreno Valley
N/S: Gilbert Street
E/W: Cactus Avenue
Weather: Clear

File Name : 02_MRV_GICA PM
Site Code : 05117597
Start Date : 9/12/2017
Page No : 2



Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	05:00 PM			05:00 PM			05:00 PM		
+0 mins.	0	0	0	2	0	2	0	**5**	**5**
+15 mins.	0	0	0	**4**	0	**4**	0	5	5
+30 mins.	0	0	0	1	0	1	0	3	3
+45 mins.	0	0	0	2	0	2	0	5	5
Total Volume	0	0	0	9	0	9	0	18	18
% App. Total	0	0		100	0		0	100	
PHF	.000	.000	.000	.563	.000	.563	.000	.900	.900

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City of Moreno Valley
N/S: Gilbert Street
E/W: Cactus Avenue
Weather: Clear

File Name : 02_MRV_GICA PM
Site Code : 05117597
Start Date : 9/12/2017
Page No : 1

Groups Printed- 3 Axle Vehicles

	Gilbert Street Southbound				Cactus Avenue Westbound				Cactus Avenue Eastbound						
Start Time	Left	Right	RTOR	App. Total	Thru	Right	RTOR	App. Total	Left	Thru	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	0	0	0	1	0	0	1	0	1	0	1	0	2	2
04:15 PM	0	0	0	0	1	0	0	1	0	3	0	3	0	4	4
04:30 PM	0	0	0	0	1	0	0	1	0	3	0	3	0	4	4
04:45 PM	0	0	0	0	0	0	0	0	0	2	0	2	0	2	2
Total	0	0	0	0	3	0	0	3	0	9	0	9	0	12	12
05:00 PM	0	0	0	0	3	0	0	3	0	3	0	3	0	6	6
05:15 PM	0	0	0	0	2	0	0	2	0	3	0	3	0	5	5
05:30 PM	0	0	0	0	0	0	0	0	0	1	0	1	0	1	1
05:45 PM	0	0	0	0	1	0	0	1	0	2	0	2	0	3	3
Total	0	0	0	0	6	0	0	6	0	9	0	9	0	15	15
Grand Total	0	0	0	0	9	0	0	9	0	18	0	18	0	27	27
Apprch %	0	0			100	0			0	100					
Total %	0	0		0	33.3	0		33.3	0	66.7		66.7	0	100	

	Gilbert Street Southbound			Cactus Avenue Westbound			Cactus Avenue Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 05:00 PM										
05:00 PM	0	0	0	**3**	0	**3**	0	**3**	**3**	**6**
05:15 PM	0	0	0	2	0	2	0	3	3	5
05:30 PM	0	0	0	0	0	0	0	1	1	1
05:45 PM	0	0	0	1	0	1	0	2	2	3
Total Volume	0	0	0	6	0	6	0	9	9	15
% App. Total	0	0		100	0		0	100		
PHF	.000	.000	.000	.500	.000	.500	.000	.750	.750	.625

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City of Moreno Valley
N/S: Gilbert Street
E/W: Cactus Avenue
Weather: Clear

File Name : 02_MRV_GICA PM
Site Code : 05117597
Start Date : 9/12/2017
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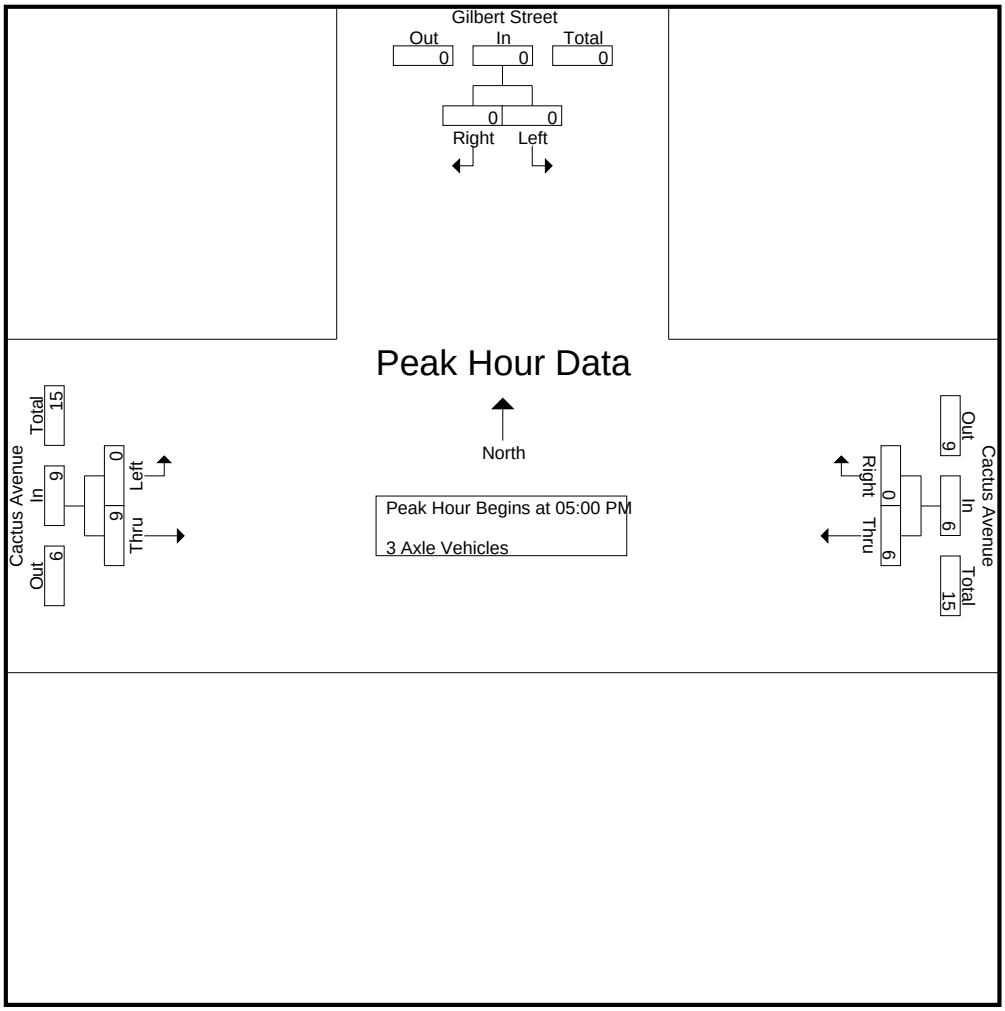

Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	05:00 PM			05:00 PM			05:00 PM		
+0 mins.	0	0	0	**3**	0	**3**	0	**3**	**3**
+15 mins.	0	0	0	2	0	2	0	3	3
+30 mins.	0	0	0	0	0	0	0	1	1
+45 mins.	0	0	0	1	0	1	0	2	2
Total Volume	0	0	0	6	0	6	0	9	9
% App. Total	0	0		100	0		0	100	
PHF	.000	.000	.000	.500	.000	.500	.000	.750	.750

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City of Moreno Valley
N/S: Gilbert Street
E/W: Cactus Avenue
Weather: Clear

File Name : 02_MRV_GICA PM
Site Code : 05117597
Start Date : 9/12/2017
Page No : 1

Groups Printed- 4+ Axle Trucks

	Gilbert Street Southbound				Cactus Avenue Westbound				Cactus Avenue Eastbound						
Start Time	Left	Right	RTOR	App. Total	Thru	Right	RTOR	App. Total	Left	Thru	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	0	0	0	3	0	0	3	0	3	0	3	0	6	6
04:15 PM	0	0	0	0	5	0	0	5	0	5	0	5	0	10	10
04:30 PM	0	0	0	0	2	0	0	2	0	3	0	3	0	5	5
04:45 PM	0	0	0	0	2	1	0	3	0	3	0	3	0	6	6
Total	0	0	0	0	12	1	0	13	0	14	0	14	0	27	27
05:00 PM	0	0	0	0	3	0	0	3	0	2	0	2	0	5	5
05:15 PM	0	0	0	0	2	0	0	2	0	3	0	3	0	5	5
05:30 PM	0	0	0	0	4	0	0	4	0	4	0	4	0	8	8
05:45 PM	0	0	0	0	4	0	0	4	0	6	0	6	0	10	10
Total	0	0	0	0	13	0	0	13	0	15	0	15	0	28	28
Grand Total	0	0	0	0	25	1	0	26	0	29	0	29	0	55	55
Apprch %	0	0			96.2	3.8			0	100					
Total %	0	0		0	45.5	1.8		47.3	0	52.7		52.7	0	100	

	Gilbert Street Southbound			Cactus Avenue Westbound			Cactus Avenue Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 05:00 PM										
05:00 PM	0	0	0	3	0	3	0	2	2	5
05:15 PM	0	0	0	2	0	2	0	3	3	5
05:30 PM	0	0	0	**4**	0	**4**	0	4	4	8
05:45 PM	0	0	0	4	0	4	0	**6**	**6**	**10**
Total Volume	0	0	0	13	0	13	0	15	15	28
% App. Total	0	0		100	0		0	100		
PHF	.000	.000	.000	.813	.000	.813	.000	.625	.625	.700

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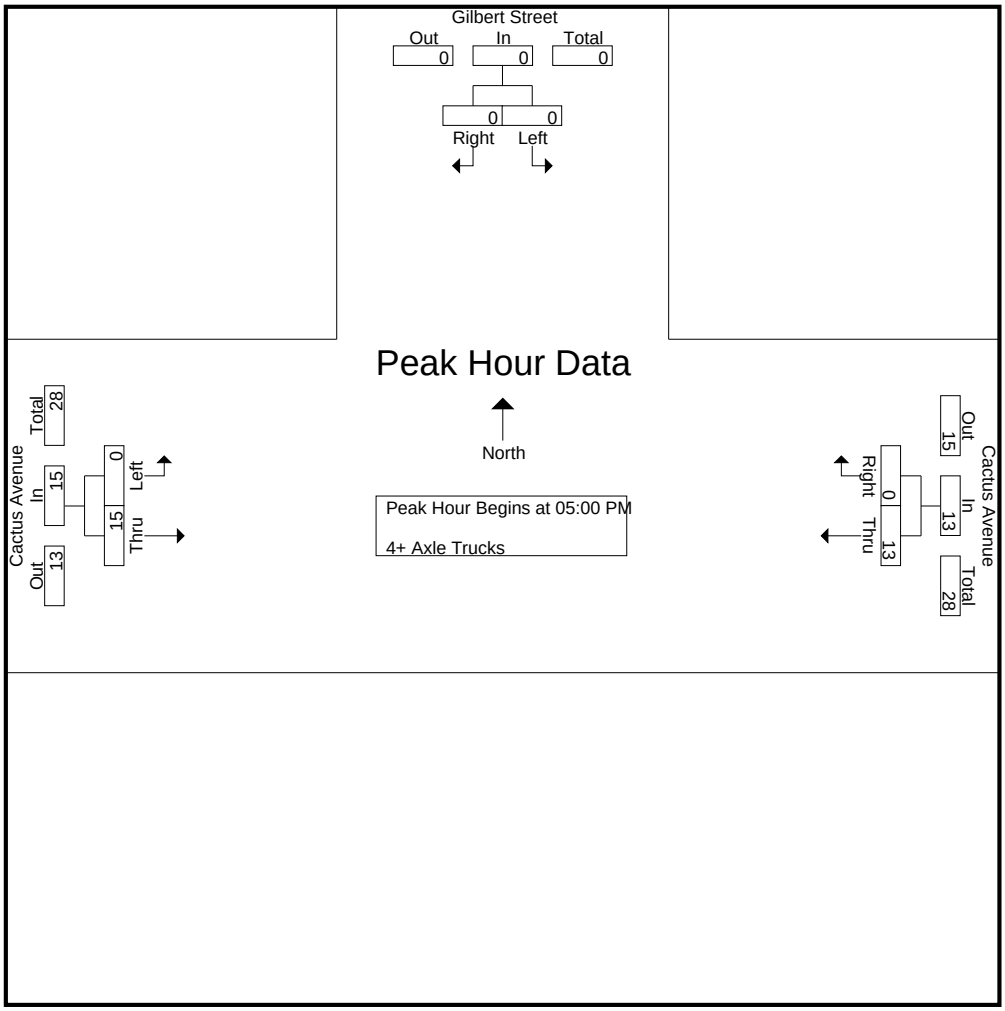
City of Moreno Valley
N/S: Gilbert Street
E/W: Cactus Avenue
Weather: Clear

File Name : 02_MRV_GICA PM
Site Code : 05117597
Start Date : 9/12/2017
Page No : 2



Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	05:00 PM			05:00 PM			05:00 PM		
+0 mins.	0	0	0	3	0	3	0	2	2
+15 mins.	0	0	0	2	0	2	0	3	3
+30 mins.	0	0	0	**4**	0	**4**	0	4	4
+45 mins.	0	0	0	4	0	4	0	**6**	**6**
Total Volume	0	0	0	13	0	13	0	15	15
% App. Total	0	0		100	0		0	100	
PHF	.000	.000	.000	.813	.000	.813	.000	.625	.625

Location: Moreno Valley
N/S: Gilbert Street
E/W: Cactus Avenue

Date: 9/12/2017
Day: Tuesday

PEDESTRIANS

	North Leg Gilbert Street	East Leg Cactus Avenue	South Leg Dead End	West Leg Cactus Avenue	TOTAL
7:00 AM	0	0	0	0	0
7:15 AM	0	0	0	0	0
7:30 AM	0	0	0	0	0
7:45 AM	0	0	0	0	0
8:00 AM	0	0	0	0	0
8:15 AM	0	0	0	0	0
8:30 AM	0	0	0	0	0
8:45 AM	1	0	0	0	1
TOTAL VOLUMES:	1	0	0	0	1

	North Leg Gilbert Street	East Leg Cactus Avenue	South Leg Dead End	West Leg Cactus Avenue	TOTAL
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	1	0	0	0	1
5:00 PM	1	0	0	0	1
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
TOTAL VOLUMES:	2	0	0	0	2

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Location: Moreno Valley
N/S: Gilbert Street
E/W: Cactus Avenue

Date: 9/12/2017
Day: Tuesday

BICYCLES

	North Leg Gilbert Street	East Leg Cactus Avenue	South Leg Dead End	West Leg Cactus Avenue	TOTAL
7:00 AM	0	0	0	0	0
7:15 AM	0	0	0	0	0
7:30 AM	0	0	0	0	0
7:45 AM	0	0	0	0	0
8:00 AM	0	0	0	0	0
8:15 AM	0	0	0	0	0
8:30 AM	0	0	0	0	0
8:45 AM	0	0	0	0	0
TOTAL VOLUMES:	0	0	0	0	0

	North Leg Gilbert Street	East Leg Cactus Avenue	South Leg Dead End	West Leg Cactus Avenue	TOTAL
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	1	0	0	0	1
5:15 PM	0	0	1	0	1
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
TOTAL VOLUMES:	1	0	1	0	2

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City of Moreno Valley
N/S: Heacock Street
E/W: Alessandro Boulevard
Weather: Clear

File Name : 05_MRV_HEAL AM
Site Code : 05117597
Start Date : 9/12/2017
Page No : 1

Groups Printed- Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks

	Heacock Street Southbound					Alessandro Boulevard Westbound					Heacock Street Northbound					Alessandro Boulevard Eastbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	11	67	57	25	135	10	311	19	6	340	32	62	11	6	105	15	59	11	7	85	44	665	709
07:15 AM	18	85	41	18	144	11	289	27	7	327	41	115	7	3	163	13	71	13	9	97	37	731	768
07:30 AM	25	94	41	18	160	11	314	28	7	353	35	100	13	6	148	13	101	13	5	127	36	788	824
07:45 AM	33	67	38	17	138	9	284	39	9	332	41	142	12	4	195	22	116	17	12	155	42	820	862
Total	87	313	177	78	577	41	1198	113	29	1352	149	419	43	19	611	63	347	54	33	464	159	3004	3163
08:00 AM	42	66	48	14	156	7	322	42	12	371	38	101	8	5	147	21	84	13	9	118	40	792	832
08:15 AM	48	59	47	24	154	6	225	41	10	272	37	103	9	2	149	26	100	13	4	139	40	714	754
08:30 AM	33	73	43	18	149	8	222	45	15	275	35	57	14	7	106	25	125	19	8	169	48	699	747
08:45 AM	51	59	42	14	152	6	205	26	7	237	32	105	5	2	142	25	102	18	14	145	37	676	713
Total	174	257	180	70	611	27	974	154	44	1155	142	366	36	16	544	97	411	63	35	571	165	2881	3046
Grand Total	261	570	357	148	1188	68	2172	267	73	2507	291	785	79	35	1155	160	758	117	68	1035	324	5885	6209
Apprch %	22	48	30.1			2.7	86.6	10.7			25.2	68	6.8			15.5	73.2	11.3					
Total %	4.4	9.7	6.1		20.2	1.2	36.9	4.5		42.6	4.9	13.3	1.3		19.6	2.7	12.9	2		17.6	5.2	94.8	
Passenger Vehicles	255	549	344		1289	62	2109	256		2498	283	749	77		1143	156	719	113		1054	0	0	5984
% Passenger Vehicles	97.7	96.3	96.4	95.3	96.5	91.2	97.1	95.9	97.3	96.8	97.3	95.4	97.5	97.1	96.1	97.5	94.9	96.6	97.1	95.6	0	0	96.4
Large 2 Axle Vehicles	6	11	8		29	4	44	11		61	5	16	2		24	4	34	3		43	0	0	157
% Large 2 Axle Vehicles	2.3	1.9	2.2	2.7	2.2	5.9	2	4.1	2.7	2.4	1.7	2	2.5	2.9	2	2.5	4.5	2.6	2.9	3.9	0	0	2.5
3 Axle Vehicles	0	2	3		8	1	3	0		4	2	5	0		7	0	0	0		0	0	0	19
% 3 Axle Vehicles	0	0.4	0.8	2	0.6	1.5	0.1	0	0	0.2	0.7	0.6	0	0	0.6	0	0	0	0	0	0	0	0.3
4+ Axle Trucks	0	8	2		10	1	16	0		17	1	15	0		16	0	5	1		6	0	0	49
% 4+ Axle Trucks	0	1.4	0.6	0	0.7	1.5	0.7	0	0	0.7	0.3	1.9	0	0	1.3	0	0.7	0.9	0	0.5	0	0	0.8

	Heacock Street Southbound				Alessandro Boulevard Westbound				Heacock Street Northbound				Alessandro Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	18	85	41	144	**11**	289	27	327	**41**	115	7	163	13	71	13	97	731
07:30 AM	25	**94**	41	**160**	11	314	28	353	35	100	**13**	148	13	101	13	127	788
07:45 AM	33	67	38	138	9	284	39	332	41	**142**	12	**195**	**22**	**116**	**17**	**155**	**820**
08:00 AM	**42**	66	**48**	156	7	**322**	**42**	**371**	38	101	8	147	21	84	13	118	792
Total Volume	118	312	168	598	38	1209	136	1383	155	458	40	653	69	372	56	497	3131
% App. Total	19.7	52.2	28.1		2.7	87.4	9.8		23.7	70.1	6.1		13.9	74.8	11.3		
PHF	.702	.830	.875	.934	.864	.939	.810	.932	.945	.806	.769	.837	.784	.802	.824	.802	.955

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City of Moreno Valley
N/S: Heacock Street
E/W: Alessandro Boulevard
Weather: Clear

File Name : 05_MRV_HEAL AM
Site Code : 05117597
Start Date : 9/12/2017
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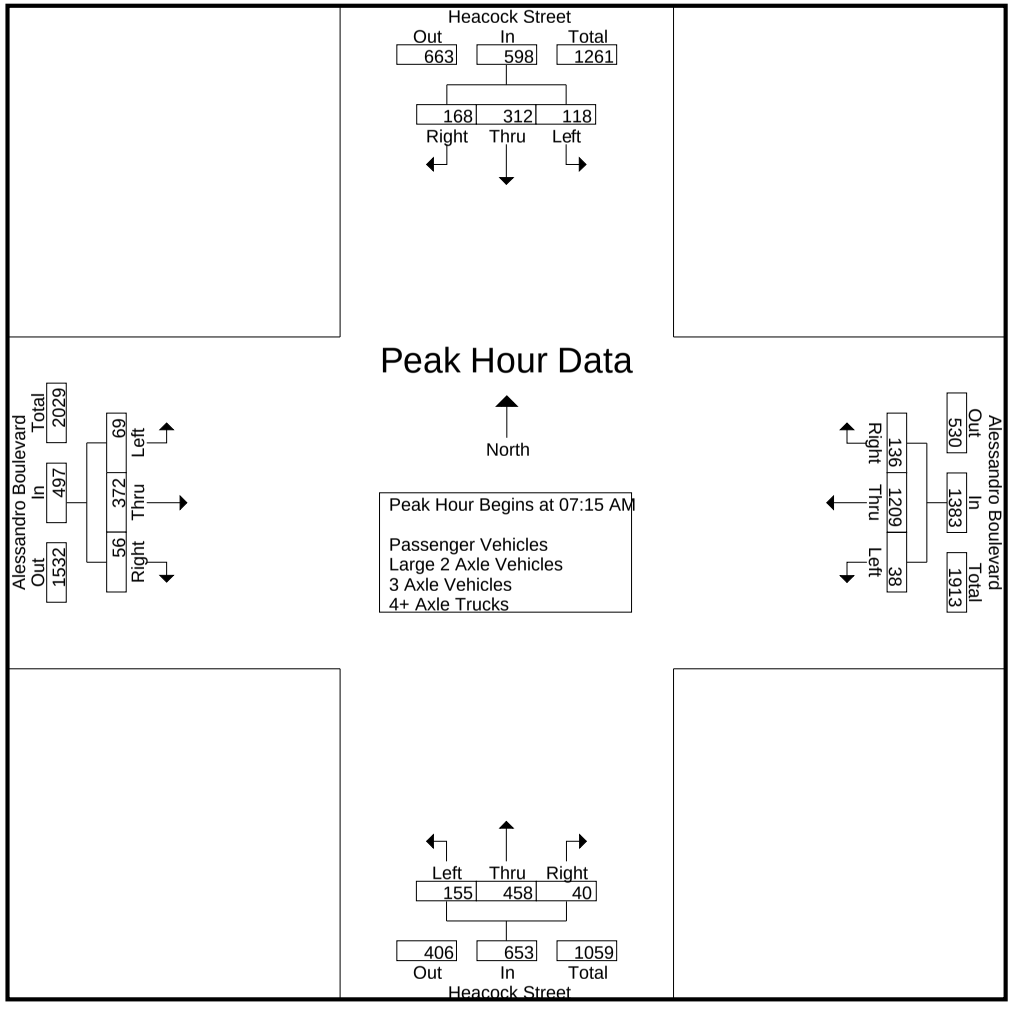

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City of Moreno Valley
N/S: Heacock Street
E/W: Alessandro Boulevard
Weather: Clear

File Name : 05_MRV_HEAL AM
Site Code : 05117597
Start Date : 9/12/2017
Page No : 3

	Heacock Street Southbound				Alessandro Boulevard Westbound				Heacock Street Northbound				Alessandro Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	08:00 AM				07:15 AM				07:15 AM				07:45 AM				
+0 mins.	42	66	**48**	**156**	**11**	289	27	327	**41**	115	7	163	22	116	17	155	
+15 mins.	48	59	47	154	11	314	28	353	35	100	**13**	148	21	84	13	118	
+30 mins.	33	**73**	43	149	9	284	39	332	41	**142**	12	**195**	**26**	100	13	139	
+45 mins.	**51**	59	42	152	7	**322**	**42**	**371**	38	101	8	147	25	**125**	**19**	**169**	
Total Volume	174	257	180	611	38	1209	136	1383	155	458	40	653	94	425	62	581	
% App. Total	28.5	42.1	29.5		2.7	87.4	9.8		23.7	70.1	6.1		16.2	73.1	10.7		
PHF	.853	.880	.938	.979	.864	.939	.810	.932	.945	.806	.769	.837	.904	.850	.816	.859	

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City of Moreno Valley
N/S: Heacock Street
E/W: Alessandro Boulevard
Weather: Clear

File Name : 05_MRV_HEAL AM
Site Code : 05117597
Start Date : 9/12/2017
Page No : 1

Groups Printed- Passenger Vehicles

	Heacock Street Southbound					Alessandro Boulevard Westbound					Heacock Street Northbound					Alessandro Boulevard Eastbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	10	62	56	24	128	10	300	16	4	326	32	54	11	6	97	15	53	11	7	79	41	630	671
07:15 AM	17	82	41	18	140	9	278	25	7	312	40	111	6	3	157	12	71	13	9	96	37	705	742
07:30 AM	24	93	39	17	156	11	302	28	7	341	34	97	12	5	143	13	98	13	5	124	34	764	798
07:45 AM	33	66	37	17	136	8	276	38	9	322	40	137	12	4	189	21	111	16	11	148	41	795	836
Total	84	303	173	76	560	38	1156	107	27	1301	146	399	41	18	586	61	333	53	32	447	153	2894	3047
08:00 AM	41	65	45	12	151	6	315	42	12	363	38	97	8	5	143	21	80	12	8	113	37	770	807
08:15 AM	47	52	44	21	143	5	222	38	10	265	36	96	9	2	141	25	95	11	4	131	37	680	717
08:30 AM	33	71	42	18	146	8	216	44	15	268	32	55	14	7	101	25	118	19	8	162	48	677	725
08:45 AM	50	58	40	14	148	5	200	25	7	230	31	102	5	2	138	24	93	18	14	135	37	651	688
Total	171	246	171	65	588	24	953	149	44	1126	137	350	36	16	523	95	386	60	34	541	159	2778	2937
Grand Total	255	549	344	141	1148	62	2109	256	71	2427	283	749	77	34	1109	156	719	113	66	988	312	5672	5984
Apprch %	22.2	47.8	30			2.6	86.9	10.5			25.5	67.5	6.9			15.8	72.8	11.4					
Total %	4.5	9.7	6.1		20.2	1.1	37.2	4.5		42.8	5	13.2	1.4		19.6	2.8	12.7	2		17.4	5.2	94.8	

	Heacock Street Southbound				Alessandro Boulevard Westbound				Heacock Street Northbound				Alessandro Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	17	82	41	140	9	278	25	312	**40**	111	6	157	12	71	13	96	705
07:30 AM	24	**93**	39	**156**	**11**	302	28	341	34	97	**12**	143	13	98	13	124	764
07:45 AM	33	66	37	136	8	276	38	322	40	**137**	12	**189**	**21**	**111**	**16**	**148**	**795**
08:00 AM	**41**	65	**45**	151	6	**315**	**42**	**363**	38	97	8	143	21	80	12	113	770
Total Volume	115	306	162	583	34	1171	133	1338	152	442	38	632	67	360	54	481	3034
% App. Total	19.7	52.5	27.8		2.5	87.5	9.9		24.1	69.9	6		13.9	74.8	11.2		
PHF	.701	.823	.900	.934	.773	.929	.792	.921	.950	.807	.792	.836	.798	.811	.844	.813	.954

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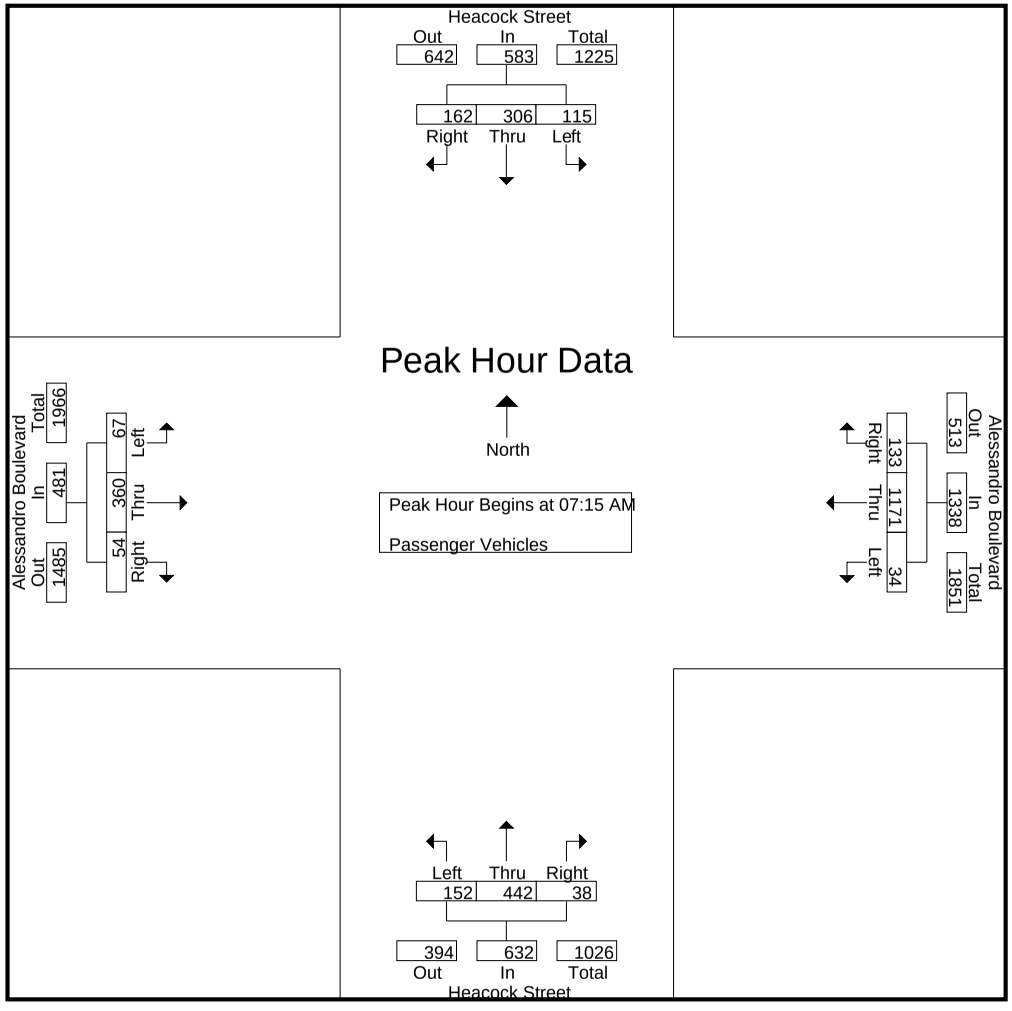
City of Moreno Valley
N/S: Heacock Street
E/W: Alessandro Boulevard
Weather: Clear

File Name : 05_MRV_HEAL AM
Site Code : 05117597
Start Date : 9/12/2017
Page No : 2



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City of Moreno Valley
N/S: Heacock Street
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Page No : 3

	Heacock Street Southbound				Alessandro Boulevard Westbound				Heacock Street Northbound				Alessandro Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	07:15 AM				07:15 AM				07:15 AM				07:15 AM				
+0 mins.	17	82	41	140	9	278	25	312	**40**	111	6	157	12	71	13	96	
+15 mins.	24	**93**	39	**156**	**11**	302	28	341	34	97	**12**	143	13	98	13	124	
+30 mins.	33	66	37	136	8	276	38	322	40	**137**	12	**189**	**21**	**111**	**16**	**148**	
+45 mins.	**41**	65	**45**	151	6	**315**	**42**	**363**	38	97	8	143	21	80	12	113	
Total Volume	115	306	162	583	34	1171	133	1338	152	442	38	632	67	360	54	481	
% App. Total	19.7	52.5	27.8		2.5	87.5	9.9		24.1	69.9	6		13.9	74.8	11.2		
PHF	.701	.823	.900	.934	.773	.929	.792	.921	.950	.807	.792	.836	.798	.811	.844	.813	

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File Name : 05_MRV_HEAL AM
Site Code : 05117597
Start Date : 9/12/2017
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Groups Printed- Large 2 Axle Vehicles

	Heacock Street Southbound					Alessandro Boulevard Westbound					Heacock Street Northbound					Alessandro Boulevard Eastbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	1	1	1	1	3	0	3	3	2	6	0	1	0	0	1	0	6	0	0	6	3	16	19
07:15 AM	1	1	0	0	2	2	9	2	0	13	1	3	1	0	5	1	0	0	0	1	0	21	21
07:30 AM	1	0	1	0	2	0	9	0	0	9	0	1	1	1	2	0	3	0	0	3	1	16	17
07:45 AM	0	0	0	0	0	0	7	1	0	8	1	3	0	0	4	1	3	1	1	5	1	17	18
Total	3	2	2	1	7	2	28	6	2	36	2	8	2	1	12	2	12	1	1	15	5	70	75
08:00 AM	1	1	1	0	3	1	6	0	0	7	0	1	0	0	1	0	4	1	1	5	1	16	17
08:15 AM	1	6	3	3	10	1	3	3	0	7	1	4	0	0	5	1	3	1	0	5	3	27	30
08:30 AM	0	1	1	0	2	0	5	1	0	6	1	1	0	0	2	0	7	0	0	7	0	17	17
08:45 AM	1	1	1	0	3	0	2	1	0	3	1	2	0	0	3	1	8	0	0	9	0	18	18
Total	3	9	6	3	18	2	16	5	0	23	3	8	0	0	11	2	22	2	1	26	4	78	82
Grand Total	6	11	8	4	25	4	44	11	2	59	5	16	2	1	23	4	34	3	2	41	9	148	157
Apprch %	24	44	32			6.8	74.6	18.6			21.7	69.6	8.7			9.8	82.9	7.3					
Total %	4.1	7.4	5.4		16.9	2.7	29.7	7.4		39.9	3.4	10.8	1.4		15.5	2.7	23	2		27.7	5.7	94.3	

	Heacock Street Southbound				Alessandro Boulevard Westbound				Heacock Street Northbound				Alessandro Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	**1**	**1**	0	2	**2**	**9**	**2**	**13**	**1**	**3**	**1**	**5**	**1**	0	0	1	**21**
07:30 AM	1	0	**1**	2	0	9	0	9	0	1	1	2	0	3	0	3	16
07:45 AM	0	0	0	0	0	7	1	8	1	3	0	4	1	3	**1**	**5**	17
08:00 AM	1	1	1	**3**	1	6	0	7	0	1	0	1	0	**4**	1	5	16
Total Volume	3	2	2	7	3	31	3	37	2	8	2	12	2	10	2	14	70
% App. Total	42.9	28.6	28.6		8.1	83.8	8.1		16.7	66.7	16.7		14.3	71.4	14.3		
PHF	.750	.500	.500	.583	.375	.861	.375	.712	.500	.667	.500	.600	.500	.625	.500	.700	.833

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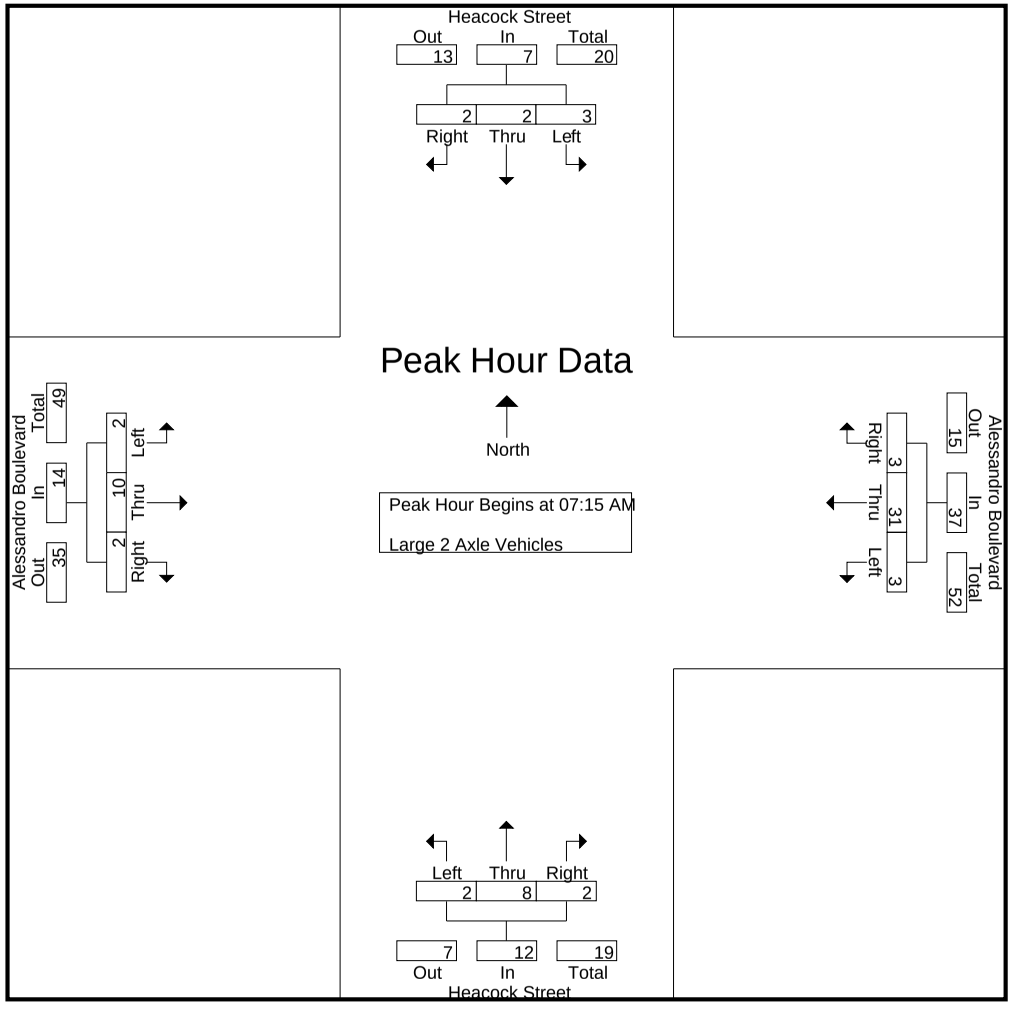
City of Moreno Valley
N/S: Heacock Street
E/W: Alessandro Boulevard
Weather: Clear

File Name : 05_MRV_HEAL AM
Site Code : 05117597
Start Date : 9/12/2017
Page No : 2



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City of Moreno Valley
N/S: Heacock Street
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File Name : 05_MRV_HEAL AM
Site Code : 05117597
Start Date : 9/12/2017
Page No : 3

	Heacock Street Southbound				Alessandro Boulevard Westbound				Heacock Street Northbound				Alessandro Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	07:15 AM				07:15 AM				07:15 AM				07:15 AM				
+0 mins.	**1**	**1**	0	2	**2**	**9**	**2**	**13**	**1**	**3**	**1**	**5**	**1**	0	0	1	
+15 mins.	1	0	**1**	2	0	9	0	9	0	1	1	2	0	3	0	3	
+30 mins.	0	0	0	0	0	7	1	8	1	3	0	4	1	3	**1**	**5**	
+45 mins.	1	1	1	**3**	1	6	0	7	0	1	0	1	0	**4**	1	5	
Total Volume	3	2	2	7	3	31	3	37	2	8	2	12	2	10	2	14	
% App. Total	42.9	28.6	28.6		8.1	83.8	8.1		16.7	66.7	16.7		14.3	71.4	14.3		
PHF	.750	.500	.500	.583	.375	.861	.375	.712	.500	.667	.500	.600	.500	.625	.500	.700	

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City of Moreno Valley
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Weather: Clear

File Name : 05_MRV_HEAL AM
Site Code : 05117597
Start Date : 9/12/2017
Page No : 1

Groups Printed- 3 Axle Vehicles

	Heacock Street Southbound					Alessandro Boulevard Westbound					Heacock Street Northbound					Alessandro Boulevard Eastbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	1	0	0	1	0	1	0	0	1	0	2	0	0	2	0	0	0	0	0	0	4	4
07:15 AM	0	0	0	0	0	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	0	2	2
07:30 AM	0	0	1	1	1	0	0	0	0	0	1	1	0	0	2	0	0	0	0	0	1	3	4
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	1	1	1	2	0	2	0	0	2	1	4	0	0	5	0	0	0	0	0	1	9	10
08:00 AM	0	0	2	2	2	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	2	3	5
08:15 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
08:30 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	1	1
08:45 AM	0	0	0	0	0	1	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2	2
Total	0	1	2	2	3	1	1	0	0	2	1	1	0	0	2	0	0	0	0	0	2	7	9
Grand Total	0	2	3	3	5	1	3	0	0	4	2	5	0	0	7	0	0	0	0	0	3	16	19
Apprch %	0	40	60			25	75	0			28.6	71.4	0			0	0	0					
Total %	0	12.5	18.8		31.2	6.2	18.8	0		25	12.5	31.2	0		43.8	0	0	0		0	15.8	84.2	

	Heacock Street Southbound				Alessandro Boulevard Westbound				Heacock Street Northbound				Alessandro Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	0	0	0	0	0	**1**	0	**1**	0	**1**	0	1	0	0	0	0	2
07:30 AM	0	0	1	1	0	0	0	0	**1**	1	0	**2**	0	0	0	0	**3**
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	**2**	**2**	0	0	0	0	0	1	0	1	0	0	0	0	3
Total Volume	0	0	3	3	0	1	0	1	1	3	0	4	0	0	0	0	8
% App. Total	0	0	100		0	100	0		25	75	0		0	0	0		
PHF	.000	.000	.375	.375	.000	.250	.000	.250	.250	.750	.000	.500	.000	.000	.000	.000	.667

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City of Moreno Valley
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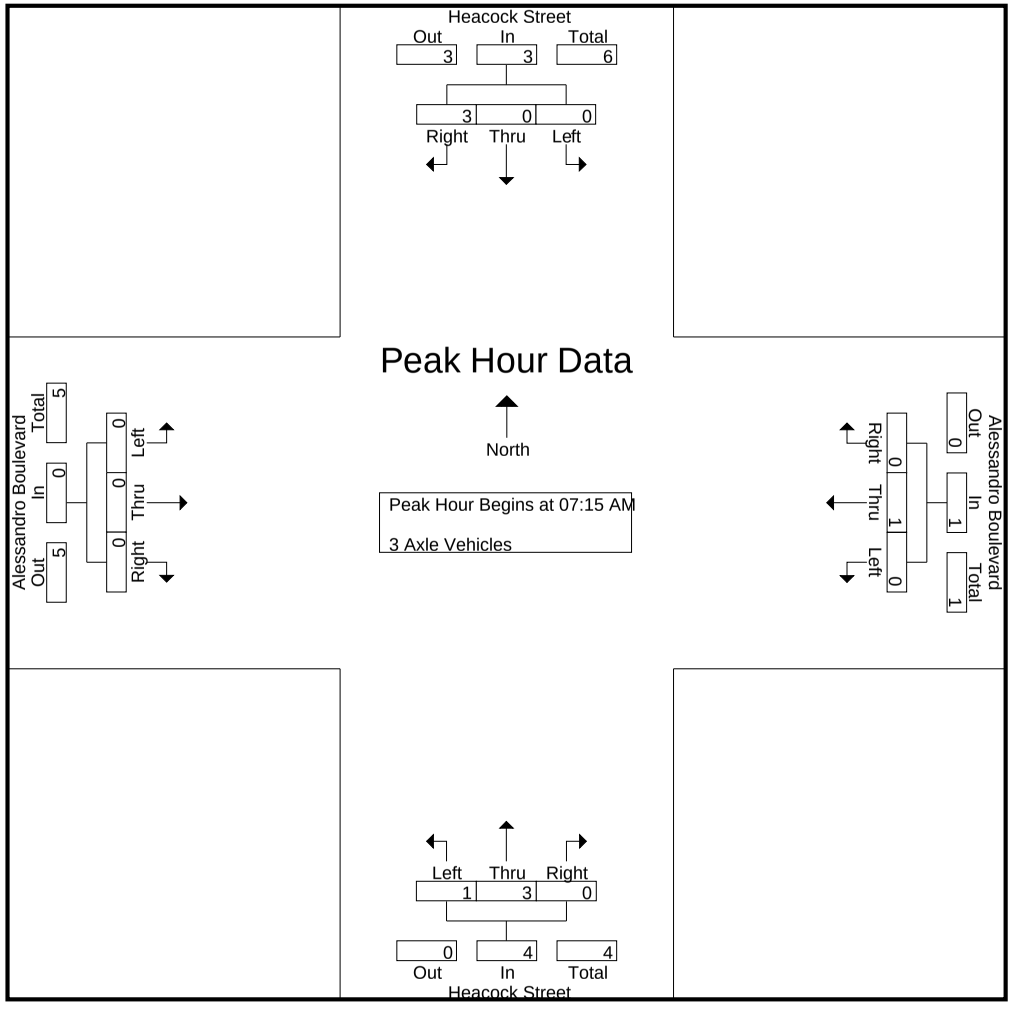
E/W: Alessandro Boulevard
Weather: Clear

File Name : 05_MRV_HEAL AM
Site Code : 05117597
Start Date : 9/12/2017
Page No : 2



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City of Moreno Valley
N/S: Heacock Street
E/W: Alessandro Boulevard
Weather: Clear

File Name : 05_MRV_HEAL AM
Site Code : 05117597
Start Date : 9/12/2017
Page No : 3

	Heacock Street Southbound				Alessandro Boulevard Westbound				Heacock Street Northbound				Alessandro Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	07:15 AM				07:15 AM				07:15 AM				07:15 AM				
+0 mins.	0	0	0	0	0	**1**	0	**1**	0	**1**	0	1	0	0	0	0	
+15 mins.	0	0	1	1	0	0	0	0	**1**	1	0	**2**	0	0	0	0	
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
+45 mins.	0	0	**2**	**2**	0	0	0	0	0	1	0	1	0	0	0	0	
Total Volume	0	0	3	3	0	1	0	1	1	3	0	4	0	0	0	0	
% App. Total	0	0	100		0	100	0		25	75	0		0	0	0		
PHF	.000	.000	.375	.375	.000	.250	.000	.250	.250	.750	.000	.500	.000	.000	.000	.000	

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Site Code : 05117597
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Groups Printed- 4+ Axle Trucks

	Heacock Street Southbound					Alessandro Boulevard Westbound					Heacock Street Northbound					Alessandro Boulevard Eastbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	3	0	0	3	0	7	0	0	7	0	5	0	0	5	0	0	0	0	0	0	15	15
07:15 AM	0	2	0	0	2	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	3	3
07:30 AM	0	1	0	0	1	0	3	0	0	3	0	1	0	0	1	0	0	0	0	0	0	5	5
07:45 AM	0	1	1	0	2	1	1	0	0	2	0	2	0	0	2	0	2	0	0	2	0	8	8
Total	0	7	1	0	8	1	12	0	0	13	0	8	0	0	8	0	2	0	0	2	0	31	31
08:00 AM	0	0	0	0	0	0	1	0	0	1	0	2	0	0	2	0	0	0	0	0	0	3	3
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	2	1	0	3	0	6	6
08:30 AM	0	1	0	0	1	0	1	0	0	1	1	1	0	0	2	0	0	0	0	0	0	4	4
08:45 AM	0	0	1	0	1	0	2	0	0	2	0	1	0	0	1	0	1	0	0	1	0	5	5
Total	0	1	1	0	2	0	4	0	0	4	1	7	0	0	8	0	3	1	0	4	0	18	18
Grand Total	0	8	2	0	10	1	16	0	0	17	1	15	0	0	16	0	5	1	0	6	0	49	49
Apprch %	0	80	20			5.9	94.1	0			6.2	93.8	0			0	83.3	16.7					
Total %	0	16.3	4.1		20.4	2	32.7	0		34.7	2	30.6	0		32.7	0	10.2	2		12.2	0	100	

	Heacock Street Southbound				Alessandro Boulevard Westbound				Heacock Street Northbound				Alessandro Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	0	**2**	0	**2**	0	1	0	1	0	0	0	0	0	0	0	0	3
07:30 AM	0	1	0	1	0	**3**	0	**3**	0	1	0	1	0	0	0	0	5
07:45 AM	0	1	**1**	2	**1**	1	0	2	0	**2**	0	**2**	0	**2**	0	**2**	**8**
08:00 AM	0	0	0	0	0	1	0	1	0	2	0	2	0	0	0	0	3
Total Volume	0	4	1	5	1	6	0	7	0	5	0	5	0	2	0	2	19
% App. Total	0	80	20		14.3	85.7	0		0	100	0		0	100	0		
PHF	.000	.500	.250	.625	.250	.500	.000	.583	.000	.625	.000	.625	.000	.250	.000	.250	.594

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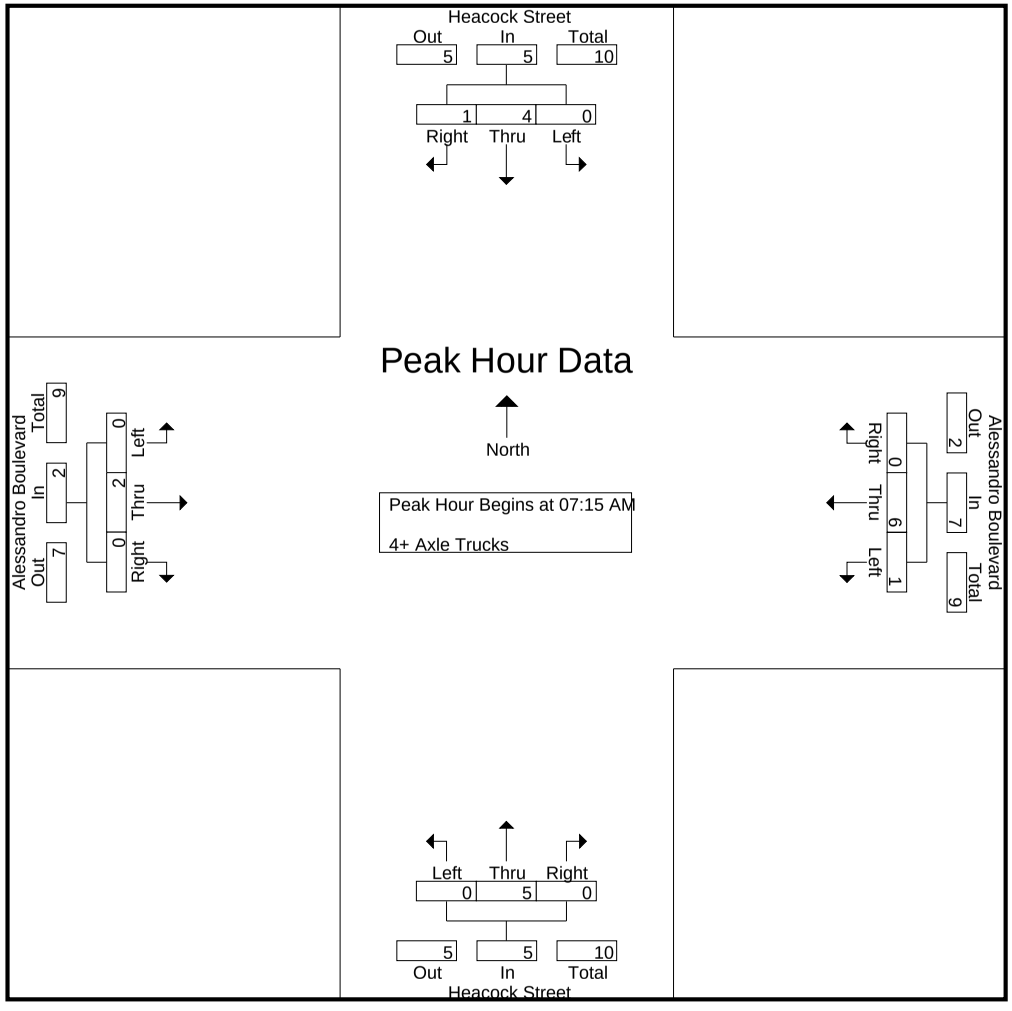

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File Name : 05_MRV_HEAL AM
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	Heacock Street Southbound				Alessandro Boulevard Westbound				Heacock Street Northbound				Alessandro Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	07:15 AM				07:15 AM				07:15 AM				07:15 AM				
+0 mins.	0	**2**	0	**2**	0	1	0	1	0	0	0	0	0	0	0	0	
+15 mins.	0	1	0	1	0	**3**	0	**3**	0	1	0	1	0	0	0	0	
+30 mins.	0	1	**1**	2	**1**	1	0	2	0	**2**	0	**2**	0	**2**	0	**2**	
+45 mins.	0	0	0	0	0	1	0	1	0	2	0	2	0	0	0	0	
Total Volume	0	4	1	5	1	6	0	7	0	5	0	5	0	2	0	2	
% App. Total	0	80	20		14.3	85.7	0		0	100	0		0	100	0		
PHF	.000	.500	.250	.625	.250	.500	.000	.583	.000	.625	.000	.625	.000	.250	.000	.250	

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City of Moreno Valley
N/S: Heacock Street
E/W: Alessandro Boulevard
Weather: Clear

File Name : 05_MRV_HEAL PM
Site Code : 05117597
Start Date : 9/12/2017
Page No : 1

Groups Printed- Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks

	Heacock Street Southbound					Alessandro Boulevard Westbound					Heacock Street Northbound					Alessandro Boulevard Eastbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	32	89	30	12	151	7	213	42	11	262	40	89	12	3	141	34	303	29	11	366	37	920	957
04:15 PM	68	102	42	21	212	14	221	39	16	274	33	86	16	3	135	32	271	21	6	324	46	945	991
04:30 PM	68	109	36	15	213	19	164	42	18	225	46	106	28	10	180	30	241	25	7	296	50	914	964
04:45 PM	45	104	27	13	176	6	224	41	6	271	51	117	16	6	184	17	312	36	13	365	38	996	1034
Total	213	404	135	61	752	46	822	164	51	1032	170	398	72	22	640	113	1127	111	37	1351	171	3775	3946
05:00 PM	73	148	44	14	265	6	162	37	12	205	32	95	21	9	148	20	289	27	10	336	45	954	999
05:15 PM	63	102	38	21	203	16	181	38	13	235	43	68	20	6	131	45	336	39	15	420	55	989	1044
05:30 PM	61	129	24	6	214	8	141	41	15	190	24	82	10	3	116	32	276	32	12	340	36	860	896
05:45 PM	53	131	25	13	209	16	173	31	15	220	38	77	20	7	135	24	269	33	14	326	49	890	939
Total	250	510	131	54	891	46	657	147	55	850	137	322	71	25	530	121	1170	131	51	1422	185	3693	3878
Grand Total	463	914	266	115	1643	92	1479	311	106	1882	307	720	143	47	1170	234	2297	242	88	2773	356	7468	7824
Apprch %	28.2	55.6	16.2			4.9	78.6	16.5			26.2	61.5	12.2			8.4	82.8	8.7					
Total %	6.2	12.2	3.6		22	1.2	19.8	4.2		25.2	4.1	9.6	1.9		15.7	3.1	30.8	3.2		37.1	4.6	95.4	
Passenger Vehicles	459	886	264		1723	92	1459	306		1959	301	697	138		1181	227	2262	236		2812	0	0	7675
% Passenger Vehicles	99.1	96.9	99.2	99.1	98	100	98.6	98.4	96.2	98.5	98	96.8	96.5	95.7	97	97	98.5	97.5	98.9	98.3	0	0	98.1
Large 2 Axle Vehicles	4	10	2		17	0	18	5		27	3	9	5		19	7	29	4		41	0	0	104
% Large 2 Axle Vehicles	0.9	1.1	0.8	0.9	1	0	1.2	1.6	3.8	1.4	1	1.2	3.5	4.3	1.6	3	1.3	1.7	1.1	1.4	0	0	1.3
3 Axle Vehicles	0	8	0		8	0	0	0		0	2	3	0		5	0	1	1		2	0	0	15
% 3 Axle Vehicles	0	0.9	0	0	0.5	0	0	0	0	0	0.7	0.4	0	0	0.4	0	0	0.4	0	0.1	0	0	0.2
4+ Axle Trucks	0	10	0		10	0	2	0		2	1	11	0		12	0	5	1		6	0	0	30
% 4+ Axle Trucks	0	1.1	0	0	0.6	0	0.1	0	0	0.1	0.3	1.5	0	0	1	0	0.2	0.4	0	0.2	0	0	0.4

	Heacock Street Southbound				Alessandro Boulevard Westbound				Heacock Street Northbound				Alessandro Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	68	109	36	213	**19**	164	**42**	225	46	106	**28**	180	30	241	25	296	914
04:45 PM	45	104	27	176	6	**224**	41	**271**	**51**	**117**	16	**184**	17	312	36	365	**996**
05:00 PM	**73**	**148**	**44**	**265**	6	162	37	205	32	95	21	148	20	289	27	336	954
05:15 PM	63	102	38	203	16	181	38	235	43	68	20	131	**45**	**336**	**39**	**420**	989
Total Volume	249	463	145	857	47	731	158	936	172	386	85	643	112	1178	127	1417	3853
% App. Total	29.1	54	16.9		5	78.1	16.9		26.7	60	13.2		7.9	83.1	9		
PHF	.853	.782	.824	.808	.618	.816	.940	.863	.843	.825	.759	.874	.622	.876	.814	.843	.967

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Weather: Clear

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Site Code : 05117597
Start Date : 9/12/2017
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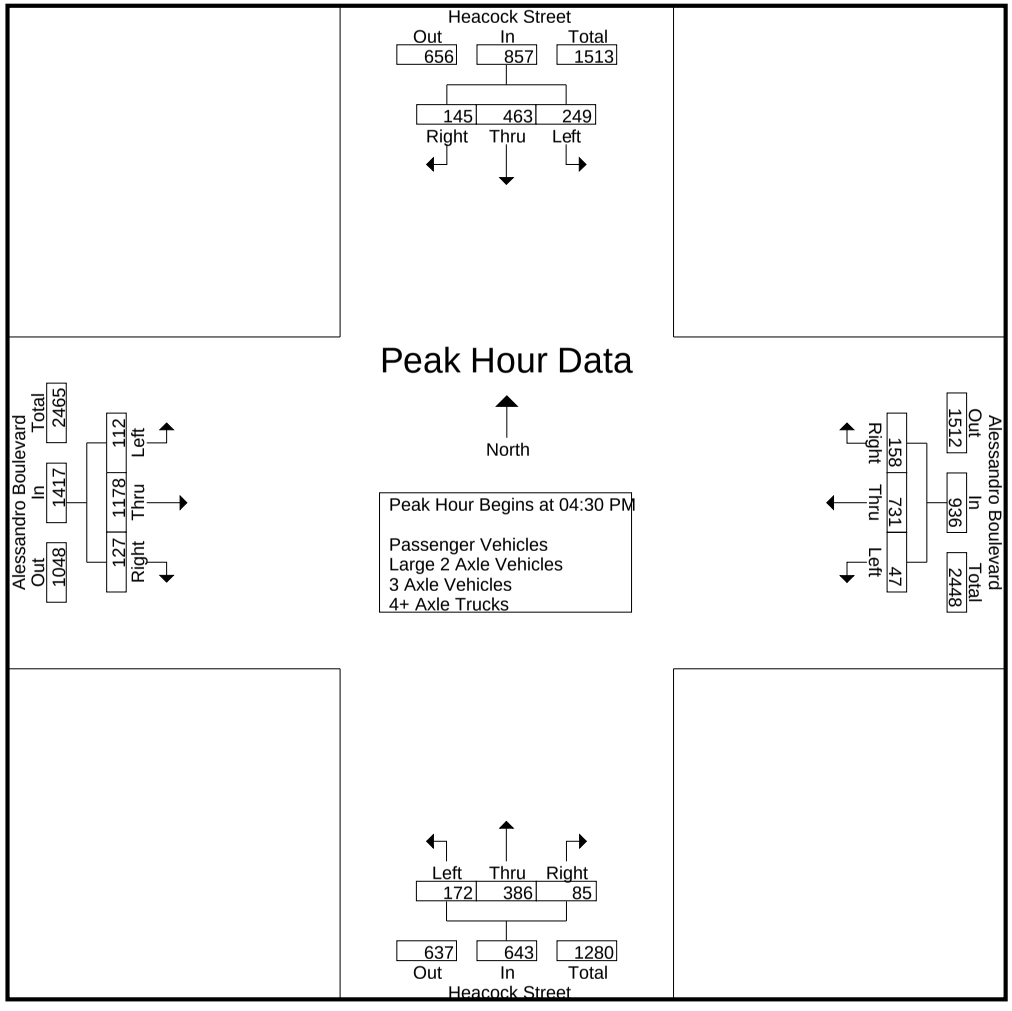

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Start Date : 9/12/2017
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	Heacock Street Southbound				Alessandro Boulevard Westbound				Heacock Street Northbound				Alessandro Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	05:00 PM				04:00 PM				04:15 PM				04:45 PM				
+0 mins.	**73**	**148**	**44**	**265**	7	213	**42**	262	33	86	16	135	17	312	36	365	
+15 mins.	63	102	38	203	14	221	39	**274**	46	106	**28**	180	20	289	27	336	
+30 mins.	61	129	24	214	**19**	164	42	225	**51**	**117**	16	**184**	**45**	**336**	**39**	**420**	
+45 mins.	53	131	25	209	6	**224**	41	271	32	95	21	148	32	276	32	340	
Total Volume	250	510	131	891	46	822	164	1032	162	404	81	647	114	1213	134	1461	
% App. Total	28.1	57.2	14.7		4.5	79.7	15.9		25	62.4	12.5		7.8	83	9.2		
PHF	.856	.861	.744	.841	.605	.917	.976	.942	.794	.863	.723	.879	.633	.903	.859	.870	

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Groups Printed- Passenger Vehicles

	Heacock Street Southbound					Alessandro Boulevard Westbound					Heacock Street Northbound					Alessandro Boulevard Eastbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	32	88	30	12	150	7	209	41	10	257	39	85	12	3	136	33	297	28	10	358	35	901	936
04:15 PM	68	102	42	21	212	14	218	39	16	271	32	84	16	3	132	32	269	20	6	321	46	936	982
04:30 PM	67	106	36	15	209	19	159	40	16	218	44	105	28	10	177	30	238	25	7	293	48	897	945
04:45 PM	43	102	27	13	172	6	221	41	6	268	51	115	15	5	181	17	306	36	13	359	37	980	1017
Total	210	398	135	61	743	46	807	161	48	1014	166	389	71	21	626	112	1110	109	36	1331	166	3714	3880
05:00 PM	72	142	43	13	257	6	159	37	12	202	30	90	21	9	141	19	285	26	10	330	44	930	974
05:15 PM	63	97	38	21	198	16	181	38	13	235	43	65	16	5	124	43	330	38	15	411	54	968	1022
05:30 PM	61	125	23	6	209	8	141	41	15	190	24	79	10	3	113	29	272	30	12	331	36	843	879
05:45 PM	53	124	25	13	202	16	171	29	14	216	38	74	20	7	132	24	265	33	14	322	48	872	920
Total	249	488	129	53	866	46	652	145	54	843	135	308	67	24	510	115	1152	127	51	1394	182	3613	3795
Grand Total	459	886	264	114	1609	92	1459	306	102	1857	301	697	138	45	1136	227	2262	236	87	2725	348	7327	7675
Apprch %	28.5	55.1	16.4			5	78.6	16.5			26.5	61.4	12.1			8.3	83	8.7					
Total %	6.3	12.1	3.6		22	1.3	19.9	4.2		25.3	4.1	9.5	1.9		15.5	3.1	30.9	3.2		37.2	4.5	95.5	

	Heacock Street Southbound				Alessandro Boulevard Westbound				Heacock Street Northbound				Alessandro Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	67	106	36	209	**19**	159	40	218	44	105	**28**	177	30	238	25	293	897
04:45 PM	43	102	27	172	6	**221**	**41**	**268**	**51**	**115**	15	**181**	17	306	36	359	**980**
05:00 PM	**72**	**142**	**43**	**257**	6	159	37	202	30	90	21	141	19	285	26	330	930
05:15 PM	63	97	38	198	16	181	38	235	43	65	16	124	**43**	**330**	**38**	**411**	968
Total Volume	245	447	144	836	47	720	156	923	168	375	80	623	109	1159	125	1393	3775
% App. Total	29.3	53.5	17.2		5.1	78	16.9		27	60.2	12.8		7.8	83.2	9		
PHF	.851	.787	.837	.813	.618	.814	.951	.861	.824	.815	.714	.860	.634	.878	.822	.847	.963

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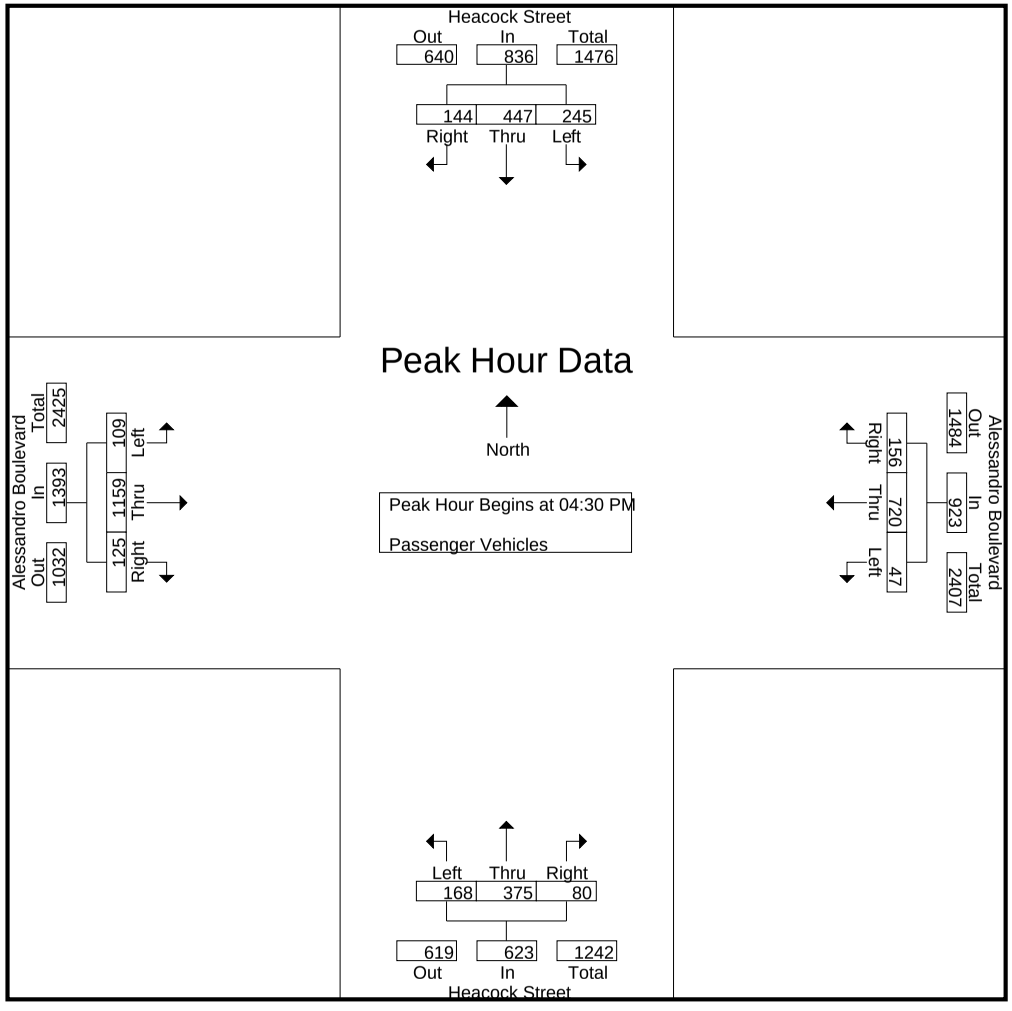

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	Heacock Street Southbound				Alessandro Boulevard Westbound				Heacock Street Northbound				Alessandro Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	04:30 PM				04:30 PM				04:30 PM				04:30 PM				
+0 mins.	67	106	36	209	**19**	159	40	218	44	105	**28**	177	30	238	25	293	
+15 mins.	43	102	27	172	6	**221**	**41**	**268**	**51**	**115**	15	**181**	17	306	36	359	
+30 mins.	**72**	**142**	**43**	**257**	6	159	37	202	30	90	21	141	19	285	26	330	
+45 mins.	63	97	38	198	16	181	38	235	43	65	16	124	**43**	**330**	**38**	**411**	
Total Volume	245	447	144	836	47	720	156	923	168	375	80	623	109	1159	125	1393	
% App. Total	29.3	53.5	17.2		5.1	78	16.9		27	60.2	12.8		7.8	83.2	9		
PHF	.851	.787	.837	.813	.618	.814	.951	.861	.824	.815	.714	.860	.634	.878	.822	.847	

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Groups Printed- Large 2 Axle Vehicles

	Heacock Street Southbound					Alessandro Boulevard Westbound					Heacock Street Northbound					Alessandro Boulevard Eastbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	0	0	0	0	0	4	1	1	5	1	1	0	0	2	1	5	1	1	7	2	14	16
04:15 PM	0	0	0	0	0	0	3	0	0	3	1	0	0	0	1	0	2	1	0	3	0	7	7
04:30 PM	1	1	0	0	2	0	4	2	2	6	0	0	0	0	0	0	3	0	0	3	2	11	13
04:45 PM	2	2	0	0	4	0	3	0	0	3	0	0	1	1	1	0	6	0	0	6	1	14	15
Total	3	3	0	0	6	0	14	3	3	17	2	1	1	1	4	1	16	2	1	19	5	46	51
05:00 PM	1	2	1	1	4	0	2	0	0	2	1	2	0	0	3	1	4	1	0	6	1	15	16
05:15 PM	0	3	0	0	3	0	0	0	0	0	0	3	4	1	7	2	5	1	0	8	1	18	19
05:30 PM	0	1	1	0	2	0	0	0	0	0	0	2	0	0	2	3	1	0	0	4	0	8	8
05:45 PM	0	1	0	0	1	0	2	2	1	4	0	1	0	0	1	0	3	0	0	3	1	9	10
Total	1	7	2	1	10	0	4	2	1	6	1	8	4	1	13	6	13	2	0	21	3	50	53
Grand Total	4	10	2	1	16	0	18	5	4	23	3	9	5	2	17	7	29	4	1	40	8	96	104
Apprch %	25	62.5	12.5			0	78.3	21.7			17.6	52.9	29.4			17.5	72.5	10					
Total %	4.2	10.4	2.1		16.7	0	18.8	5.2		24	3.1	9.4	5.2		17.7	7.3	30.2	4.2		41.7	7.7	92.3	

	Heacock Street Southbound				Alessandro Boulevard Westbound				Heacock Street Northbound				Alessandro Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	1	1	0	2	0	**4**	**2**	**6**	0	0	0	0	0	3	0	3	11
04:45 PM	**2**	2	0	**4**	0	3	0	3	0	0	1	1	0	**6**	0	6	14
05:00 PM	1	2	**1**	4	0	2	0	2	**1**	2	0	3	1	4	**1**	6	15
05:15 PM	0	**3**	0	3	0	0	0	0	0	**3**	**4**	**7**	**2**	5	1	**8**	**18**
Total Volume	4	8	1	13	0	9	2	11	1	5	5	11	3	18	2	23	58
% App. Total	30.8	61.5	7.7		0	81.8	18.2		9.1	45.5	45.5		13	78.3	8.7		
PHF	.500	.667	.250	.813	.000	.563	.250	.458	.250	.417	.313	.393	.375	.750	.500	.719	.806

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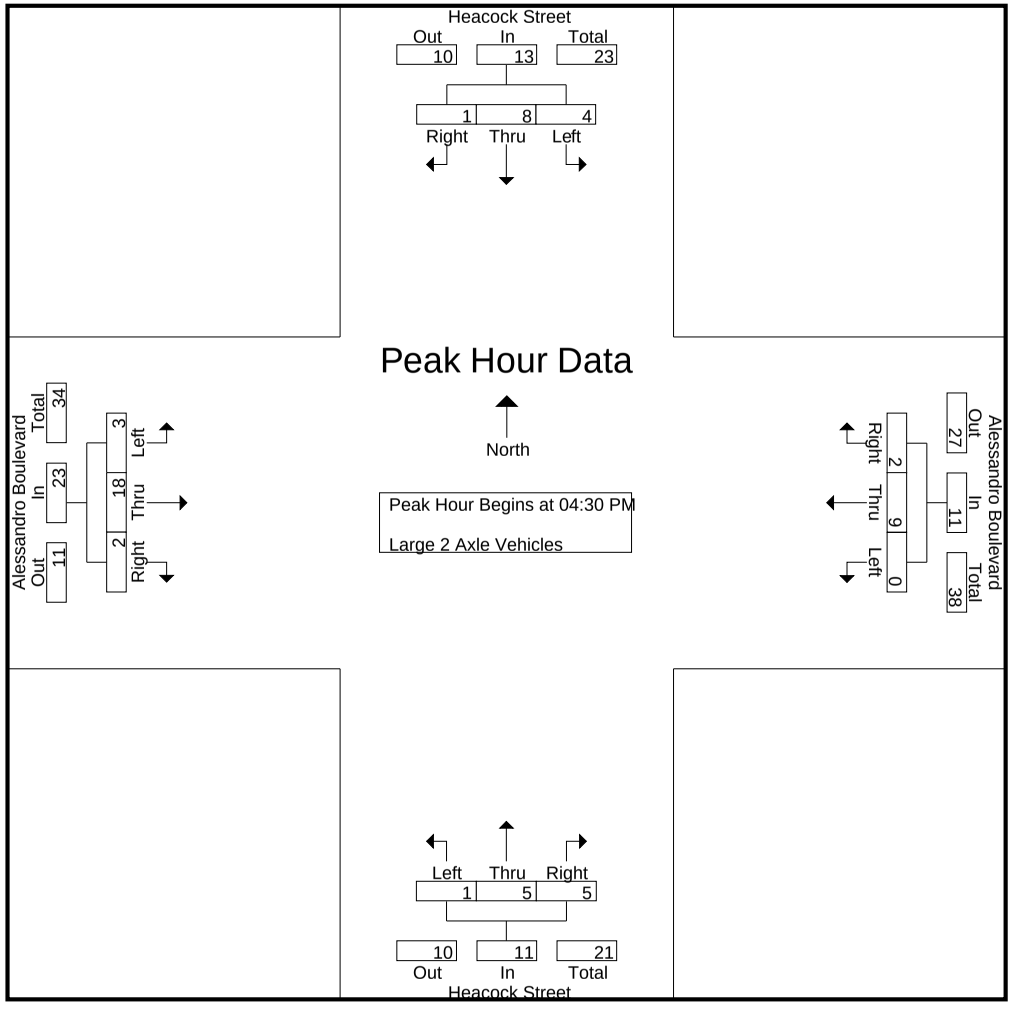

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	Heacock Street Southbound				Alessandro Boulevard Westbound				Heacock Street Northbound				Alessandro Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	04:30 PM				04:30 PM				04:30 PM				04:30 PM				
+0 mins.	1	1	0	2	0	**4**	**2**	**6**	0	0	0	0	0	3	0	3	
+15 mins.	**2**	2	0	**4**	0	3	0	3	0	0	1	1	0	**6**	0	6	
+30 mins.	1	2	**1**	4	0	2	0	2	**1**	2	0	3	1	4	**1**	6	
+45 mins.	0	**3**	0	3	0	0	0	0	0	**3**	**4**	**7**	**2**	5	1	**8**	
Total Volume	4	8	1	13	0	9	2	11	1	5	5	11	3	18	2	23	
% App. Total	30.8	61.5	7.7		0	81.8	18.2		9.1	45.5	45.5		13	78.3	8.7		
PHF	.500	.667	.250	.813	.000	.563	.250	.458	.250	.417	.313	.393	.375	.750	.500	.719	

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Groups Printed- 3 Axle Vehicles

	Heacock Street Southbound					Alessandro Boulevard Westbound					Heacock Street Northbound					Alessandro Boulevard Eastbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	2	2
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	2	2
Total	0	0	0	0	0	0	0	0	0	0	2	2	0	0	4	0	0	0	0	0	0	4	4
05:00 PM	0	2	0	0	2	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	3	3
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2	0	3	3
05:45 PM	0	5	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5
Total	0	8	0	0	8	0	0	0	0	0	0	1	0	0	1	0	1	1	0	2	0	11	11
Grand Total	0	8	0	0	8	0	0	0	0	0	2	3	0	0	5	0	1	1	0	2	0	15	15
Apprch %	0	100	0			0	0	0			40	60	0			0	50	50					
Total %	0	53.3	0		53.3	0	0	0		0	13.3	20	0		33.3	0	6.7	6.7		13.3	0	100	

	Heacock Street Southbound				Alessandro Boulevard Westbound				Heacock Street Northbound				Alessandro Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	0	0	0	0	0	0	0	**2**	0	0	**2**	0	0	0	0	2
04:45 PM	0	0	0	0	0	0	0	0	0	**2**	0	2	0	0	0	0	2
05:00 PM	0	**2**	0	**2**	0	0	0	0	0	1	0	1	0	0	0	0	**3**
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	2	0	2	0	0	0	0	2	3	0	5	0	0	0	0	7
% App. Total	0	100	0		0	0	0		40	60	0		0	0	0		
PHF	.000	.250	.000	.250	.000	.000	.000	.000	.250	.375	.000	.625	.000	.000	.000	.000	.583

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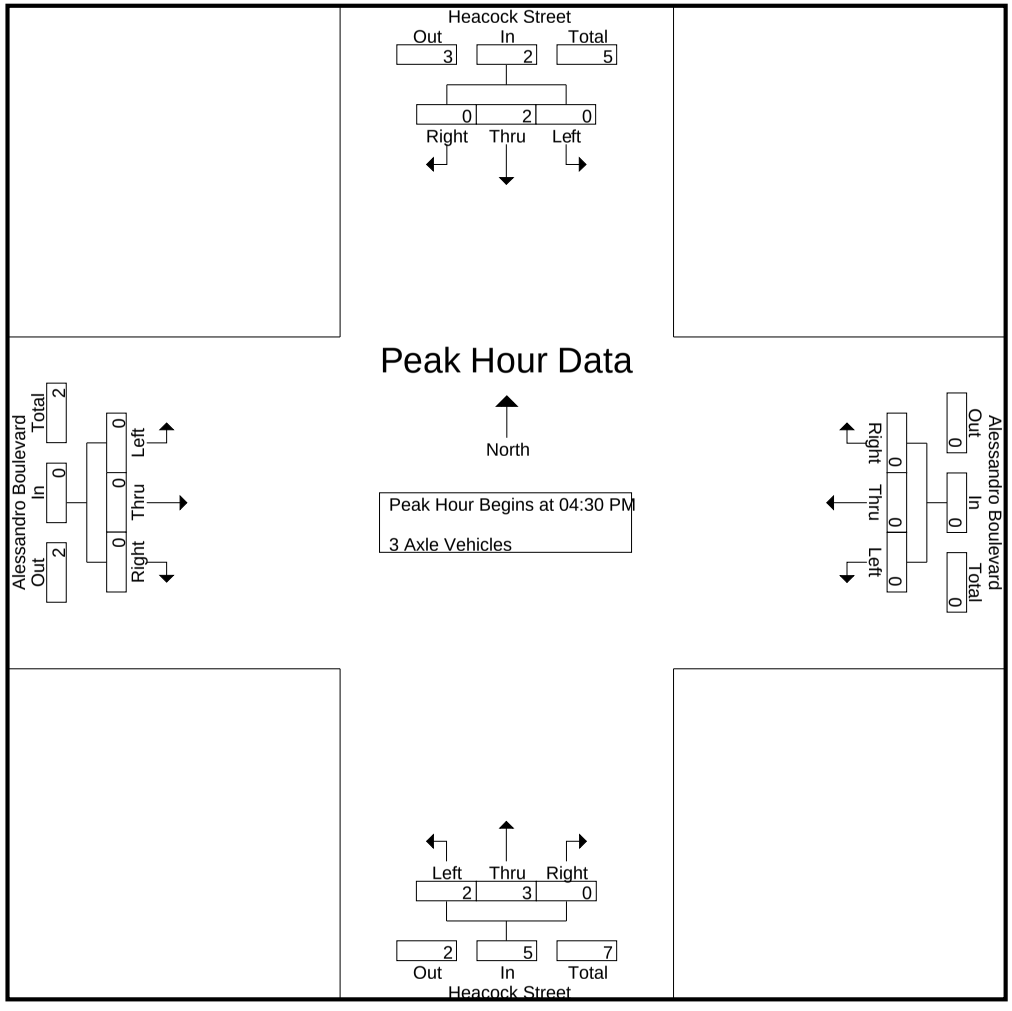
City of Moreno Valley
N/S: Heacock Street
E/W: Alessandro Boulevard
Weather: Clear

File Name : 05_MRV_HEAL PM
Site Code : 05117597
Start Date : 9/12/2017
Page No : 2



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	Heacock Street Southbound				Alessandro Boulevard Westbound				Heacock Street Northbound				Alessandro Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	04:30 PM				04:30 PM				04:30 PM				04:30 PM				
+0 mins.	0	0	0	0	0	0	0	0	**2**	0	0	**2**	0	0	0	0	
+15 mins.	0	0	0	0	0	0	0	0	0	**2**	0	2	0	0	0	0	
+30 mins.	0	**2**	0	**2**	0	0	0	0	0	1	0	1	0	0	0	0	
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total Volume	0	2	0	2	0	0	0	0	2	3	0	5	0	0	0	0	
% App. Total	0	100	0		0	0	0		40	60	0		0	0	0		
PHF	.000	.250	.000	.250	.000	.000	.000	.000	.250	.375	.000	.625	.000	.000	.000	.000	

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Groups Printed- 4+ Axle Trucks

	Heacock Street Southbound					Alessandro Boulevard Westbound					Heacock Street Northbound					Alessandro Boulevard Eastbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	1	0	0	1	0	0	0	0	0	0	3	0	0	3	0	1	0	0	1	0	5	5
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	2	2
04:30 PM	0	2	0	0	2	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	0	4	4
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	3	0	0	3	0	1	0	0	1	0	6	0	0	6	0	1	0	0	1	0	11	11
05:00 PM	0	2	0	0	2	0	1	0	0	1	1	2	0	0	3	0	0	0	0	0	0	6	6
05:15 PM	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	3	3
05:30 PM	0	2	0	0	2	0	0	0	0	0	0	1	0	0	1	0	2	1	0	3	0	6	6
05:45 PM	0	1	0	0	1	0	0	0	0	0	0	2	0	0	2	0	1	0	0	1	0	4	4
Total	0	7	0	0	7	0	1	0	0	1	1	5	0	0	6	0	4	1	0	5	0	19	19
Grand Total	0	10	0	0	10	0	2	0	0	2	1	11	0	0	12	0	5	1	0	6	0	30	30
Apprch %	0	100	0			0	100	0			8.3	91.7	0			0	83.3	16.7					
Total %	0	33.3	0		33.3	0	6.7	0		6.7	3.3	36.7	0		40	0	16.7	3.3		20	0	100	

	Heacock Street Southbound				Alessandro Boulevard Westbound				Heacock Street Northbound				Alessandro Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	**2**	0	**2**	0	**1**	0	**1**	0	1	0	1	0	0	0	0	4
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	2	0	2	0	1	0	1	**1**	**2**	0	**3**	0	0	0	0	**6**
05:15 PM	0	2	0	2	0	0	0	0	0	0	0	0	0	**1**	0	**1**	3
Total Volume	0	6	0	6	0	2	0	2	1	3	0	4	0	1	0	1	13
% App. Total	0	100	0		0	100	0		25	75	0		0	100	0		
PHF	.000	.750	.000	.750	.000	.500	.000	.500	.250	.375	.000	.333	.000	.250	.000	.250	.542

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City of Moreno Valley
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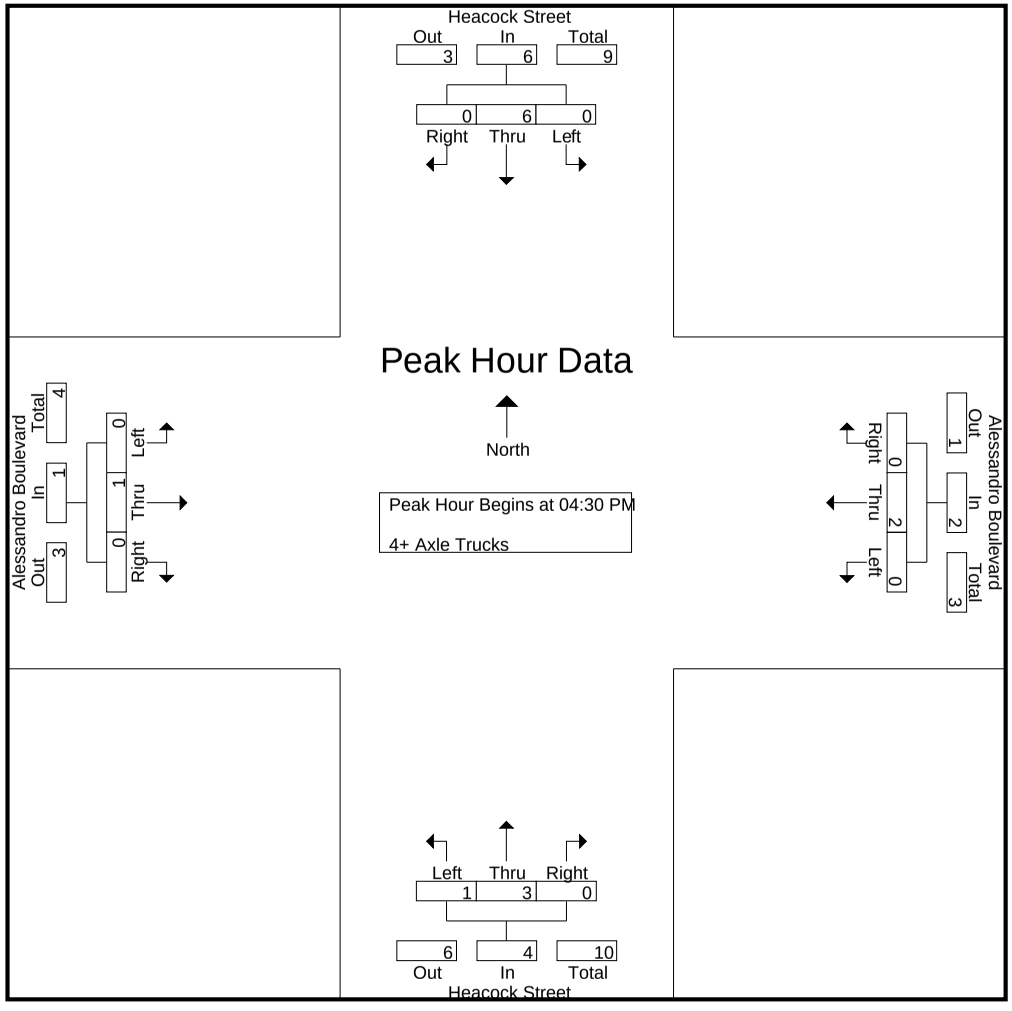
Weather: Clear

File Name : 05_MRV_HEAL PM
Site Code : 05117597
Start Date : 9/12/2017
Page No : 2



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City of Moreno Valley
N/S: Heacock Street
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File Name : 05_MRV_HEAL PM
Site Code : 05117597
Start Date : 9/12/2017
Page No : 3

	Heacock Street Southbound				Alessandro Boulevard Westbound				Heacock Street Northbound				Alessandro Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	04:30 PM				04:30 PM				04:30 PM				04:30 PM				
+0 mins.	0	**2**	0	**2**	0	**1**	0	**1**	0	1	0	1	0	0	0	0	
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
+30 mins.	0	2	0	2	0	1	0	1	**1**	**2**	0	**3**	0	0	0	0	
+45 mins.	0	2	0	2	0	0	0	0	0	0	0	0	0	**1**	0	**1**	
Total Volume	0	6	0	6	0	2	0	2	1	3	0	4	0	1	0	1	
% App. Total	0	100	0		0	100	0		25	75	0		0	100	0		
PHF	.000	.750	.000	.750	.000	.500	.000	.500	.250	.375	.000	.333	.000	.250	.000	.250	

Location: Moreno Valley
N/S: Heacock Street
E/W: Alessandro Boulevard

Date: 9/12/2017
Day: Tuesday

PEDESTRIANS

	North Leg Heacock Street	East Leg Alessandro Boulevard	South Leg Heacock Street	West Leg Alessandro Boulevard	TOTAL
7:00 AM	3	0	0	1	4
7:15 AM	4	3	0	0	7
7:30 AM	1	1	0	0	2
7:45 AM	3	2	0	0	5
8:00 AM	0	0	0	0	0
8:15 AM	0	2	1	0	3
8:30 AM	2	1	0	0	3
8:45 AM	0	0	0	0	0
TOTAL VOLUMES:	13	9	1	1	24

	North Leg Heacock Street	East Leg Alessandro Boulevard	South Leg Heacock Street	West Leg Alessandro Boulevard	TOTAL
4:00 PM	4	1	2	2	9
4:15 PM	4	1	4	5	14
4:30 PM	0	2	0	0	2
4:45 PM	3	0	1	0	4
5:00 PM	1	1	0	1	3
5:15 PM	7	3	1	0	11
5:30 PM	3	2	0	0	5
5:45 PM	3	1	0	0	4
TOTAL VOLUMES:	25	11	8	8	52

Location: Moreno Valley
N/S: Heacock Street
E/W: Alessandro Boulevard

Date: 9/12/2017
Day: Tuesday

BICYCLES

	North Leg Heacock Street	East Leg Alessandro Boulevard	South Leg Heacock Street	West Leg Alessandro Boulevard	TOTAL
7:00 AM	1	0	0	0	1
7:15 AM	0	0	1	0	1
7:30 AM	1	0	1	1	3
7:45 AM	1	2	0	0	3
8:00 AM	1	0	0	0	1
8:15 AM	1	1	0	0	2
8:30 AM	0	0	1	0	1
8:45 AM	0	0	0	0	0
TOTAL VOLUMES:	5	3	3	1	12

	North Leg Heacock Street	East Leg Alessandro Boulevard	South Leg Heacock Street	West Leg Alessandro Boulevard	TOTAL
4:00 PM	0	2	0	0	2
4:15 PM	1	0	0	0	1
4:30 PM	2	0	0	0	2
4:45 PM	0	0	1	0	1
5:00 PM	1	0	1	0	2
5:15 PM	1	0	0	0	1
5:30 PM	2	0	0	0	2
5:45 PM	2	0	0	1	3
TOTAL VOLUMES:	9	2	2	1	14

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City of Moreno Valley
N/S: Heacock Street
E/W: Brodiaea Avenue
Weather: Clear

File Name : 06_MRV_HEBI AM
Site Code : 05117597
Start Date : 9/12/2017
Page No : 1

Groups Printed- Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks

	Heacock Street Southbound					Brodiaea Avenue Westbound					Heacock Street Northbound					Brodiaea Avenue Eastbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	88	2	1	90	2	22	9	8	33	2	89	0	0	91	1	3	2	1	6	10	220	230
07:15 AM	0	105	3	0	108	4	21	6	5	31	10	161	0	0	171	0	1	4	4	5	9	315	324
07:30 AM	2	105	8	2	115	6	19	10	4	35	6	145	3	0	154	1	3	4	3	8	9	312	321
07:45 AM	5	78	2	0	85	0	31	16	9	47	11	180	3	0	194	2	11	4	2	17	11	343	354
Total	7	376	15	3	398	12	93	41	26	146	29	575	6	0	610	4	18	14	10	36	39	1190	1229
08:00 AM	9	67	1	0	77	2	26	7	4	35	8	131	6	4	145	2	4	2	1	8	9	265	274
08:15 AM	7	68	1	0	76	2	21	9	3	32	7	131	1	0	139	3	7	3	2	13	5	260	265
08:30 AM	3	88	3	1	94	0	8	4	1	12	2	107	1	0	110	1	4	2	2	7	4	223	227
08:45 AM	1	77	4	1	82	2	15	9	7	26	4	126	1	1	131	0	6	1	1	7	10	246	256
Total	20	300	9	2	329	6	70	29	15	105	21	495	9	5	525	6	21	8	6	35	28	994	1022
Grand Total	27	676	24	5	727	18	163	70	41	251	50	1070	15	5	1135	10	39	22	16	71	67	2184	2251
Apprch %	3.7	93	3.3			7.2	64.9	27.9			4.4	94.3	1.3			14.1	54.9	31					
Total %	1.2	31	1.1		33.3	0.8	7.5	3.2		11.5	2.3	49	0.7		52	0.5	1.8	1		3.3	3	97	
Passenger Vehicles	26	654	20		704	16	159	69		285	45	1036	14		1099	2	38	19		72	0	0	2160
% Passenger Vehicles	96.3	96.7	83.3	80	96.2	88.9	97.5	98.6	100	97.6	90	96.8	93.3	80	96.4	20	97.4	86.4	81.2	82.8	0	0	96
Large 2 Axle Vehicles	1	14	0		15	2	4	1		7	1	18	1		21	0	1	0		1	0	0	44
% Large 2 Axle Vehicles	3.7	2.1	0	0	2	11.1	2.5	1.4	0	2.4	2	1.7	6.7	20	1.8	0	2.6	0	0	1.1	0	0	2
3 Axle Vehicles	0	2	1		3	0	0	0		0	3	7	0		10	0	0	3		6	0	0	19
% 3 Axle Vehicles	0	0.3	4.2	0	0.4	0	0	0	0	0	6	0.7	0	0	0.9	0	0	13.6	18.8	6.9	0	0	0.8
4+ Axle Trucks	0	6	3		10	0	0	0		0	1	9	0		10	8	0	0		8	0	0	28
% 4+ Axle Trucks	0	0.9	12.5	20	1.4	0	0	0	0	0	2	0.8	0	0	0.9	80	0	0	0	9.2	0	0	1.2

	Heacock Street Southbound				Brodiaea Avenue Westbound				Heacock Street Northbound				Brodiaea Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	0	**105**	3	108	4	21	6	31	10	161	0	171	0	1	**4**	5	315
07:30 AM	2	105	**8**	**115**	**6**	19	10	35	6	145	3	154	1	3	4	8	312
07:45 AM	5	78	2	85	0	**31**	**16**	**47**	**11**	**180**	3	**194**	**2**	**11**	4	**17**	**343**
08:00 AM	**9**	67	1	77	2	26	7	35	8	131	**6**	145	2	4	2	8	265
Total Volume	16	355	14	385	12	97	39	148	35	617	12	664	5	19	14	38	1235
% App. Total	4.2	92.2	3.6		8.1	65.5	26.4		5.3	92.9	1.8		13.2	50	36.8		
PHF	.444	.845	.438	.837	.500	.782	.609	.787	.795	.857	.500	.856	.625	.432	.875	.559	.900

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City of Moreno Valley
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File Name : 06_MRV_HEBI AM
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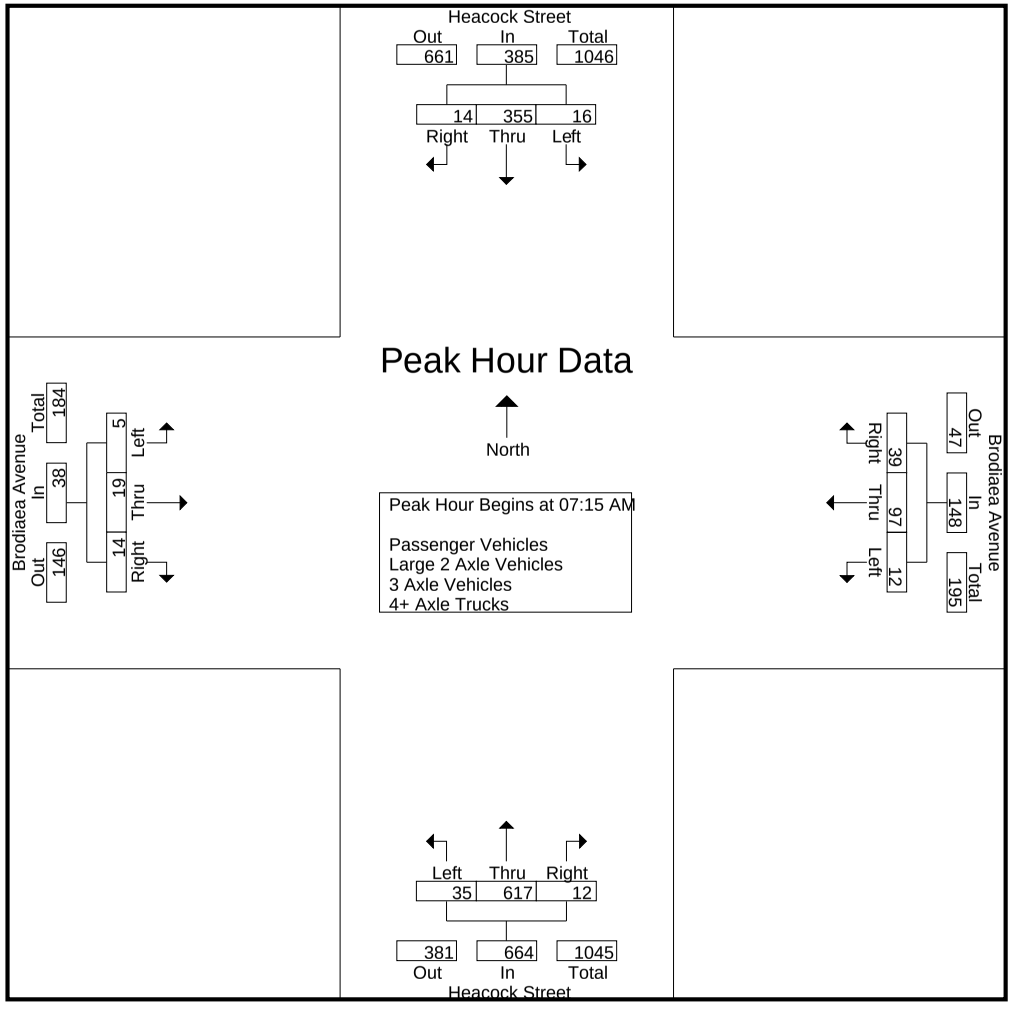

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City of Moreno Valley
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	Heacock Street Southbound				Brodiaea Avenue Westbound				Heacock Street Northbound				Brodiaea Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	07:00 AM				07:30 AM				07:15 AM				07:30 AM				
+0 mins.	0	88	2	90	**6**	19	10	35	10	161	0	171	1	3	**4**	8	
+15 mins.	0	**105**	3	108	0	**31**	**16**	**47**	6	145	3	154	2	**11**	4	**17**	
+30 mins.	2	105	**8**	**115**	2	26	7	35	**11**	**180**	3	**194**	2	4	2	8	
+45 mins.	**5**	78	2	85	2	21	9	32	8	131	**6**	145	**3**	7	3	13	
Total Volume	7	376	15	398	10	97	42	149	35	617	12	664	8	25	13	46	
% App. Total	1.8	94.5	3.8		6.7	65.1	28.2		5.3	92.9	1.8		17.4	54.3	28.3		
PHF	.350	.895	.469	.865	.417	.782	.656	.793	.795	.857	.500	.856	.667	.568	.813	.676	

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Page No : 1

Groups Printed- Passenger Vehicles

	Heacock Street Southbound					Brodiaea Avenue Westbound					Heacock Street Northbound					Brodiaea Avenue Eastbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	85	1	0	86	2	22	9	8	33	1	80	0	0	81	0	3	2	1	5	9	205	214
07:15 AM	0	102	2	0	104	4	21	6	5	31	10	156	0	0	166	0	1	3	3	4	8	305	313
07:30 AM	2	104	7	2	113	6	19	10	4	35	5	142	3	0	150	0	3	4	3	7	9	305	314
07:45 AM	5	77	2	0	84	0	29	16	9	45	10	175	3	0	188	1	11	4	2	16	11	333	344
Total	7	368	12	2	387	12	91	41	26	144	26	553	6	0	585	1	18	13	9	32	37	1148	1185
08:00 AM	9	65	1	0	75	2	26	7	4	35	7	128	5	3	140	1	4	2	1	7	8	257	265
08:15 AM	6	60	1	0	67	0	20	8	3	28	7	128	1	0	136	0	7	2	1	9	4	240	244
08:30 AM	3	85	3	1	91	0	8	4	1	12	2	104	1	0	107	0	4	1	1	5	3	215	218
08:45 AM	1	76	3	1	80	2	14	9	7	25	3	123	1	1	127	0	5	1	1	6	10	238	248
Total	19	286	8	2	313	4	68	28	15	100	19	483	8	4	510	1	20	6	4	27	25	950	975
Grand Total	26	654	20	4	700	16	159	69	41	244	45	1036	14	4	1095	2	38	19	13	59	62	2098	2160
Apprch %	3.7	93.4	2.9			6.6	65.2	28.3			4.1	94.6	1.3			3.4	64.4	32.2					
Total %	1.2	31.2	1		33.4	0.8	7.6	3.3		11.6	2.1	49.4	0.7		52.2	0.1	1.8	0.9		2.8	2.9	97.1	

	Heacock Street Southbound				Brodiaea Avenue Westbound				Heacock Street Northbound				Brodiaea Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	0	102	2	104	4	21	6	31	**10**	156	0	166	0	1	3	4	305
07:30 AM	2	**104**	**7**	**113**	**6**	19	10	35	5	142	3	150	0	3	**4**	7	305
07:45 AM	5	77	2	84	0	**29**	**16**	**45**	10	**175**	3	**188**	**1**	**11**	4	**16**	**333**
08:00 AM	**9**	65	1	75	2	26	7	35	7	128	**5**	140	1	4	2	7	257
Total Volume	16	348	12	376	12	95	39	146	32	601	11	644	2	19	13	34	1200
% App. Total	4.3	92.6	3.2		8.2	65.1	26.7		5	93.3	1.7		5.9	55.9	38.2		
PHF	.444	.837	.429	.832	.500	.819	.609	.811	.800	.859	.550	.856	.500	.432	.813	.531	.901

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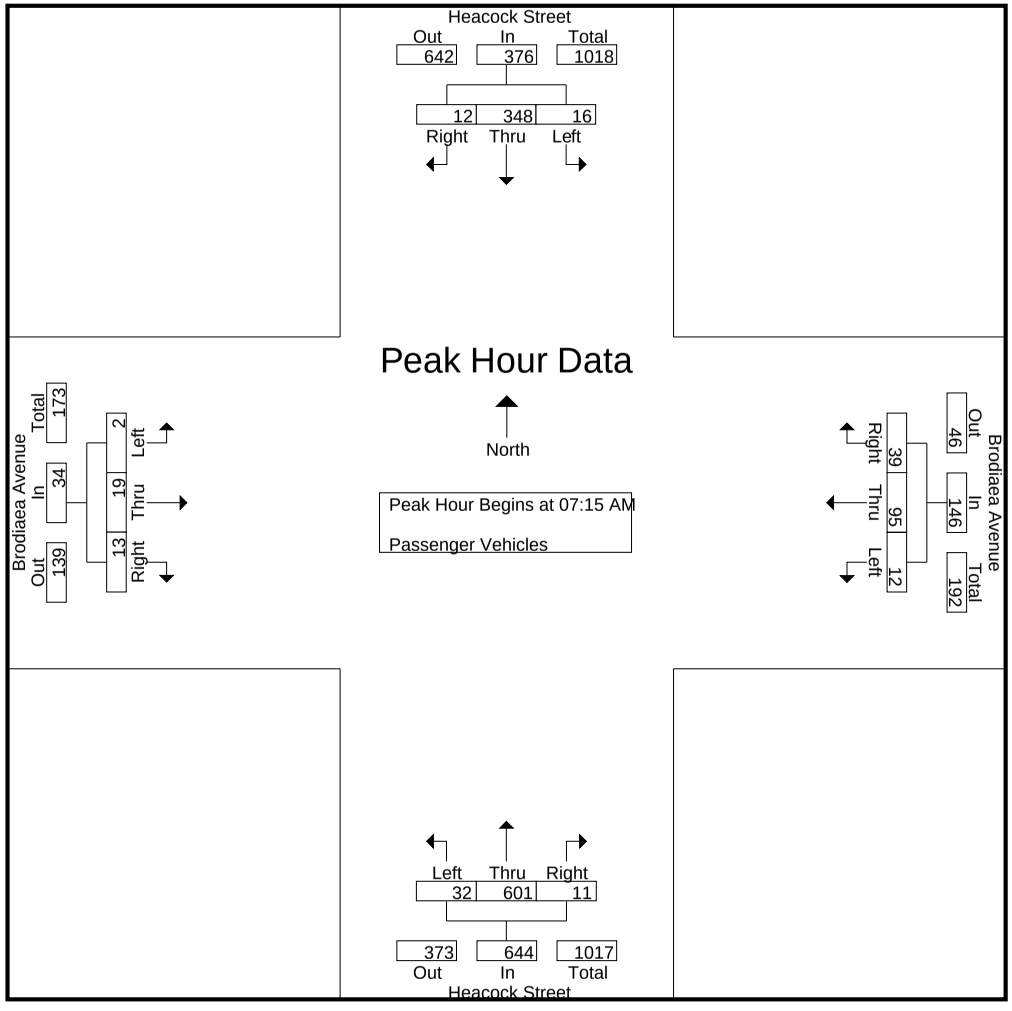
City of Moreno Valley
N/S: Heacock Street
E/W: Brodiaea Avenue
Weather: Clear

File Name : 06_MRV_HEBI AM
Site Code : 05117597
Start Date : 9/12/2017
Page No : 2



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City of Moreno Valley
N/S: Heacock Street
E/W: Brodiaea Avenue
Weather: Clear

File Name : 06_MRV_HEBI AM
Site Code : 05117597
Start Date : 9/12/2017
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	Heacock Street Southbound				Brodiaea Avenue Westbound				Heacock Street Northbound				Brodiaea Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	07:15 AM				07:15 AM				07:15 AM				07:15 AM				
+0 mins.	0	102	2	104	4	21	6	31	**10**	156	0	166	0	1	3	4	
+15 mins.	2	**104**	**7**	**113**	**6**	19	10	35	5	142	3	150	0	3	**4**	7	
+30 mins.	5	77	2	84	0	**29**	**16**	**45**	10	**175**	3	**188**	**1**	**11**	4	**16**	
+45 mins.	**9**	65	1	75	2	26	7	35	7	128	**5**	140	1	4	2	7	
Total Volume	16	348	12	376	12	95	39	146	32	601	11	644	2	19	13	34	
% App. Total	4.3	92.6	3.2		8.2	65.1	26.7		5	93.3	1.7		5.9	55.9	38.2		
PHF	.444	.837	.429	.832	.500	.819	.609	.811	.800	.859	.550	.856	.500	.432	.813	.531	

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City of Moreno Valley
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E/W: Brodiaea Avenue
Weather: Clear

File Name : 06_MRV_HEBI AM
Site Code : 05117597
Start Date : 9/12/2017
Page No : 1

Groups Printed- Large 2 Axle Vehicles

	Heacock Street Southbound					Brodiaea Avenue Westbound					Heacock Street Northbound					Brodiaea Avenue Eastbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	3	3
07:15 AM	0	3	0	0	3	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	0	7	7
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	1
07:45 AM	0	0	0	0	0	0	2	0	0	2	1	3	0	0	4	0	0	0	0	0	0	6	6
Total	0	3	0	0	3	0	2	0	0	2	1	11	0	0	12	0	0	0	0	0	0	17	17
08:00 AM	0	2	0	0	2	0	0	0	0	0	0	1	1	1	2	0	0	0	0	0	1	4	5
08:15 AM	1	6	0	0	7	2	1	1	0	4	0	2	0	0	2	0	0	0	0	0	0	13	13
08:30 AM	0	2	0	0	2	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	4	4
08:45 AM	0	1	0	0	1	0	1	0	0	1	0	2	0	0	2	0	1	0	0	1	0	5	5
Total	1	11	0	0	12	2	2	1	0	5	0	7	1	1	8	0	1	0	0	1	1	26	27
Grand Total	1	14	0	0	15	2	4	1	0	7	1	18	1	1	20	0	1	0	0	1	1	43	44
Apprch %	6.7	93.3	0			28.6	57.1	14.3			5	90	5			0	100	0					
Total %	2.3	32.6	0		34.9	4.7	9.3	2.3		16.3	2.3	41.9	2.3		46.5	0	2.3	0		2.3	2.3	97.7	

	Heacock Street Southbound				Brodiaea Avenue Westbound				Heacock Street Northbound				Brodiaea Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	0	**3**	0	**3**	0	0	0	0	0	**4**	0	**4**	0	0	0	0	**7**
07:30 AM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
07:45 AM	0	0	0	0	0	**2**	0	**2**	**1**	3	0	4	0	0	0	0	6
08:00 AM	0	2	0	2	0	0	0	0	0	1	**1**	2	0	0	0	0	4
Total Volume	0	5	0	5	0	2	0	2	1	9	1	11	0	0	0	0	18
% App. Total	0	100	0		0	100	0		9.1	81.8	9.1		0	0	0		
PHF	.000	.417	.000	.417	.000	.250	.000	.250	.250	.563	.250	.688	.000	.000	.000	.000	.643

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City of Moreno Valley
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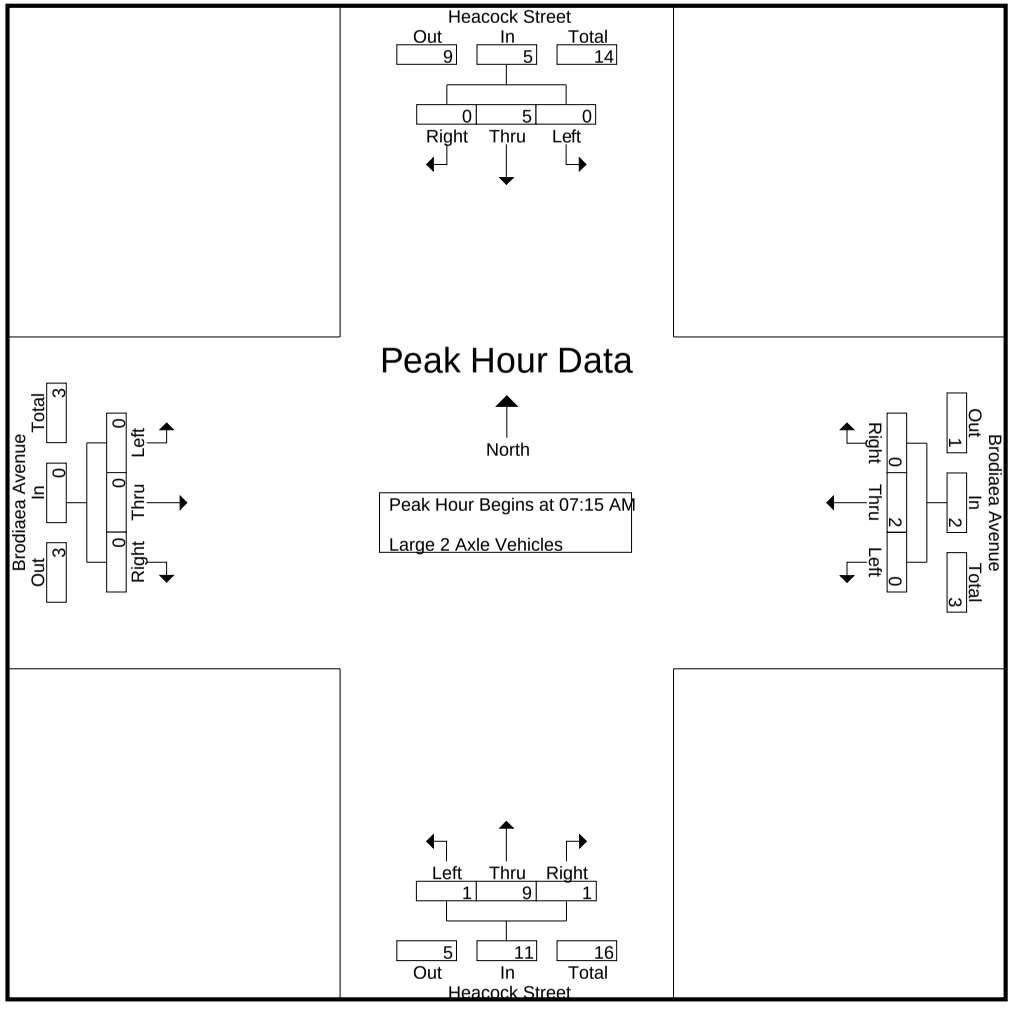
Weather: Clear

File Name : 06_MRV_HEBI AM
Site Code : 05117597
Start Date : 9/12/2017
Page No : 2



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City of Moreno Valley
N/S: Heacock Street
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File Name : 06_MRV_HEBI AM
Site Code : 05117597
Start Date : 9/12/2017
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	Heacock Street Southbound				Brodiaea Avenue Westbound				Heacock Street Northbound				Brodiaea Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	07:15 AM				07:15 AM				07:15 AM				07:15 AM				
+0 mins.	0	**3**	0	**3**	0	0	0	0	0	**4**	0	**4**	0	0	0	0	
+15 mins.	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	
+30 mins.	0	0	0	0	0	**2**	0	**2**	**1**	3	0	4	0	0	0	0	
+45 mins.	0	2	0	2	0	0	0	0	0	1	**1**	2	0	0	0	0	
Total Volume	0	5	0	5	0	2	0	2	1	9	1	11	0	0	0	0	
% App. Total	0	100	0		0	100	0		9.1	81.8	9.1		0	0	0		
PHF	.000	.417	.000	.417	.000	.250	.000	.250	.250	.563	.250	.688	.000	.000	.000	.000	

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File Name : 06_MRV_HEBI AM
Site Code : 05117597
Start Date : 9/12/2017
Page No : 1

Groups Printed- 3 Axle Vehicles

	Heacock Street Southbound					Brodiaea Avenue Westbound					Heacock Street Northbound					Brodiaea Avenue Eastbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	1	0	0	1	0	0	0	0	0	1	2	0	0	3	0	0	0	0	0	0	4	4
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	1	1	1	2	3
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	2	2
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	1	0	0	1	0	0	0	0	0	1	5	0	0	6	0	0	1	1	1	1	8	9
08:00 AM	0	0	0	0	0	0	0	0	0	0	1	1	0	0	2	0	0	0	0	0	0	2	2
08:15 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	2	3
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	1	1	1	2	3
08:45 AM	0	0	1	0	1	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	2	2
Total	0	1	1	0	2	0	0	0	0	0	2	2	0	0	4	0	0	2	2	2	2	8	10
Grand Total	0	2	1	0	3	0	0	0	0	0	3	7	0	0	10	0	0	3	3	3	3	16	19
Apprch %	0	66.7	33.3			0	0	0			30	70	0			0	0	100					
Total %	0	12.5	6.2		18.8	0	0	0		0	18.8	43.8	0		62.5	0	0	18.8		18.8	15.8	84.2	

	Heacock Street Southbound				Brodiaea Avenue Westbound				Heacock Street Northbound				Brodiaea Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	**1**	**1**	**2**
07:30 AM	0	0	0	0	0	0	0	0	0	**2**	0	**2**	0	0	0	0	2
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	**1**	1	0	2	0	0	0	0	2
Total Volume	0	0	0	0	0	0	0	0	1	4	0	5	0	0	1	1	6
% App. Total	0	0	0		0	0	0		20	80	0		0	0	100		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.250	.500	.000	.625	.000	.000	.250	.250	.750

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City of Moreno Valley
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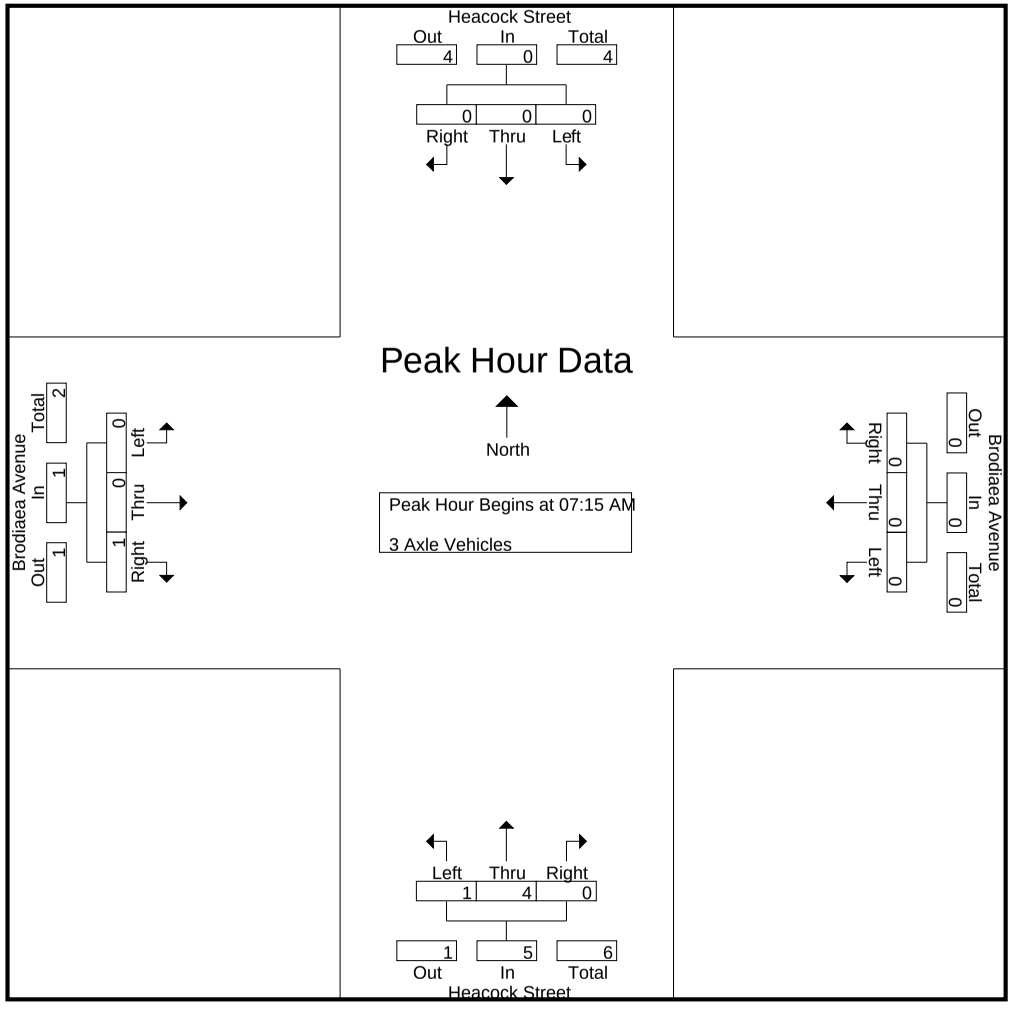
E/W: Brodiaea Avenue
Weather: Clear

File Name : 06_MRV_HEBI AM
Site Code : 05117597
Start Date : 9/12/2017
Page No : 2



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City of Moreno Valley
N/S: Heacock Street
E/W: Brodiaea Avenue
Weather: Clear

File Name : 06_MRV_HEBI AM
Site Code : 05117597
Start Date : 9/12/2017
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	Heacock Street Southbound				Brodiaea Avenue Westbound				Heacock Street Northbound				Brodiaea Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	07:15 AM				07:15 AM				07:15 AM				07:15 AM				
+0 mins.	0	0	0	0	0	0	0	0	0	1	0	1	0	0	**1**	**1**	
+15 mins.	0	0	0	0	0	0	0	0	0	**2**	0	**2**	0	0	0	0	
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
+45 mins.	0	0	0	0	0	0	0	0	**1**	1	0	2	0	0	0	0	
Total Volume	0	0	0	0	0	0	0	0	1	4	0	5	0	0	1	1	
% App. Total	0	0	0		0	0	0		20	80	0		0	0	100		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.250	.500	.000	.625	.000	.000	.250	.250	

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File Name : 06_MRV_HEBI AM
Site Code : 05117597
Start Date : 9/12/2017
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Groups Printed- 4+ Axle Trucks

	Heacock Street Southbound					Brodiaea Avenue Westbound					Heacock Street Northbound					Brodiaea Avenue Eastbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	2	1	1	3	0	0	0	0	0	0	4	0	0	4	1	0	0	0	1	1	8	9
07:15 AM	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
07:30 AM	0	1	1	0	2	0	0	0	0	0	1	0	0	0	1	1	0	0	0	1	0	4	4
07:45 AM	0	1	0	0	1	0	0	0	0	0	0	2	0	0	2	1	0	0	0	1	0	4	4
Total	0	4	3	1	7	0	0	0	0	0	1	6	0	0	7	3	0	0	0	3	1	17	18
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	1	0	2	2
08:15 AM	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	3	0	0	0	3	0	5	5
08:30 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	2	2
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	1
Total	0	2	0	0	2	0	0	0	0	0	0	3	0	0	3	5	0	0	0	5	0	10	10
Grand Total	0	6	3	1	9	0	0	0	0	0	1	9	0	0	10	8	0	0	0	8	1	27	28
Apprch %	0	66.7	33.3			0	0	0			10	90	0			100	0	0					
Total %	0	22.2	11.1		33.3	0	0	0		0	3.7	33.3	0		37	29.6	0	0		29.6	3.6	96.4	

	Heacock Street Southbound				Brodiaea Avenue Westbound				Heacock Street Northbound				Brodiaea Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	0	0	**1**	1	0	0	0	0	0	0	0	0	0	0	0	0	1
07:30 AM	0	**1**	1	**2**	0	0	0	0	**1**	0	0	1	**1**	0	0	**1**	**4**
07:45 AM	0	1	0	1	0	0	0	0	0	**2**	0	**2**	1	0	0	1	4
08:00 AM	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	1	2
Total Volume	0	2	2	4	0	0	0	0	1	3	0	4	3	0	0	3	11
% App. Total	0	50	50		0	0	0		25	75	0		100	0	0		
PHF	.000	.500	.500	.500	.000	.000	.000	.000	.250	.375	.000	.500	.750	.000	.000	.750	.688

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Site Code : 05117597
Start Date : 9/12/2017
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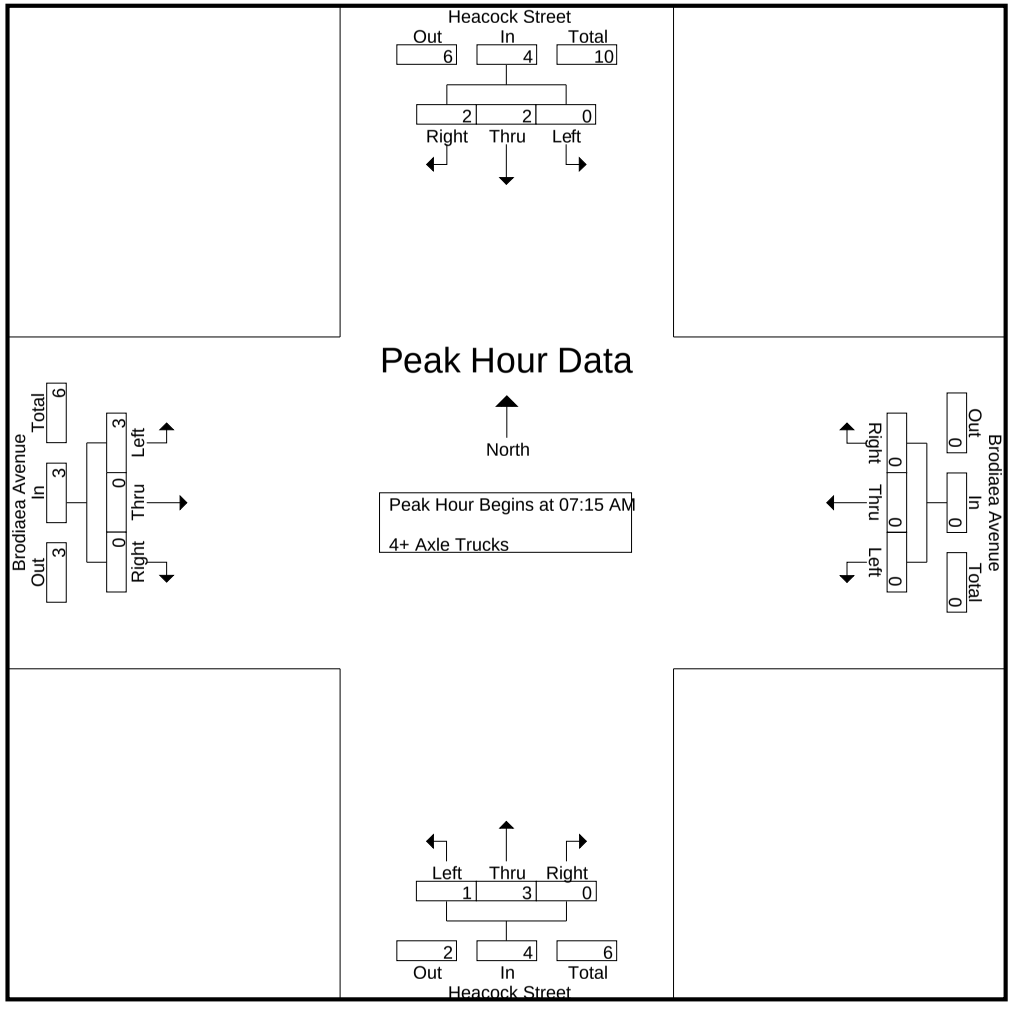

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File Name : 06_MRV_HEBI AM
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Start Date : 9/12/2017
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	Heacock Street Southbound				Brodiaea Avenue Westbound				Heacock Street Northbound				Brodiaea Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	07:15 AM				07:15 AM				07:15 AM				07:15 AM				
+0 mins.	0	0	**1**	1	0	0	0	0	0	0	0	0	0	0	0	0	
+15 mins.	0	**1**	1	**2**	0	0	0	0	**1**	0	0	1	**1**	0	0	**1**	
+30 mins.	0	1	0	1	0	0	0	0	0	**2**	0	**2**	1	0	0	1	
+45 mins.	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	1	
Total Volume	0	2	2	4	0	0	0	0	1	3	0	4	3	0	0	3	
% App. Total	0	50	50		0	0	0		25	75	0		100	0	0		
PHF	.000	.500	.500	.500	.000	.000	.000	.000	.250	.375	.000	.500	.750	.000	.000	.750	

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Site Code : 05117597
Start Date : 9/12/2017
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Groups Printed- Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks

	Heacock Street Southbound					Brodiaea Avenue Westbound					Heacock Street Northbound					Brodiaea Avenue Eastbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	9	118	4	0	131	0	16	8	1	24	2	142	4	2	148	5	12	6	0	23	3	326	329
04:15 PM	10	115	3	0	128	1	10	9	3	20	4	115	4	0	123	4	15	4	1	23	4	294	298
04:30 PM	8	133	6	0	147	4	6	12	7	22	9	143	4	0	156	8	15	7	4	30	11	355	366
04:45 PM	10	135	4	1	149	2	17	14	6	33	8	156	4	0	168	2	14	5	3	21	10	371	381
Total	37	501	17	1	555	7	49	43	17	99	23	556	16	2	595	19	56	22	8	97	28	1346	1374
05:00 PM	14	136	7	0	157	5	17	6	2	28	2	108	3	0	113	9	25	9	4	43	6	341	347
05:15 PM	8	156	5	0	169	4	13	7	2	24	3	116	6	2	125	4	12	1	1	17	5	335	340
05:30 PM	16	141	7	1	164	8	18	6	3	32	7	112	5	0	124	7	26	6	1	39	5	359	364
05:45 PM	18	148	15	0	181	0	7	6	2	13	6	104	7	2	117	7	15	3	3	25	7	336	343
Total	56	581	34	1	671	17	55	25	9	97	18	440	21	4	479	27	78	19	9	124	23	1371	1394
Grand Total	93	1082	51	2	1226	24	104	68	26	196	41	996	37	6	1074	46	134	41	17	221	51	2717	2768
Apprch %	7.6	88.3	4.2			12.2	53.1	34.7			3.8	92.7	3.4			20.8	60.6	18.6					
Total %	3.4	39.8	1.9		45.1	0.9	3.8	2.5		7.2	1.5	36.7	1.4		39.5	1.7	4.9	1.5		8.1	1.8	98.2	
Passenger Vehicles	92	1056	46		1196	24	103	67		220	40	974	35		1054	40	134	39		230	0	0	2700
% Passenger Vehicles	98.9	97.6	90.2	100	97.4	100	99	98.5	100	99.1	97.6	97.8	94.6	83.3	97.6	87	100	95.1	100	96.6	0	0	97.5
Large 2 Axle Vehicles	1	11	0		12	0	1	1		2	1	11	2		15	1	0	1		2	0	0	31
% Large 2 Axle Vehicles	1.1	1	0	0	1	0	1	1.5	0	0.9	2.4	1.1	5.4	16.7	1.4	2.2	0	2.4	0	0.8	0	0	1.1
3 Axle Vehicles	0	9	0		9	0	0	0		0	0	4	0		4	0	0	1		1	0	0	14
% 3 Axle Vehicles	0	0.8	0	0	0.7	0	0	0	0	0	0	0.4	0	0	0.4	0	0	2.4	0	0.4	0	0	0.5
4+ Axle Trucks	0	6	5		11	0	0	0		0	0	7	0		7	5	0	0		5	0	0	23
% 4+ Axle Trucks	0	0.6	9.8	0	0.9	0	0	0	0	0	0	0.7	0	0	0.6	10.9	0	0	0	2.1	0	0	0.8

	Heacock Street Southbound				Brodiaea Avenue Westbound				Heacock Street Northbound				Brodiaea Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	10	135	4	149	2	17	**14**	**33**	**8**	**156**	4	**168**	2	14	5	21	**371**
05:00 PM	14	136	**7**	157	5	17	6	28	2	108	3	113	**9**	25	**9**	**43**	341
05:15 PM	8	**156**	5	**169**	4	13	7	24	3	116	**6**	125	4	12	1	17	335
05:30 PM	**16**	141	7	164	**8**	**18**	6	32	7	112	5	124	7	**26**	6	39	359
Total Volume	48	568	23	639	19	65	33	117	20	492	18	530	22	77	21	120	1406
% App. Total	7.5	88.9	3.6		16.2	55.6	28.2		3.8	92.8	3.4		18.3	64.2	17.5		
PHF	.750	.910	.821	.945	.594	.903	.589	.886	.625	.788	.750	.789	.611	.740	.583	.698	.947

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E/W: Brodiaea Avenue
Weather: Clear

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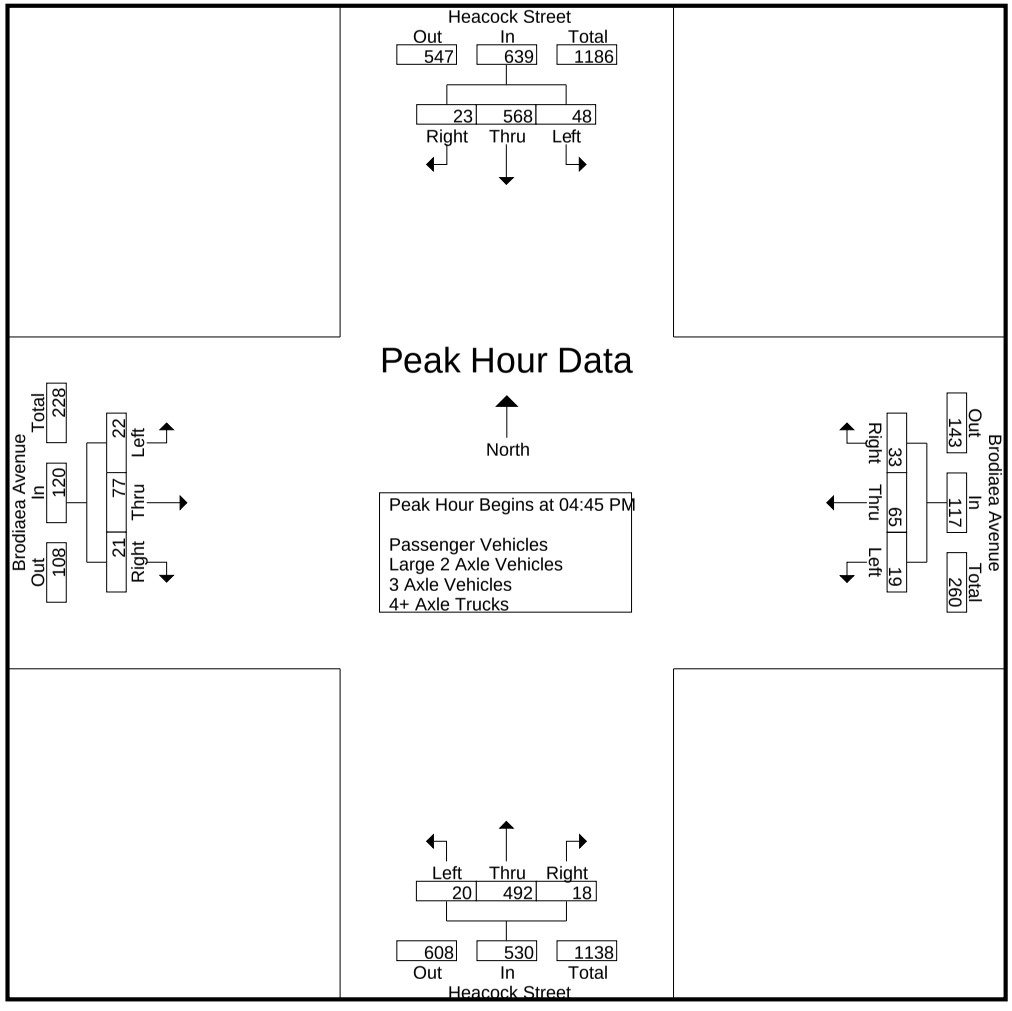
Site Code : 05117597
Start Date : 9/12/2017
Page No : 2



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	Heacock Street Southbound				Brodiaea Avenue Westbound				Heacock Street Northbound				Brodiaea Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	05:00 PM				04:45 PM				04:00 PM				05:00 PM				
+0 mins.	14	136	7	157	2	17	**14**	**33**	2	142	**4**	148	**9**	25	**9**	**43**	
+15 mins.	8	**156**	5	169	5	17	6	28	4	115	4	123	4	12	1	17	
+30 mins.	16	141	7	164	4	13	7	24	**9**	143	4	156	7	**26**	6	39	
+45 mins.	**18**	148	**15**	**181**	**8**	**18**	6	32	8	**156**	4	**168**	7	15	3	25	
Total Volume	56	581	34	671	19	65	33	117	23	556	16	595	27	78	19	124	
% App. Total	8.3	86.6	5.1		16.2	55.6	28.2		3.9	93.4	2.7		21.8	62.9	15.3		
PHF	.778	.931	.567	.927	.594	.903	.589	.886	.639	.891	1.000	.885	.750	.750	.528	.721	

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Groups Printed- Passenger Vehicles

	Heacock Street Southbound					Brodiaea Avenue Westbound					Heacock Street Northbound					Brodiaea Avenue Eastbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	9	118	3	0	130	0	16	8	1	24	2	139	4	2	145	3	12	5	0	20	3	319	322
04:15 PM	10	113	3	0	126	1	10	9	3	20	3	113	4	0	120	3	15	4	1	22	4	288	292
04:30 PM	8	132	6	0	146	4	6	12	7	22	9	141	4	0	154	8	15	7	4	30	11	352	363
04:45 PM	10	132	4	1	146	2	17	14	6	33	8	152	3	0	163	2	14	5	3	21	10	363	373
Total	37	495	16	1	548	7	49	43	17	99	22	545	15	2	582	16	56	21	8	93	28	1322	1350
05:00 PM	13	132	6	0	151	5	17	6	2	28	2	104	3	0	109	8	25	9	4	42	6	330	336
05:15 PM	8	151	4	0	163	4	13	6	2	23	3	112	5	1	120	4	12	1	1	17	4	323	327
05:30 PM	16	136	6	1	158	8	18	6	3	32	7	111	5	0	123	6	26	5	1	37	5	350	355
05:45 PM	18	142	14	0	174	0	6	6	2	12	6	102	7	2	115	6	15	3	3	24	7	325	332
Total	55	561	30	1	646	17	54	24	9	95	18	429	20	3	467	24	78	18	9	120	22	1328	1350
Grand Total	92	1056	46	2	1194	24	103	67	26	194	40	974	35	5	1049	40	134	39	17	213	50	2650	2700
Apprch %	7.7	88.4	3.9			12.4	53.1	34.5			3.8	92.9	3.3			18.8	62.9	18.3					
Total %	3.5	39.8	1.7		45.1	0.9	3.9	2.5		7.3	1.5	36.8	1.3		39.6	1.5	5.1	1.5		8	1.9	98.1	

	Heacock Street Southbound				Brodiaea Avenue Westbound				Heacock Street Northbound				Brodiaea Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	10	132	4	146	2	17	**14**	**33**	**8**	**152**	3	**163**	2	14	5	21	**363**
05:00 PM	13	132	**6**	151	5	17	6	28	2	104	3	109	**8**	25	**9**	**42**	330
05:15 PM	8	**151**	4	**163**	4	13	6	23	3	112	**5**	120	4	12	1	17	323
05:30 PM	**16**	136	6	158	**8**	**18**	6	32	7	111	5	123	6	**26**	5	37	350
Total Volume	47	551	20	618	19	65	32	116	20	479	16	515	20	77	20	117	1366
% App. Total	7.6	89.2	3.2		16.4	56	27.6		3.9	93	3.1		17.1	65.8	17.1		
PHF	.734	.912	.833	.948	.594	.903	.571	.879	.625	.788	.800	.790	.625	.740	.556	.696	.941

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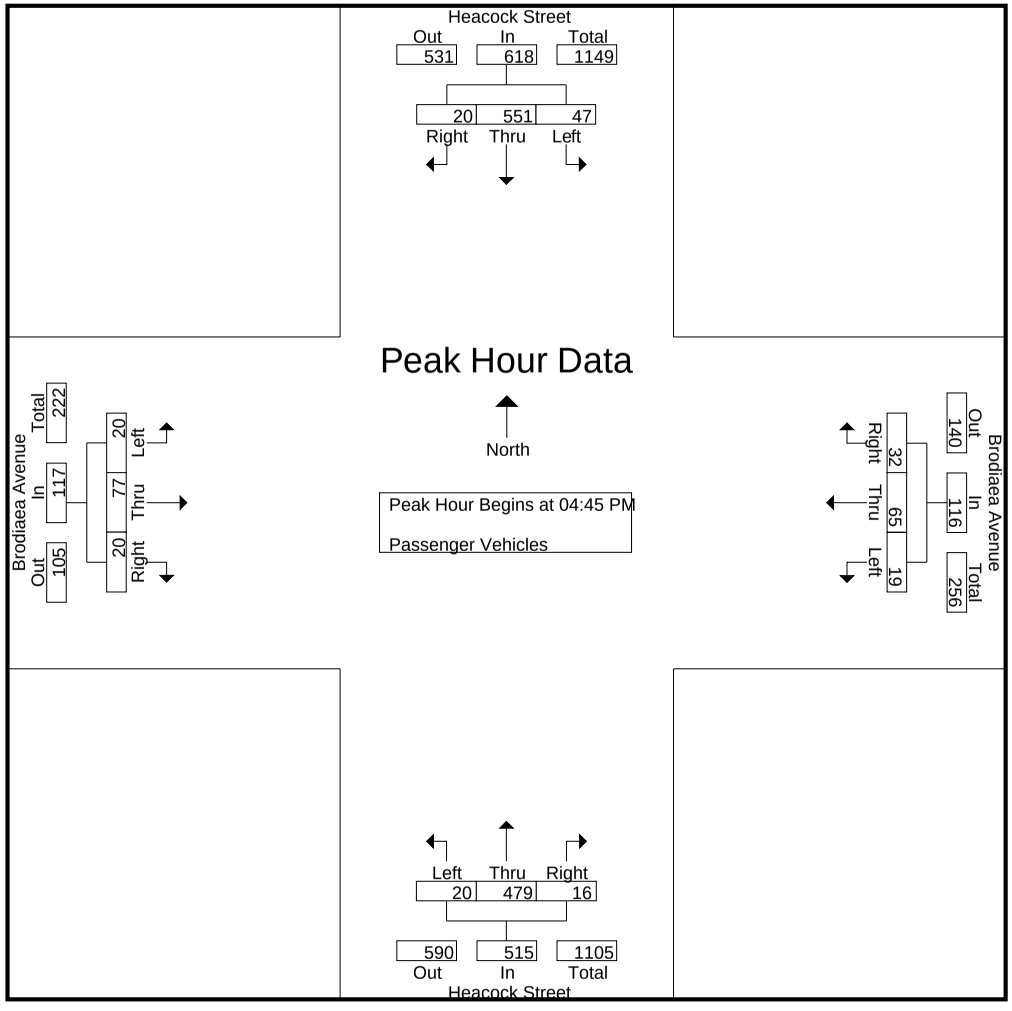
Page No : 2



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	Heacock Street Southbound				Brodiaea Avenue Westbound				Heacock Street Northbound				Brodiaea Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	04:45 PM				04:45 PM				04:45 PM				04:45 PM				
+0 mins.	10	132	4	146	2	17	**14**	**33**	**8**	**152**	3	**163**	2	14	5	21	
+15 mins.	13	132	**6**	151	5	17	6	28	2	104	3	109	**8**	25	**9**	**42**	
+30 mins.	8	**151**	4	**163**	4	13	6	23	3	112	**5**	120	4	12	1	17	
+45 mins.	**16**	136	6	158	**8**	**18**	6	32	7	111	5	123	6	**26**	5	37	
Total Volume	47	551	20	618	19	65	32	116	20	479	16	515	20	77	20	117	
% App. Total	7.6	89.2	3.2		16.4	56	27.6		3.9	93	3.1		17.1	65.8	17.1		
PHF	.734	.912	.833	.948	.594	.903	.571	.879	.625	.788	.800	.790	.625	.740	.556	.696	

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Site Code : 05117597
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Groups Printed- Large 2 Axle Vehicles

	Heacock Street Southbound					Brodiaea Avenue Westbound					Heacock Street Northbound					Brodiaea Avenue Eastbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	1	0	2	2
04:15 PM	0	2	0	0	2	0	0	0	0	0	1	1	0	0	2	0	0	0	0	0	0	4	4
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	2	0	0	2	0	0	0	0	0	0	1	1	0	2	0	0	0	0	0	0	4	4
Total	0	4	0	0	4	0	0	0	0	0	1	3	1	0	5	1	0	0	0	1	0	10	10
05:00 PM	1	2	0	0	3	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	5	5
05:15 PM	0	3	0	0	3	0	0	1	0	1	0	4	1	1	5	0	0	0	0	0	1	9	10
05:30 PM	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	1	0	1	0	3	3
05:45 PM	0	1	0	0	1	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	0	3	3
Total	1	7	0	0	8	0	1	1	0	2	0	8	1	1	9	0	0	1	0	1	1	20	21
Grand Total	1	11	0	0	12	0	1	1	0	2	1	11	2	1	14	1	0	1	0	2	1	30	31
Apprch %	8.3	91.7	0			0	50	50			7.1	78.6	14.3			50	0	50					
Total %	3.3	36.7	0		40	0	3.3	3.3		6.7	3.3	36.7	6.7		46.7	3.3	0	3.3		6.7	3.2	96.8	

	Heacock Street Southbound				Brodiaea Avenue Westbound				Heacock Street Northbound				Brodiaea Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	0	2	0	2	0	0	0	0	0	1	**1**	2	0	0	0	0	4
05:00 PM	**1**	2	0	**3**	0	0	0	0	0	2	0	2	0	0	0	0	5
05:15 PM	0	**3**	0	3	0	0	**1**	**1**	0	**4**	1	**5**	0	0	0	0	**9**
05:30 PM	0	1	0	1	0	0	0	0	0	1	0	1	0	0	**1**	**1**	3
Total Volume	1	8	0	9	0	0	1	1	0	8	2	10	0	0	1	1	21
% App. Total	11.1	88.9	0		0	0	100		0	80	20		0	0	100		
PHF	.250	.667	.000	.750	.000	.000	.250	.250	.000	.500	.500	.500	.000	.000	.250	.250	.583

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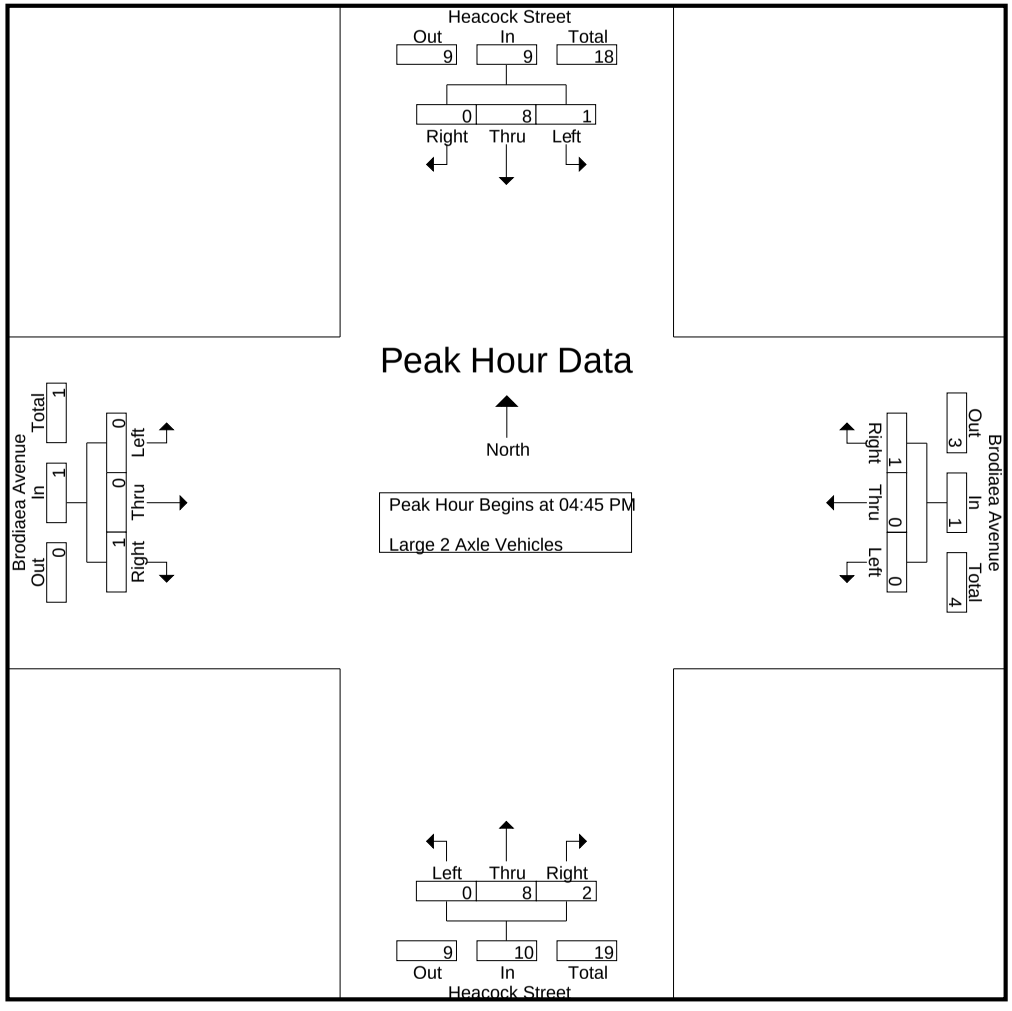

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	Heacock Street Southbound				Brodiaea Avenue Westbound				Heacock Street Northbound				Brodiaea Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	04:45 PM				04:45 PM				04:45 PM				04:45 PM				
+0 mins.	0	2	0	2	0	0	0	0	0	1	**1**	2	0	0	0	0	
+15 mins.	**1**	2	0	**3**	0	0	0	0	0	2	0	2	0	0	0	0	
+30 mins.	0	**3**	0	3	0	0	**1**	**1**	0	**4**	1	**5**	0	0	0	0	
+45 mins.	0	1	0	1	0	0	0	0	0	1	0	1	0	0	**1**	**1**	
Total Volume	1	8	0	9	0	0	1	1	0	8	2	10	0	0	1	1	
% App. Total	11.1	88.9	0		0	0	100		0	80	20		0	0	100		
PHF	.250	.667	.000	.750	.000	.000	.250	.250	.000	.500	.500	.500	.000	.000	.250	.250	

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Weather: Clear

File Name : 06_MRV_HEBI PM
Site Code : 05117597
Start Date : 9/12/2017
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Groups Printed- 3 Axle Vehicles

	Heacock Street Southbound					Brodiaea Avenue Westbound					Heacock Street Northbound					Brodiaea Avenue Eastbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	1
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	1
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	3	3
Total	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4	0	0	1	0	1	0	5	5
05:00 PM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
05:15 PM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
05:30 PM	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
05:45 PM	0	5	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5
Total	0	9	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	9
Grand Total	0	9	0	0	9	0	0	0	0	0	0	4	0	0	4	0	0	1	0	1	0	14	14
Apprch %	0	100	0			0	0	0			0	100	0			0	0	100					
Total %	0	64.3	0		64.3	0	0	0		0	0	28.6	0		28.6	0	0	7.1		7.1	0	100	

	Heacock Street Southbound				Brodiaea Avenue Westbound				Heacock Street Northbound				Brodiaea Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	0	0	0	0	0	0	0	0	0	**3**	0	**3**	0	0	0	0	**3**
05:00 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
05:15 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
05:30 PM	0	**2**	0	**2**	0	0	0	0	0	0	0	0	0	0	0	0	2
Total Volume	0	4	0	4	0	0	0	0	0	3	0	3	0	0	0	0	7
% App. Total	0	100	0		0	0	0		0	100	0		0	0	0		
PHF	.000	.500	.000	.500	.000	.000	.000	.000	.000	.250	.000	.250	.000	.000	.000	.000	.583

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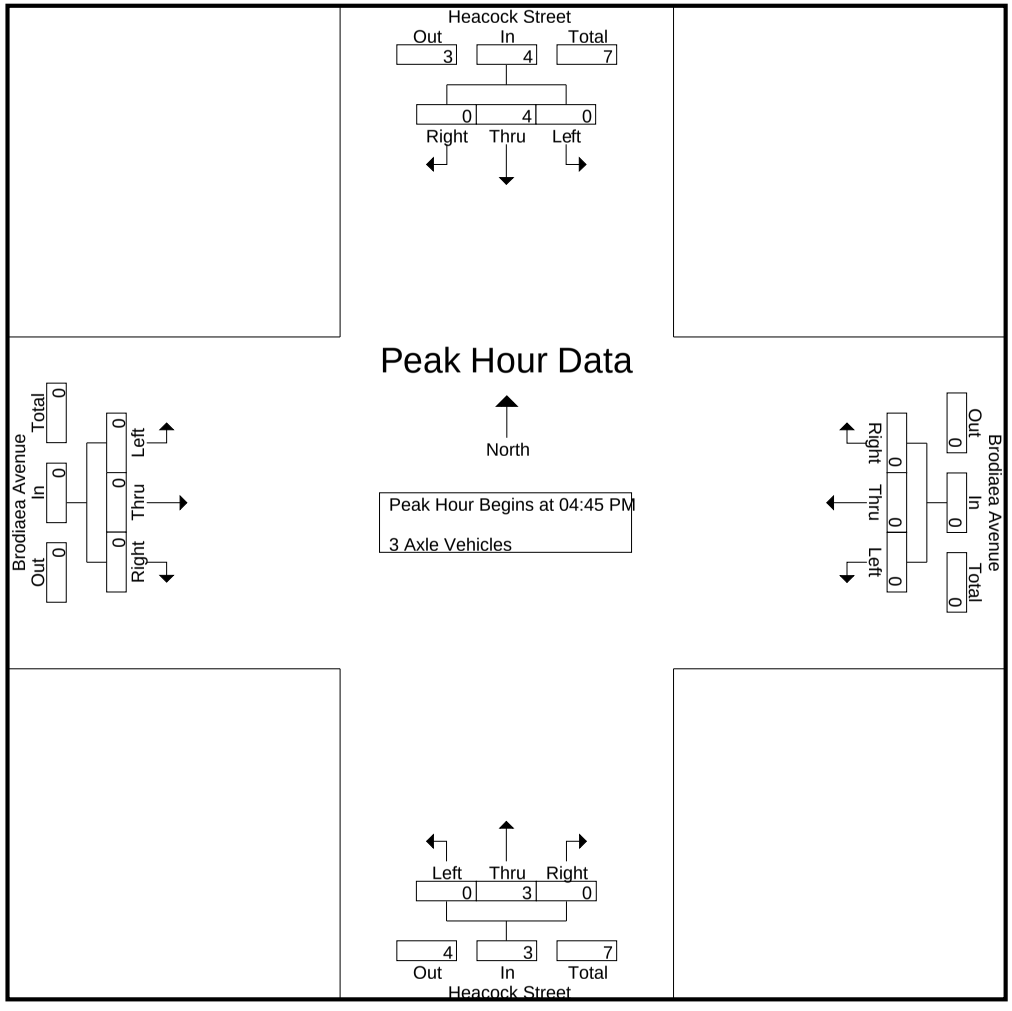
City of Moreno Valley
N/S: Heacock Street
E/W: Brodiaea Avenue
Weather: Clear

File Name : 06_MRV_HEBI PM
Site Code : 05117597
Start Date : 9/12/2017
Page No : 2



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City of Moreno Valley
N/S: Heacock Street
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File Name : 06_MRV_HEBI PM
Site Code : 05117597
Start Date : 9/12/2017
Page No : 3

	Heacock Street Southbound				Brodiaea Avenue Westbound				Heacock Street Northbound				Brodiaea Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	04:45 PM				04:45 PM				04:45 PM				04:45 PM				
+0 mins.	0	0	0	0	0	0	0	0	0	**3**	0	**3**	0	0	0	0	
+15 mins.	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	
+30 mins.	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	
+45 mins.	0	**2**	0	**2**	0	0	0	0	0	0	0	0	0	0	0	0	
Total Volume	0	4	0	4	0	0	0	0	0	3	0	3	0	0	0	0	
% App. Total	0	100	0		0	0	0		0	100	0		0	0	0		
PHF	.000	.500	.000	.500	.000	.000	.000	.000	.000	.250	.000	.250	.000	.000	.000	.000	

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Weather: Clear

File Name : 06_MRV_HEBI PM
Site Code : 05117597
Start Date : 9/12/2017
Page No : 1

Groups Printed- 4+ Axle Trucks

	Heacock Street Southbound					Brodiaea Avenue Westbound					Heacock Street Northbound					Brodiaea Avenue Eastbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	0	1	0	1	0	0	0	0	0	0	2	0	0	2	1	0	0	0	1	0	4	4
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	1	0	2	2
04:30 PM	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	2	2
04:45 PM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Total	0	2	1	0	3	0	0	0	0	0	0	4	0	0	4	2	0	0	0	2	0	9	9
05:00 PM	0	1	1	0	2	0	0	0	0	0	0	2	0	0	2	1	0	0	0	1	0	5	5
05:15 PM	0	1	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
05:30 PM	0	2	1	0	3	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	4	4
05:45 PM	0	0	1	0	1	0	0	0	0	0	0	1	0	0	1	1	0	0	0	1	0	3	3
Total	0	4	4	0	8	0	0	0	0	0	0	3	0	0	3	3	0	0	0	3	0	14	14
Grand Total	0	6	5	0	11	0	0	0	0	0	0	7	0	0	7	5	0	0	0	5	0	23	23
Apprch %	0	54.5	45.5			0	0	0			0	100	0			100	0	0					
Total %	0	26.1	21.7		47.8	0	0	0		0	0	30.4	0		30.4	21.7	0	0		21.7	0	100	

	Heacock Street Southbound				Brodiaea Avenue Westbound				Heacock Street Northbound				Brodiaea Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
05:00 PM	0	1	**1**	2	0	0	0	0	0	**2**	0	**2**	**1**	0	0	**1**	**5**
05:15 PM	0	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	2
05:30 PM	0	**2**	1	**3**	0	0	0	0	0	0	0	0	1	0	0	1	4
Total Volume	0	5	3	8	0	0	0	0	0	2	0	2	2	0	0	2	12
% App. Total	0	62.5	37.5		0	0	0		0	100	0		100	0	0		
PHF	.000	.625	.750	.667	.000	.000	.000	.000	.000	.250	.000	.250	.500	.000	.000	.500	.600

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E/W: Brodiaea Avenue
Weather: Clear

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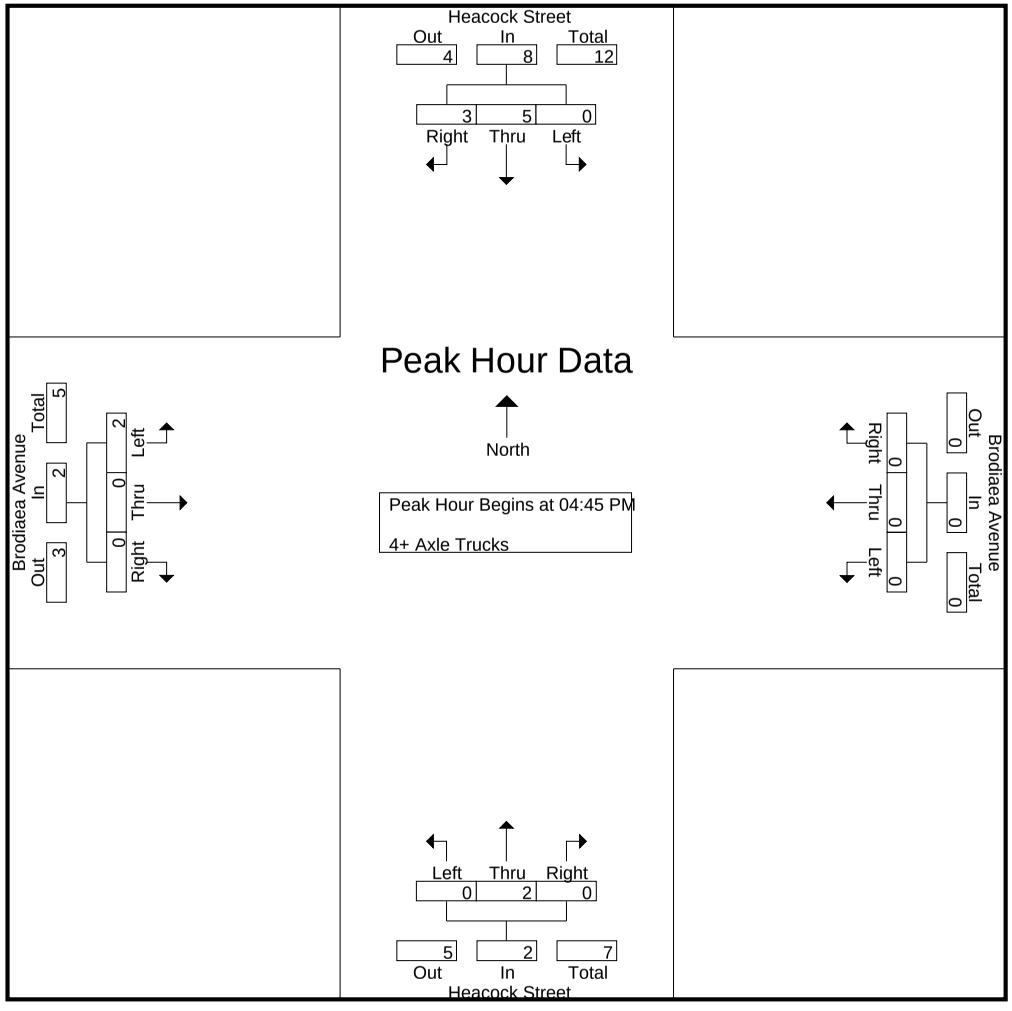
Site Code : 05117597
Start Date : 9/12/2017
Page No : 2



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File Name : 06_MRV_HEBI PM
Site Code : 05117597
Start Date : 9/12/2017
Page No : 3

	Heacock Street Southbound				Brodiaea Avenue Westbound				Heacock Street Northbound				Brodiaea Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	04:45 PM				04:45 PM				04:45 PM				04:45 PM				
+0 mins.	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	
+15 mins.	0	1	**1**	2	0	0	0	0	0	**2**	0	**2**	**1**	0	0	**1**	
+30 mins.	0	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	
+45 mins.	0	**2**	1	**3**	0	0	0	0	0	0	0	0	1	0	0	1	
Total Volume	0	5	3	8	0	0	0	0	0	2	0	2	2	0	0	2	
% App. Total	0	62.5	37.5		0	0	0		0	100	0		100	0	0		
PHF	.000	.625	.750	.667	.000	.000	.000	.000	.000	.250	.000	.250	.500	.000	.000	.500	

Location: Moreno Valley
N/S: Heacock Street
E/W: Brodiaea Avenue

Date: 9/12/2017
Day: Tuesday

PEDESTRIANS

	North Leg Heacock Street	East Leg Brodiaea Avenue	South Leg Heacock Street	West Leg Brodiaea Avenue	TOTAL
7:00 AM	0	1	3	1	5
7:15 AM	0	0	0	0	0
7:30 AM	1	0	0	0	1
7:45 AM	1	2	0	1	4
8:00 AM	0	1	1	0	2
8:15 AM	0	0	1	0	1
8:30 AM	0	3	0	0	3
8:45 AM	0	3	0	0	3
TOTAL VOLUMES:	2	10	5	2	19

	North Leg Heacock Street	East Leg Brodiaea Avenue	South Leg Heacock Street	West Leg Brodiaea Avenue	TOTAL
4:00 PM	0	1	0	0	1
4:15 PM	0	0	0	0	0
4:30 PM	0	2	0	0	2
4:45 PM	0	1	0	1	2
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
TOTAL VOLUMES:	0	4	0	1	5

Location: Moreno Valley
N/S: Heacock Street
E/W: Brodiaea Avenue

Date: 9/12/2017
Day: Tuesday

BICYCLES

	North Leg Heacock Street	East Leg Brodiaea Avenue	South Leg Heacock Street	West Leg Brodiaea Avenue	TOTAL
7:00 AM	0	0	0	0	0
7:15 AM	2	0	0	0	2
7:30 AM	0	0	2	0	2
7:45 AM	0	0	0	1	1
8:00 AM	1	0	0	0	1
8:15 AM	0	0	0	0	0
8:30 AM	0	0	0	0	0
8:45 AM	0	0	0	0	0
TOTAL VOLUMES:	3	0	2	1	6

	North Leg Heacock Street	East Leg Brodiaea Avenue	South Leg Heacock Street	West Leg Brodiaea Avenue	TOTAL
4:00 PM	1	0	0	0	1
4:15 PM	0	0	0	0	0
4:30 PM	0	0	1	0	1
4:45 PM	0	0	0	0	0
5:00 PM	1	0	0	0	1
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	1	0	0	1
TOTAL VOLUMES:	2	1	1	0	4

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email: counts@countsunlimited.com

City of Moreno Valley
Brodiaea Avenue
W/ Heacock Street
24 Hour Directional Classification Count

MRVBRWHE
Site Code: 051-17597

Eastbound

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
09/12/17	0	11	2	0	0	0	0	0	0	0	0	0	0	13
01:00	1	8	2	0	0	1	0	0	**2**	0	0	0	0	14
02:00	1	9	1	0	1	0	0	0	0	0	0	0	0	12
03:00	1	20	2	0	1	1	0	1	0	0	0	0	0	26
04:00	0	19	4	0	1	0	0	0	0	0	0	0	0	24
05:00	0	36	7	0	1	0	0	**2**	1	0	0	0	0	47
06:00	0	18	5	**2**	1	0	0	0	1	0	0	0	0	27
07:00	**4**	31	2	1	0	2	0	0	0	0	0	0	0	40
08:00	3	26	2	1	1	**3**	0	1	2	0	0	0	0	39
09:00	1	21	**11**	2	**4**	2	0	0	0	0	0	0	0	41
10:00	2	**42**	11	0	2	2	0	0	0	0	0	0	0	**59**
11:00	3	38	8	0	0	2	0	0	0	0	0	0	0	51
12 PM	2	43	16	0	0	3	0	0	**2**	0	0	0	0	66
13:00	**4**	55	12	0	3	2	**1**	**1**	1	0	0	0	0	79
14:00	1	50	**20**	0	1	1	0	0	0	0	0	0	0	73
15:00	2	86	19	**1**	2	**4**	0	0	0	0	0	0	0	114
16:00	2	74	15	0	2	2	0	1	0	0	0	0	0	96
17:00	3	**100**	16	0	**4**	3	0	0	0	0	0	0	0	**126**
18:00	3	66	12	0	3	3	0	0	0	0	0	0	0	87
19:00	0	49	9	0	1	0	0	0	0	0	0	0	0	59
20:00	1	57	6	0	0	0	0	0	0	0	0	0	0	64
21:00	0	33	4	0	0	2	0	0	0	0	0	0	0	39
22:00	0	26	1	0	1	2	0	0	0	0	0	0	0	30
23:00	0	14	3	0	0	0	0	0	0	0	0	0	0	17
Total	34	932	190	7	29	35	1	6	9	0	0	0	0	1243
Percent	2.7%	75.0%	15.3%	0.6%	2.3%	2.8%	0.1%	0.5%	0.7%	0.0%	0.0%	0.0%	0.0%	
AM Peak	07:00	10:00	09:00	06:00	09:00	08:00		05:00	01:00					10:00
Vol.	4	42	11	2	4	3		2	2					59
PM Peak	13:00	17:00	14:00	15:00	17:00	15:00	13:00	13:00	12:00					17:00
Vol.	4	100	20	1	4	4	1	1	2					126
Grand Total	34	932	190	7	29	35	1	6	9	0	0	0	0	1243
Percent	2.7%	75.0%	15.3%	0.6%	2.3%	2.8%	0.1%	0.5%	0.7%	0.0%	0.0%	0.0%	0.0%	

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City of Moreno Valley
Brodiaea Avenue
W/ Heacock Street
24 Hour Directional Classification Count

MRVBRWHE
Site Code: 051-17597

Westbound

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
09/12/17	0	6	1	0	0	0	0	0	0	0	0	0	0	7
01:00	0	3	1	0	1	0	0	0	0	0	0	0	0	5
02:00	1	12	0	0	0	1	0	0	0	0	0	0	0	14
03:00	0	11	6	0	1	0	0	0	0	0	0	0	0	18
04:00	0	39	10	0	**5**	0	0	1	0	0	0	0	0	55
05:00	1	69	**29**	0	3	0	0	1	1	0	0	0	0	104
06:00	0	58	12	1	2	0	0	0	0	0	0	0	0	73
07:00	1	**109**	20	1	3	1	0	**2**	1	0	0	0	0	**138**
08:00	0	76	18	**2**	5	1	0	0	0	0	0	0	0	102
09:00	**3**	51	18	0	3	**3**	0	0	**2**	0	0	0	0	80
10:00	2	61	7	1	4	1	0	0	2	0	0	0	0	78
11:00	2	58	11	0	3	1	0	0	0	0	0	0	0	75
12 PM	0	57	12	0	1	0	0	**2**	1	0	0	0	0	73
13:00	0	33	13	0	**5**	0	0	1	2	0	0	0	0	54
14:00	0	62	11	0	2	0	0	0	1	0	0	0	0	76
15:00	0	71	10	**2**	0	0	0	1	2	0	0	0	0	86
16:00	0	71	13	0	3	0	0	0	1	0	0	0	0	88
17:00	**3**	**86**	**16**	0	2	**3**	0	1	0	0	0	0	0	**111**
18:00	1	63	10	0	1	1	0	0	**3**	0	0	0	0	79
19:00	1	40	6	0	1	0	0	0	0	0	0	0	0	48
20:00	0	56	7	0	0	0	0	0	0	0	0	0	0	63
21:00	0	26	4	0	1	0	0	0	1	0	0	0	0	32
22:00	0	18	5	0	0	0	0	0	0	0	0	0	0	23
23:00	0	16	4	0	1	0	0	0	0	0	0	0	0	21
Total	15	1152	244	7	47	12	0	9	17	0	0	0	0	1503
Percent	1.0%	76.6%	16.2%	0.5%	3.1%	0.8%	0.0%	0.6%	1.1%	0.0%	0.0%	0.0%	0.0%	
AM Peak	09:00	07:00	05:00	08:00	04:00	09:00		07:00	09:00					07:00
Vol.	3	109	29	2	5	3		2	2					138
PM Peak	17:00	17:00	17:00	15:00	13:00	17:00		12:00	18:00					17:00
Vol.	3	86	16	2	5	3		2	3					111
Grand Total	15	1152	244	7	47	12	0	9	17	0	0	0	0	1503
Percent	1.0%	76.6%	16.2%	0.5%	3.1%	0.8%	0.0%	0.6%	1.1%	0.0%	0.0%	0.0%	0.0%	

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24 Hour Directional Classification Count

MRVBRWHE
Site Code: 051-17597

Eastbound, Westbound

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
09/12/17	0	17	3	0	0	0	0	0	0	0	0	0	0	20
01:00	1	11	3	0	1	1	0	0	**2**	0	0	0	0	19
02:00	2	21	1	0	1	1	0	0	0	0	0	0	0	26
03:00	1	31	8	0	2	1	0	1	0	0	0	0	0	44
04:00	0	58	14	0	6	0	0	1	0	0	0	0	0	79
05:00	1	105	**36**	0	4	0	0	**3**	2	0	0	0	0	151
06:00	0	76	17	**3**	3	0	0	0	1	0	0	0	0	100
07:00	**5**	**140**	22	2	3	3	0	2	1	0	0	0	0	**178**
08:00	3	102	20	3	6	4	0	1	2	0	0	0	0	141
09:00	4	72	29	2	**7**	**5**	0	0	2	0	0	0	0	121
10:00	4	103	18	1	6	3	0	0	2	0	0	0	0	137
11:00	5	96	19	0	3	3	0	0	0	0	0	0	0	126
12 PM	2	100	28	0	1	3	0	**2**	**3**	0	0	0	0	139
13:00	4	88	25	0	**8**	2	**1**	2	3	0	0	0	0	133
14:00	1	112	31	0	3	1	0	0	1	0	0	0	0	149
15:00	2	157	29	**3**	2	4	0	1	2	0	0	0	0	200
16:00	2	145	28	0	5	2	0	1	1	0	0	0	0	184
17:00	**6**	**186**	**32**	0	6	**6**	0	1	0	0	0	0	0	**237**
18:00	4	129	22	0	4	4	0	0	3	0	0	0	0	166
19:00	1	89	15	0	2	0	0	0	0	0	0	0	0	107
20:00	1	113	13	0	0	0	0	0	0	0	0	0	0	127
21:00	0	59	8	0	1	2	0	0	1	0	0	0	0	71
22:00	0	44	6	0	1	2	0	0	0	0	0	0	0	53
23:00	0	30	7	0	1	0	0	0	0	0	0	0	0	38
Total	49	2084	434	14	76	47	1	15	26	0	0	0	0	2746
Percent	1.8%	75.9%	15.8%	0.5%	2.8%	1.7%	0.0%	0.5%	0.9%	0.0%	0.0%	0.0%	0.0%	
AM Peak	07:00	07:00	05:00	06:00	09:00	09:00		05:00	01:00					07:00
Vol.	5	140	36	3	7	5		3	2					178
PM Peak	17:00	17:00	17:00	15:00	13:00	17:00	13:00	12:00	12:00					17:00
Vol.	6	186	32	3	8	6	1	2	3					237
Grand Total	49	2084	434	14	76	47	1	15	26	0	0	0	0	2746
Percent	1.8%	75.9%	15.8%	0.5%	2.8%	1.7%	0.0%	0.5%	0.9%	0.0%	0.0%	0.0%	0.0%	

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APPENDIX 3.2:

EXISTING (2017) CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

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Intersection	
Int Delay, s/veh	1.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	41	6	8	147	15	18
Future Vol, veh/h	41	6	8	147	15	18
Conflicting Peds, #/hr	0	3	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	155	-	145	0
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	75	75	75	75	75	75
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	55	8	11	196	20	24

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	66	0	279	62
Stage 1	-	-	-	-	62	-
Stage 2	-	-	-	-	217	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1549	-	715	1009
Stage 1	-	-	-	-	966	-
Stage 2	-	-	-	-	824	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1549	-	708	1006
Mov Cap-2 Maneuver	-	-	-	-	716	-
Stage 1	-	-	-	-	963	-
Stage 2	-	-	-	-	818	-

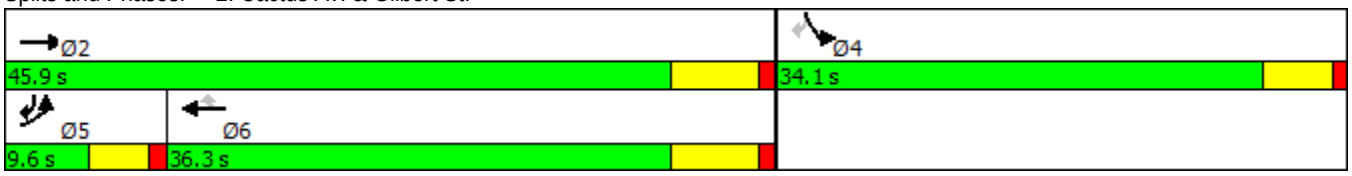
Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	9.4
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	716	1006	-	-	1549	-
HCM Lane V/C Ratio	0.028	0.024	-	-	0.007	-
HCM Control Delay (s)	10.2	8.7	-	-	7.3	-
HCM Lane LOS	B	A	-	-	A	-
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	24	1044	1938	11	13	20
Future Volume (vph)	24	1044	1938	11	13	20
Turn Type	Prot	NA	NA	Perm	Prot	pm+ov
Protected Phases	5	2	6		4	5
Permitted Phases				6		4
Detector Phase	5	2	6	6	4	5
Switch Phase						
Minimum Initial (s)	5.0	10.0	10.0	10.0	5.0	5.0
Minimum Split (s)	9.6	16.2	29.2	29.2	34.1	9.6
Total Split (s)	9.6	45.9	36.3	36.3	34.1	9.6
Total Split (%)	12.0%	57.4%	45.4%	45.4%	42.6%	12.0%
Yellow Time (s)	3.6	5.2	5.2	5.2	4.1	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	6.2	6.2	6.2	5.1	4.6
Lead/Lag	Lead		Lag	Lag		Lead
Lead-Lag Optimize?	Yes		Yes	Yes		Yes
Recall Mode	None	None	None	None	Min	None
Act Effct Green (s)	5.2	34.6	31.4	31.4	9.2	19.7
Actuated g/C Ratio	0.09	0.62	0.56	0.56	0.17	0.35
v/c Ratio	0.14	0.33	0.68	0.01	0.04	0.03
Control Delay	31.1	6.5	13.7	7.3	19.3	11.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.1	6.5	13.7	7.3	19.3	11.9
LOS	C	A	B	A	B	B
Approach Delay		7.0	13.7		14.8	
Approach LOS		A	B		B	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 55.6	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.68	
Intersection Signal Delay: 11.3	Intersection LOS: B
Intersection Capacity Utilization 51.0%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 2: Cactus Av. & Gilbert St.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	24	1044	1938	11	13	20
Future Volume (veh/h)	24	1044	1938	11	13	20
Number	5	2	6	16	7	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	24	1065	1978	11	13	13
Adj No. of Lanes	1	3	3	1	1	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	51	3530	2916	908	177	204
Arrive On Green	0.03	0.68	0.56	0.56	0.10	0.10
Sat Flow, veh/h	1810	5358	5358	1615	1810	1615
Grp Volume(v), veh/h	24	1065	1978	11	13	13
Grp Sat Flow(s),veh/h/ln	1810	1729	1729	1615	1810	1615
Q Serve(g_s), s	0.7	4.2	13.8	0.2	0.3	0.4
Cycle Q Clear(g_c), s	0.7	4.2	13.8	0.2	0.3	0.4
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	51	3530	2916	908	177	204
V/C Ratio(X)	0.47	0.30	0.68	0.01	0.07	0.06
Avail Cap(c_a), veh/h	177	4035	3059	952	1028	963
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.4	3.3	7.9	4.9	20.9	19.6
Incr Delay (d2), s/veh	2.5	0.0	0.6	0.0	0.2	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	2.0	6.6	0.1	0.2	0.0
LnGrp Delay(d),s/veh	26.9	3.3	8.5	4.9	21.1	19.8
LnGrp LOS	C	A	A	A	C	B
Approach Vol, veh/h		1089	1989		26	
Approach Delay, s/veh		3.8	8.5		20.4	
Approach LOS		A	A		C	

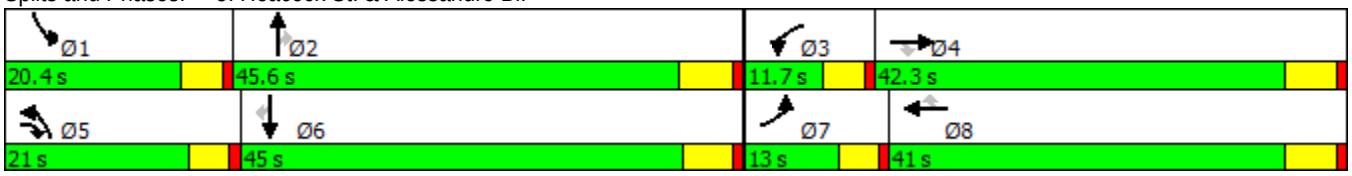
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		40.9		10.1	6.0	34.9		
Change Period (Y+Rc), s		6.2		5.1	4.6	6.2		
Max Green Setting (Gmax), s		39.7		29.0	5.0	30.1		
Max Q Clear Time (g_c+I1), s		6.2		2.4	2.7	15.8		
Green Ext Time (p_c), s		27.2		0.0	0.0	12.9		

Intersection Summary	
HCM 2010 Ctrl Delay	6.9
HCM 2010 LOS	A

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	381	57	42	1238	138	157	475	41	120	321	174
Future Volume (vph)	70	381	57	42	1238	138	157	475	41	120	321	174
Turn Type	Prot	NA	pm+ov	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	5	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	5.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	9.6	32.8	9.6	9.6	32.8	32.8	9.6	44.8	44.8	9.6	44.4	44.4
Total Split (s)	13.0	42.3	21.0	11.7	41.0	41.0	21.0	45.6	45.6	20.4	45.0	45.0
Total Split (%)	10.8%	35.3%	17.5%	9.8%	34.2%	34.2%	17.5%	38.0%	38.0%	17.0%	37.5%	37.5%
Yellow Time (s)	3.6	4.8	3.6	3.6	4.8	4.8	3.6	4.8	4.8	3.6	4.4	4.4
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.8	4.6	4.6	5.8	5.8	4.6	5.8	5.8	4.6	5.4	5.4
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	7.6	34.4	48.3	6.5	31.1	31.1	12.5	20.6	20.6	10.8	19.3	19.3
Actuated g/C Ratio	0.09	0.39	0.54	0.07	0.35	0.35	0.14	0.23	0.23	0.12	0.22	0.22
v/c Ratio	0.48	0.20	0.07	0.33	0.72	0.23	0.65	0.60	0.10	0.58	0.43	0.38
Control Delay	56.9	21.4	3.3	54.1	30.1	6.3	53.8	35.0	0.4	53.1	33.3	7.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.9	21.4	3.3	54.1	30.1	6.3	53.8	35.0	0.4	53.1	33.3	7.0
LOS	E	C	A	D	C	A	D	C	A	D	C	A
Approach Delay		24.2			28.5			37.3			29.7	
Approach LOS		C			C			D			C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 89.3	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.72	
Intersection Signal Delay: 29.9	Intersection LOS: C
Intersection Capacity Utilization 68.7%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 5: Heacock St. & Alessandro Bl.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	381	57	42	1238	138	157	475	41	120	321	174
Future Volume (veh/h)	70	381	57	42	1238	138	157	475	41	120	321	174
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	1.00		0.98	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	74	401	23	44	1303	108	165	500	24	126	338	112
Adj No. of Lanes	1	3	1	1	3	1	1	2	1	1	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	96	1953	781	70	1880	573	203	864	379	160	778	344
Arrive On Green	0.05	0.38	0.38	0.04	0.36	0.36	0.11	0.24	0.24	0.09	0.22	0.22
Sat Flow, veh/h	1810	5187	1594	1810	5187	1582	1810	3610	1581	1810	3610	1594
Grp Volume(v), veh/h	74	401	23	44	1303	108	165	500	24	126	338	112
Grp Sat Flow(s),veh/h/ln	1810	1729	1594	1810	1729	1582	1810	1805	1581	1810	1805	1594
Q Serve(g_s), s	3.3	4.2	0.6	1.9	17.3	3.8	7.2	9.9	0.9	5.5	6.6	4.8
Cycle Q Clear(g_c), s	3.3	4.2	0.6	1.9	17.3	3.8	7.2	9.9	0.9	5.5	6.6	4.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	96	1953	781	70	1880	573	203	864	379	160	778	344
V/C Ratio(X)	0.77	0.21	0.03	0.63	0.69	0.19	0.81	0.58	0.06	0.79	0.43	0.33
Avail Cap(c_a), veh/h	188	2337	900	159	2254	688	366	1774	777	353	1765	779
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	37.9	17.1	10.7	38.4	22.0	17.7	35.1	27.2	23.8	36.2	27.5	26.8
Incr Delay (d2), s/veh	4.9	0.1	0.0	3.4	0.7	0.2	3.0	0.6	0.1	3.2	0.4	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	2.0	0.3	1.0	8.3	1.7	3.8	5.0	0.4	2.9	3.3	2.2
LnGrp Delay(d),s/veh	42.8	17.1	10.8	41.7	22.7	17.8	38.1	27.8	23.9	39.4	27.9	27.3
LnGrp LOS	D	B	B	D	C	B	D	C	C	D	C	C
Approach Vol, veh/h		498			1455			689			576	
Approach Delay, s/veh		20.6			22.9			30.1			30.3	
Approach LOS		C			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.8	25.2	7.7	36.3	13.7	23.3	8.9	35.2
Change Period (Y+Rc), s	4.6	5.8	4.6	5.8	4.6	* 5.8	4.6	5.8
Max Green Setting (Gmax), s	15.8	39.8	7.1	36.5	16.4	* 40	8.4	35.2
Max Q Clear Time (g_c+I1), s	7.5	11.9	3.9	6.2	9.2	8.6	5.3	19.3
Green Ext Time (p_c), s	0.1	6.1	0.0	14.7	0.1	6.2	0.0	10.0

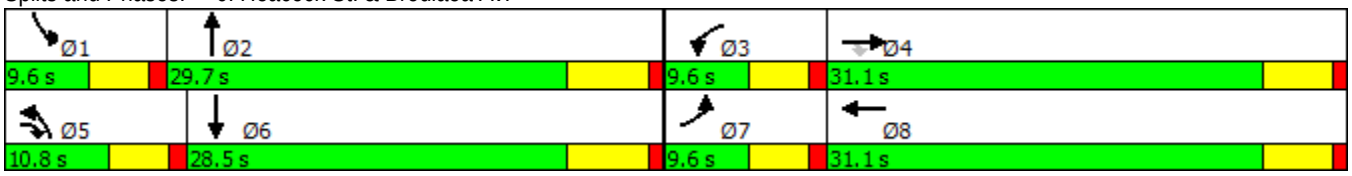
Intersection Summary	
HCM 2010 Ctrl Delay	25.4
HCM 2010 LOS	C

Notes

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	18	23	18	12	99	39	632	16	362
Future Volume (vph)	18	23	18	12	99	39	632	16	362
Turn Type	Prot	NA	pm+ov	Prot	NA	Prot	NA	Prot	NA
Protected Phases	7	4	5	3	8	5	2	1	6
Permitted Phases			4						
Detector Phase	7	4	5	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	10.0	5.0	5.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	9.6	31.1	9.6	9.6	31.1	9.6	23.8	9.6	25.8
Total Split (s)	9.6	31.1	10.8	9.6	31.1	10.8	29.7	9.6	28.5
Total Split (%)	12.0%	38.9%	13.5%	12.0%	38.9%	13.5%	37.1%	12.0%	35.6%
Yellow Time (s)	3.6	4.1	3.6	3.6	4.1	3.6	4.8	3.6	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.1	4.6	4.6	5.1	4.6	5.8	4.6	5.8
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	5.7	13.4	17.1	5.7	13.4	6.2	22.6	5.7	20.4
Actuated g/C Ratio	0.13	0.30	0.38	0.13	0.30	0.14	0.51	0.13	0.46
v/c Ratio	0.09	0.05	0.03	0.06	0.27	0.17	0.39	0.08	0.26
Control Delay	26.8	15.1	0.1	26.8	14.0	25.8	12.6	26.8	13.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.8	15.1	0.1	26.8	14.0	25.8	12.6	26.8	13.7
LOS	C	B	A	C	B	C	B	C	B
Approach Delay		14.1			15.0		13.3		14.3
Approach LOS		B			B		B		B

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 44.5	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.39	
Intersection Signal Delay: 13.8	Intersection LOS: B
Intersection Capacity Utilization 50.2%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 6: Heacock St. & Brodiaea Av.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	23	18	12	99	39	39	632	13	16	362	18
Future Volume (veh/h)	18	23	18	12	99	39	39	632	13	16	362	18
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	20	26	9	13	110	19	43	702	10	18	402	18
Adj No. of Lanes	1	1	1	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	44	395	404	30	315	54	83	1174	17	40	1050	47
Arrive On Green	0.02	0.21	0.21	0.02	0.20	0.20	0.05	0.32	0.32	0.02	0.30	0.30
Sat Flow, veh/h	1810	1900	1590	1810	1574	272	1810	3644	52	1810	3516	157
Grp Volume(v), veh/h	20	26	9	13	0	129	43	348	364	18	206	214
Grp Sat Flow(s),veh/h/ln	1810	1900	1590	1810	0	1846	1810	1805	1891	1810	1805	1868
Q Serve(g_s), s	0.5	0.5	0.2	0.3	0.0	2.8	1.1	7.5	7.5	0.5	4.2	4.2
Cycle Q Clear(g_c), s	0.5	0.5	0.2	0.3	0.0	2.8	1.1	7.5	7.5	0.5	4.2	4.2
Prop In Lane	1.00		1.00	1.00		0.15	1.00		0.03	1.00		0.08
Lane Grp Cap(c), veh/h	44	395	404	30	0	369	83	581	609	40	539	558
V/C Ratio(X)	0.45	0.07	0.02	0.43	0.00	0.35	0.52	0.60	0.60	0.45	0.38	0.38
Avail Cap(c_a), veh/h	194	1060	961	194	0	1030	241	925	969	194	879	910
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.4	14.8	13.1	22.7	0.0	16.0	21.7	13.3	13.3	22.5	12.9	13.0
Incr Delay (d2), s/veh	2.7	0.1	0.0	3.6	0.0	0.6	1.9	1.0	0.9	2.8	0.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.3	0.1	0.2	0.0	1.5	0.6	3.9	4.1	0.3	2.1	2.2
LnGrp Delay(d),s/veh	25.1	14.9	13.1	26.3	0.0	16.6	23.6	14.3	14.2	25.4	13.4	13.4
LnGrp LOS	C	B	B	C		B	C	B	B	C	B	B
Approach Vol, veh/h		55			142			755			438	
Approach Delay, s/veh		18.3			17.5			14.8			13.9	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.6	20.8	5.4	14.8	6.7	19.7	5.7	14.4
Change Period (Y+Rc), s	4.6	5.8	4.6	5.1	4.6	5.8	4.6	5.1
Max Green Setting (Gmax), s	5.0	23.9	5.0	26.0	6.2	22.7	5.0	26.0
Max Q Clear Time (g_c+I1), s	2.5	9.5	2.3	2.5	3.1	6.2	2.5	4.8
Green Ext Time (p_c), s	0.0	5.4	0.0	0.8	0.0	5.8	0.0	0.8

Intersection Summary	
HCM 2010 Ctrl Delay	14.9
HCM 2010 LOS	B

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	111	8	12	103	8	16
Future Vol, veh/h	111	8	12	103	8	16
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	155	-	145	0
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	135	10	15	126	10	20

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	145	0	295	140
Stage 1	-	-	-	-	140	-
Stage 2	-	-	-	-	155	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1450	-	700	913
Stage 1	-	-	-	-	892	-
Stage 2	-	-	-	-	878	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1450	-	693	913
Mov Cap-2 Maneuver	-	-	-	-	718	-
Stage 1	-	-	-	-	892	-
Stage 2	-	-	-	-	869	-

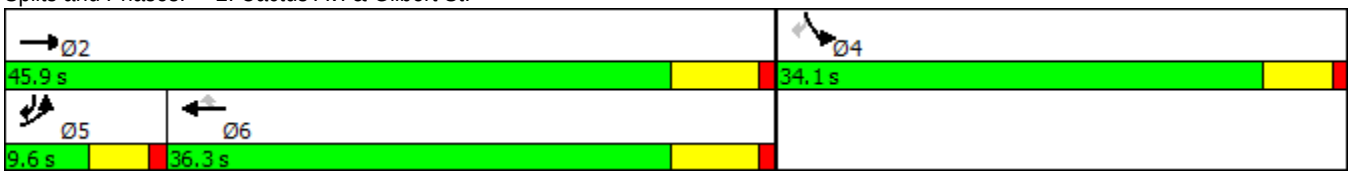
Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	9.4
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	718	913	-	-	1450	-
HCM Lane V/C Ratio	0.014	0.021	-	-	0.01	-
HCM Control Delay (s)	10.1	9	-	-	7.5	-
HCM Lane LOS	B	A	-	-	A	-
HCM 95th %tile Q(veh)	0	0.1	-	-	0	-

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	3	2195	1013	2	2	3
Future Volume (vph)	3	2195	1013	2	2	3
Turn Type	Prot	NA	NA	Perm	Prot	pm+ov
Protected Phases	5	2	6		4	5
Permitted Phases				6		4
Detector Phase	5	2	6	6	4	5
Switch Phase						
Minimum Initial (s)	5.0	10.0	10.0	10.0	5.0	5.0
Minimum Split (s)	9.6	16.2	29.2	29.2	34.1	9.6
Total Split (s)	9.6	45.9	36.3	36.3	34.1	9.6
Total Split (%)	12.0%	57.4%	45.4%	45.4%	42.6%	12.0%
Yellow Time (s)	3.6	5.2	5.2	5.2	4.1	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	6.2	6.2	6.2	5.1	4.6
Lead/Lag	Lead		Lag	Lag		Lead
Lead-Lag Optimize?	Yes		Yes	Yes		Yes
Recall Mode	None	None	None	None	Min	None
Act Effct Green (s)	5.2	38.1	36.7	36.7	9.2	19.6
Actuated g/C Ratio	0.09	0.65	0.62	0.62	0.16	0.33
v/c Ratio	0.02	0.68	0.33	0.00	0.01	0.01
Control Delay	30.7	9.9	8.1	8.5	19.0	8.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.7	9.9	8.1	8.5	19.0	8.3
LOS	C	A	A	A	B	A
Approach Delay		9.9	8.1		12.6	
Approach LOS		A	A		B	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 58.9	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.68	
Intersection Signal Delay: 9.3	Intersection LOS: A
Intersection Capacity Utilization 56.0%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 2: Cactus Av. & Gilbert St.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	2195	1013	2	2	3
Future Volume (veh/h)	3	2195	1013	2	2	3
Number	5	2	6	16	7	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.98	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	3	2286	1055	2	2	0
Adj No. of Lanes	1	3	3	1	1	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	7	3586	3113	948	171	159
Arrive On Green	0.00	0.69	0.60	0.60	0.09	0.00
Sat Flow, veh/h	1810	5358	5358	1580	1810	1615
Grp Volume(v), veh/h	3	2286	1055	2	2	0
Grp Sat Flow(s),veh/h/ln	1810	1729	1729	1580	1810	1615
Q Serve(g_s), s	0.1	12.8	5.4	0.0	0.1	0.0
Cycle Q Clear(g_c), s	0.1	12.8	5.4	0.0	0.1	0.0
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	7	3586	3113	948	171	159
V/C Ratio(X)	0.41	0.64	0.34	0.00	0.01	0.00
Avail Cap(c_a), veh/h	171	3900	3113	948	994	893
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	26.2	4.5	5.3	4.2	21.7	0.0
Incr Delay (d2), s/veh	12.8	0.3	0.1	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	6.0	2.6	0.0	0.0	0.0
LnGrp Delay(d),s/veh	39.0	4.8	5.4	4.2	21.7	0.0
LnGrp LOS	D	A	A	A	C	
Approach Vol, veh/h		2289	1057		2	
Approach Delay, s/veh		4.9	5.4		21.7	
Approach LOS		A	A		C	

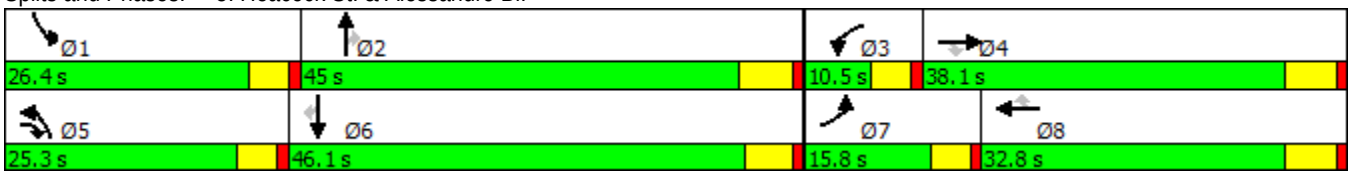
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		42.7		10.1	4.8	37.9		
Change Period (Y+Rc), s		6.2		5.1	4.6	6.2		
Max Green Setting (Gmax), s		39.7		29.0	5.0	30.1		
Max Q Clear Time (g_c+I1), s		14.8		2.1	2.1	7.4		
Green Ext Time (p_c), s		21.7		0.0	0.0	20.6		

Intersection Summary	
HCM 2010 Ctrl Delay	5.0
HCM 2010 LOS	A

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	114	1189	128	47	740	159	177	398	88	251	481	146
Future Volume (vph)	114	1189	128	47	740	159	177	398	88	251	481	146
Turn Type	Prot	NA	pm+ov	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	5	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	5.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	9.6	32.8	9.6	9.6	32.8	32.8	9.6	44.8	44.8	9.6	44.4	44.4
Total Split (s)	15.8	38.1	25.3	10.5	32.8	32.8	25.3	45.0	45.0	26.4	46.1	46.1
Total Split (%)	13.2%	31.8%	21.1%	8.8%	27.3%	27.3%	21.1%	37.5%	37.5%	22.0%	38.4%	38.4%
Yellow Time (s)	3.6	4.8	3.6	3.6	4.8	4.8	3.6	4.8	4.8	3.6	4.4	4.4
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.8	4.6	4.6	5.8	5.8	4.6	5.8	5.8	4.6	5.4	5.4
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	9.9	30.4	45.4	5.9	23.6	23.6	13.7	18.8	18.8	17.5	23.0	23.0
Actuated g/C Ratio	0.11	0.33	0.50	0.06	0.26	0.26	0.15	0.21	0.21	0.19	0.25	0.25
v/c Ratio	0.61	0.71	0.16	0.41	0.57	0.31	0.68	0.55	0.20	0.75	0.55	0.29
Control Delay	57.9	32.0	6.3	59.2	33.1	7.4	53.1	36.1	1.5	52.5	32.8	6.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.9	32.0	6.3	59.2	33.1	7.4	53.1	36.1	1.5	52.5	32.8	6.4
LOS	E	C	A	E	C	A	D	D	A	D	C	A
Approach Delay		31.7			30.0			36.0			34.0	
Approach LOS		C			C			D			C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 91.6	
Natural Cycle: 110	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 32.6	Intersection LOS: C
Intersection Capacity Utilization 73.3%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 5: Heacock St. & Alessandro Bl.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	114	1189	128	47	740	159	177	398	88	251	481	146
Future Volume (veh/h)	114	1189	128	47	740	159	177	398	88	251	481	146
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	118	1226	86	48	763	113	182	410	59	259	496	86
Adj No. of Lanes	1	3	1	1	3	1	1	2	1	1	2	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	149	1744	731	71	1521	461	220	797	353	298	953	426
Arrive On Green	0.08	0.34	0.34	0.04	0.29	0.29	0.12	0.22	0.22	0.16	0.26	0.26
Sat Flow, veh/h	1810	5187	1591	1810	5187	1573	1810	3610	1602	1810	3610	1613
Grp Volume(v), veh/h	118	1226	86	48	763	113	182	410	59	259	496	86
Grp Sat Flow(s),veh/h/ln	1810	1729	1591	1810	1729	1573	1810	1805	1602	1810	1805	1613
Q Serve(g_s), s	5.6	17.9	2.7	2.3	10.6	4.8	8.6	8.7	2.6	12.1	10.2	3.6
Cycle Q Clear(g_c), s	5.6	17.9	2.7	2.3	10.6	4.8	8.6	8.7	2.6	12.1	10.2	3.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	149	1744	731	71	1521	461	220	797	353	298	953	426
V/C Ratio(X)	0.79	0.70	0.12	0.67	0.50	0.24	0.83	0.51	0.17	0.87	0.52	0.20
Avail Cap(c_a), veh/h	233	1924	786	123	1608	488	430	1625	721	453	1687	754
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.2	25.1	13.5	41.3	25.5	23.4	37.4	29.8	27.5	35.4	27.3	24.9
Incr Delay (d2), s/veh	4.1	1.0	0.1	4.0	0.3	0.3	3.0	0.5	0.2	7.5	0.4	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.0	8.7	1.2	1.2	5.1	2.1	4.4	4.4	1.2	6.7	5.2	1.6
LnGrp Delay(d),s/veh	43.3	26.2	13.6	45.3	25.8	23.7	40.4	30.3	27.7	43.0	27.8	25.2
LnGrp LOS	D	C	B	D	C	C	D	C	C	D	C	C
Approach Vol, veh/h		1430			924			651			841	
Approach Delay, s/veh		26.8			26.5			32.9			32.2	
Approach LOS		C			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.9	25.0	8.0	35.1	15.2	28.8	11.8	31.3
Change Period (Y+Rc), s	4.6	5.8	4.6	5.8	4.6	* 5.8	4.6	5.8
Max Green Setting (Gmax), s	21.8	39.2	5.9	32.3	20.7	* 41	11.2	27.0
Max Q Clear Time (g_c+I1), s	14.1	10.7	4.3	19.9	10.6	12.2	7.6	12.6
Green Ext Time (p_c), s	0.2	6.7	0.0	9.4	0.2	6.7	0.0	10.6

Intersection Summary	
HCM 2010 Ctrl Delay	29.0
HCM 2010 LOS	C

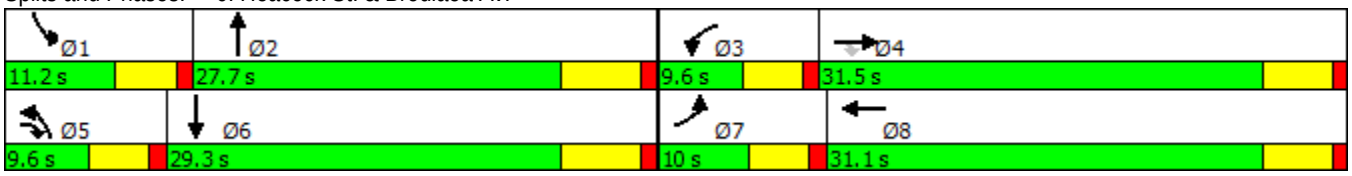
Notes

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	26	79	22	19	66	20	503	49	586
Future Volume (vph)	26	79	22	19	66	20	503	49	586
Turn Type	Prot	NA	pm+ov	Prot	NA	Prot	NA	Prot	NA
Protected Phases	7	4	5	3	8	5	2	1	6
Permitted Phases			4						
Detector Phase	7	4	5	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	10.0	5.0	5.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	9.6	31.1	9.6	9.6	31.1	9.6	23.8	9.6	25.8
Total Split (s)	10.0	31.5	9.6	9.6	31.1	9.6	27.7	11.2	29.3
Total Split (%)	12.5%	39.4%	12.0%	12.0%	38.9%	12.0%	34.6%	14.0%	36.6%
Yellow Time (s)	3.6	4.1	3.6	3.6	4.1	3.6	4.8	3.6	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.1	4.6	4.6	5.1	4.6	5.8	4.6	5.8
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	6.5	16.1	17.6	6.4	14.5	6.4	26.3	7.0	26.7
Actuated g/C Ratio	0.15	0.36	0.39	0.14	0.33	0.14	0.59	0.16	0.60
v/c Ratio	0.10	0.12	0.03	0.08	0.17	0.08	0.26	0.18	0.30
Control Delay	28.7	14.3	0.1	29.1	13.1	29.1	13.9	27.1	13.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.7	14.3	0.1	29.1	13.1	29.1	13.9	27.1	13.4
LOS	C	B	A	C	B	C	B	C	B
Approach Delay		14.7			15.6		14.4		14.4
Approach LOS		B			B		B		B

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 44.6
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.30
Intersection Signal Delay: 14.6 — Intersection LOS: B
Intersection Capacity Utilization 42.5% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 6: Heacock St. & Brodiaea Av.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	26	79	22	19	66	34	20	503	19	49	586	29
Future Volume (veh/h)	26	79	22	19	66	34	20	503	19	49	586	29
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	27	83	12	20	69	13	21	529	16	52	617	29
Adj No. of Lanes	1	1	1	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	57	389	372	44	306	58	46	1031	31	95	1107	52
Arrive On Green	0.03	0.20	0.20	0.02	0.20	0.20	0.03	0.29	0.29	0.05	0.32	0.32
Sat Flow, veh/h	1810	1900	1615	1810	1552	292	1810	3578	108	1810	3511	165
Grp Volume(v), veh/h	27	83	12	20	0	82	21	267	278	52	317	329
Grp Sat Flow(s),veh/h/ln	1810	1900	1615	1810	0	1844	1810	1805	1881	1810	1805	1871
Q Serve(g_s), s	0.7	1.7	0.3	0.5	0.0	1.7	0.5	5.8	5.8	1.3	6.8	6.8
Cycle Q Clear(g_c), s	0.7	1.7	0.3	0.5	0.0	1.7	0.5	5.8	5.8	1.3	6.8	6.8
Prop In Lane	1.00		1.00	1.00		0.16	1.00		0.06	1.00		0.09
Lane Grp Cap(c), veh/h	57	389	372	44	0	364	46	520	542	95	569	590
V/C Ratio(X)	0.47	0.21	0.03	0.45	0.00	0.23	0.45	0.51	0.51	0.55	0.56	0.56
Avail Cap(c_a), veh/h	209	1074	954	194	0	1026	194	846	882	256	908	941
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.2	15.5	13.9	22.5	0.0	15.7	22.4	13.9	13.9	21.6	13.3	13.3
Incr Delay (d2), s/veh	2.2	0.3	0.0	2.7	0.0	0.3	2.6	0.8	0.8	1.8	0.9	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.9	0.1	0.3	0.0	0.9	0.3	2.9	3.1	0.7	3.5	3.6
LnGrp Delay(d),s/veh	24.5	15.7	14.0	25.1	0.0	16.1	25.0	14.7	14.6	23.4	14.1	14.1
LnGrp LOS	C	B	B	C		B	C	B	B	C	B	B
Approach Vol, veh/h		122			102			566			698	
Approach Delay, s/veh		17.5			17.8			15.0			14.8	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.1	19.3	5.7	14.7	5.8	20.5	6.1	14.3
Change Period (Y+Rc), s	4.6	5.8	4.6	5.1	4.6	5.8	4.6	5.1
Max Green Setting (Gmax), s	6.6	21.9	5.0	26.4	5.0	23.5	5.4	26.0
Max Q Clear Time (g_c+I1), s	3.3	7.8	2.5	3.7	2.5	8.8	2.7	3.7
Green Ext Time (p_c), s	0.0	5.6	0.0	0.8	0.0	5.7	0.0	0.8

Intersection Summary	
HCM 2010 Ctrl Delay	15.3
HCM 2010 LOS	B

APPENDIX 3.3:

EXISTING (2017) CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS

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Figure 4C-3. Warrant 3, Peak Hour

Traffic Conditions = **Existing (2017) Conditions - Weekday PM Peak Hour**

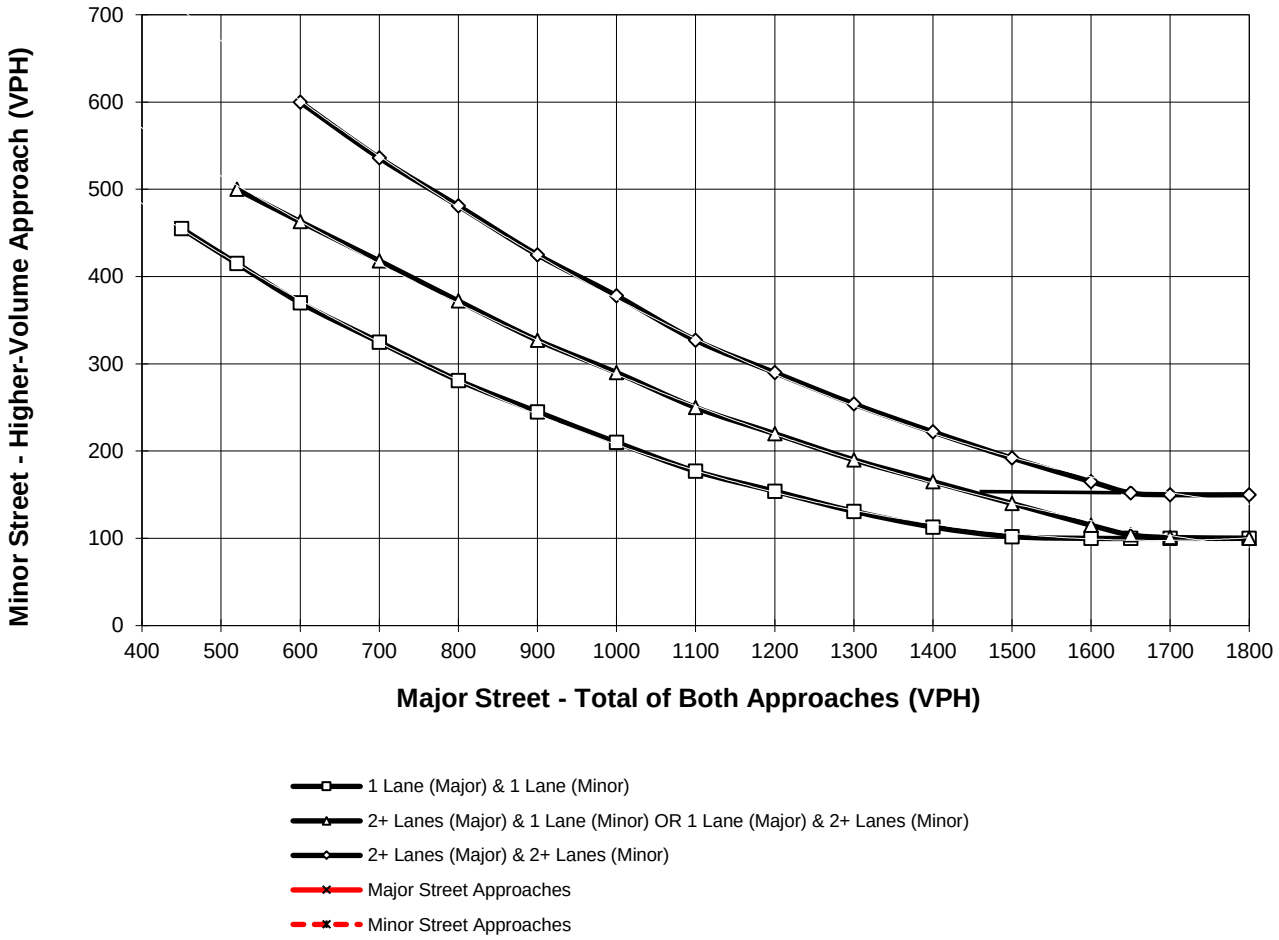
Major Street Name = **Brodiaea Avenue**

Total of Both Approaches (VPH) = **234**
Number of Approach Lanes on Major Street = **1**

Minor Street Name = **Gilbert Street**

High Volume Approach (VPH) = **24**
Number of Approach Lanes On Minor Street = **1**

SIGNAL WARRANT NOT SATISFIED



*Note: 150 vph applies as the lower threshold for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold for a minor-street approach with one lane

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APPENDIX 3.4:

EXISTING (2017) CONDITIONS QUEUING ANALYSIS WORKSHEETS

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Intersection: 1: Gilbert St. & Brodiaea Av.

Movement	WB	NB	NB
Directions Served	L	L	R
Maximum Queue (ft)	12	31	40
Average Queue (ft)	1	12	13
95th Queue (ft)	8	37	38
Link Distance (ft)			1096
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	155	145	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: Cactus Av. & Gilbert St.

Movement	EB	EB	EB	EB	WB	WB	WB	WB	SB	SB
Directions Served	L	T	T	T	T	T	T	R	L	R
Maximum Queue (ft)	65	140	113	58	265	236	195	26	47	26
Average Queue (ft)	18	55	34	10	114	88	54	2	9	8
95th Queue (ft)	49	105	77	39	212	182	129	13	31	24
Link Distance (ft)		928	928	928	969	969	969	969		1096
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	150								150	
Storage Blk Time (%)		0								
Queuing Penalty (veh)		0								

Intersection: 5: Heacock St. & Alessandro Bl.

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	T	T	T	R	L	T	T	T	R	L	T
Maximum Queue (ft)	111	155	123	42	33	174	364	343	252	70	189	200
Average Queue (ft)	45	82	45	5	7	56	246	205	118	24	95	102
95th Queue (ft)	88	138	98	25	22	153	346	309	228	52	158	173
Link Distance (ft)		1203	1203	1203			778	778	778	778		1141
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	205				105	120					145	
Storage Blk Time (%)				0			37				2	2
Queuing Penalty (veh)				0			15				4	3

Intersection: 5: Heacock St. & Alessandro Bl.

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	T	T	R
Maximum Queue (ft)	191	39	147	151	132	92
Average Queue (ft)	104	12	76	89	51	38
95th Queue (ft)	173	29	127	139	108	72
Link Distance (ft)	1141	1141		921	921	921
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			250			
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 6: Heacock St. & Brodiaea Av.

Movement	EB	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	58	44	40	46	110	81	160	125	51	121	139
Average Queue (ft)	16	13	10	9	48	22	74	34	13	44	59
95th Queue (ft)	46	40	34	33	91	58	131	84	40	99	118
Link Distance (ft)		157			697		1125	1125		1141	1141
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	150		150	90		150			100		
Storage Blk Time (%)					1		0			1	
Queuing Penalty (veh)					0		0			0	

Network Summary

Network wide Queuing Penalty: 23

Intersection: 1: Gilbert St. & Brodiaea Av.

Movement	WB	NB	NB
Directions Served	L	L	R
Maximum Queue (ft)	24	31	31
Average Queue (ft)	1	6	11
95th Queue (ft)	11	25	34
Link Distance (ft)			1096
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	155	145	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: Cactus Av. & Gilbert St.

Movement	EB	EB	EB	EB	WB	WB	WB	WB	SB	SB
Directions Served	L	T	T	T	T	T	T	R	L	R
Maximum Queue (ft)	30	247	218	161	187	151	57	10	19	19
Average Queue (ft)	4	91	74	43	64	38	10	0	1	2
95th Queue (ft)	20	189	167	107	131	98	37	5	10	11
Link Distance (ft)		928	928	928	969	969	969	969		1096
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	150								150	
Storage Blk Time (%)		2								
Queuing Penalty (veh)		0								

Intersection: 5: Heacock St. & Alessandro Bl.

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	T	T	T	R	L	T	T	T	R	L	T
Maximum Queue (ft)	202	321	296	258	148	157	283	253	179	96	194	240
Average Queue (ft)	78	223	198	136	34	50	192	151	55	30	118	98
95th Queue (ft)	153	308	284	241	104	133	262	227	144	65	185	179
Link Distance (ft)		1203	1203	1203			778	778	778	778		1141
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	205				105	120					145	
Storage Blk Time (%)	0	12		9		0	29				6	1
Queuing Penalty (veh)	1	13		11		0	14				11	2

Intersection: 5: Heacock St. & Alessandro Bl.

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	T	T	R
Maximum Queue (ft)	209	67	257	213	190	62
Average Queue (ft)	95	23	152	121	95	26
95th Queue (ft)	161	52	236	192	167	50
Link Distance (ft)	1141	1141		921	921	921
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			250			
Storage Blk Time (%)			0	0		
Queuing Penalty (veh)			1	0		

Intersection: 6: Heacock St. & Brodiaea Av.

Movement	EB	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	54	88	40	50	96	38	162	104	114	210	216
Average Queue (ft)	20	35	11	14	38	13	75	35	34	77	94
95th Queue (ft)	50	71	35	38	75	35	135	80	79	165	182
Link Distance (ft)		157			697		1125	1125		1141	1141
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	150		150	90		150			100		
Storage Blk Time (%)					0		0		1	3	
Queuing Penalty (veh)					0		0		3	2	

Network Summary

Network wide Queuing Penalty: 59

APPENDIX 4.1:

POST PROCESSING WORKSHEETS

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Project:	Holly Street Truck Terminal	Job #:	11140
Scenario:	Horizon Year (2040) Without Project	Analyst:	BA
		Date:	9/19/17

LOCATION: Heacock St. / Alessandro Bl.
FORECAST YEAR: 2035

INDIVIDUAL TURN VOLUME GROWTH REVIEW

		AM PEAK HOUR INPUT DATA				PM PEAK HOUR INPUT DATA			
APPROACH	TURNING MOVEMENT	EXISTING COUNT	FUTURE VOLUME	DIFF-ERENCE	% CHANGE	EXISTING COUNT	FUTURE VOLUME	DIFF-ERENCE	% CHANGE
NORTH BOUND	Left	157	120	-37	-24%	177	159	-18	-10%
	Through	475	493	18	4%	398	407	10	2%
	Right	41	56	15	37%	88	95	8	9%
	NB Total	673	669	-4	-1%	662	661	-1	0%
SOUTH BOUND	Left	120	255	136	113%	251	385	134	53%
	Through	321	320	-1	0%	481	472	-9	-2%
	Right	174	208	34	20%	146	186	41	28%
	SB Total	615	783	169	27%	878	1,043	166	19%
EAST BOUND	Left	70	114	44	63%	114	163	50	44%
	Through	381	817	436	114%	1,189	1,800	611	51%
	Right	57	57	0	0%	128	124	-4	-3%
	EB Total	508	988	480	94%	1,431	2,087	657	46%
WEST BOUND	Left	42	50	9	20%	47	64	17	36%
	Through	1,238	1,774	537	43%	740	1,315	576	78%
	Right	138	267	130	94%	159	321	162	102%
	WB Total	1,417	2,091	675	48%	946	1,700	755	80%
TOTAL ENTERING VOLUME		3,212	4,531	1319	41%	3,915	5,491	1576	40%

FORECAST PEAK HOUR TO ADT COMPARISON

		VOLUMES		PERCENT OF ADT		
		AM	PM	AM	PM	ADT
North Leg	Inbound	783	1,043			
North Leg	Outbound	874	891			
North Leg	**TOTAL**	**1,657**	**1,934**	**9%**	**10%**	**18,467**
South Leg	Inbound	669	661			
South Leg	Outbound	427	660			
South Leg	**TOTAL**	**1,096**	**1,321**	**6%**	**7%**	**18,121**
East Leg	Inbound	2,091	1,700			
East Leg	Outbound	1,128	2,280			
East Leg	**TOTAL**	**3,219**	**3,980**	**8%**	**10%**	**40,855**
West Leg	Inbound	988	2,087			
West Leg	Outbound	2,102	1,660			
West Leg	**TOTAL**	**3,090**	**3,747**	**7%**	**9%**	**42,064**
OVERALL TOTAL		***9,062***	***10,982***	**8%**	***9%***	***119,507***

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Project:	Holly Street Truck Terminal	Job #:	11140
Scenario:	Horizon Year (2040) Without Project	Analyst:	BA
		Date:	9/19/17

LOCATION: Heacock St. / Cactus Av.
FORECAST YEAR: 2035

INDIVIDUAL TURN VOLUME GROWTH REVIEW

		AM PEAK HOUR INPUT DATA				PM PEAK HOUR INPUT DATA			
APPROACH	TURNING MOVEMENT	EXISTING COUNT	FUTURE VOLUME	DIFF-ERENCE	% CHANGE	EXISTING COUNT	FUTURE VOLUME	DIFF-ERENCE	% CHANGE
NORTH BOUND	Left	694	643	-51	-7%	384	516	132	34%
	Through	373	343	-30	-8%	458	417	-41	-9%
	Right	11	9	-2	-18%	19	12	-7	-37%
	NB Total	1,078	995	-83	-8%	861	945	84	10%
SOUTH BOUND	Left	46	47	2	3%	109	116	8	7%
	Through	270	243	-27	-10%	526	532	7	1%
	Right	47	57	10	21%	43	99	56	130%
	SB Total	363	347	-16	-4%	677	747	70	10%
EAST BOUND	Left	89	123	34	38%	82	122	40	49%
	Through	524	626	102	19%	933	943	10	1%
	Right	341	352	12	3%	781	750	-31	-4%
	EB Total	954	1,101	148	15%	1,796	1,815	19	1%
WEST BOUND	Left	9	7	-2	-22%	13	8	-5	-38%
	Through	1,011	1,014	4	0%	560	755	195	35%
	Right	96	96	0	0%	67	61	-6	-9%
	WB Total	1,116	1,117	2	0%	640	824	184	29%
TOTAL ENTERING VOLUME		3,509	3,560	51	1%	3,974	4,331	357	9%

FORECAST PEAK HOUR TO ADT COMPARISON

		VOLUMES		PERCENT OF ADT		
		AM	PM	AM	PM	ADT
North Leg	Inbound	347	747			
North Leg	Outbound	562	600			
North Leg	**TOTAL**	**909**	**1,347**	**6%**	**9%**	**14,357**
South Leg	Inbound	995	945			
South Leg	Outbound	602	1,290			
South Leg	**TOTAL**	**1,597**	**2,235**	**9%**	**13%**	**17,850**
East Leg	Inbound	1,117	824			
East Leg	Outbound	682	1,071			
East Leg	**TOTAL**	**1,799**	**1,895**	**17%**	**18%**	**10,412**
West Leg	Inbound	1,101	1,815			
West Leg	Outbound	1,714	1,370			
West Leg	**TOTAL**	**2,815**	**3,185**	**20%**	**22%**	**14,373**
OVERALL TOTAL		***7,120***	***8,662***	**12%**	***15%***	***56,992***

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APPENDIX 5.1:

E+P CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

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Intersection	
Int Delay, s/veh	2.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	43	6	15	148	15	35
Future Vol, veh/h	43	6	15	148	15	35
Conflicting Peds, #/hr	0	3	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	155	-	145	0
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	75	75	75	75	75	75
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	57	8	20	197	20	47

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	68	0	301	64
Stage 1	-	-	-	-	64	-
Stage 2	-	-	-	-	237	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1546	-	695	1006
Stage 1	-	-	-	-	964	-
Stage 2	-	-	-	-	807	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1546	-	684	1003
Mov Cap-2 Maneuver	-	-	-	-	698	-
Stage 1	-	-	-	-	961	-
Stage 2	-	-	-	-	797	-

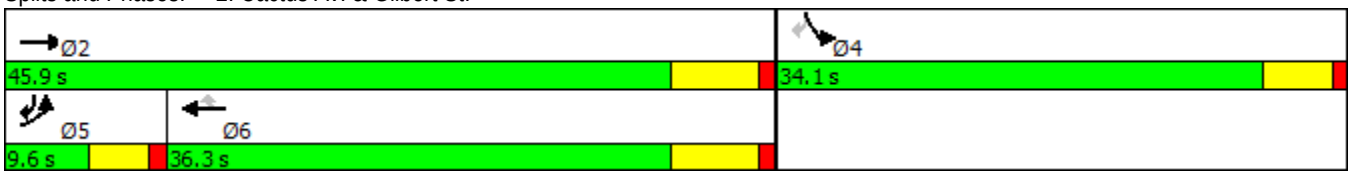
Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	9.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	698	1003	-	-	1546	-
HCM Lane V/C Ratio	0.029	0.047	-	-	0.013	-
HCM Control Delay (s)	10.3	8.8	-	-	7.4	-
HCM Lane LOS	B	A	-	-	A	-
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	41	1044	1938	11	13	27
Future Volume (vph)	41	1044	1938	11	13	27
Turn Type	Prot	NA	NA	Perm	Prot	pm+ov
Protected Phases	5	2	6		4	5
Permitted Phases				6		4
Detector Phase	5	2	6	6	4	5
Switch Phase						
Minimum Initial (s)	5.0	10.0	10.0	10.0	5.0	5.0
Minimum Split (s)	9.6	16.2	29.2	29.2	34.1	9.6
Total Split (s)	9.6	45.9	36.3	36.3	34.1	9.6
Total Split (%)	12.0%	57.4%	45.4%	45.4%	42.6%	12.0%
Yellow Time (s)	3.6	5.2	5.2	5.2	4.1	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	6.2	6.2	6.2	5.1	4.6
Lead/Lag	Lead		Lag	Lag		Lead
Lead-Lag Optimize?	Yes		Yes	Yes		Yes
Recall Mode	None	None	None	None	Min	None
Act Effct Green (s)	5.2	36.6	31.3	31.3	9.3	19.8
Actuated g/C Ratio	0.09	0.64	0.54	0.54	0.16	0.34
v/c Ratio	0.26	0.32	0.70	0.01	0.04	0.05
Control Delay	33.7	6.3	15.0	7.3	20.0	12.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.7	6.3	15.0	7.3	20.0	12.8
LOS	C	A	B	A	B	B
Approach Delay		7.4	14.9		15.1	
Approach LOS		A	B		B	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 57.6	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.70	
Intersection Signal Delay: 12.3	Intersection LOS: B
Intersection Capacity Utilization 51.0%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 2: Cactus Av. & Gilbert St.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	41	1044	1938	11	13	27
Future Volume (veh/h)	41	1044	1938	11	13	27
Number	5	2	6	16	7	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	42	1065	1978	11	13	21
Adj No. of Lanes	1	3	3	1	1	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	79	3560	2874	895	174	226
Arrive On Green	0.04	0.69	0.55	0.55	0.10	0.10
Sat Flow, veh/h	1810	5358	5358	1615	1810	1615
Grp Volume(v), veh/h	42	1065	1978	11	13	21
Grp Sat Flow(s),veh/h/ln	1810	1729	1729	1615	1810	1615
Q Serve(g_s), s	1.2	4.2	14.3	0.2	0.3	0.6
Cycle Q Clear(g_c), s	1.2	4.2	14.3	0.2	0.3	0.6
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	79	3560	2874	895	174	226
V/C Ratio(X)	0.53	0.30	0.69	0.01	0.07	0.09
Avail Cap(c_a), veh/h	174	3963	3005	936	1010	972
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.3	3.2	8.4	5.2	21.4	19.5
Incr Delay (d2), s/veh	2.0	0.0	0.6	0.0	0.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	2.0	6.8	0.1	0.2	0.6
LnGrp Delay(d),s/veh	26.4	3.3	9.0	5.2	21.6	19.6
LnGrp LOS	C	A	A	A	C	B
Approach Vol, veh/h		1107	1989		34	
Approach Delay, s/veh		4.1	9.0		20.4	
Approach LOS		A	A		C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		41.9		10.1	6.9	35.0		
Change Period (Y+Rc), s		6.2		5.1	4.6	6.2		
Max Green Setting (Gmax), s		39.7		29.0	5.0	30.1		
Max Q Clear Time (g_c+I1), s		6.2		2.6	3.2	16.3		
Green Ext Time (p_c), s		27.2		0.1	0.0	12.5		

Intersection Summary	
HCM 2010 Ctrl Delay	7.4
HCM 2010 LOS	A

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	11	67	158	3	1	5
Future Vol, veh/h	11	67	158	3	1	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	12	73	172	3	1	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	175	0	-	0	270	173
Stage 1	-	-	-	-	173	-
Stage 2	-	-	-	-	97	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1414	-	-	-	724	876
Stage 1	-	-	-	-	862	-
Stage 2	-	-	-	-	932	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1414	-	-	-	718	876
Mov Cap-2 Maneuver	-	-	-	-	733	-
Stage 1	-	-	-	-	862	-
Stage 2	-	-	-	-	924	-

Approach	EB	WB	SB
HCM Control Delay, s	1.1	0	9.3
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1414	-	-	-	848
HCM Lane V/C Ratio	0.008	-	-	-	0.008
HCM Control Delay (s)	7.6	-	-	-	9.3
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	8	60	158	6	3	3
Future Vol, veh/h	8	60	158	6	3	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	9	65	172	7	3	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	178	0	-	0	258	175
Stage 1	-	-	-	-	175	-
Stage 2	-	-	-	-	83	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1410	-	-	-	735	874
Stage 1	-	-	-	-	860	-
Stage 2	-	-	-	-	945	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1410	-	-	-	730	874
Mov Cap-2 Maneuver	-	-	-	-	739	-
Stage 1	-	-	-	-	860	-
Stage 2	-	-	-	-	939	-

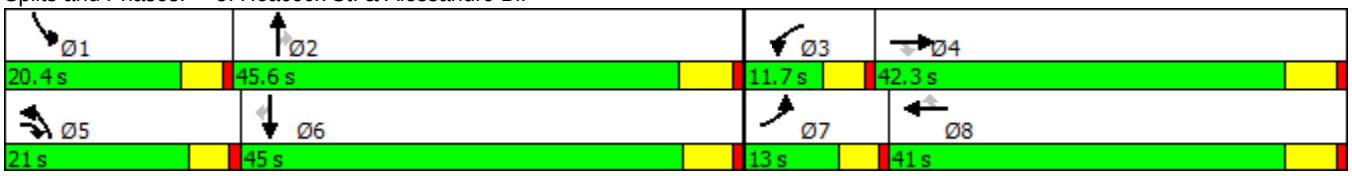
Approach	EB	WB	SB
HCM Control Delay, s	0.9	0	9.5
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1410	-	-	-	801
HCM Lane V/C Ratio	0.006	-	-	-	0.008
HCM Control Delay (s)	7.6	-	-	-	9.5
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	381	60	43	1238	138	158	476	41	120	323	174
Future Volume (vph)	70	381	60	43	1238	138	158	476	41	120	323	174
Turn Type	Prot	NA	pm+ov	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	5	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	5.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	9.6	32.8	9.6	9.6	32.8	32.8	9.6	44.8	44.8	9.6	44.4	44.4
Total Split (s)	13.0	42.3	21.0	11.7	41.0	41.0	21.0	45.6	45.6	20.4	45.0	45.0
Total Split (%)	10.8%	35.3%	17.5%	9.8%	34.2%	34.2%	17.5%	38.0%	38.0%	17.0%	37.5%	37.5%
Yellow Time (s)	3.6	4.8	3.6	3.6	4.8	4.8	3.6	4.8	4.8	3.6	4.4	4.4
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.8	4.6	4.6	5.8	5.8	4.6	5.8	5.8	4.6	5.4	5.4
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	7.6	34.4	48.3	6.6	31.1	31.1	12.6	20.6	20.6	10.8	19.2	19.2
Actuated g/C Ratio	0.09	0.39	0.54	0.07	0.35	0.35	0.14	0.23	0.23	0.12	0.22	0.22
v/c Ratio	0.48	0.20	0.07	0.34	0.72	0.23	0.65	0.60	0.10	0.58	0.44	0.38
Control Delay	56.9	21.4	3.5	54.2	30.1	6.3	53.7	35.0	0.4	53.1	33.4	7.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.9	21.4	3.5	54.2	30.1	6.3	53.7	35.0	0.4	53.1	33.4	7.0
LOS	E	C	A	D	C	A	D	D	A	D	C	A
Approach Delay		24.2			28.5			37.3			29.8	
Approach LOS		C			C			D			C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 89.3	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.72	
Intersection Signal Delay: 29.9	Intersection LOS: C
Intersection Capacity Utilization 68.7%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 5: Heacock St. & Alessandro Bl.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	381	60	43	1238	138	158	476	41	120	323	174
Future Volume (veh/h)	70	381	60	43	1238	138	158	476	41	120	323	174
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	1.00		0.98	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	74	401	26	45	1303	108	166	501	24	126	340	112
Adj No. of Lanes	1	3	1	1	3	1	1	2	1	1	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	96	1950	781	71	1879	573	204	866	379	160	777	343
Arrive On Green	0.05	0.38	0.38	0.04	0.36	0.36	0.11	0.24	0.24	0.09	0.22	0.22
Sat Flow, veh/h	1810	5187	1594	1810	5187	1582	1810	3610	1581	1810	3610	1594
Grp Volume(v), veh/h	74	401	26	45	1303	108	166	501	24	126	340	112
Grp Sat Flow(s),veh/h/ln	1810	1729	1594	1810	1729	1582	1810	1805	1581	1810	1805	1594
Q Serve(g_s), s	3.3	4.2	0.7	2.0	17.3	3.8	7.3	9.9	1.0	5.5	6.6	4.8
Cycle Q Clear(g_c), s	3.3	4.2	0.7	2.0	17.3	3.8	7.3	9.9	1.0	5.5	6.6	4.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	96	1950	781	71	1879	573	204	866	379	160	777	343
V/C Ratio(X)	0.77	0.21	0.03	0.63	0.69	0.19	0.81	0.58	0.06	0.79	0.44	0.33
Avail Cap(c_a), veh/h	187	2335	900	158	2252	687	366	1772	776	353	1763	779
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	37.9	17.1	10.8	38.4	22.0	17.7	35.1	27.2	23.8	36.2	27.6	26.8
Incr Delay (d2), s/veh	4.9	0.1	0.0	3.4	0.7	0.2	3.0	0.6	0.1	3.2	0.4	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	2.0	0.3	1.1	8.3	1.7	3.8	5.0	0.4	2.9	3.3	2.2
LnGrp Delay(d),s/veh	42.8	17.2	10.8	41.8	22.8	17.9	38.1	27.8	23.9	39.4	27.9	27.4
LnGrp LOS	D	B	B	D	C	B	D	C	C	D	C	C
Approach Vol, veh/h		501			1456			691			578	
Approach Delay, s/veh		20.6			23.0			30.1			30.3	
Approach LOS		C			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.8	25.2	7.8	36.3	13.8	23.3	8.9	35.2
Change Period (Y+Rc), s	4.6	5.8	4.6	5.8	4.6	* 5.8	4.6	5.8
Max Green Setting (Gmax), s	15.8	39.8	7.1	36.5	16.4	* 40	8.4	35.2
Max Q Clear Time (g_c+I1), s	7.5	11.9	4.0	6.2	9.3	8.6	5.3	19.3
Green Ext Time (p_c), s	0.1	6.1	0.0	14.7	0.1	6.2	0.0	10.0

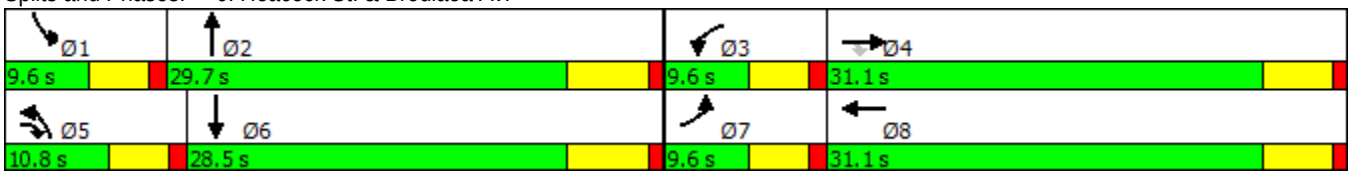
Intersection Summary	
HCM 2010 Ctrl Delay	25.5
HCM 2010 LOS	C

Notes

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	20	23	19	12	100	42	632	16	362
Future Volume (vph)	20	23	19	12	100	42	632	16	362
Turn Type	Prot	NA	pm+ov	Prot	NA	Prot	NA	Prot	NA
Protected Phases	7	4	5	3	8	5	2	1	6
Permitted Phases			4						
Detector Phase	7	4	5	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	10.0	5.0	5.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	9.6	31.1	9.6	9.6	31.1	9.6	23.8	9.6	25.8
Total Split (s)	9.6	31.1	10.8	9.6	31.1	10.8	29.7	9.6	28.5
Total Split (%)	12.0%	38.9%	13.5%	12.0%	38.9%	13.5%	37.1%	12.0%	35.6%
Yellow Time (s)	3.6	4.1	3.6	3.6	4.1	3.6	4.8	3.6	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.1	4.6	4.6	5.1	4.6	5.8	4.6	5.8
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	5.6	13.4	16.9	5.6	13.4	6.1	24.4	5.6	19.8
Actuated g/C Ratio	0.12	0.29	0.37	0.12	0.29	0.13	0.53	0.12	0.43
v/c Ratio	0.10	0.05	0.03	0.06	0.28	0.20	0.37	0.08	0.28
Control Delay	27.7	15.8	0.1	27.5	14.8	26.9	12.2	27.6	14.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.7	15.8	0.1	27.5	14.8	26.9	12.2	27.6	14.9
LOS	C	B	A	C	B	C	B	C	B
Approach Delay		14.8			15.8		13.1		15.4
Approach LOS		B			B		B		B

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 46	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.37	
Intersection Signal Delay: 14.2	Intersection LOS: B
Intersection Capacity Utilization 51.8%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 6: Heacock St. & Brodiaea Av.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	23	19	12	100	39	42	632	13	16	362	24
Future Volume (veh/h)	20	23	19	12	100	39	42	632	13	16	362	24
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	22	26	10	13	111	19	47	702	10	18	402	25
Adj No. of Lanes	1	1	1	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	48	399	413	30	315	54	88	1173	17	40	1019	63
Arrive On Green	0.03	0.21	0.21	0.02	0.20	0.20	0.05	0.32	0.32	0.02	0.30	0.30
Sat Flow, veh/h	1810	1900	1590	1810	1577	270	1810	3644	52	1810	3448	214
Grp Volume(v), veh/h	22	26	10	13	0	130	47	348	364	18	210	217
Grp Sat Flow(s),veh/h/ln	1810	1900	1590	1810	0	1847	1810	1805	1891	1810	1805	1856
Q Serve(g_s), s	0.6	0.5	0.2	0.3	0.0	2.8	1.2	7.6	7.6	0.5	4.3	4.4
Cycle Q Clear(g_c), s	0.6	0.5	0.2	0.3	0.0	2.8	1.2	7.6	7.6	0.5	4.3	4.4
Prop In Lane	1.00		1.00	1.00		0.15	1.00		0.03	1.00		0.12
Lane Grp Cap(c), veh/h	48	399	413	30	0	369	88	581	609	40	533	549
V/C Ratio(X)	0.46	0.07	0.02	0.43	0.00	0.35	0.53	0.60	0.60	0.45	0.39	0.40
Avail Cap(c_a), veh/h	193	1055	962	193	0	1025	240	921	965	193	875	900
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.5	14.8	12.9	22.8	0.0	16.1	21.7	13.3	13.3	22.6	13.1	13.2
Incr Delay (d2), s/veh	2.5	0.1	0.0	3.6	0.0	0.6	1.8	1.0	0.9	2.9	0.5	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.3	0.1	0.2	0.0	1.5	0.6	3.9	4.1	0.3	2.2	2.3
LnGrp Delay(d),s/veh	25.0	14.9	13.0	26.4	0.0	16.7	23.6	14.3	14.3	25.5	13.6	13.6
LnGrp LOS	C	B	B	C		B	C	B	B	C	B	B
Approach Vol, veh/h		58			143			759			445	
Approach Delay, s/veh		18.4			17.6			14.9			14.1	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.6	20.9	5.4	14.9	6.9	19.6	5.8	14.5
Change Period (Y+Rc), s	4.6	5.8	4.6	5.1	4.6	5.8	4.6	5.1
Max Green Setting (Gmax), s	5.0	23.9	5.0	26.0	6.2	22.7	5.0	26.0
Max Q Clear Time (g_c+I1), s	2.5	9.6	2.3	2.5	3.2	6.4	2.6	4.8
Green Ext Time (p_c), s	0.0	5.4	0.0	0.8	0.0	5.8	0.0	0.8

Intersection Summary	
HCM 2010 Ctrl Delay	15.0
HCM 2010 LOS	B

Intersection	
Int Delay, s/veh	1.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	112	8	32	105	8	25
Future Vol, veh/h	112	8	32	105	8	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	155	-	145	0
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	137	10	39	128	10	30

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	146	0	347	141
Stage 1	-	-	-	-	141	-
Stage 2	-	-	-	-	206	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1448	-	654	912
Stage 1	-	-	-	-	891	-
Stage 2	-	-	-	-	833	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1448	-	636	912
Mov Cap-2 Maneuver	-	-	-	-	675	-
Stage 1	-	-	-	-	891	-
Stage 2	-	-	-	-	811	-

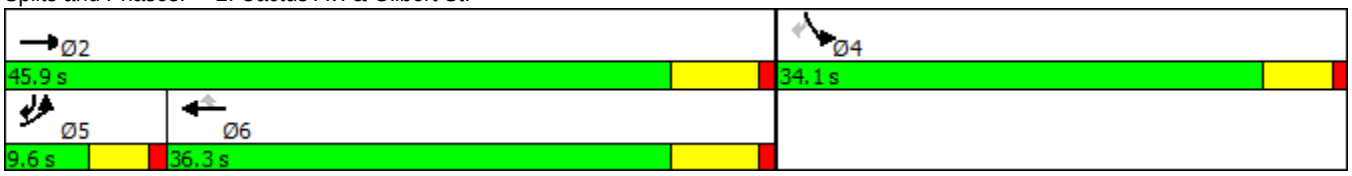
Approach	EB	WB	NB
HCM Control Delay, s	0	1.8	9.4
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	675	912	-	-	1448	-
HCM Lane V/C Ratio	0.014	0.033	-	-	0.027	-
HCM Control Delay (s)	10.4	9.1	-	-	7.6	-
HCM Lane LOS	B	A	-	-	A	-
HCM 95th %tile Q(veh)	0	0.1	-	-	0.1	-

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	12	2195	1013	2	2	23
Future Volume (vph)	12	2195	1013	2	2	23
Turn Type	Prot	NA	NA	Perm	Prot	pm+ov
Protected Phases	5	2	6		4	5
Permitted Phases				6		4
Detector Phase	5	2	6	6	4	5
Switch Phase						
Minimum Initial (s)	5.0	10.0	10.0	10.0	5.0	5.0
Minimum Split (s)	9.6	16.2	29.2	29.2	34.1	9.6
Total Split (s)	9.6	45.9	36.3	36.3	34.1	9.6
Total Split (%)	12.0%	57.4%	45.4%	45.4%	42.6%	12.0%
Yellow Time (s)	3.6	5.2	5.2	5.2	4.1	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	6.2	6.2	6.2	5.1	4.6
Lead/Lag	Lead		Lag	Lag		Lead
Lead-Lag Optimize?	Yes		Yes	Yes		Yes
Recall Mode	None	None	None	None	Min	None
Act Effct Green (s)	5.2	38.1	34.7	34.7	9.2	19.6
Actuated g/C Ratio	0.09	0.65	0.59	0.59	0.16	0.33
v/c Ratio	0.08	0.68	0.35	0.00	0.01	0.04
Control Delay	31.2	9.9	9.2	9.5	19.0	5.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.2	9.9	9.2	9.5	19.0	5.6
LOS	C	A	A	A	B	A
Approach Delay		10.0	9.2		6.6	
Approach LOS		A	A		A	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 58.9	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.68	
Intersection Signal Delay: 9.7	Intersection LOS: A
Intersection Capacity Utilization 56.0%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 2: Cactus Av. & Gilbert St.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	12	2195	1013	2	2	23
Future Volume (veh/h)	12	2195	1013	2	2	23
Number	5	2	6	16	7	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.98	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	12	2286	1055	2	2	21
Adj No. of Lanes	1	3	3	1	1	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	28	3591	3062	933	171	177
Arrive On Green	0.02	0.69	0.59	0.59	0.09	0.09
Sat Flow, veh/h	1810	5358	5358	1580	1810	1615
Grp Volume(v), veh/h	12	2286	1055	2	2	21
Grp Sat Flow(s),veh/h/ln	1810	1729	1729	1580	1810	1615
Q Serve(g_s), s	0.3	12.8	5.5	0.0	0.1	0.6
Cycle Q Clear(g_c), s	0.3	12.8	5.5	0.0	0.1	0.6
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	28	3591	3062	933	171	177
V/C Ratio(X)	0.43	0.64	0.34	0.00	0.01	0.12
Avail Cap(c_a), veh/h	171	3886	3062	933	990	909
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.9	4.5	5.6	4.5	21.8	21.3
Incr Delay (d2), s/veh	3.9	0.3	0.1	0.0	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	6.0	2.7	0.0	0.0	0.6
LnGrp Delay(d),s/veh	29.8	4.8	5.6	4.5	21.8	21.6
LnGrp LOS	C	A	A	A	C	C
Approach Vol, veh/h		2298	1057		23	
Approach Delay, s/veh		4.9	5.6		21.6	
Approach LOS		A	A		C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		42.9		10.1	5.4	37.5		
Change Period (Y+Rc), s		6.2		5.1	4.6	6.2		
Max Green Setting (Gmax), s		39.7		29.0	5.0	30.1		
Max Q Clear Time (g_c+I1), s		14.8		2.6	2.3	7.5		
Green Ext Time (p_c), s		21.8		0.0	0.0	20.4		

Intersection Summary	
HCM 2010 Ctrl Delay	5.3
HCM 2010 LOS	A

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	6	131	123	2	4	14
Future Vol, veh/h	6	131	123	2	4	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	7	142	134	2	4	15

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	136	0	-	0	290	135
Stage 1	-	-	-	-	135	-
Stage 2	-	-	-	-	155	-
Critical Hdwy	4.1	-	-	-	7.1	6.2
Critical Hdwy Stg 1	-	-	-	-	6.1	-
Critical Hdwy Stg 2	-	-	-	-	6.1	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1461	-	-	-	666	919
Stage 1	-	-	-	-	873	-
Stage 2	-	-	-	-	852	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1461	-	-	-	664	919
Mov Cap-2 Maneuver	-	-	-	-	695	-
Stage 1	-	-	-	-	869	-
Stage 2	-	-	-	-	848	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	9.3
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1461	-	-	-	858
HCM Lane V/C Ratio	0.004	-	-	-	0.023
HCM Control Delay (s)	7.5	-	-	-	9.3
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	4	131	117	3	6	8
Future Vol, veh/h	4	131	117	3	6	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	4	142	127	3	7	9

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	130	0	-	0	280	129
Stage 1	-	-	-	-	129	-
Stage 2	-	-	-	-	151	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1468	-	-	-	714	926
Stage 1	-	-	-	-	902	-
Stage 2	-	-	-	-	882	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1468	-	-	-	712	926
Mov Cap-2 Maneuver	-	-	-	-	731	-
Stage 1	-	-	-	-	902	-
Stage 2	-	-	-	-	880	-

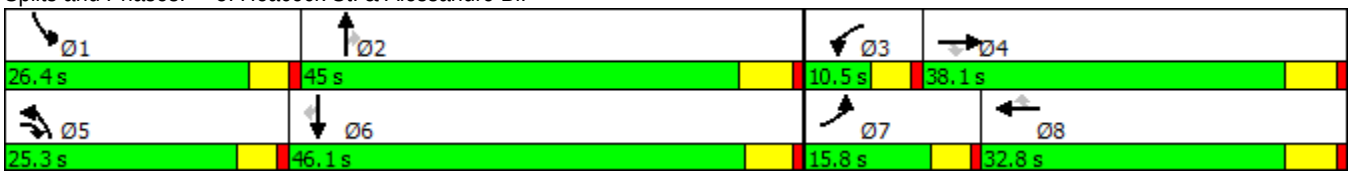
Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	9.4
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1468	-	-	-	831
HCM Lane V/C Ratio	0.003	-	-	-	0.018
HCM Control Delay (s)	7.5	-	-	-	9.4
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	114	1189	130	47	740	159	180	401	89	251	482	146
Future Volume (vph)	114	1189	130	47	740	159	180	401	89	251	482	146
Turn Type	Prot	NA	pm+ov	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	5	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	5.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	9.6	32.8	9.6	9.6	32.8	32.8	9.6	44.8	44.8	9.6	44.4	44.4
Total Split (s)	15.8	38.1	25.3	10.5	32.8	32.8	25.3	45.0	45.0	26.4	46.1	46.1
Total Split (%)	13.2%	31.8%	21.1%	8.8%	27.3%	27.3%	21.1%	37.5%	37.5%	22.0%	38.4%	38.4%
Yellow Time (s)	3.6	4.8	3.6	3.6	4.8	4.8	3.6	4.8	4.8	3.6	4.4	4.4
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.8	4.6	4.6	5.8	5.8	4.6	5.8	5.8	4.6	5.4	5.4
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	9.9	30.4	45.5	5.9	23.6	23.6	13.8	18.9	18.9	17.5	22.9	22.9
Actuated g/C Ratio	0.11	0.33	0.50	0.06	0.26	0.26	0.15	0.21	0.21	0.19	0.25	0.25
v/c Ratio	0.61	0.71	0.16	0.41	0.57	0.31	0.68	0.56	0.21	0.75	0.55	0.29
Control Delay	57.9	32.0	6.3	59.3	33.1	7.4	53.3	36.2	1.6	52.5	32.9	6.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.9	32.0	6.3	59.3	33.1	7.4	53.3	36.2	1.6	52.5	32.9	6.4
LOS	E	C	A	E	C	A	D	D	A	D	C	A
Approach Delay		31.7			30.1			36.2			34.1	
Approach LOS		C			C			D			C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 91.6	
Natural Cycle: 110	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 32.6	Intersection LOS: C
Intersection Capacity Utilization 73.3%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 5: Heacock St. & Alessandro Bl.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	114	1189	130	47	740	159	180	401	89	251	482	146
Future Volume (veh/h)	114	1189	130	47	740	159	180	401	89	251	482	146
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	118	1226	88	48	763	113	186	413	60	259	497	86
Adj No. of Lanes	1	3	1	1	3	1	1	2	1	1	2	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	149	1742	734	71	1519	461	224	800	355	298	947	423
Arrive On Green	0.08	0.34	0.34	0.04	0.29	0.29	0.12	0.22	0.22	0.16	0.26	0.26
Sat Flow, veh/h	1810	5187	1591	1810	5187	1573	1810	3610	1602	1810	3610	1613
Grp Volume(v), veh/h	118	1226	88	48	763	113	186	413	60	259	497	86
Grp Sat Flow(s),veh/h/ln	1810	1729	1591	1810	1729	1573	1810	1805	1602	1810	1805	1613
Q Serve(g_s), s	5.6	17.9	2.8	2.3	10.6	4.8	8.8	8.8	2.6	12.2	10.3	3.6
Cycle Q Clear(g_c), s	5.6	17.9	2.8	2.3	10.6	4.8	8.8	8.8	2.6	12.2	10.3	3.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	149	1742	734	71	1519	461	224	800	355	298	947	423
V/C Ratio(X)	0.79	0.70	0.12	0.67	0.50	0.25	0.83	0.52	0.17	0.87	0.52	0.20
Avail Cap(c_a), veh/h	232	1921	789	122	1606	487	429	1622	720	452	1685	753
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.3	25.2	13.5	41.3	25.6	23.5	37.3	29.8	27.5	35.5	27.5	25.1
Incr Delay (d2), s/veh	4.2	1.1	0.1	4.1	0.3	0.3	3.0	0.5	0.2	7.6	0.5	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.0	8.7	1.2	1.2	5.1	2.1	4.6	4.4	1.2	6.7	5.2	1.6
LnGrp Delay(d),s/veh	43.4	26.2	13.5	45.4	25.8	23.8	40.4	30.4	27.7	43.1	28.0	25.3
LnGrp LOS	D	C	B	D	C	C	D	C	C	D	C	C
Approach Vol, veh/h		1432			924			659			842	
Approach Delay, s/veh		26.9			26.6			32.9			32.3	
Approach LOS		C			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	19.0	25.1	8.0	35.1	15.4	28.7	11.8	31.3
Change Period (Y+Rc), s	4.6	5.8	4.6	5.8	4.6	* 5.8	4.6	5.8
Max Green Setting (Gmax), s	21.8	39.2	5.9	32.3	20.7	* 41	11.2	27.0
Max Q Clear Time (g_c+I1), s	14.2	10.8	4.3	19.9	10.8	12.3	7.6	12.6
Green Ext Time (p_c), s	0.2	6.8	0.0	9.4	0.2	6.8	0.0	10.6

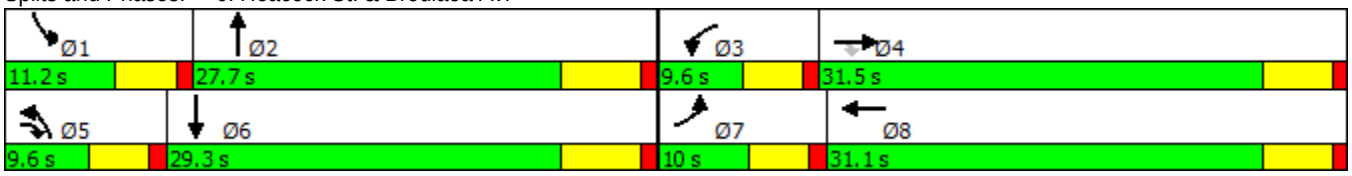
Intersection Summary	
HCM 2010 Ctrl Delay	29.0
HCM 2010 LOS	C

Notes

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	32	80	25	19	66	21	503	49	586
Future Volume (vph)	32	80	25	19	66	21	503	49	586
Turn Type	Prot	NA	pm+ov	Prot	NA	Prot	NA	Prot	NA
Protected Phases	7	4	5	3	8	5	2	1	6
Permitted Phases			4						
Detector Phase	7	4	5	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	10.0	5.0	5.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	9.6	31.1	9.6	9.6	31.1	9.6	23.8	9.6	25.8
Total Split (s)	10.0	31.5	9.6	9.6	31.1	9.6	27.7	11.2	29.3
Total Split (%)	12.5%	39.4%	12.0%	12.0%	38.9%	12.0%	34.6%	14.0%	36.6%
Yellow Time (s)	3.6	4.1	3.6	3.6	4.1	3.6	4.8	3.6	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.1	4.6	4.6	5.1	4.6	5.8	4.6	5.8
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	6.6	16.3	17.2	6.4	14.7	6.4	26.9	7.1	27.6
Actuated g/C Ratio	0.14	0.35	0.37	0.14	0.31	0.14	0.57	0.15	0.59
v/c Ratio	0.13	0.13	0.04	0.08	0.18	0.09	0.27	0.19	0.31
Control Delay	29.5	15.5	0.1	30.1	13.9	30.2	14.9	28.3	14.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.5	15.5	0.1	30.1	13.9	30.2	14.9	28.3	14.4
LOS	C	B	A	C	B	C	B	C	B
Approach Delay		16.1			16.5		15.5		15.4
Approach LOS		B			B		B		B

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 46.9	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.31	
Intersection Signal Delay: 15.6	Intersection LOS: B
Intersection Capacity Utilization 42.7%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 6: Heacock St. & Brodiaea Av.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	32	80	25	19	66	34	21	503	19	49	586	32
Future Volume (veh/h)	32	80	25	19	66	34	21	503	19	49	586	32
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	34	84	15	20	69	13	22	529	16	52	617	32
Adj No. of Lanes	1	1	1	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	69	400	383	44	305	57	48	1027	31	95	1092	57
Arrive On Green	0.04	0.21	0.21	0.02	0.20	0.20	0.03	0.29	0.29	0.05	0.31	0.31
Sat Flow, veh/h	1810	1900	1615	1810	1552	292	1810	3578	108	1810	3492	181
Grp Volume(v), veh/h	34	84	15	20	0	82	22	267	278	52	319	330
Grp Sat Flow(s),veh/h/ln	1810	1900	1615	1810	0	1844	1810	1805	1881	1810	1805	1868
Q Serve(g_s), s	0.9	1.7	0.3	0.5	0.0	1.8	0.6	5.8	5.8	1.3	7.0	7.0
Cycle Q Clear(g_c), s	0.9	1.7	0.3	0.5	0.0	1.8	0.6	5.8	5.8	1.3	7.0	7.0
Prop In Lane	1.00		1.00	1.00		0.16	1.00		0.06	1.00		0.10
Lane Grp Cap(c), veh/h	69	400	383	44	0	363	48	518	540	95	565	584
V/C Ratio(X)	0.49	0.21	0.04	0.45	0.00	0.23	0.46	0.51	0.52	0.55	0.56	0.57
Avail Cap(c_a), veh/h	207	1063	946	192	0	1016	192	837	873	253	899	930
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.3	15.4	13.9	22.7	0.0	15.9	22.6	14.1	14.1	21.8	13.5	13.5
Incr Delay (d2), s/veh	2.0	0.3	0.0	2.7	0.0	0.3	2.5	0.8	0.8	1.8	0.9	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.9	0.2	0.3	0.0	0.9	0.3	3.0	3.1	0.7	3.6	3.7
LnGrp Delay(d),s/veh	24.3	15.7	13.9	25.4	0.0	16.3	25.2	14.9	14.8	23.7	14.4	14.4
LnGrp LOS	C	B	B	C		B	C	B	B	C	B	B
Approach Vol, veh/h		133			102			567			701	
Approach Delay, s/veh		17.7			18.0			15.3			15.1	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.1	19.3	5.8	15.0	5.9	20.6	6.4	14.4
Change Period (Y+Rc), s	4.6	5.8	4.6	5.1	4.6	5.8	4.6	5.1
Max Green Setting (Gmax), s	6.6	21.9	5.0	26.4	5.0	23.5	5.4	26.0
Max Q Clear Time (g_c+I1), s	3.3	7.8	2.5	3.7	2.6	9.0	2.9	3.8
Green Ext Time (p_c), s	0.0	5.6	0.0	0.9	0.0	5.7	0.0	0.8

Intersection Summary	
HCM 2010 Ctrl Delay	15.6
HCM 2010 LOS	B

APPENDIX 5.2:

E+P CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS

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Figure 4C-3. Warrant 3, Peak Hour

Traffic Conditions = **E+P Conditions - Weekday PM Peak Hour**

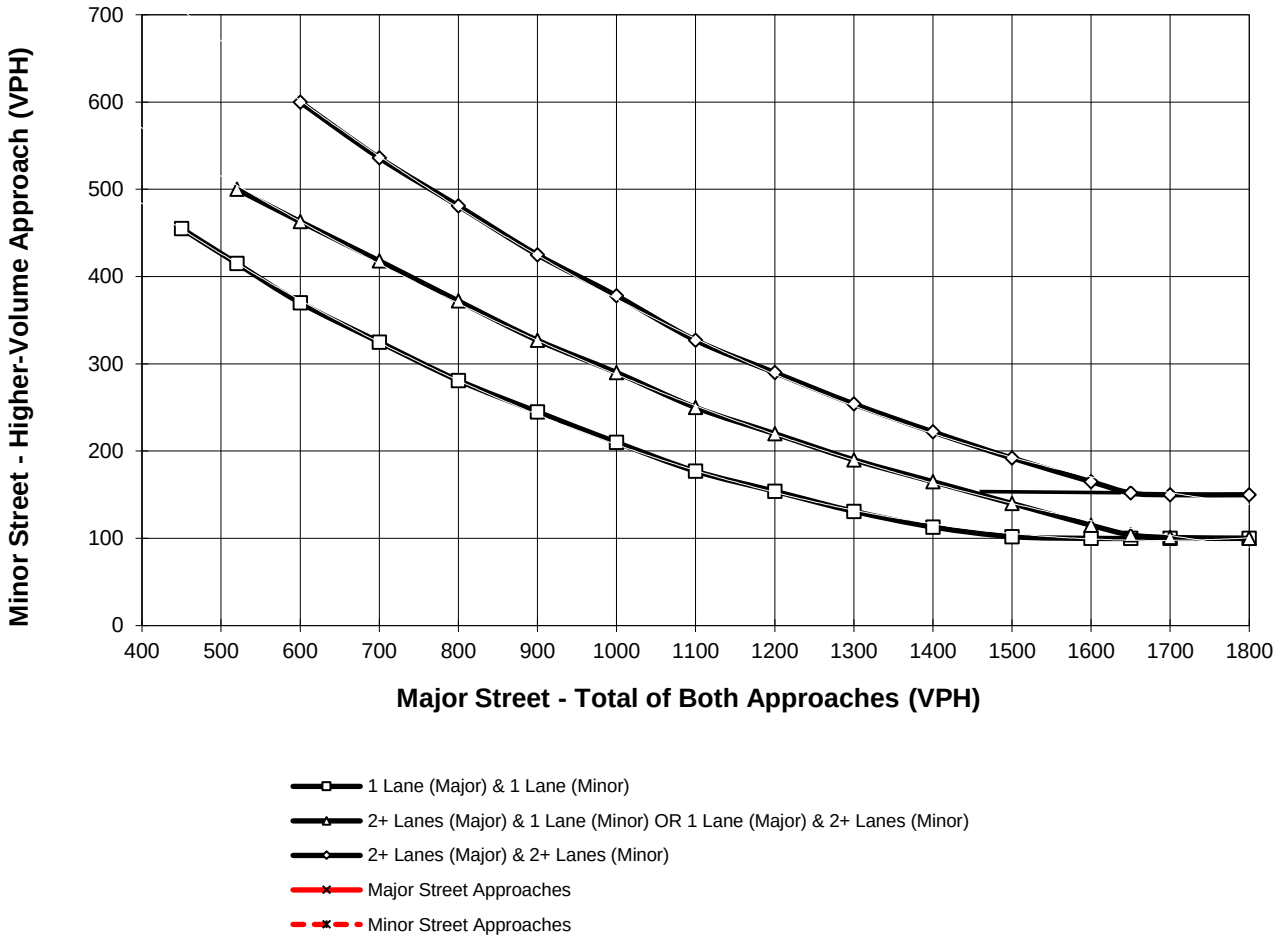
Major Street Name = **Brodiaea Avenue**

Total of Both Approaches (VPH) = **257**
Number of Approach Lanes on Major Street = **1**

Minor Street Name = **Gilbert Street**

High Volume Approach (VPH) = **33**
Number of Approach Lanes On Minor Street = **1**

SIGNAL WARRANT NOT SATISFIED



*Note: 150 vph applies as the lower threshold for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold for a minor-street approach with one lane

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet
(Average Traffic Estimate Form)

___	___	___	___	TRAFFIC CONDITIONS			E+P
DIST	CO	RTE	PM	CALC	BA	DATE	09/21/16
Jurisdiction:	City of Moreno Valley			CHK	BA	DATE	09/21/16
Major Street:	Brodiaea Av.			Critical Approach Speed (Major)			35 mph
Minor Street:	Driveway 1			Critical Approach Speed (Minor)			15 mph

Major Street Approach Lanes = **1** lane Minor Street Approach Lanes **1** lane

Major Street Future ADT = **3,105** vpd Minor Street Future ADT = **209** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); …….. [ ]

or **URBAN (U)**

In built up area of isolated community of < 10,000 population …… [ ]

(Based on Estimated Average Daily Traffic - See Note)

URBAN	RURAL	Minimum Requirements EADT			
XX					
CONDITION A - Minimum Vehicular Volume		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **3,105**	*1* **209**	8,000	5,600	2,400	1,680
2 +	*1*	9,600	6,720	2,400	1,680
2 +	*2 +*	9,600	6,720	3,200	2,240
1	*2 +*	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **3,105**	*1* **209**	12,000	8,400	1,200	850
2 +	*1*	14,400	10,080	1,200	850
2 +	*2 +*	14,400	10,080	1,600	1,120
1	*2 +*	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B					
Satisfied	Not Satisfied				
	XX	2 CONDITIONS 80%		2 CONDITIONS 80%	
No one condition satisfied, but following conditions fulfilled 80% of more …..	A: 9% B: 17%				

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet
(Average Traffic Estimate Form)

___	___	___	___	TRAFFIC CONDITIONS			E+P
DIST	CO	RTE	PM	CALC	BA	DATE	09/21/16
Jurisdiction:	City of Moreno Valley			CHK	BA	DATE	09/21/16
Major Street:	Brodiaea Av.			Critical Approach Speed (Major)			35 mph
Minor Street:	Driveway 2			Critical Approach Speed (Minor)			15 mph

Major Street Approach Lanes = **1** lane Minor Street Approach Lanes **1** lane

Major Street Future ADT = **2,966** vpd Minor Street Future ADT = **136** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); …….. [ ]

or **URBAN (U)**

In built up area of isolated community of < 10,000 population …… [ ]

(Based on Estimated Average Daily Traffic - See Note)

URBAN	RURAL	Minimum Requirements EADT			
XX					
CONDITION A - Minimum Vehicular Volume		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **2,966**	*1* **136**	8,000	5,600	2,400	1,680
2 +	*1*	9,600	6,720	2,400	1,680
2 +	*2 +*	9,600	6,720	3,200	2,240
1	*2 +*	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **2,966**	*1* **136**	12,000	8,400	1,200	850
2 +	*1*	14,400	10,080	1,200	850
2 +	*2 +*	14,400	10,080	1,600	1,120
1	*2 +*	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B					
Satisfied	Not Satisfied				
	XX	2 CONDITIONS 80%		2 CONDITIONS 80%	
No one condition satisfied, but following conditions fulfilled 80% of more …..	A: 6% B: 11%				

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

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APPENDIX 5.3:

E+P CONDITIONS QUEUING ANALYSIS WORKSHEETS

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Intersection: 1: Gilbert St. & Brodiaea Av.

Movement	WB	NB	NB
Directions Served	L	L	R
Maximum Queue (ft)	25	35	45
Average Queue (ft)	1	14	19
95th Queue (ft)	11	39	43
Link Distance (ft)			1096
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	155	145	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: Cactus Av. & Gilbert St.

Movement	EB	EB	EB	EB	WB	WB	WB	WB	SB	SB
Directions Served	L	T	T	T	T	T	T	R	L	R
Maximum Queue (ft)	70	172	137	70	318	276	222	26	42	40
Average Queue (ft)	25	59	37	12	134	110	66	3	9	10
95th Queue (ft)	56	122	88	42	249	214	152	15	30	28
Link Distance (ft)		928	928	928	969	969	969	969		1096
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	150								150	
Storage Blk Time (%)		0								
Queuing Penalty (veh)		0								

Intersection: 3: Brodiaea Av. & Dwy. 1

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (ft)	30	30
Average Queue (ft)	1	5
95th Queue (ft)	11	24
Link Distance (ft)		217
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	100	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: Brodiaea Av. & Dwy. 2

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (ft)	18	30
Average Queue (ft)	1	6
95th Queue (ft)	10	26
Link Distance (ft)		126
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	100	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: Heacock St. & Alessandro Bl.

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	T	T	T	R	L	T	T	T	R	L	T
Maximum Queue (ft)	136	163	135	60	33	175	374	360	250	70	179	199
Average Queue (ft)	54	92	47	7	9	60	254	212	132	26	101	100
95th Queue (ft)	111	146	105	34	23	158	356	325	240	54	163	169
Link Distance (ft)		1203	1203	1203			778	778	778	778		1141
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	205				105	120					145	
Storage Blk Time (%)				0		0	39				3	1
Queuing Penalty (veh)				0		0	17				7	2

Intersection: 5: Heacock St. & Alessandro Bl.

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	T	T	R
Maximum Queue (ft)	196	35	182	164	160	87
Average Queue (ft)	102	11	85	99	62	39
95th Queue (ft)	170	28	150	152	124	75
Link Distance (ft)	1141	1141		921	921	921
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			250			
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 6: Heacock St. & Brodiaea Av.

Movement	EB	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	52	48	40	41	106	63	144	109	52	128	148
Average Queue (ft)	17	11	11	8	48	21	72	32	12	50	64
95th Queue (ft)	46	37	35	29	84	49	130	80	38	109	131
Link Distance (ft)		157			697		1125	1125		1141	1141
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	150		150	90		150			100		
Storage Blk Time (%)					1		0			1	
Queuing Penalty (veh)					0		0			0	

Network Summary

Network wide Queuing Penalty: 26

Intersection: 1: Gilbert St. & Brodiaea Av.

Movement	WB	NB	NB
Directions Served	L	L	R
Maximum Queue (ft)	31	31	40
Average Queue (ft)	3	7	15
95th Queue (ft)	17	28	39
Link Distance (ft)			1096
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	155	145	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: Cactus Av. & Gilbert St.

Movement	EB	EB	EB	EB	WB	WB	WB	WB	SB	SB
Directions Served	L	T	T	T	T	T	T	R	L	R
Maximum Queue (ft)	51	238	202	149	208	164	103	4	13	26
Average Queue (ft)	12	92	70	40	69	45	14	0	1	9
95th Queue (ft)	36	186	153	103	145	109	58	3	7	25
Link Distance (ft)		928	928	928	969	969	969	969		1096
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	150								150	
Storage Blk Time (%)		2								
Queuing Penalty (veh)		0								

Intersection: 3: Brodiaea Av. & Dwy. 1

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (ft)	18	31
Average Queue (ft)	1	12
95th Queue (ft)	10	37
Link Distance (ft)		217
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	100	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: Brodiaea Av. & Dwy. 2

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (ft)	6	35
Average Queue (ft)	0	11
95th Queue (ft)	6	36
Link Distance (ft)		126
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	100	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: Heacock St. & Alessandro Bl.

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	T	T	T	R	L	T	T	T	R	L	T
Maximum Queue (ft)	217	336	314	272	127	174	289	256	177	72	189	211
Average Queue (ft)	81	225	200	143	38	57	188	151	57	28	122	94
95th Queue (ft)	155	312	292	243	115	147	265	232	150	57	188	166
Link Distance (ft)		1203	1203	1203			778	778	778	778		1141
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	205				105	120					145	
Storage Blk Time (%)	0	11		9		0	28				6	0
Queuing Penalty (veh)	1	13		12		1	13				13	1

Intersection: 5: Heacock St. & Alessandro Bl.

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	T	T	R
Maximum Queue (ft)	169	64	303	251	174	60
Average Queue (ft)	96	24	165	124	96	27
95th Queue (ft)	158	49	265	200	157	49
Link Distance (ft)	1141	1141		921	921	921
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			250			
Storage Blk Time (%)			2	0		
Queuing Penalty (veh)			6	0		

Intersection: 6: Heacock St. & Brodiaea Av.

Movement	EB	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	70	82	35	46	101	54	173	130	114	218	222
Average Queue (ft)	24	38	11	15	41	14	78	38	38	75	93
95th Queue (ft)	55	72	35	38	75	39	141	85	79	159	174
Link Distance (ft)		157			697		1125	1125		1141	1141
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	150		150	90		150			100		
Storage Blk Time (%)					1		1		1	3	
Queuing Penalty (veh)					0		0		2	2	

Network Summary

Network wide Queuing Penalty: 63

APPENDIX 6.1:

OPENING YEAR CUMULATIVE (2022) WITHOUT PROJECT CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

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Intersection	
Int Delay, s/veh	1.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	46	6	9	163	17	20
Future Vol, veh/h	46	6	9	163	17	20
Conflicting Peds, #/hr	0	3	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	155	-	145	0
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	75	75	75	75	75	75
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	61	8	12	217	23	27

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	72	0	309	68
Stage 1	-	-	-	-	68	-
Stage 2	-	-	-	-	241	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1541	-	687	1001
Stage 1	-	-	-	-	960	-
Stage 2	-	-	-	-	804	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1541	-	680	998
Mov Cap-2 Maneuver	-	-	-	-	696	-
Stage 1	-	-	-	-	957	-
Stage 2	-	-	-	-	798	-

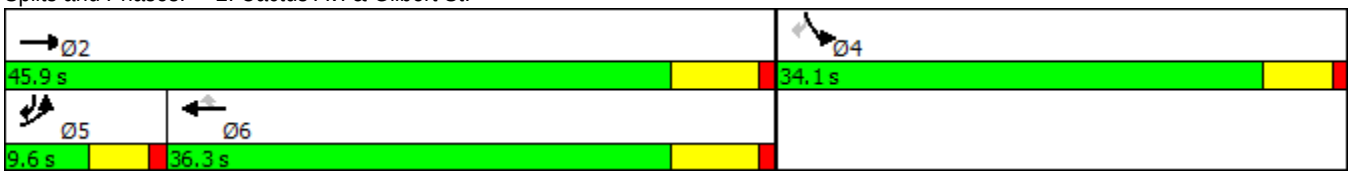
Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	9.4
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	696	998	-	-	1541	-
HCM Lane V/C Ratio	0.033	0.027	-	-	0.008	-
HCM Control Delay (s)	10.3	8.7	-	-	7.4	-
HCM Lane LOS	B	A	-	-	A	-
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	26	1801	2982	12	14	22
Future Volume (vph)	26	1801	2982	12	14	22
Turn Type	Prot	NA	NA	Perm	Prot	pm+ov
Protected Phases	5	2	6		4	5
Permitted Phases				6		4
Detector Phase	5	2	6	6	4	5
Switch Phase						
Minimum Initial (s)	5.0	10.0	10.0	10.0	5.0	5.0
Minimum Split (s)	9.6	16.2	29.2	29.2	34.1	9.6
Total Split (s)	9.6	45.9	36.3	36.3	34.1	9.6
Total Split (%)	12.0%	57.4%	45.4%	45.4%	42.6%	12.0%
Yellow Time (s)	3.6	5.2	5.2	5.2	4.1	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	6.2	6.2	6.2	5.1	4.6
Lead/Lag	Lead		Lag	Lag		Lead
Lead-Lag Optimize?	Yes		Yes	Yes		Yes
Recall Mode	None	None	None	None	Min	None
Act Effct Green (s)	5.2	36.5	31.3	31.3	9.3	19.8
Actuated g/C Ratio	0.09	0.63	0.54	0.54	0.16	0.34
v/c Ratio	0.17	0.56	1.08	0.01	0.05	0.04
Control Delay	32.3	8.2	62.0	8.2	20.1	13.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.3	8.2	62.0	8.2	20.1	13.0
LOS	C	A	E	A	C	B
Approach Delay		8.5	61.8		15.8	
Approach LOS		A	E		B	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 57.6	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.08	
Intersection Signal Delay: 41.4	Intersection LOS: D
Intersection Capacity Utilization 71.2%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 2: Cactus Av. & Gilbert St.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	26	1801	2982	12	14	22
Future Volume (veh/h)	26	1801	2982	12	14	22
Number	5	2	6	16	7	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	27	1838	3043	12	14	15
Adj No. of Lanes	1	3	3	1	1	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	56	3613	3008	937	168	200
Arrive On Green	0.03	0.70	0.58	0.58	0.09	0.09
Sat Flow, veh/h	1810	5358	5358	1615	1810	1615
Grp Volume(v), veh/h	27	1838	3043	12	14	15
Grp Sat Flow(s),veh/h/ln	1810	1729	1729	1615	1810	1615
Q Serve(g_s), s	0.8	8.9	31.1	0.2	0.4	0.4
Cycle Q Clear(g_c), s	0.8	8.9	31.1	0.2	0.4	0.4
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	56	3613	3008	937	168	200
V/C Ratio(X)	0.48	0.51	1.01	0.01	0.08	0.07
Avail Cap(c_a), veh/h	168	3835	3008	937	977	922
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.6	3.8	11.3	4.8	22.3	20.8
Incr Delay (d2), s/veh	2.4	0.1	19.3	0.0	0.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	4.1	19.9	0.1	0.2	0.4
LnGrp Delay(d),s/veh	28.0	3.9	30.6	4.8	22.5	21.0
LnGrp LOS	C	A	F	A	C	C
Approach Vol, veh/h		1865	3055		29	
Approach Delay, s/veh		4.3	30.5		21.7	
Approach LOS		A	C		C	

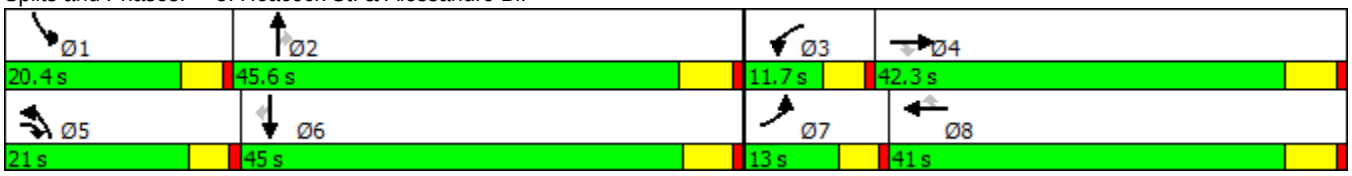
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		43.6		10.1	6.3	37.3		
Change Period (Y+Rc), s		6.2		5.1	4.6	6.2		
Max Green Setting (Gmax), s		39.7		29.0	5.0	30.1		
Max Q Clear Time (g_c+I1), s		10.9		2.4	2.8	33.1		
Green Ext Time (p_c), s		26.5		0.0	0.0	0.0		

Intersection Summary	
HCM 2010 Ctrl Delay	20.6
HCM 2010 LOS	C

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	92	451	91	74	1450	152	229	692	101	132	437	234
Future Volume (vph)	92	451	91	74	1450	152	229	692	101	132	437	234
Turn Type	Prot	NA	pm+ov	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	5	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	5.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	9.6	32.8	9.6	9.6	32.8	32.8	9.6	44.8	44.8	9.6	44.4	44.4
Total Split (s)	13.0	42.3	21.0	11.7	41.0	41.0	21.0	45.6	45.6	20.4	45.0	45.0
Total Split (%)	10.8%	35.3%	17.5%	9.8%	34.2%	34.2%	17.5%	38.0%	38.0%	17.0%	37.5%	37.5%
Yellow Time (s)	3.6	4.8	3.6	3.6	4.8	4.8	3.6	4.8	4.8	3.6	4.4	4.4
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.8	4.6	4.6	5.8	5.8	4.6	5.8	5.8	4.6	5.4	5.4
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	8.1	36.7	54.5	6.9	35.5	35.5	16.5	28.6	28.6	11.9	24.4	24.4
Actuated g/C Ratio	0.08	0.35	0.52	0.07	0.34	0.34	0.16	0.27	0.27	0.11	0.23	0.23
v/c Ratio	0.70	0.26	0.11	0.66	0.87	0.26	0.85	0.74	0.21	0.68	0.55	0.50
Control Delay	76.3	26.4	3.5	77.1	40.5	8.7	71.7	40.0	6.2	63.2	37.3	15.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	76.3	26.4	3.5	77.1	40.5	8.7	71.7	40.0	6.2	63.2	37.3	15.2
LOS	E	C	A	E	D	A	E	D	A	E	D	B
Approach Delay		30.4			39.2			43.8			35.1	
Approach LOS		C			D			D			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 105.1	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.87	
Intersection Signal Delay: 38.2	Intersection LOS: D
Intersection Capacity Utilization 79.3%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 5: Heacock St. & Alessandro Bl.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	92	451	91	74	1450	152	229	692	101	132	437	234
Future Volume (veh/h)	92	451	91	74	1450	152	229	692	101	132	437	234
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	1.00		0.98	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	97	475	59	78	1526	123	241	728	87	139	460	175
Adj No. of Lanes	1	3	1	1	3	1	1	2	1	1	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	123	1822	803	100	1758	536	272	1064	467	170	860	380
Arrive On Green	0.07	0.35	0.35	0.06	0.34	0.34	0.15	0.29	0.29	0.09	0.24	0.24
Sat Flow, veh/h	1810	5187	1594	1810	5187	1581	1810	3610	1584	1810	3610	1594
Grp Volume(v), veh/h	97	475	59	78	1526	123	241	728	87	139	460	175
Grp Sat Flow(s),veh/h/ln	1810	1729	1594	1810	1729	1581	1810	1805	1584	1810	1805	1594
Q Serve(g_s), s	5.4	6.6	1.9	4.3	28.0	5.7	13.3	18.1	4.2	7.7	11.3	9.5
Cycle Q Clear(g_c), s	5.4	6.6	1.9	4.3	28.0	5.7	13.3	18.1	4.2	7.7	11.3	9.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	123	1822	803	100	1758	536	272	1064	467	170	860	380
V/C Ratio(X)	0.79	0.26	0.07	0.78	0.87	0.23	0.89	0.68	0.19	0.82	0.54	0.46
Avail Cap(c_a), veh/h	150	1863	815	126	1797	548	292	1414	620	281	1407	621
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.6	23.5	13.1	47.4	31.5	24.1	42.3	31.7	26.8	45.2	33.8	33.1
Incr Delay (d2), s/veh	16.6	0.1	0.0	16.0	4.8	0.2	23.7	0.9	0.2	3.6	0.5	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.3	3.2	0.9	2.6	14.1	2.5	8.4	9.1	1.9	4.0	5.7	4.3
LnGrp Delay(d),s/veh	63.2	23.6	13.1	63.4	36.2	24.3	66.0	32.5	26.9	48.8	34.3	34.0
LnGrp LOS	E	C	B	E	D	C	E	C	C	D	C	C
Approach Vol, veh/h		631			1727			1056			774	
Approach Delay, s/veh		28.7			36.6			39.7			36.9	
Approach LOS		C			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.1	35.7	10.2	41.5	19.9	30.0	11.5	40.2
Change Period (Y+Rc), s	4.6	5.8	4.6	5.8	4.6	* 5.8	4.6	5.8
Max Green Setting (Gmax), s	15.8	39.8	7.1	36.5	16.4	* 40	8.4	35.2
Max Q Clear Time (g_c+I1), s	9.7	20.1	6.3	8.6	15.3	13.3	7.4	30.0
Green Ext Time (p_c), s	0.1	8.5	0.0	17.1	0.0	9.6	0.0	4.4

Intersection Summary	
HCM 2010 Ctrl Delay	36.3
HCM 2010 LOS	D

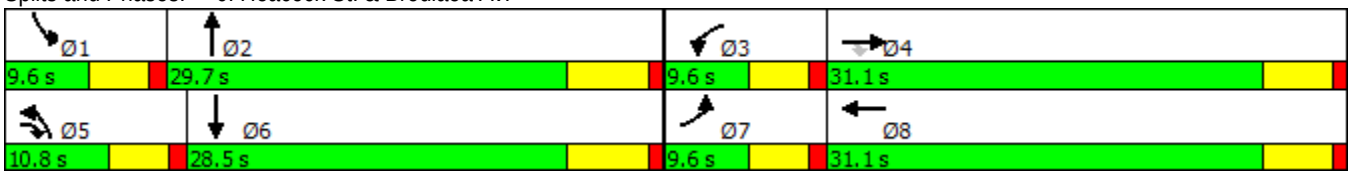
Notes

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	20	25	20	13	109	43	977	18	538
Future Volume (vph)	20	25	20	13	109	43	977	18	538
Turn Type	Prot	NA	pm+ov	Prot	NA	Prot	NA	Prot	NA
Protected Phases	7	4	5	3	8	5	2	1	6
Permitted Phases			4						
Detector Phase	7	4	5	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	10.0	5.0	5.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	9.6	31.1	9.6	9.6	31.1	9.6	23.8	9.6	25.8
Total Split (s)	9.6	31.1	10.8	9.6	31.1	10.8	29.7	9.6	28.5
Total Split (%)	12.0%	38.9%	13.5%	12.0%	38.9%	13.5%	37.1%	12.0%	35.6%
Yellow Time (s)	3.6	4.1	3.6	3.6	4.1	3.6	4.8	3.6	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.1	4.6	4.6	5.1	4.6	5.8	4.6	5.8
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	5.2	13.2	19.6	5.2	13.2	5.8	28.9	5.2	23.8
Actuated g/C Ratio	0.09	0.23	0.35	0.09	0.23	0.10	0.51	0.09	0.42
v/c Ratio	0.13	0.06	0.04	0.08	0.38	0.26	0.60	0.12	0.41
Control Delay	29.8	17.0	0.1	29.2	17.5	29.9	15.3	29.6	15.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.8	17.0	0.1	29.2	17.5	29.9	15.3	29.6	15.4
LOS	C	B	A	C	B	C	B	C	B
Approach Delay		15.7			18.4		16.0		15.8
Approach LOS		B			B		B		B

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 56.2
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.60
Intersection Signal Delay: 16.1 — Intersection LOS: B
Intersection Capacity Utilization 61.3% — ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 6: Heacock St. & Brodiaea Av.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	25	20	13	109	43	43	977	14	18	538	20
Future Volume (veh/h)	20	25	20	13	109	43	43	977	14	18	538	20
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	22	28	11	14	121	24	48	1086	12	20	598	20
Adj No. of Lanes	1	1	1	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	47	363	381	32	280	56	86	1444	16	43	1322	44
Arrive On Green	0.03	0.19	0.19	0.02	0.18	0.18	0.05	0.39	0.39	0.02	0.37	0.37
Sat Flow, veh/h	1810	1900	1589	1810	1535	304	1810	3657	40	1810	3562	119
Grp Volume(v), veh/h	22	28	11	14	0	145	48	536	562	20	303	315
Grp Sat Flow(s),veh/h/ln	1810	1900	1589	1810	0	1839	1810	1805	1893	1810	1805	1876
Q Serve(g_s), s	0.6	0.7	0.3	0.4	0.0	3.8	1.4	13.8	13.8	0.6	6.8	6.9
Cycle Q Clear(g_c), s	0.6	0.7	0.3	0.4	0.0	3.8	1.4	13.8	13.8	0.6	6.8	6.9
Prop In Lane	1.00		1.00	1.00		0.17	1.00		0.02	1.00		0.06
Lane Grp Cap(c), veh/h	47	363	381	32	0	336	86	713	747	43	670	696
V/C Ratio(X)	0.47	0.08	0.03	0.44	0.00	0.43	0.56	0.75	0.75	0.46	0.45	0.45
Avail Cap(c_a), veh/h	168	915	843	168	0	886	208	799	838	168	759	789
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.9	17.9	15.7	26.2	0.0	19.6	25.1	14.1	14.1	26.0	12.8	12.8
Incr Delay (d2), s/veh	2.7	0.1	0.0	3.5	0.0	0.9	2.1	3.6	3.4	2.8	0.5	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.4	0.1	0.2	0.0	2.0	0.7	7.6	7.9	0.3	3.5	3.6
LnGrp Delay(d),s/veh	28.6	18.0	15.8	29.8	0.0	20.4	27.2	17.6	17.5	28.8	13.3	13.3
LnGrp LOS	C	B	B	C		C	C	B	B	C	B	B
Approach Vol, veh/h		61			159			1146			638	
Approach Delay, s/veh		21.4			21.3			18.0			13.8	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.9	27.1	5.5	15.4	7.2	25.8	6.0	15.0
Change Period (Y+Rc), s	4.6	5.8	4.6	5.1	4.6	5.8	4.6	5.1
Max Green Setting (Gmax), s	5.0	23.9	5.0	26.0	6.2	22.7	5.0	26.0
Max Q Clear Time (g_c+I1), s	2.6	15.8	2.4	2.7	3.4	8.9	2.6	5.8
Green Ext Time (p_c), s	0.0	5.5	0.0	0.9	0.0	8.2	0.0	0.9

Intersection Summary	
HCM 2010 Ctrl Delay	17.0
HCM 2010 LOS	B

Intersection	
Int Delay, s/veh	1.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	123	9	13	114	9	18
Future Vol, veh/h	123	9	13	114	9	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	155	-	145	0
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	150	11	16	139	11	22

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	161	0	326	155
Stage 1	-	-	-	-	155	-
Stage 2	-	-	-	-	171	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1430	-	672	896
Stage 1	-	-	-	-	878	-
Stage 2	-	-	-	-	864	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1430	-	664	896
Mov Cap-2 Maneuver	-	-	-	-	698	-
Stage 1	-	-	-	-	878	-
Stage 2	-	-	-	-	854	-

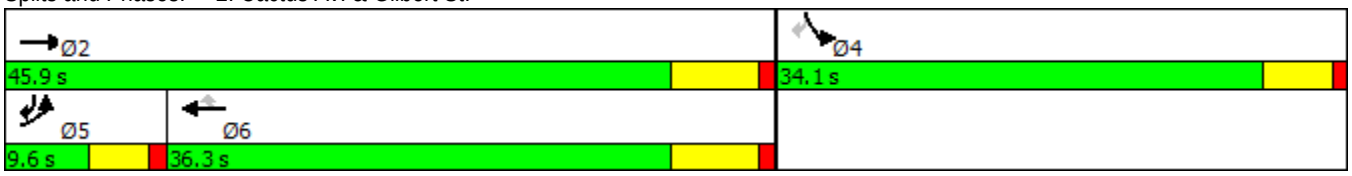
Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	9.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	698	896	-	-	1430	-
HCM Lane V/C Ratio	0.016	0.024	-	-	0.011	-
HCM Control Delay (s)	10.2	9.1	-	-	7.5	-
HCM Lane LOS	B	A	-	-	A	-
HCM 95th %tile Q(veh)	0	0.1	-	-	0	-

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	3	3586	1710	2	2	3
Future Volume (vph)	3	3586	1710	2	2	3
Turn Type	Prot	NA	NA	Perm	Prot	pm+ov
Protected Phases	5	2	6		4	5
Permitted Phases				6		4
Detector Phase	5	2	6	6	4	5
Switch Phase						
Minimum Initial (s)	5.0	10.0	10.0	10.0	5.0	5.0
Minimum Split (s)	9.6	16.2	29.2	29.2	34.1	9.6
Total Split (s)	9.6	45.9	36.3	36.3	34.1	9.6
Total Split (%)	12.0%	57.4%	45.4%	45.4%	42.6%	12.0%
Yellow Time (s)	3.6	5.2	5.2	5.2	4.1	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	6.2	6.2	6.2	5.1	4.6
Lead/Lag	Lead		Lag	Lag		Lead
Lead-Lag Optimize?	Yes		Yes	Yes		Yes
Recall Mode	None	None	None	None	Min	None
Act Effct Green (s)	5.1	40.4	39.0	39.0	9.2	19.5
Actuated g/C Ratio	0.08	0.66	0.64	0.64	0.15	0.32
v/c Ratio	0.02	1.09	0.54	0.00	0.01	0.01
Control Delay	30.7	60.2	10.3	8.5	19.0	11.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.7	60.2	10.3	8.5	19.0	11.0
LOS	C	E	B	A	B	B
Approach Delay		60.2	10.3		14.2	
Approach LOS		E	B		B	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 61.2	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.09	
Intersection Signal Delay: 44.0	Intersection LOS: D
Intersection Capacity Utilization 82.9%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 2: Cactus Av. & Gilbert St.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	3586	1710	2	2	3
Future Volume (veh/h)	3	3586	1710	2	2	3
Number	5	2	6	16	7	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.98	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	3	3735	1781	2	2	0
Adj No. of Lanes	1	3	3	1	1	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	7	3677	3230	984	162	151
Arrive On Green	0.00	0.71	0.62	0.62	0.09	0.00
Sat Flow, veh/h	1810	5358	5358	1580	1810	1615
Grp Volume(v), veh/h	3	3735	1781	2	2	0
Grp Sat Flow(s),veh/h/ln	1810	1729	1729	1580	1810	1615
Q Serve(g_s), s	0.1	39.7	11.0	0.0	0.1	0.0
Cycle Q Clear(g_c), s	0.1	39.7	11.0	0.0	0.1	0.0
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	7	3677	3230	984	162	151
V/C Ratio(X)	0.41	1.02	0.55	0.00	0.01	0.00
Avail Cap(c_a), veh/h	162	3677	3230	984	937	843
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	27.8	8.1	6.1	4.0	23.2	0.0
Incr Delay (d2), s/veh	12.9	18.9	0.2	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	24.5	5.2	0.0	0.0	0.0
LnGrp Delay(d),s/veh	40.7	27.1	6.3	4.0	23.3	0.0
LnGrp LOS	D	F	A	A	C	
Approach Vol, veh/h		3738	1783		2	
Approach Delay, s/veh		27.1	6.3		23.3	
Approach LOS		C	A		C	

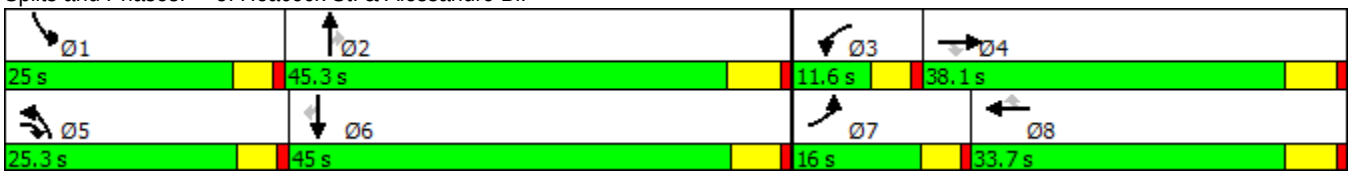
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		45.9		10.1	4.8	41.1		
Change Period (Y+Rc), s		6.2		5.1	4.6	6.2		
Max Green Setting (Gmax), s		39.7		29.0	5.0	30.1		
Max Q Clear Time (g_c+I1), s		41.7		2.1	2.1	13.0		
Green Ext Time (p_c), s		0.0		0.0	0.0	17.0		

Intersection Summary	
HCM 2010 Ctrl Delay	20.4
HCM 2010 LOS	C

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	167	1397	193	104	850	176	242	582	144	277	689	178
Future Volume (vph)	167	1397	193	104	850	176	242	582	144	277	689	178
Turn Type	Prot	NA	pm+ov	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	5	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	5.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	9.6	32.8	9.6	9.6	32.8	32.8	9.6	44.8	44.8	9.6	44.4	44.4
Total Split (s)	16.0	38.1	25.3	11.6	33.7	33.7	25.3	45.3	45.3	25.0	45.0	45.0
Total Split (%)	13.3%	31.8%	21.1%	9.7%	28.1%	28.1%	21.1%	37.8%	37.8%	20.8%	37.5%	37.5%
Yellow Time (s)	3.6	4.8	3.6	3.6	4.8	4.8	3.6	4.8	4.8	3.6	4.4	4.4
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.8	4.6	4.6	5.8	5.8	4.6	5.8	5.8	4.6	5.4	5.4
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	11.5	32.5	51.6	7.1	28.1	28.1	17.9	26.6	26.6	19.7	28.8	28.8
Actuated g/C Ratio	0.11	0.30	0.48	0.07	0.26	0.26	0.17	0.25	0.25	0.18	0.27	0.27
v/c Ratio	0.89	0.91	0.25	0.91	0.64	0.33	0.82	0.67	0.29	0.86	0.73	0.33
Control Delay	90.4	46.6	10.5	112.6	38.7	7.1	66.4	39.6	6.3	68.6	40.3	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	90.4	46.6	10.5	112.6	38.7	7.1	66.4	39.6	6.3	68.6	40.3	5.9
LOS	F	D	B	F	D	A	E	D	A	E	D	A
Approach Delay		46.8			40.6			41.3			41.8	
Approach LOS		D			D			D			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 106.8	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.91	
Intersection Signal Delay: 43.2	Intersection LOS: D
Intersection Capacity Utilization 84.5%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 5: Heacock St. & Alessandro Bl.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	167	1397	193	104	850	176	242	582	144	277	689	178
Future Volume (veh/h)	167	1397	193	104	850	176	242	582	144	277	689	178
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	172	1440	153	107	876	130	249	600	116	286	710	119
Adj No. of Lanes	1	3	1	1	3	1	1	2	1	1	2	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	192	1557	727	118	1344	407	280	962	427	316	1033	462
Arrive On Green	0.11	0.30	0.30	0.07	0.26	0.26	0.15	0.27	0.27	0.17	0.29	0.29
Sat Flow, veh/h	1810	5187	1590	1810	5187	1570	1810	3610	1604	1810	3610	1613
Grp Volume(v), veh/h	172	1440	153	107	876	130	249	600	116	286	710	119
Grp Sat Flow(s),veh/h/ln	1810	1729	1590	1810	1729	1570	1810	1805	1604	1810	1805	1613
Q Serve(g_s), s	10.1	28.9	6.2	6.3	16.2	7.2	14.5	15.7	6.1	16.6	18.8	6.1
Cycle Q Clear(g_c), s	10.1	28.9	6.2	6.3	16.2	7.2	14.5	15.7	6.1	16.6	18.8	6.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	192	1557	727	118	1344	407	280	962	427	316	1033	462
V/C Ratio(X)	0.89	0.92	0.21	0.91	0.65	0.32	0.89	0.62	0.27	0.91	0.69	0.26
Avail Cap(c_a), veh/h	192	1561	728	118	1348	408	349	1329	590	344	1332	595
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.4	36.4	17.6	49.8	35.4	32.1	44.5	34.6	31.1	43.4	34.0	29.5
Incr Delay (d2), s/veh	36.4	9.7	0.1	53.8	1.1	0.4	18.0	0.7	0.3	24.2	1.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.0	15.1	2.8	4.9	7.8	3.2	8.7	7.9	2.8	10.5	9.5	2.8
LnGrp Delay(d),s/veh	83.7	46.1	17.8	103.6	36.6	32.6	62.4	35.3	31.5	67.6	35.1	29.8
LnGrp LOS	F	D	B	F	D	C	E	D	C	E	D	C
Approach Vol, veh/h		1765			1113			965			1115	
Approach Delay, s/veh		47.3			42.5			41.8			42.9	
Approach LOS		D			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	23.3	34.4	11.6	38.0	21.2	36.5	16.0	33.6
Change Period (Y+Rc), s	4.6	5.8	4.6	5.8	4.6	* 5.8	4.6	5.8
Max Green Setting (Gmax), s	20.4	39.5	7.0	32.3	20.7	* 40	11.4	27.9
Max Q Clear Time (g_c+I1), s	18.6	17.7	8.3	30.9	16.5	20.8	12.1	18.2
Green Ext Time (p_c), s	0.1	9.7	0.0	1.3	0.1	9.0	0.0	8.4

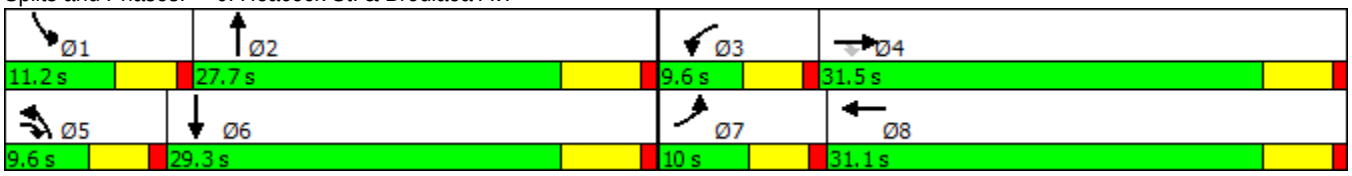
Intersection Summary	
HCM 2010 Ctrl Delay	44.2
HCM 2010 LOS	D

Notes

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	29	87	24	21	72	22	792	54	909
Future Volume (vph)	29	87	24	21	72	22	792	54	909
Turn Type	Prot	NA	pm+ov	Prot	NA	Prot	NA	Prot	NA
Protected Phases	7	4	5	3	8	5	2	1	6
Permitted Phases			4						
Detector Phase	7	4	5	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	10.0	5.0	5.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	9.6	31.1	9.6	9.6	31.1	9.6	23.8	9.6	25.8
Total Split (s)	10.0	31.5	9.6	9.6	31.1	9.6	27.7	11.2	29.3
Total Split (%)	12.5%	39.4%	12.0%	12.0%	38.9%	12.0%	34.6%	14.0%	36.6%
Yellow Time (s)	3.6	4.1	3.6	3.6	4.1	3.6	4.8	3.6	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.1	4.6	4.6	5.1	4.6	5.8	4.6	5.8
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	5.8	15.0	21.2	5.6	13.3	5.6	26.0	6.3	28.8
Actuated g/C Ratio	0.11	0.28	0.40	0.11	0.25	0.11	0.49	0.12	0.54
v/c Ratio	0.16	0.17	0.04	0.12	0.24	0.12	0.49	0.27	0.51
Control Delay	32.0	18.0	0.1	32.1	16.4	32.2	17.9	31.8	16.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.0	18.0	0.1	32.1	16.4	32.2	17.9	31.8	16.5
LOS	C	B	A	C	B	C	B	C	B
Approach Delay		17.9			18.9		18.3		17.3
Approach LOS		B			B		B		B

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 53.1	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.51	
Intersection Signal Delay: 17.8	Intersection LOS: B
Intersection Capacity Utilization 51.6%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 6: Heacock St. & Brodiaea Av.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	29	87	24	21	72	37	22	792	21	54	909	32
Future Volume (veh/h)	29	87	24	21	72	37	22	792	21	54	909	32
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	31	92	14	22	76	16	23	834	18	57	957	32
Adj No. of Lanes	1	1	1	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	62	357	347	47	273	57	49	1293	28	97	1370	46
Arrive On Green	0.03	0.19	0.19	0.03	0.18	0.18	0.03	0.36	0.36	0.05	0.38	0.38
Sat Flow, veh/h	1810	1900	1615	1810	1519	320	1810	3613	78	1810	3565	119
Grp Volume(v), veh/h	31	92	14	22	0	92	23	417	435	57	485	504
Grp Sat Flow(s),veh/h/ln	1810	1900	1615	1810	0	1839	1810	1805	1886	1810	1805	1879
Q Serve(g_s), s	0.9	2.2	0.4	0.6	0.0	2.3	0.7	10.3	10.3	1.7	12.1	12.1
Cycle Q Clear(g_c), s	0.9	2.2	0.4	0.6	0.0	2.3	0.7	10.3	10.3	1.7	12.1	12.1
Prop In Lane	1.00		1.00	1.00		0.17	1.00		0.04	1.00		0.06
Lane Grp Cap(c), veh/h	62	357	347	47	0	330	49	646	675	97	694	722
V/C Ratio(X)	0.50	0.26	0.04	0.47	0.00	0.28	0.47	0.64	0.64	0.59	0.70	0.70
Avail Cap(c_a), veh/h	182	935	839	169	0	891	169	737	770	223	791	823
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.4	18.6	16.7	25.7	0.0	19.0	25.7	14.4	14.4	24.8	13.9	13.9
Incr Delay (d2), s/veh	2.3	0.4	0.0	2.7	0.0	0.5	2.6	1.6	1.5	2.1	2.3	2.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	1.2	0.2	0.4	0.0	1.2	0.4	5.4	5.6	0.9	6.4	6.6
LnGrp Delay(d),s/veh	27.7	19.0	16.7	28.4	0.0	19.5	28.3	16.0	15.9	26.9	16.2	16.1
LnGrp LOS	C	B	B	C		B	C	B	B	C	B	B
Approach Vol, veh/h		137			114			875			1046	
Approach Delay, s/veh		20.7			21.2			16.3			16.8	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.5	25.0	6.0	15.2	6.1	26.4	6.4	14.7
Change Period (Y+Rc), s	4.6	5.8	4.6	5.1	4.6	5.8	4.6	5.1
Max Green Setting (Gmax), s	6.6	21.9	5.0	26.4	5.0	23.5	5.4	26.0
Max Q Clear Time (g_c+I1), s	3.7	12.3	2.6	4.2	2.7	14.1	2.9	4.3
Green Ext Time (p_c), s	0.0	6.6	0.0	0.9	0.0	6.5	0.0	0.9

Intersection Summary	
HCM 2010 Ctrl Delay	17.0
HCM 2010 LOS	B

APPENDIX 6.2:

OPENING YEAR CUMULATIVE (2022) WITH PROJECT CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

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Intersection	
Int Delay, s/veh	2.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	48	6	16	164	17	37
Future Vol, veh/h	48	6	16	164	17	37
Conflicting Peds, #/hr	0	3	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	155	-	145	0
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	75	75	75	75	75	75
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	64	8	21	219	23	49

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	75	0	332	71
Stage 1	-	-	-	-	71	-
Stage 2	-	-	-	-	261	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1537	-	667	997
Stage 1	-	-	-	-	957	-
Stage 2	-	-	-	-	787	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1537	-	656	994
Mov Cap-2 Maneuver	-	-	-	-	677	-
Stage 1	-	-	-	-	954	-
Stage 2	-	-	-	-	776	-

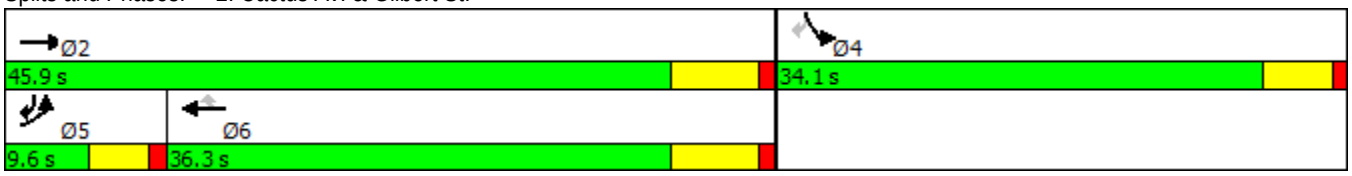
Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	9.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	677	994	-	-	1537	-
HCM Lane V/C Ratio	0.033	0.05	-	-	0.014	-
HCM Control Delay (s)	10.5	8.8	-	-	7.4	-
HCM Lane LOS	B	A	-	-	A	-
HCM 95th %tile Q(veh)	0.1	0.2	-	-	0	-

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	43	1801	2982	12	14	29
Future Volume (vph)	43	1801	2982	12	14	29
Turn Type	Prot	NA	NA	Perm	Prot	pm+ov
Protected Phases	5	2	6		4	5
Permitted Phases				6		4
Detector Phase	5	2	6	6	4	5
Switch Phase						
Minimum Initial (s)	5.0	10.0	10.0	10.0	5.0	5.0
Minimum Split (s)	9.6	16.2	29.2	29.2	34.1	9.6
Total Split (s)	9.6	45.9	36.3	36.3	34.1	9.6
Total Split (%)	12.0%	57.4%	45.4%	45.4%	42.6%	12.0%
Yellow Time (s)	3.6	5.2	5.2	5.2	4.1	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	6.2	6.2	6.2	5.1	4.6
Lead/Lag	Lead		Lag	Lag		Lead
Lead-Lag Optimize?	Yes		Yes	Yes		Yes
Recall Mode	None	None	None	None	Min	None
Act Effct Green (s)	5.2	36.5	31.3	31.3	9.3	19.8
Actuated g/C Ratio	0.09	0.63	0.54	0.54	0.16	0.34
v/c Ratio	0.27	0.56	1.08	0.01	0.05	0.05
Control Delay	33.9	8.2	62.0	8.2	20.1	13.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.9	8.2	62.0	8.2	20.1	13.2
LOS	C	A	E	A	C	B
Approach Delay		8.8	61.8		15.4	
Approach LOS		A	E		B	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 57.6	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.08	
Intersection Signal Delay: 41.4	Intersection LOS: D
Intersection Capacity Utilization 71.2%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 2: Cactus Av. & Gilbert St.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	43	1801	2982	12	14	29
Future Volume (veh/h)	43	1801	2982	12	14	29
Number	5	2	6	16	7	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	44	1838	3043	12	14	23
Adj No. of Lanes	1	3	3	1	1	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	81	3627	2955	920	167	221
Arrive On Green	0.04	0.70	0.57	0.57	0.09	0.09
Sat Flow, veh/h	1810	5358	5358	1615	1810	1615
Grp Volume(v), veh/h	44	1838	3043	12	14	23
Grp Sat Flow(s),veh/h/ln	1810	1729	1729	1615	1810	1615
Q Serve(g_s), s	1.3	8.9	30.9	0.2	0.4	0.7
Cycle Q Clear(g_c), s	1.3	8.9	30.9	0.2	0.4	0.7
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	81	3627	2955	920	167	221
V/C Ratio(X)	0.54	0.51	1.03	0.01	0.08	0.10
Avail Cap(c_a), veh/h	167	3799	2955	920	968	936
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.3	3.8	11.7	5.1	22.5	20.5
Incr Delay (d2), s/veh	2.1	0.1	24.8	0.0	0.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	4.1	21.3	0.1	0.2	0.7
LnGrp Delay(d),s/veh	27.5	3.9	36.5	5.1	22.7	20.7
LnGrp LOS	C	A	F	A	C	C
Approach Vol, veh/h		1882	3055		37	
Approach Delay, s/veh		4.5	36.3		21.5	
Approach LOS		A	D		C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		44.1		10.1	7.0	37.1		
Change Period (Y+Rc), s		6.2		5.1	4.6	6.2		
Max Green Setting (Gmax), s		39.7		29.0	5.0	30.1		
Max Q Clear Time (g_c+I1), s		10.9		2.7	3.3	32.9		
Green Ext Time (p_c), s		27.0		0.1	0.0	0.0		

Intersection Summary	
HCM 2010 Ctrl Delay	24.2
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	11	73	174	3	1	5
Future Vol, veh/h	11	73	174	3	1	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	12	79	189	3	1	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	192	0	-	0	294	191
Stage 1	-	-	-	-	191	-
Stage 2	-	-	-	-	103	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1394	-	-	-	701	856
Stage 1	-	-	-	-	846	-
Stage 2	-	-	-	-	926	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1394	-	-	-	695	856
Mov Cap-2 Maneuver	-	-	-	-	717	-
Stage 1	-	-	-	-	846	-
Stage 2	-	-	-	-	918	-

Approach	EB	WB	SB
HCM Control Delay, s	1	0	9.4
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1394	-	-	-	829
HCM Lane V/C Ratio	0.009	-	-	-	0.008
HCM Control Delay (s)	7.6	-	-	-	9.4
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	8	66	174	6	3	3
Future Vol, veh/h	8	66	174	6	3	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	9	72	189	7	3	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	196	0	-	0	281	192
Stage 1	-	-	-	-	192	-
Stage 2	-	-	-	-	89	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1389	-	-	-	713	855
Stage 1	-	-	-	-	845	-
Stage 2	-	-	-	-	940	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1389	-	-	-	708	855
Mov Cap-2 Maneuver	-	-	-	-	724	-
Stage 1	-	-	-	-	845	-
Stage 2	-	-	-	-	934	-

Approach	EB	WB	SB
HCM Control Delay, s	0.8	0	9.6
HCM LOS			A

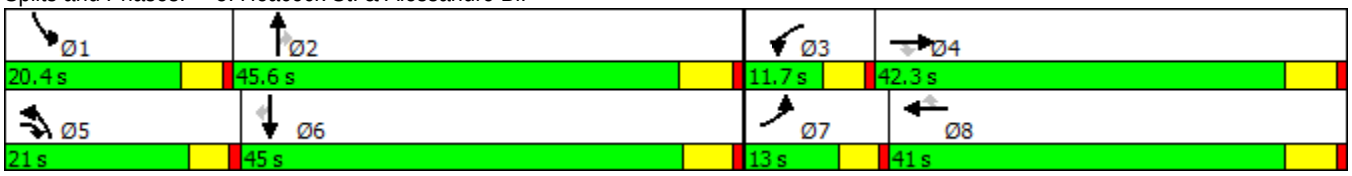
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1389	-	-	-	784
HCM Lane V/C Ratio	0.006	-	-	-	0.008
HCM Control Delay (s)	7.6	-	-	-	9.6
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	92	451	94	75	1450	152	230	693	101	132	439	234
Future Volume (vph)	92	451	94	75	1450	152	230	693	101	132	439	234
Turn Type	Prot	NA	pm+ov	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	5	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	5.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	9.6	32.8	9.6	9.6	32.8	32.8	9.6	44.8	44.8	9.6	44.4	44.4
Total Split (s)	13.0	42.3	21.0	11.7	41.0	41.0	21.0	45.6	45.6	20.4	45.0	45.0
Total Split (%)	10.8%	35.3%	17.5%	9.8%	34.2%	34.2%	17.5%	38.0%	38.0%	17.0%	37.5%	37.5%
Yellow Time (s)	3.6	4.8	3.6	3.6	4.8	4.8	3.6	4.8	4.8	3.6	4.4	4.4
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.8	4.6	4.6	5.8	5.8	4.6	5.8	5.8	4.6	5.4	5.4
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	8.1	36.6	54.4	6.9	35.5	35.5	16.5	28.6	28.6	11.9	24.4	24.4
Actuated g/C Ratio	0.08	0.35	0.52	0.07	0.34	0.34	0.16	0.27	0.27	0.11	0.23	0.23
v/c Ratio	0.70	0.26	0.11	0.67	0.87	0.26	0.85	0.74	0.21	0.68	0.55	0.50
Control Delay	76.4	26.5	3.4	77.5	40.5	8.7	72.2	40.0	6.2	63.3	37.3	15.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	76.4	26.5	3.4	77.5	40.5	8.7	72.2	40.0	6.2	63.3	37.3	15.2
LOS	E	C	A	E	D	A	E	D	A	E	D	B
Approach Delay		30.3			39.3			43.9			35.2	
Approach LOS		C			D			D			D	

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 105.1
Natural Cycle: 120
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.87
Intersection Signal Delay: 38.2 — Intersection LOS: D
Intersection Capacity Utilization 79.3% — ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 5: Heacock St. & Alessandro Bl.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	92	451	94	75	1450	152	230	693	101	132	439	234
Future Volume (veh/h)	92	451	94	75	1450	152	230	693	101	132	439	234
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	1.00		0.98	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	97	475	62	79	1526	123	242	729	87	139	462	175
Adj No. of Lanes	1	3	1	1	3	1	1	2	1	1	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	123	1816	802	101	1755	535	273	1067	468	170	861	380
Arrive On Green	0.07	0.35	0.35	0.06	0.34	0.34	0.15	0.30	0.30	0.09	0.24	0.24
Sat Flow, veh/h	1810	5187	1594	1810	5187	1581	1810	3610	1584	1810	3610	1594
Grp Volume(v), veh/h	97	475	62	79	1526	123	242	729	87	139	462	175
Grp Sat Flow(s),veh/h/ln	1810	1729	1594	1810	1729	1581	1810	1805	1584	1810	1805	1594
Q Serve(g_s), s	5.4	6.7	2.1	4.4	28.1	5.7	13.3	18.1	4.2	7.7	11.4	9.6
Cycle Q Clear(g_c), s	5.4	6.7	2.1	4.4	28.1	5.7	13.3	18.1	4.2	7.7	11.4	9.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	123	1816	802	101	1755	535	273	1067	468	170	861	380
V/C Ratio(X)	0.79	0.26	0.08	0.78	0.87	0.23	0.89	0.68	0.19	0.82	0.54	0.46
Avail Cap(c_a), veh/h	149	1860	815	126	1793	547	291	1411	619	281	1404	620
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.7	23.7	13.2	47.4	31.6	24.2	42.4	31.7	26.7	45.3	33.9	33.2
Incr Delay (d2), s/veh	16.7	0.1	0.0	16.7	4.8	0.2	24.0	0.9	0.2	3.6	0.5	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.3	3.2	0.9	2.7	14.2	2.5	8.5	9.1	1.9	4.0	5.7	4.3
LnGrp Delay(d),s/veh	63.4	23.7	13.2	64.1	36.4	24.4	66.3	32.5	26.9	48.9	34.4	34.0
LnGrp LOS	E	C	B	E	D	C	E	C	C	D	C	C
Approach Vol, veh/h		634			1728			1058			776	
Approach Delay, s/veh		28.8			36.8			39.8			36.9	
Approach LOS		C			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.2	35.9	10.3	41.5	20.0	30.1	11.5	40.3
Change Period (Y+Rc), s	4.6	5.8	4.6	5.8	4.6	* 5.8	4.6	5.8
Max Green Setting (Gmax), s	15.8	39.8	7.1	36.5	16.4	* 40	8.4	35.2
Max Q Clear Time (g_c+I1), s	9.7	20.1	6.4	8.7	15.3	13.4	7.4	30.1
Green Ext Time (p_c), s	0.1	8.5	0.0	17.1	0.0	9.6	0.0	4.4

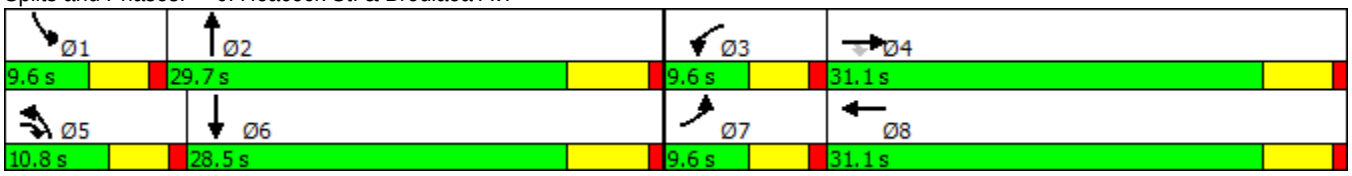
Intersection Summary	
HCM 2010 Ctrl Delay	36.4
HCM 2010 LOS	D

Notes

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	22	25	21	13	110	46	977	18	538
Future Volume (vph)	22	25	21	13	110	46	977	18	538
Turn Type	Prot	NA	pm+ov	Prot	NA	Prot	NA	Prot	NA
Protected Phases	7	4	5	3	8	5	2	1	6
Permitted Phases			4						
Detector Phase	7	4	5	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	10.0	5.0	5.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	9.6	31.1	9.6	9.6	31.1	9.6	23.8	9.6	25.8
Total Split (s)	9.6	31.1	10.8	9.6	31.1	10.8	29.7	9.6	28.5
Total Split (%)	12.0%	38.9%	13.5%	12.0%	38.9%	13.5%	37.1%	12.0%	35.6%
Yellow Time (s)	3.6	4.1	3.6	3.6	4.1	3.6	4.8	3.6	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.1	4.6	4.6	5.1	4.6	5.8	4.6	5.8
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	5.2	15.1	21.5	5.2	13.2	5.9	28.9	5.2	24.0
Actuated g/C Ratio	0.09	0.26	0.37	0.09	0.23	0.10	0.50	0.09	0.41
v/c Ratio	0.15	0.06	0.04	0.09	0.39	0.28	0.62	0.12	0.42
Control Delay	31.7	16.2	0.1	31.1	18.9	32.0	16.8	31.4	16.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.7	16.2	0.1	31.1	18.9	32.0	16.8	31.4	16.7
LOS	C	B	A	C	B	C	B	C	B
Approach Delay		16.2			19.8		17.4		17.2
Approach LOS		B			B		B		B

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 58.2	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.62	
Intersection Signal Delay: 17.5	Intersection LOS: B
Intersection Capacity Utilization 61.9%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 6: Heacock St. & Brodiaea Av.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	25	21	13	110	43	46	977	14	18	538	26
Future Volume (veh/h)	22	25	21	13	110	43	46	977	14	18	538	26
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	24	28	12	14	122	24	51	1086	12	20	598	27
Adj No. of Lanes	1	1	1	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	51	367	387	32	281	55	90	1442	16	43	1296	58
Arrive On Green	0.03	0.19	0.19	0.02	0.18	0.18	0.05	0.39	0.39	0.02	0.37	0.37
Sat Flow, veh/h	1810	1900	1589	1810	1537	302	1810	3657	40	1810	3514	158
Grp Volume(v), veh/h	24	28	12	14	0	146	51	536	562	20	307	318
Grp Sat Flow(s),veh/h/ln	1810	1900	1589	1810	0	1840	1810	1805	1893	1810	1805	1868
Q Serve(g_s), s	0.7	0.7	0.3	0.4	0.0	3.8	1.5	13.9	13.9	0.6	7.0	7.0
Cycle Q Clear(g_c), s	0.7	0.7	0.3	0.4	0.0	3.8	1.5	13.9	13.9	0.6	7.0	7.0
Prop In Lane	1.00		1.00	1.00		0.16	1.00		0.02	1.00		0.08
Lane Grp Cap(c), veh/h	51	367	387	32	0	336	90	712	746	43	666	689
V/C Ratio(X)	0.47	0.08	0.03	0.44	0.00	0.43	0.57	0.75	0.75	0.46	0.46	0.46
Avail Cap(c_a), veh/h	167	912	843	167	0	883	207	797	835	167	757	783
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.9	17.9	15.7	26.3	0.0	19.7	25.2	14.1	14.1	26.1	13.0	13.0
Incr Delay (d2), s/veh	2.5	0.1	0.0	3.5	0.0	0.9	2.1	3.6	3.5	2.8	0.5	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.4	0.1	0.2	0.0	2.0	0.8	7.6	7.9	0.3	3.5	3.7
LnGrp Delay(d),s/veh	28.5	18.0	15.7	29.9	0.0	20.5	27.3	17.8	17.6	28.9	13.5	13.5
LnGrp LOS	C	B	B	C		C	C	B	B	C	B	B
Approach Vol, veh/h		64			160			1149			645	
Approach Delay, s/veh		21.5			21.4			18.1			14.0	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.9	27.1	5.5	15.5	7.3	25.8	6.1	15.0
Change Period (Y+Rc), s	4.6	5.8	4.6	5.1	4.6	5.8	4.6	5.1
Max Green Setting (Gmax), s	5.0	23.9	5.0	26.0	6.2	22.7	5.0	26.0
Max Q Clear Time (g_c+I1), s	2.6	15.9	2.4	2.7	3.5	9.0	2.7	5.8
Green Ext Time (p_c), s	0.0	5.5	0.0	0.9	0.0	8.1	0.0	0.9

Intersection Summary	
HCM 2010 Ctrl Delay	17.1
HCM 2010 LOS	B

Intersection	
Int Delay, s/veh	1.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	124	9	33	116	9	27
Future Vol, veh/h	124	9	33	116	9	27
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	155	-	145	0
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	151	11	40	141	11	33

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	162	0	379	157
Stage 1	-	-	-	-	157	-
Stage 2	-	-	-	-	222	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1429	-	627	894
Stage 1	-	-	-	-	876	-
Stage 2	-	-	-	-	820	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1429	-	609	894
Mov Cap-2 Maneuver	-	-	-	-	657	-
Stage 1	-	-	-	-	876	-
Stage 2	-	-	-	-	797	-

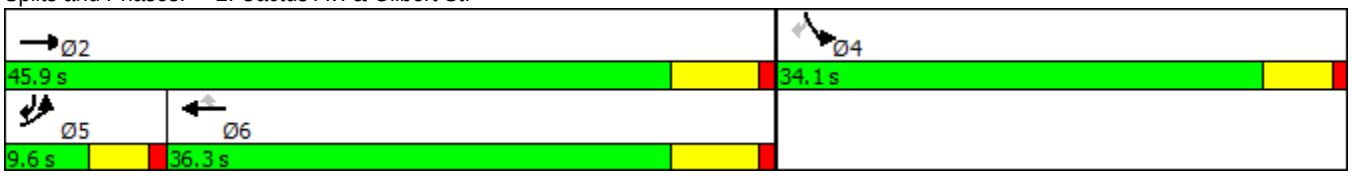
Approach	EB	WB	NB
HCM Control Delay, s	0	1.7	9.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	657	894	-	-	1429	-
HCM Lane V/C Ratio	0.017	0.037	-	-	0.028	-
HCM Control Delay (s)	10.6	9.2	-	-	7.6	-
HCM Lane LOS	B	A	-	-	A	-
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0.1	-

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	12	3586	1710	2	2	23
Future Volume (vph)	12	3586	1710	2	2	23
Turn Type	Prot	NA	NA	Perm	Prot	pm+ov
Protected Phases	5	2	6		4	5
Permitted Phases				6		4
Detector Phase	5	2	6	6	4	5
Switch Phase						
Minimum Initial (s)	5.0	10.0	10.0	10.0	5.0	5.0
Minimum Split (s)	9.6	16.2	29.2	29.2	34.1	9.6
Total Split (s)	9.6	45.9	36.3	36.3	34.1	9.6
Total Split (%)	12.0%	57.4%	45.4%	45.4%	42.6%	12.0%
Yellow Time (s)	3.6	5.2	5.2	5.2	4.1	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	6.2	6.2	6.2	5.1	4.6
Lead/Lag	Lead		Lag	Lag		Lead
Lead-Lag Optimize?	Yes		Yes	Yes		Yes
Recall Mode	None	None	None	None	Min	None
Act Effct Green (s)	5.1	40.4	36.9	36.9	9.2	19.5
Actuated g/C Ratio	0.08	0.66	0.60	0.60	0.15	0.32
v/c Ratio	0.09	1.09	0.57	0.00	0.01	0.05
Control Delay	31.2	60.2	11.7	9.5	19.0	12.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.2	60.2	11.7	9.5	19.0	12.8
LOS	C	E	B	A	B	B
Approach Delay		60.1	11.7		13.3	
Approach LOS		E	B		B	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 61.2	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.09	
Intersection Signal Delay: 44.3	Intersection LOS: D
Intersection Capacity Utilization 82.9%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 2: Cactus Av. & Gilbert St.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	12	3586	1710	2	2	23
Future Volume (veh/h)	12	3586	1710	2	2	23
Number	5	2	6	16	7	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.98	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	12	3735	1781	2	2	21
Adj No. of Lanes	1	3	3	1	1	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	28	3677	3172	967	162	169
Arrive On Green	0.02	0.71	0.61	0.61	0.09	0.09
Sat Flow, veh/h	1810	5358	5358	1580	1810	1615
Grp Volume(v), veh/h	12	3735	1781	2	2	21
Grp Sat Flow(s),veh/h/ln	1810	1729	1729	1580	1810	1615
Q Serve(g_s), s	0.4	39.7	11.4	0.0	0.1	0.7
Cycle Q Clear(g_c), s	0.4	39.7	11.4	0.0	0.1	0.7
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	28	3677	3172	967	162	169
V/C Ratio(X)	0.44	1.02	0.56	0.00	0.01	0.12
Avail Cap(c_a), veh/h	162	3677	3172	967	937	861
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.3	8.1	6.4	4.2	23.2	22.8
Incr Delay (d2), s/veh	4.0	18.9	0.2	0.0	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	24.5	5.3	0.0	0.0	0.6
LnGrp Delay(d),s/veh	31.3	27.1	6.7	4.2	23.3	23.1
LnGrp LOS	C	F	A	A	C	C
Approach Vol, veh/h		3747	1783		23	
Approach Delay, s/veh		27.1	6.7		23.1	
Approach LOS		C	A		C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		45.9		10.1	5.5	40.4		
Change Period (Y+Rc), s		6.2		5.1	4.6	6.2		
Max Green Setting (Gmax), s		39.7		29.0	5.0	30.1		
Max Q Clear Time (g_c+I1), s		41.7		2.7	2.4	13.4		
Green Ext Time (p_c), s		0.0		0.0	0.0	16.7		

Intersection Summary	
HCM 2010 Ctrl Delay	20.5
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	6	144	134	2	4	14
Future Vol, veh/h	6	144	134	2	4	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	7	157	146	2	4	15

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	148	0	-	0	317	147
Stage 1	-	-	-	-	147	-
Stage 2	-	-	-	-	170	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1446	-	-	-	680	905
Stage 1	-	-	-	-	885	-
Stage 2	-	-	-	-	865	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1446	-	-	-	677	905
Mov Cap-2 Maneuver	-	-	-	-	707	-
Stage 1	-	-	-	-	885	-
Stage 2	-	-	-	-	861	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	9.3
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1446	-	-	-	852
HCM Lane V/C Ratio	0.005	-	-	-	0.023
HCM Control Delay (s)	7.5	-	-	-	9.3
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	4	144	128	3	6	8
Future Vol, veh/h	4	144	128	3	6	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	4	157	139	3	7	9

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	142	0	-	0	306	141
Stage 1	-	-	-	-	141	-
Stage 2	-	-	-	-	165	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1453	-	-	-	690	912
Stage 1	-	-	-	-	891	-
Stage 2	-	-	-	-	869	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1453	-	-	-	688	912
Mov Cap-2 Maneuver	-	-	-	-	715	-
Stage 1	-	-	-	-	891	-
Stage 2	-	-	-	-	867	-

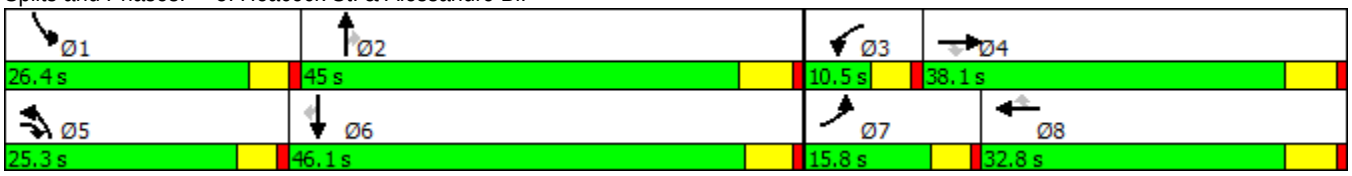
Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	9.5
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1453	-	-	-	816
HCM Lane V/C Ratio	0.003	-	-	-	0.019
HCM Control Delay (s)	7.5	-	-	-	9.5
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	167	1397	195	104	850	176	245	585	145	277	690	178
Future Volume (vph)	167	1397	195	104	850	176	245	585	145	277	690	178
Turn Type	Prot	NA	pm+ov	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	5	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	5.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	9.6	32.8	9.6	9.6	32.8	32.8	9.6	44.8	44.8	9.6	44.4	44.4
Total Split (s)	15.8	38.1	25.3	10.5	32.8	32.8	25.3	45.0	45.0	26.4	46.1	46.1
Total Split (%)	13.2%	31.8%	21.1%	8.8%	27.3%	27.3%	21.1%	37.5%	37.5%	22.0%	38.4%	38.4%
Yellow Time (s)	3.6	4.8	3.6	3.6	4.8	4.8	3.6	4.8	4.8	3.6	4.4	4.4
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.8	4.6	4.6	5.8	5.8	4.6	5.8	5.8	4.6	5.4	5.4
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	11.3	32.6	51.8	6.0	27.3	27.3	18.0	26.2	26.2	19.8	28.4	28.4
Actuated g/C Ratio	0.11	0.31	0.49	0.06	0.26	0.26	0.17	0.25	0.25	0.19	0.27	0.27
v/c Ratio	0.89	0.90	0.25	1.06	0.65	0.34	0.82	0.67	0.29	0.85	0.73	0.33
Control Delay	91.0	44.8	10.4	155.7	39.1	7.3	65.5	39.6	6.2	65.4	39.9	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	91.0	44.8	10.4	155.7	39.1	7.3	65.5	39.6	6.2	65.4	39.9	5.8
LOS	F	D	B	F	D	A	E	D	A	E	D	A
Approach Delay		45.4			44.8			41.1			40.7	
Approach LOS		D			D			D			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 105.5	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.06	
Intersection Signal Delay: 43.4	Intersection LOS: D
Intersection Capacity Utilization 84.6%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 5: Heacock St. & Alessandro Bl.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	167	1397	195	104	850	176	245	585	145	277	690	178
Future Volume (veh/h)	167	1397	195	104	850	176	245	585	145	277	690	178
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	172	1440	155	107	876	130	253	603	117	286	711	119
Adj No. of Lanes	1	3	1	1	3	1	1	2	1	1	2	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	190	1569	735	100	1311	397	284	981	436	317	1045	467
Arrive On Green	0.11	0.30	0.30	0.06	0.25	0.25	0.16	0.27	0.27	0.18	0.29	0.29
Sat Flow, veh/h	1810	5187	1590	1810	5187	1569	1810	3610	1604	1810	3610	1613
Grp Volume(v), veh/h	172	1440	155	107	876	130	253	603	117	286	711	119
Grp Sat Flow(s),veh/h/ln	1810	1729	1590	1810	1729	1569	1810	1805	1604	1810	1805	1613
Q Serve(g_s), s	10.0	28.5	6.2	5.9	16.2	7.2	14.6	15.5	6.1	16.5	18.5	6.0
Cycle Q Clear(g_c), s	10.0	28.5	6.2	5.9	16.2	7.2	14.6	15.5	6.1	16.5	18.5	6.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	190	1569	735	100	1311	397	284	981	436	317	1045	467
V/C Ratio(X)	0.90	0.92	0.21	1.07	0.67	0.33	0.89	0.61	0.27	0.90	0.68	0.25
Avail Cap(c_a), veh/h	190	1574	736	100	1316	398	352	1330	591	371	1381	617
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.1	35.8	17.2	50.3	35.8	32.4	44.0	33.9	30.4	43.0	33.4	29.0
Incr Delay (d2), s/veh	38.5	8.9	0.1	109.0	1.3	0.5	18.1	0.6	0.3	20.8	0.9	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.1	14.9	2.8	6.0	7.9	3.2	8.7	7.8	2.8	10.1	9.4	2.7
LnGrp Delay(d),s/veh	85.5	44.8	17.4	159.7	37.1	32.9	62.1	34.5	30.8	63.8	34.3	29.3
LnGrp LOS	F	D	B	F	D	C	E	C	C	E	C	C
Approach Vol, veh/h		1767			1113			973			1116	
Approach Delay, s/veh		46.3			48.4			41.2			41.3	
Approach LOS		D			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	23.2	34.7	10.5	38.0	21.3	36.6	15.8	32.7
Change Period (Y+Rc), s	4.6	5.8	4.6	5.8	4.6	* 5.8	4.6	5.8
Max Green Setting (Gmax), s	21.8	39.2	5.9	32.3	20.7	* 41	11.2	27.0
Max Q Clear Time (g_c+I1), s	18.5	17.5	7.9	30.5	16.6	20.5	12.0	18.2
Green Ext Time (p_c), s	0.1	9.7	0.0	1.7	0.1	9.4	0.0	7.7

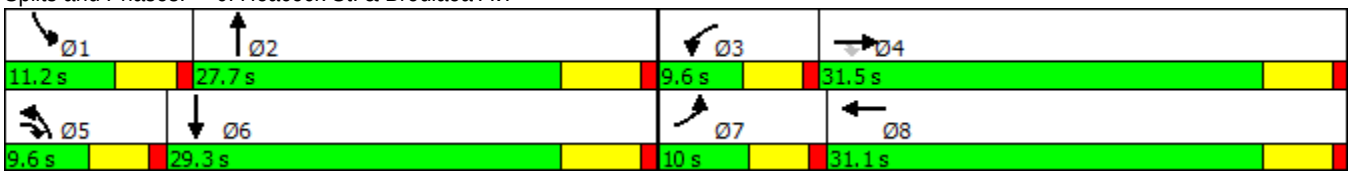
Intersection Summary	
HCM 2010 Ctrl Delay	44.7
HCM 2010 LOS	D

Notes

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	35	88	27	21	72	23	792	54	909
Future Volume (vph)	35	88	27	21	72	23	792	54	909
Turn Type	Prot	NA	pm+ov	Prot	NA	Prot	NA	Prot	NA
Protected Phases	7	4	5	3	8	5	2	1	6
Permitted Phases			4						
Detector Phase	7	4	5	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	10.0	5.0	5.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	9.6	31.1	9.6	9.6	31.1	9.6	23.8	9.6	25.8
Total Split (s)	10.0	31.5	9.6	9.6	31.1	9.6	27.7	11.2	29.3
Total Split (%)	12.5%	39.4%	12.0%	12.0%	38.9%	12.0%	34.6%	14.0%	36.6%
Yellow Time (s)	3.6	4.1	3.6	3.6	4.1	3.6	4.8	3.6	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.1	4.6	4.6	5.1	4.6	5.8	4.6	5.8
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	5.8	15.0	21.2	5.6	13.3	5.6	26.8	6.3	27.5
Actuated g/C Ratio	0.11	0.28	0.39	0.10	0.25	0.10	0.50	0.12	0.51
v/c Ratio	0.19	0.18	0.04	0.12	0.25	0.13	0.48	0.27	0.54
Control Delay	32.5	18.4	0.1	32.4	16.6	32.6	17.7	32.1	17.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.5	18.4	0.1	32.4	16.6	32.6	17.7	32.1	17.9
LOS	C	B	A	C	B	C	B	C	B
Approach Delay		18.4			19.2		18.1		18.6
Approach LOS		B			B		B		B

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 53.8	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.54	
Intersection Signal Delay: 18.5	Intersection LOS: B
Intersection Capacity Utilization 51.9%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 6: Heacock St. & Brodiaea Av.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	88	27	21	72	37	23	792	21	54	909	35
Future Volume (veh/h)	35	88	27	21	72	37	23	792	21	54	909	35
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	37	93	17	22	76	16	24	834	18	57	957	35
Adj No. of Lanes	1	1	1	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	71	365	355	47	271	57	51	1292	28	96	1359	50
Arrive On Green	0.04	0.19	0.19	0.03	0.18	0.18	0.03	0.36	0.36	0.05	0.38	0.38
Sat Flow, veh/h	1810	1900	1615	1810	1519	320	1810	3613	78	1810	3552	130
Grp Volume(v), veh/h	37	93	17	22	0	92	24	417	435	57	486	506
Grp Sat Flow(s),veh/h/ln	1810	1900	1615	1810	0	1839	1810	1805	1886	1810	1805	1877
Q Serve(g_s), s	1.1	2.3	0.4	0.6	0.0	2.3	0.7	10.4	10.4	1.7	12.3	12.3
Cycle Q Clear(g_c), s	1.1	2.3	0.4	0.6	0.0	2.3	0.7	10.4	10.4	1.7	12.3	12.3
Prop In Lane	1.00		1.00	1.00		0.17	1.00		0.04	1.00		0.07
Lane Grp Cap(c), veh/h	71	365	355	47	0	328	51	645	674	96	691	718
V/C Ratio(X)	0.52	0.26	0.05	0.47	0.00	0.28	0.47	0.65	0.65	0.59	0.70	0.70
Avail Cap(c_a), veh/h	181	927	833	167	0	883	167	731	763	221	784	815
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.5	18.6	16.6	26.0	0.0	19.2	25.9	14.5	14.5	25.0	14.1	14.1
Incr Delay (d2), s/veh	2.2	0.4	0.1	2.7	0.0	0.5	2.5	1.6	1.6	2.2	2.5	2.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	1.2	0.2	0.4	0.0	1.2	0.4	5.4	5.6	0.9	6.6	6.8
LnGrp Delay(d),s/veh	27.6	18.9	16.7	28.6	0.0	19.7	28.4	16.2	16.1	27.2	16.6	16.5
LnGrp LOS	C	B	B	C		B	C	B	B	C	B	B
Approach Vol, veh/h		147			114			876			1049	
Approach Delay, s/veh		20.9			21.4			16.5			17.1	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.5	25.1	6.0	15.5	6.1	26.5	6.7	14.8
Change Period (Y+Rc), s	4.6	5.8	4.6	5.1	4.6	5.8	4.6	5.1
Max Green Setting (Gmax), s	6.6	21.9	5.0	26.4	5.0	23.5	5.4	26.0
Max Q Clear Time (g_c+I1), s	3.7	12.4	2.6	4.3	2.7	14.3	3.1	4.3
Green Ext Time (p_c), s	0.0	6.5	0.0	1.0	0.0	6.4	0.0	1.0

Intersection Summary	
HCM 2010 Ctrl Delay	17.3
HCM 2010 LOS	B

APPENDIX 6.3:

OPENING YEAR CUMULATIVE (2022) WITHOUT PROJECT CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS

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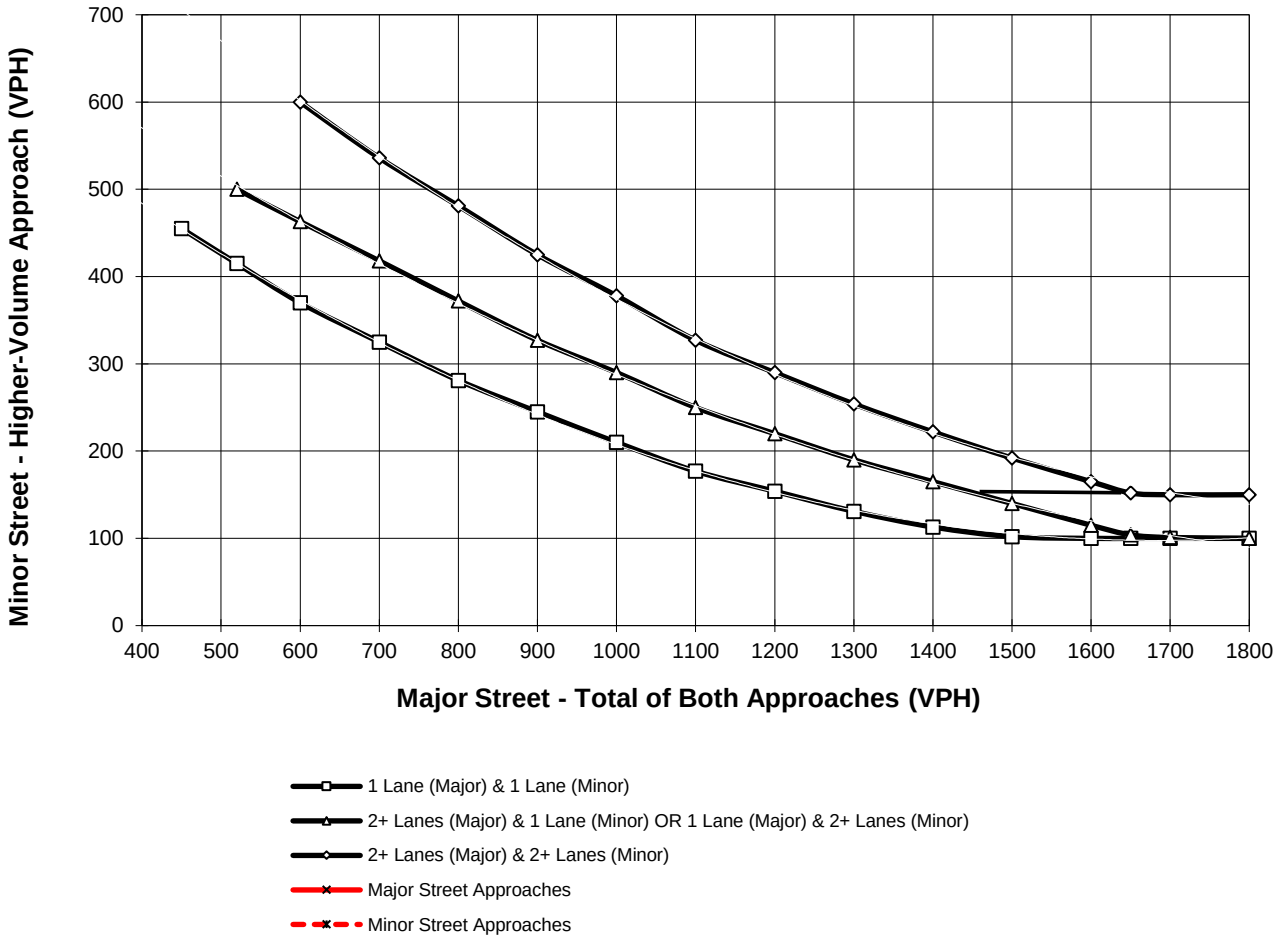
Figure 4C-3. Warrant 3, Peak Hour

Traffic Conditions = **Opening Year Cumulative (2022) Without Project Conditions - Weekday PM Peak Hour**

Major Street Name = **Brodiaea Avenue**
Total of Both Approaches (VPH) = **259**
Number of Approach Lanes on Major Street = **1**

Minor Street Name = **Gilbert Street**
High Volume Approach (VPH) = **27**
Number of Approach Lanes On Minor Street = **1**

SIGNAL WARRANT NOT SATISFIED



*Note: 150 vph applies as the lower threshold for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold for a minor-street approach with one lane

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APPENDIX 6.4:

OPENING YEAR CUMULATIVE (2022) WITH PROJECT CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS

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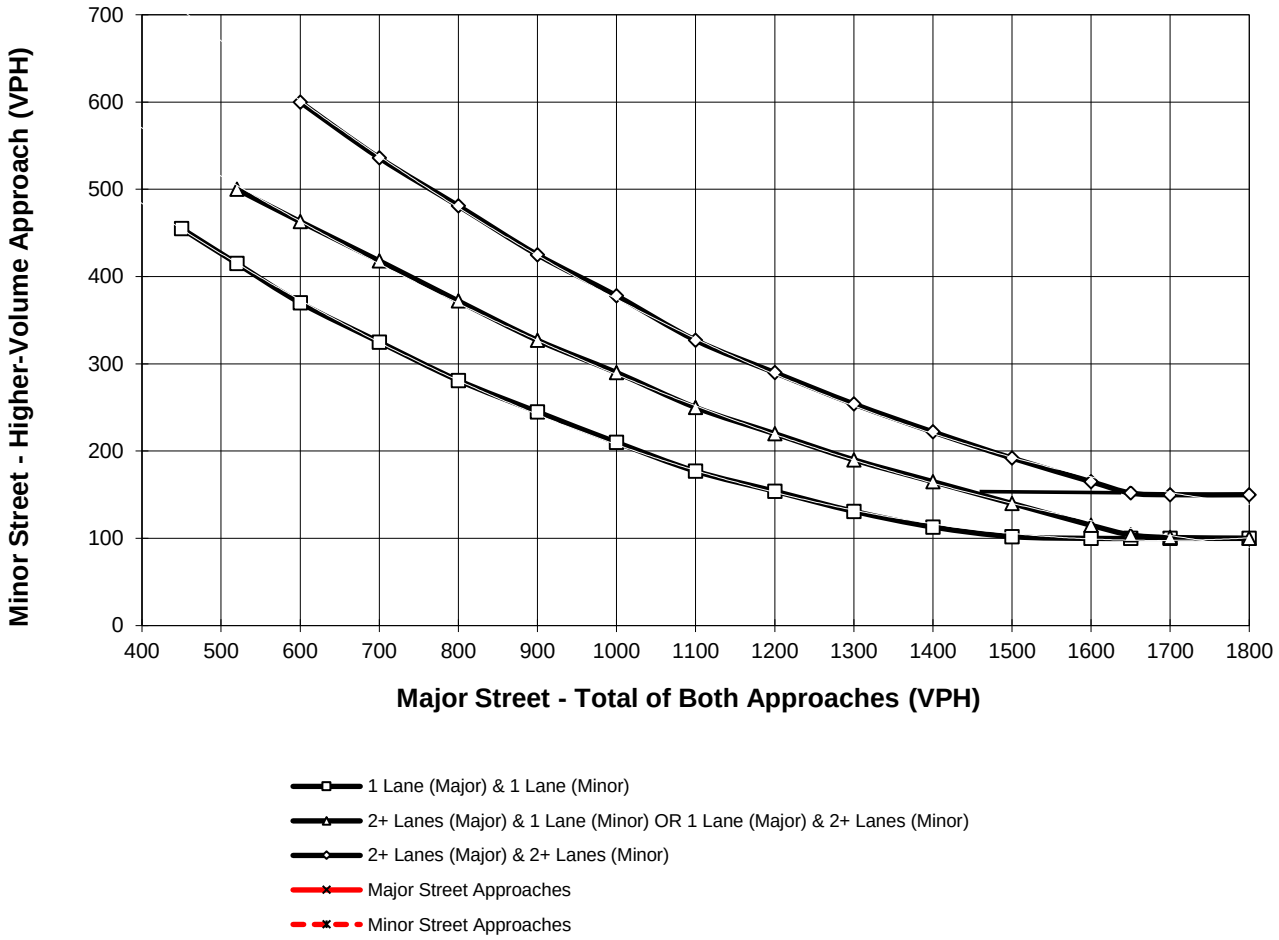
Figure 4C-3. Warrant 3, Peak Hour

Traffic Conditions = **Openng Year Cumulative (2022) With Project Conditions - Weekday PM Peak Hour**

Major Street Name = **Brodiaea Avenue**
Total of Both Approaches (VPH) = **282**
Number of Approach Lanes on Major Street = **1**

Minor Street Name = **Gilbert Street**
High Volume Approach (VPH) = **36**
Number of Approach Lanes On Minor Street = **1**

SIGNAL WARRANT NOT SATISFIED



*Note: 150 vph applies as the lower threshold for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold for a minor-street approach with one lane

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet
(Average Traffic Estimate Form)

___	___	___	___		TRAFFIC CONDITIONS		**OYC 2022 WP**
DIST	CO	RTE	PM	CALC	BA	DATE	09/21/16
Jurisdiction:	**City of Moreno Valley**			CHK	BA	DATE	09/21/16
Major Street:	**Brodiaea Av.**				Critical Approach Speed (Major)		35 mph
Minor Street:	**Driveway 1**				Critical Approach Speed (Minor)		15 mph

Major Street Approach Lanes = **1** lane Minor Street Approach Lanes **1** lane

Major Street Future ADT = **3,415** vpd Minor Street Future ADT = **209** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); …….. [ ]

or **URBAN (U)**

In built up area of isolated community of < 10,000 population …… [ ]

(Based on Estimated Average Daily Traffic - See Note)

URBAN	RURAL	Minimum Requirements EADT			
XX					
CONDITION A - Minimum Vehicular Volume		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **3,415**	*1* **209**	8,000	5,600	2,400	1,680
2 +	*1*	9,600	6,720	2,400	1,680
2 +	*2 +*	9,600	6,720	3,200	2,240
1	*2 +*	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **3,415**	*1* **209**	12,000	8,400	1,200	850
2 +	*1*	14,400	10,080	1,200	850
2 +	*2 +*	14,400	10,080	1,600	1,120
1	*2 +*	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B					
Satisfied	Not Satisfied				
	XX	2 CONDITIONS 80%		2 CONDITIONS 80%	
No one condition satisfied, but following conditions fulfilled 80% of more …..	**A** 9% **B** 17%				

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet
(Average Traffic Estimate Form)

___	___	___	___		TRAFFIC CONDITIONS		**OYC 2022 WP**
DIST	CO	RTE	PM	CALC	BA	DATE	09/21/16
Jurisdiction:	**City of Moreno Valley**			CHK	BA	DATE	09/21/16
Major Street:	**Brodiaea Av.**				Critical Approach Speed (Major)		35 mph
Minor Street:	**Driveway 2**				Critical Approach Speed (Minor)		15 mph

Major Street Approach Lanes = **1** lane Minor Street Approach Lanes **1** lane

Major Street Future ADT = **3,276** vpd Minor Street Future ADT = **136** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); …….. [ ]

or **URBAN (U)**

In built up area of isolated community of < 10,000 population …… [ ]

(Based on Estimated Average Daily Traffic - See Note)

URBAN	RURAL	Minimum Requirements EADT			
XX					
CONDITION A - Minimum Vehicular Volume		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **3,276**	*1* **136**	8,000	5,600	2,400	1,680
2 +	*1*	9,600	6,720	2,400	1,680
2 +	*2 +*	9,600	6,720	3,200	2,240
1	*2 +*	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **3,276**	*1* **136**	12,000	8,400	1,200	850
2 +	*1*	14,400	10,080	1,200	850
2 +	*2 +*	14,400	10,080	1,600	1,120
1	*2 +*	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B					
Satisfied	Not Satisfied				
	XX	2 CONDITIONS 80%		2 CONDITIONS 80%	
No one condition satisfied, but following conditions fulfilled 80% of more …..	**A** **6%** **B** **11%**				

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

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APPENDIX 6.5:

OPENING YEAR CUMULATIVE (2022) WITHOUT PROJECT CONDITIONS QUEUING ANALYSIS WORKSHEETS

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Intersection: 1: Gilbert St. & Brodiaea Av.

Movement	WB	NB	NB
Directions Served	L	L	R
Maximum Queue (ft)	12	48	40
Average Queue (ft)	0	14	14
95th Queue (ft)	6	41	39
Link Distance (ft)			1096
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	155	145	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: Cactus Av. & Gilbert St.

Movement	EB	EB	EB	EB	WB	WB	WB	WB	SB	SB
Directions Served	L	T	T	T	T	T	T	R	L	R
Maximum Queue (ft)	73	191	157	124	430	407	351	26	42	43
Average Queue (ft)	23	70	52	27	217	194	151	3	9	10
95th Queue (ft)	57	133	106	72	358	334	289	17	31	29
Link Distance (ft)		928	928	928	969	969	969	969		1096
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	150								150	
Storage Blk Time (%)		1								
Queuing Penalty (veh)		0								

Intersection: 5: Heacock St. & Alessandro Bl.

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	T	T	T	R	L	T	T	T	R	L	T
Maximum Queue (ft)	138	191	150	102	50	175	497	483	359	107	195	462
Average Queue (ft)	64	111	70	15	13	98	364	322	235	36	169	230
95th Queue (ft)	121	170	135	58	32	203	473	438	333	77	225	414
Link Distance (ft)		1203	1203	1203			778	778	778	778		1141
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	205				105	120					145	
Storage Blk Time (%)	0	0		0		2	55				36	6
Queuing Penalty (veh)	0	0		0		8	41				124	13

Intersection: 5: Heacock St. & Alessandro Bl.

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	T	T	R
Maximum Queue (ft)	426	65	195	207	221	137
Average Queue (ft)	202	22	95	126	93	64
95th Queue (ft)	350	45	167	186	175	115
Link Distance (ft)	1141	1141		921	921	921
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			250			
Storage Blk Time (%)				0		
Queuing Penalty (veh)				0		

Intersection: 6: Heacock St. & Brodiaea Av.

Movement	EB	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	52	48	35	42	112	72	222	181	80	204	216
Average Queue (ft)	17	15	11	10	54	28	109	73	14	74	88
95th Queue (ft)	45	44	34	33	97	59	188	147	49	161	177
Link Distance (ft)		157			697		1125	1125		1141	1141
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	150		150	90		150			100		
Storage Blk Time (%)					1		3			4	
Queuing Penalty (veh)					0		1			1	

Network Summary

Network wide Queuing Penalty: 188

Intersection: 1: Gilbert St. & Brodiaea Av.

Movement	WB	NB	NB
Directions Served	L	L	R
Maximum Queue (ft)	18	31	34
Average Queue (ft)	1	7	14
95th Queue (ft)	10	28	37
Link Distance (ft)			1096
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	155	145	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: Cactus Av. & Gilbert St.

Movement	EB	EB	EB	EB	WB	WB	WB	WB	SB	SB
Directions Served	L	T	T	T	T	T	T	R	L	R
Maximum Queue (ft)	116	792	762	692	214	204	161	5	20	20
Average Queue (ft)	7	357	341	292	80	63	33	0	1	1
95th Queue (ft)	68	709	676	600	164	147	94	3	9	10
Link Distance (ft)		928	928	928	969	969	969	969		1096
Upstream Blk Time (%)		1	1	0						
Queuing Penalty (veh)		0	0	0						
Storage Bay Dist (ft)	150								150	
Storage Blk Time (%)		23								
Queuing Penalty (veh)		1								

Intersection: 5: Heacock St. & Alessandro Bl.

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	T	T	T	R	L	T	T	T	R	L	T
Maximum Queue (ft)	399	579	546	495	150	175	412	412	218	100	194	320
Average Queue (ft)	221	392	363	318	102	133	270	231	132	40	158	170
95th Queue (ft)	423	600	566	512	202	219	385	347	229	80	224	297
Link Distance (ft)		1203	1203	1203			778	778	778	778		1141
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	205				105	120					145	
Storage Blk Time (%)	17	46		44	0	26	42				19	5
Queuing Penalty (veh)	79	77		85	1	74	44				56	11

Intersection: 5: Heacock St. & Alessandro Bl.

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	T	T	R
Maximum Queue (ft)	297	84	306	316	289	100
Average Queue (ft)	149	37	186	186	160	36
95th Queue (ft)	241	70	282	277	241	74
Link Distance (ft)	1141	1141		921	921	921
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			250			
Storage Blk Time (%)			3	1		
Queuing Penalty (veh)			9	2		

Intersection: 6: Heacock St. & Brodiaea Av.

Movement	EB	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	74	87	40	50	115	38	203	176	146	257	260
Average Queue (ft)	25	37	12	15	45	14	108	66	40	121	137
95th Queue (ft)	59	70	36	39	86	37	178	135	90	225	240
Link Distance (ft)		157			697		1125	1125		1141	1141
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	150		150	90		150			100		
Storage Blk Time (%)					1		2		0	8	
Queuing Penalty (veh)					0		0		1	4	

Network Summary

Network wide Queuing Penalty: 444

APPENDIX 6.6:

OPENING YEAR CUMULATIVE (2022) WITH PROJECT CONDITIONS QUEUING ANALYSIS WORKSHEETS

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Intersection: 1: Gilbert St. & Brodiaea Av.

Movement	WB	NB	NB
Directions Served	L	L	R
Maximum Queue (ft)	25	36	54
Average Queue (ft)	1	13	20
95th Queue (ft)	10	38	45
Link Distance (ft)			1096
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	155	145	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: Cactus Av. & Gilbert St.

Movement	EB	EB	EB	EB	WB	WB	WB	WB	SB	SB
Directions Served	L	T	T	T	T	T	T	R	L	R
Maximum Queue (ft)	78	217	205	158	707	661	610	22	43	52
Average Queue (ft)	30	86	66	39	360	336	286	3	9	13
95th Queue (ft)	65	171	147	98	699	655	590	18	32	37
Link Distance (ft)		928	928	928	969	969	969	969		1096
Upstream Blk Time (%)					0					
Queuing Penalty (veh)					0					
Storage Bay Dist (ft)	150								150	
Storage Blk Time (%)		2								
Queuing Penalty (veh)		1								

Intersection: 3: Brodiaea Av. & Dwy. 1

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (ft)	18	30
Average Queue (ft)	2	8
95th Queue (ft)	13	29
Link Distance (ft)		217
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	100	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: Brodiaea Av. & Dwy. 2

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (ft)	12	30
Average Queue (ft)	1	6
95th Queue (ft)	9	26
Link Distance (ft)		126
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	100	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: Heacock St. & Alessandro Bl.

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	T	T	T	R	L	T	T	T	R	L	T
Maximum Queue (ft)	155	169	154	83	44	175	551	504	384	93	195	354
Average Queue (ft)	71	108	70	13	12	101	368	323	232	34	152	187
95th Queue (ft)	126	162	136	46	30	205	498	455	347	72	219	304
Link Distance (ft)		1203	1203	1203			778	778	778	778		1141
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	205				105	120					145	
Storage Blk Time (%)				0		1	54				19	9
Queuing Penalty (veh)				0		5	41				67	20

Intersection: 5: Heacock St. & Alessandro Bl.

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	T	T	R
Maximum Queue (ft)	340	57	215	209	179	145
Average Queue (ft)	180	23	93	128	94	61
95th Queue (ft)	285	46	174	192	165	112
Link Distance (ft)	1141	1141		921	921	921
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			250			
Storage Blk Time (%)			0			
Queuing Penalty (veh)			0			

Intersection: 6: Heacock St. & Brodiaea Av.

Movement	EB	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	55	53	35	42	116	66	214	162	83	202	208
Average Queue (ft)	19	13	10	9	57	24	114	71	15	76	92
95th Queue (ft)	47	42	34	31	100	53	190	147	51	157	173
Link Distance (ft)		157			697		1125	1125		1141	1141
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	150		150	90		150			100		
Storage Blk Time (%)					2		3			4	
Queuing Penalty (veh)					0		1			1	

Network Summary

Network wide Queuing Penalty: 136

Intersection: 1: Gilbert St. & Brodiaea Av.

Movement	WB	NB	NB
Directions Served	L	L	R
Maximum Queue (ft)	31	31	34
Average Queue (ft)	4	8	16
95th Queue (ft)	22	29	39
Link Distance (ft)			1096
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	155	145	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: Cactus Av. & Gilbert St.

Movement	EB	EB	EB	EB	WB	WB	WB	WB	SB	SB
Directions Served	L	T	T	T	T	T	T	R	L	R
Maximum Queue (ft)	214	857	842	816	212	193	158	9	15	34
Average Queue (ft)	25	407	391	342	90	64	35	0	1	10
95th Queue (ft)	125	801	771	711	163	137	93	6	7	29
Link Distance (ft)		928	928	928	969	969	969	969		1096
Upstream Blk Time (%)		2	1	1						
Queuing Penalty (veh)		0	0	0						
Storage Bay Dist (ft)	150								150	
Storage Blk Time (%)		24								
Queuing Penalty (veh)		3								

Intersection: 3: Brodiaea Av. & Dwy. 1

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (ft)	12	40
Average Queue (ft)	0	15
95th Queue (ft)	6	41
Link Distance (ft)		217
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	100	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: Brodiaea Av. & Dwy. 2

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (ft)	6	35
Average Queue (ft)	0	11
95th Queue (ft)	4	35
Link Distance (ft)		126
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	100	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: Heacock St. & Alessandro Bl.

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	T	T	T	R	L	T	T	T	R	L	T
Maximum Queue (ft)	400	668	661	541	150	175	397	368	237	110	194	377
Average Queue (ft)	275	452	421	343	101	135	265	221	123	40	161	178
95th Queue (ft)	491	662	630	532	202	216	379	342	227	82	219	314
Link Distance (ft)		1203	1203	1203			778	778	778	778		1141
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	205				105	120					145	
Storage Blk Time (%)	23	49		49	0	25	40				22	6
Queuing Penalty (veh)	105	81		97	2	72	41				64	15

Intersection: 5: Heacock St. & Alessandro Bl.

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	T	T	R
Maximum Queue (ft)	325	100	300	394	349	79
Average Queue (ft)	160	45	188	191	154	33
95th Queue (ft)	261	86	301	340	267	63
Link Distance (ft)	1141	1141		921	921	921
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			250			
Storage Blk Time (%)			6	0		
Queuing Penalty (veh)			22	1		

Intersection: 6: Heacock St. & Brodiaea Av.

Movement	EB	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	73	98	44	46	114	53	230	205	143	263	265
Average Queue (ft)	28	41	14	13	46	14	111	76	39	117	135
95th Queue (ft)	60	80	39	37	85	39	187	152	87	221	236
Link Distance (ft)		157			697		1125	1125		1141	1141
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	150		150	90		150			100		
Storage Blk Time (%)		0			1		3		0	8	
Queuing Penalty (veh)		0			0		1		1	4	

Network Summary

Network wide Queuing Penalty: 510

APPENDIX 7.1:

HORIZON YEAR (2040) WITHOUT PROJECT CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

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Intersection	
Int Delay, s/veh	1.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	51	10	10	180	18	22
Future Vol, veh/h	51	10	10	180	18	22
Conflicting Peds, #/hr	0	3	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	155	-	145	0
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	75	75	75	75	75	75
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	68	13	13	240	24	29

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	84	0	345	78
Stage 1	-	-	-	-	78	-
Stage 2	-	-	-	-	267	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1526	-	656	988
Stage 1	-	-	-	-	950	-
Stage 2	-	-	-	-	782	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1526	-	649	985
Mov Cap-2 Maneuver	-	-	-	-	673	-
Stage 1	-	-	-	-	947	-
Stage 2	-	-	-	-	775	-

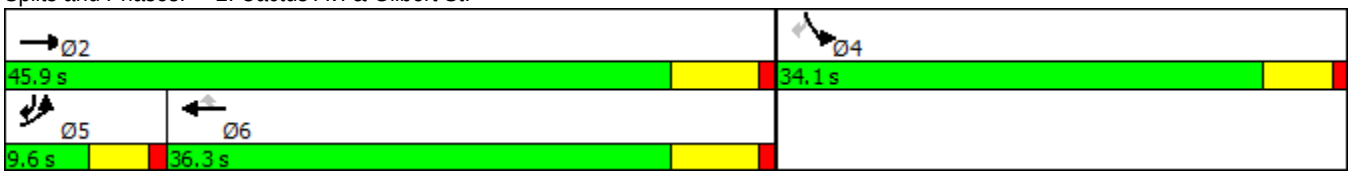
Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	9.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	673	985	-	-	1526	-
HCM Lane V/C Ratio	0.036	0.03	-	-	0.009	-
HCM Control Delay (s)	10.5	8.8	-	-	7.4	-
HCM Lane LOS	B	A	-	-	A	-
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	29	1981	3280	13	15	24
Future Volume (vph)	29	1981	3280	13	15	24
Turn Type	Prot	NA	NA	Perm	Prot	pm+ov
Protected Phases	5	2	6		4	5
Permitted Phases				6		4
Detector Phase	5	2	6	6	4	5
Switch Phase						
Minimum Initial (s)	5.0	10.0	10.0	10.0	5.0	5.0
Minimum Split (s)	9.6	16.2	29.2	29.2	34.1	9.6
Total Split (s)	9.6	45.9	36.3	36.3	34.1	9.6
Total Split (%)	12.0%	57.4%	45.4%	45.4%	42.6%	12.0%
Yellow Time (s)	3.6	5.2	5.2	5.2	4.1	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	6.2	6.2	6.2	5.1	4.6
Lead/Lag	Lead		Lag	Lag		Lead
Lead-Lag Optimize?	Yes		Yes	Yes		Yes
Recall Mode	None	None	None	None	Min	None
Act Effct Green (s)	5.2	36.5	31.3	31.3	9.3	19.8
Actuated g/C Ratio	0.09	0.63	0.54	0.54	0.16	0.34
v/c Ratio	0.19	0.61	1.19	0.01	0.05	0.04
Control Delay	32.4	8.8	107.4	8.7	20.1	13.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.4	8.8	107.4	8.7	20.1	13.1
LOS	C	A	F	A	C	B
Approach Delay		9.2	107.0		15.8	
Approach LOS		A	F		B	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 57.6	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.19	
Intersection Signal Delay: 69.5	Intersection LOS: E
Intersection Capacity Utilization 77.0%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 2: Cactus Av. & Gilbert St.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	29	1981	3280	13	15	24
Future Volume (veh/h)	29	1981	3280	13	15	24
Number	5	2	6	16	7	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	30	2021	3347	13	15	17
Adj No. of Lanes	1	3	3	1	1	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	61	3617	3000	934	168	204
Arrive On Green	0.03	0.70	0.58	0.58	0.09	0.09
Sat Flow, veh/h	1810	5358	5358	1615	1810	1615
Grp Volume(v), veh/h	30	2021	3347	13	15	17
Grp Sat Flow(s),veh/h/ln	1810	1729	1729	1615	1810	1615
Q Serve(g_s), s	0.9	10.4	31.1	0.2	0.4	0.5
Cycle Q Clear(g_c), s	0.9	10.4	31.1	0.2	0.4	0.5
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	61	3617	3000	934	168	204
V/C Ratio(X)	0.49	0.56	1.12	0.01	0.09	0.08
Avail Cap(c_a), veh/h	168	3824	3000	934	974	924
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.6	4.0	11.4	4.8	22.3	20.8
Incr Delay (d2), s/veh	2.3	0.2	57.3	0.0	0.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	4.9	30.4	0.1	0.2	0.5
LnGrp Delay(d),s/veh	27.9	4.2	68.7	4.8	22.6	20.9
LnGrp LOS	C	A	F	A	C	C
Approach Vol, veh/h		2051	3360		32	
Approach Delay, s/veh		4.6	68.4		21.7	
Approach LOS		A	E		C	

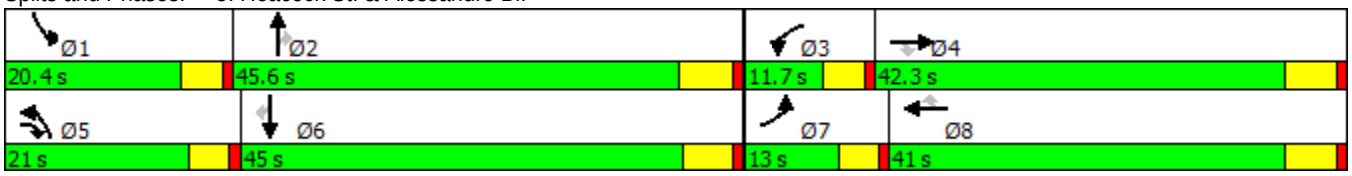
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		43.8		10.1	6.4	37.3		
Change Period (Y+Rc), s		6.2		5.1	4.6	6.2		
Max Green Setting (Gmax), s		39.7		29.0	5.0	30.1		
Max Q Clear Time (g_c+I1), s		12.4		2.5	2.9	33.1		
Green Ext Time (p_c), s		25.1		0.1	0.0	0.0		

Intersection Summary	
HCM 2010 Ctrl Delay	44.1
HCM 2010 LOS	D

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	126	902	100	81	1959	295	252	762	111	282	481	258
Future Volume (vph)	126	902	100	81	1959	295	252	762	111	282	481	258
Turn Type	Prot	NA	pm+ov	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	5	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	5.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	9.6	32.8	9.6	9.6	32.8	32.8	9.6	44.8	44.8	9.6	44.4	44.4
Total Split (s)	13.0	42.3	21.0	11.7	41.0	41.0	21.0	45.6	45.6	20.4	45.0	45.0
Total Split (%)	10.8%	35.3%	17.5%	9.8%	34.2%	34.2%	17.5%	38.0%	38.0%	17.0%	37.5%	37.5%
Yellow Time (s)	3.6	4.8	3.6	3.6	4.8	4.8	3.6	4.8	4.8	3.6	4.4	4.4
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.8	4.6	4.6	5.8	5.8	4.6	5.8	5.8	4.6	5.4	5.4
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	8.4	36.7	54.3	7.0	35.3	35.3	16.4	31.2	31.2	15.8	31.0	31.0
Actuated g/C Ratio	0.08	0.33	0.49	0.06	0.32	0.32	0.15	0.28	0.28	0.14	0.28	0.28
v/c Ratio	0.98	0.56	0.13	0.75	1.26	0.49	1.00	0.79	0.22	1.16	0.50	0.49
Control Delay	125.3	33.0	5.1	89.7	154.9	15.3	104.2	43.5	6.3	150.2	35.4	16.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	125.3	33.0	5.1	89.7	154.9	15.3	104.2	43.5	6.3	150.2	35.4	16.7
LOS	F	C	A	F	F	B	F	D	A	F	D	B
Approach Delay		40.9			135.0			53.4			62.4	
Approach LOS		D			F			D			E	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 111.6	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.26	
Intersection Signal Delay: 86.5	Intersection LOS: F
Intersection Capacity Utilization 100.9%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 5: Heacock St. & Alessandro Bl.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	126	902	100	81	1959	295	252	762	111	282	481	258
Future Volume (veh/h)	126	902	100	81	1959	295	252	762	111	282	481	258
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	1.00		0.98	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	133	949	68	85	2062	274	265	802	98	297	506	201
Adj No. of Lanes	1	3	1	1	3	1	1	2	1	1	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	134	1680	749	108	1605	489	261	1064	467	251	1045	462
Arrive On Green	0.07	0.32	0.32	0.06	0.31	0.31	0.14	0.29	0.29	0.14	0.29	0.29
Sat Flow, veh/h	1810	5187	1593	1810	5187	1580	1810	3610	1584	1810	3610	1594
Grp Volume(v), veh/h	133	949	68	85	2062	274	265	802	98	297	506	201
Grp Sat Flow(s),veh/h/ln	1810	1729	1593	1810	1729	1580	1810	1805	1584	1810	1805	1594
Q Serve(g_s), s	8.4	17.2	2.7	5.3	35.2	16.5	16.4	22.9	5.3	15.8	13.2	11.7
Cycle Q Clear(g_c), s	8.4	17.2	2.7	5.3	35.2	16.5	16.4	22.9	5.3	15.8	13.2	11.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	134	1680	749	108	1605	489	261	1064	467	251	1045	462
V/C Ratio(X)	1.00	0.57	0.09	0.79	1.28	0.56	1.02	0.75	0.21	1.18	0.48	0.44
Avail Cap(c_a), veh/h	134	1680	749	113	1605	489	261	1263	554	251	1257	555
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.6	31.8	16.8	52.8	39.3	32.8	48.7	36.4	30.1	49.0	33.4	32.8
Incr Delay (d2), s/veh	76.2	0.4	0.1	26.5	132.8	1.4	59.8	2.2	0.2	114.8	0.3	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.0	8.3	1.2	3.4	36.4	7.4	12.4	11.7	2.3	15.8	6.6	5.2
LnGrp Delay(d),s/veh	128.9	32.3	16.9	79.3	172.1	34.2	108.5	38.5	30.4	163.7	33.7	33.5
LnGrp LOS	F	C	B	E	F	C	F	D	C	F	C	C
Approach Vol, veh/h		1150			2421			1165			1004	
Approach Delay, s/veh		42.5			153.2			53.8			72.1	
Approach LOS		D			F			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	20.4	39.3	11.4	42.6	21.0	38.7	13.0	41.0
Change Period (Y+Rc), s	4.6	5.8	4.6	5.8	4.6	* 5.8	4.6	5.8
Max Green Setting (Gmax), s	15.8	39.8	7.1	36.5	16.4	* 40	8.4	35.2
Max Q Clear Time (g_c+I1), s	17.8	24.9	7.3	19.2	18.4	15.2	10.4	37.2
Green Ext Time (p_c), s	0.0	8.1	0.0	15.8	0.0	10.5	0.0	0.0

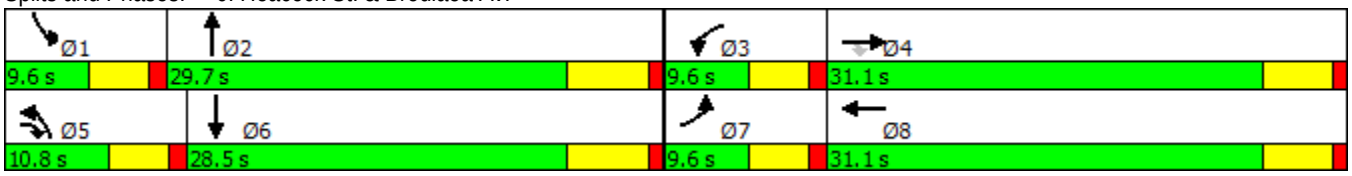
Intersection Summary	
HCM 2010 Ctrl Delay	96.7
HCM 2010 LOS	F

Notes

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	23	28	22	15	120	47	1075	19	592
Future Volume (vph)	23	28	22	15	120	47	1075	19	592
Turn Type	Prot	NA	pm+ov	Prot	NA	Prot	NA	Prot	NA
Protected Phases	7	4	5	3	8	5	2	1	6
Permitted Phases			4						
Detector Phase	7	4	5	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	10.0	5.0	5.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	9.6	31.1	9.6	9.6	31.1	9.6	23.8	9.6	25.8
Total Split (s)	9.6	31.1	10.8	9.6	31.1	10.8	29.7	9.6	28.5
Total Split (%)	12.0%	38.9%	13.5%	12.0%	38.9%	13.5%	37.1%	12.0%	35.6%
Yellow Time (s)	3.6	4.1	3.6	3.6	4.1	3.6	4.8	3.6	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.1	4.6	4.6	5.1	4.6	5.8	4.6	5.8
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	5.2	15.1	21.6	5.2	13.4	5.9	29.6	5.2	24.8
Actuated g/C Ratio	0.09	0.26	0.37	0.09	0.23	0.10	0.50	0.09	0.42
v/c Ratio	0.16	0.06	0.04	0.11	0.43	0.29	0.67	0.13	0.45
Control Delay	32.5	16.7	0.1	31.9	20.1	32.8	17.8	32.2	17.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.5	16.7	0.1	31.9	20.1	32.8	17.8	32.2	17.0
LOS	C	B	A	C	C	C	B	C	B
Approach Delay		16.8			21.1		18.4		17.4
Approach LOS		B			C		B		B

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 59	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.67	
Intersection Signal Delay: 18.3	Intersection LOS: B
Intersection Capacity Utilization 65.3%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 6: Heacock St. & Brodiaea Av.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	23	28	22	15	120	47	47	1075	15	19	592	23
Future Volume (veh/h)	23	28	22	15	120	47	47	1075	15	19	592	23
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	26	31	13	17	133	28	52	1194	13	21	658	24
Adj No. of Lanes	1	1	1	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	54	360	381	38	274	58	90	1480	16	45	1348	49
Arrive On Green	0.03	0.19	0.19	0.02	0.18	0.18	0.05	0.40	0.40	0.02	0.38	0.38
Sat Flow, veh/h	1810	1900	1589	1810	1517	319	1810	3658	40	1810	3549	129
Grp Volume(v), veh/h	26	31	13	17	0	161	52	589	618	21	334	348
Grp Sat Flow(s),veh/h/ln	1810	1900	1589	1810	0	1836	1810	1805	1893	1810	1805	1874
Q Serve(g_s), s	0.8	0.7	0.3	0.5	0.0	4.4	1.6	16.1	16.1	0.6	7.9	7.9
Cycle Q Clear(g_c), s	0.8	0.7	0.3	0.5	0.0	4.4	1.6	16.1	16.1	0.6	7.9	7.9
Prop In Lane	1.00		1.00	1.00		0.17	1.00		0.02	1.00		0.07
Lane Grp Cap(c), veh/h	54	360	381	38	0	331	90	730	766	45	686	712
V/C Ratio(X)	0.48	0.09	0.03	0.45	0.00	0.49	0.58	0.81	0.81	0.47	0.49	0.49
Avail Cap(c_a), veh/h	162	886	821	162	0	856	201	774	811	162	735	763
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.6	18.6	16.3	27.0	0.0	20.5	25.9	14.7	14.7	26.8	13.2	13.2
Incr Delay (d2), s/veh	2.5	0.1	0.0	3.1	0.0	1.1	2.2	6.0	5.8	2.8	0.5	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.4	0.2	0.3	0.0	2.3	0.8	9.1	9.5	0.3	4.0	4.2
LnGrp Delay(d),s/veh	29.1	18.7	16.3	30.1	0.0	21.6	28.1	20.7	20.5	29.6	13.7	13.7
LnGrp LOS	C	B	B	C		C	C	C	C	C	B	B
Approach Vol, veh/h		70			178			1259			703	
Approach Delay, s/veh		22.1			22.4			20.9			14.2	
Approach LOS		C			C			C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.0	28.4	5.8	15.7	7.4	27.0	6.3	15.2
Change Period (Y+Rc), s	4.6	5.8	4.6	5.1	4.6	5.8	4.6	5.1
Max Green Setting (Gmax), s	5.0	23.9	5.0	26.0	6.2	22.7	5.0	26.0
Max Q Clear Time (g_c+I1), s	2.6	18.1	2.5	2.7	3.6	9.9	2.8	6.4
Green Ext Time (p_c), s	0.0	4.5	0.0	1.0	0.0	8.5	0.0	1.0

Intersection Summary	
HCM 2010 Ctrl Delay	18.9
HCM 2010 LOS	B

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	135	10	15	126	10	19
Future Vol, veh/h	135	10	15	126	10	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	155	-	145	0
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	165	12	18	154	12	23

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	177	0	361	171
Stage 1	-	-	-	-	171	-
Stage 2	-	-	-	-	190	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1411	-	642	878
Stage 1	-	-	-	-	864	-
Stage 2	-	-	-	-	847	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1411	-	634	878
Mov Cap-2 Maneuver	-	-	-	-	677	-
Stage 1	-	-	-	-	864	-
Stage 2	-	-	-	-	836	-

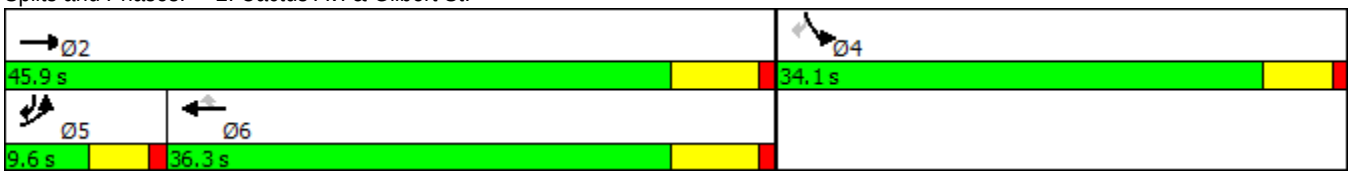
Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	9.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	677	878	-	-	1411	-
HCM Lane V/C Ratio	0.018	0.026	-	-	0.013	-
HCM Control Delay (s)	10.4	9.2	-	-	7.6	-
HCM Lane LOS	B	A	-	-	A	-
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	10	3945	1881	10	10	10
Future Volume (vph)	10	3945	1881	10	10	10
Turn Type	Prot	NA	NA	Perm	Prot	pm+ov
Protected Phases	5	2	6		4	5
Permitted Phases				6		4
Detector Phase	5	2	6	6	4	5
Switch Phase						
Minimum Initial (s)	5.0	10.0	10.0	10.0	5.0	5.0
Minimum Split (s)	9.6	16.2	29.2	29.2	34.1	9.6
Total Split (s)	9.6	45.9	36.3	36.3	34.1	9.6
Total Split (%)	12.0%	57.4%	45.4%	45.4%	42.6%	12.0%
Yellow Time (s)	3.6	5.2	5.2	5.2	4.1	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	6.2	6.2	6.2	5.1	4.6
Lead/Lag	Lead		Lag	Lag		Lead
Lead-Lag Optimize?	Yes		Yes	Yes		Yes
Recall Mode	None	None	None	None	Min	None
Act Effct Green (s)	5.1	40.5	39.0	39.0	9.4	19.7
Actuated g/C Ratio	0.08	0.66	0.64	0.64	0.15	0.32
v/c Ratio	0.07	1.20	0.59	0.01	0.04	0.02
Control Delay	31.1	109.3	11.3	6.6	19.9	12.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.1	109.3	11.3	6.6	19.9	12.1
LOS	C	F	B	A	B	B
Approach Delay		109.1	11.2		16.0	
Approach LOS		F	B		B	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 61.4	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.20	
Intersection Signal Delay: 77.2	Intersection LOS: E
Intersection Capacity Utilization 89.8%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 2: Cactus Av. & Gilbert St.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	10	3945	1881	10	10	10
Future Volume (veh/h)	10	3945	1881	10	10	10
Number	5	2	6	16	7	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.98	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	10	4109	1959	10	10	7
Adj No. of Lanes	1	3	3	1	1	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	23	3677	3184	970	162	165
Arrive On Green	0.01	0.71	0.61	0.61	0.09	0.09
Sat Flow, veh/h	1810	5358	5358	1580	1810	1615
Grp Volume(v), veh/h	10	4109	1959	10	10	7
Grp Sat Flow(s),veh/h/ln	1810	1729	1729	1580	1810	1615
Q Serve(g_s), s	0.3	39.7	13.1	0.1	0.3	0.2
Cycle Q Clear(g_c), s	0.3	39.7	13.1	0.1	0.3	0.2
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	23	3677	3184	970	162	165
V/C Ratio(X)	0.43	1.12	0.62	0.01	0.06	0.04
Avail Cap(c_a), veh/h	162	3677	3184	970	937	857
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.4	8.1	6.7	4.2	23.4	22.7
Incr Delay (d2), s/veh	4.6	57.1	0.4	0.0	0.2	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	37.5	6.3	0.1	0.1	0.2
LnGrp Delay(d),s/veh	32.0	65.3	7.1	4.2	23.5	22.8
LnGrp LOS	C	F	A	A	C	C
Approach Vol, veh/h		4119	1969		17	
Approach Delay, s/veh		65.2	7.0		23.2	
Approach LOS		E	A		C	

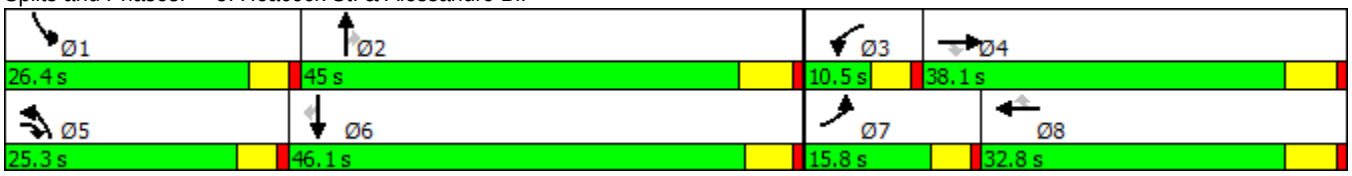
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		45.9		10.1	5.3	40.6		
Change Period (Y+Rc), s		6.2		5.1	4.6	6.2		
Max Green Setting (Gmax), s		39.7		29.0	5.0	30.1		
Max Q Clear Time (g_c+I1), s		41.7		2.3	2.3	15.1		
Green Ext Time (p_c), s		0.0		0.0	0.0	15.0		

Intersection Summary	
HCM 2010 Ctrl Delay	46.3
HCM 2010 LOS	D

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	184	1987	213	114	1452	354	266	640	158	425	758	195
Future Volume (vph)	184	1987	213	114	1452	354	266	640	158	425	758	195
Turn Type	Prot	NA	pm+ov	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	5	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	5.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	9.6	32.8	9.6	9.6	32.8	32.8	9.6	44.8	44.8	9.6	44.4	44.4
Total Split (s)	15.8	38.1	25.3	10.5	32.8	32.8	25.3	45.0	45.0	26.4	46.1	46.1
Total Split (%)	13.2%	31.8%	21.1%	8.8%	27.3%	27.3%	21.1%	37.5%	37.5%	22.0%	38.4%	38.4%
Yellow Time (s)	3.6	4.8	3.6	3.6	4.8	4.8	3.6	4.8	4.8	3.6	4.4	4.4
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.8	4.6	4.6	5.8	5.8	4.6	5.8	5.8	4.6	5.4	5.4
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	11.2	32.4	52.9	5.9	27.1	27.1	19.2	28.9	28.9	21.9	31.9	31.9
Actuated g/C Ratio	0.10	0.29	0.48	0.05	0.25	0.25	0.17	0.26	0.26	0.20	0.29	0.29
v/c Ratio	1.03	1.34	0.27	1.22	1.17	0.61	0.87	0.70	0.31	1.22	0.75	0.34
Control Delay	124.7	190.1	11.6	206.7	123.5	14.4	71.8	40.5	7.5	161.0	40.3	7.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	124.7	190.1	11.6	206.7	123.5	14.4	71.8	40.5	7.5	161.0	40.3	7.1
LOS	F	F	B	F	F	B	E	D	A	F	D	A
Approach Delay		169.0			108.3			43.4			72.8	
Approach LOS		F			F			D			E	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 110	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.34	
Intersection Signal Delay: 112.3	Intersection LOS: F
Intersection Capacity Utilization 106.0%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 5: Heacock St. & Alessandro Bl.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	184	1987	213	114	1452	354	266	640	158	425	758	195
Future Volume (veh/h)	184	1987	213	114	1452	354	266	640	158	425	758	195
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	190	2048	174	118	1497	314	274	660	131	438	781	136
Adj No. of Lanes	1	3	1	1	3	1	1	2	1	1	2	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	181	1497	729	95	1252	378	303	1003	446	353	1103	493
Arrive On Green	0.10	0.29	0.29	0.05	0.24	0.24	0.17	0.28	0.28	0.19	0.31	0.31
Sat Flow, veh/h	1810	5187	1590	1810	5187	1568	1810	3610	1605	1810	3610	1613
Grp Volume(v), veh/h	190	2048	174	118	1497	314	274	660	131	438	781	136
Grp Sat Flow(s),veh/h/ln	1810	1729	1590	1810	1729	1568	1810	1805	1605	1810	1805	1613
Q Serve(g_s), s	11.2	32.3	7.5	5.9	27.0	21.3	16.6	18.1	7.2	21.8	21.5	7.2
Cycle Q Clear(g_c), s	11.2	32.3	7.5	5.9	27.0	21.3	16.6	18.1	7.2	21.8	21.5	7.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	181	1497	729	95	1252	378	303	1003	446	353	1103	493
V/C Ratio(X)	1.05	1.37	0.24	1.24	1.20	0.83	0.91	0.66	0.29	1.24	0.71	0.28
Avail Cap(c_a), veh/h	181	1497	729	95	1252	378	335	1265	562	353	1313	587
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.4	39.8	18.6	53.0	42.5	40.3	45.7	35.7	31.8	45.1	34.4	29.5
Incr Delay (d2), s/veh	80.4	169.9	0.2	168.8	96.3	14.3	24.2	0.9	0.4	130.9	1.4	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.6	38.9	3.3	7.4	24.0	10.7	10.3	9.1	3.2	23.6	11.0	3.2
LnGrp Delay(d),s/veh	130.8	209.7	18.8	221.8	138.8	54.6	69.9	36.6	32.1	176.0	35.9	29.8
LnGrp LOS	F	F	B	F	F	D	E	D	C	F	D	C
Approach Vol, veh/h		2412			1929			1065			1355	
Approach Delay, s/veh		189.7			130.1			44.6			80.5	
Approach LOS		F			F			D			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	26.4	36.9	10.5	38.1	23.3	40.0	15.8	32.8
Change Period (Y+Rc), s	4.6	5.8	4.6	5.8	4.6	* 5.8	4.6	5.8
Max Green Setting (Gmax), s	21.8	39.2	5.9	32.3	20.7	* 41	11.2	27.0
Max Q Clear Time (g_c+I1), s	23.8	20.1	7.9	34.3	18.6	23.5	13.2	29.0
Green Ext Time (p_c), s	0.0	10.1	0.0	0.0	0.1	9.5	0.0	0.0

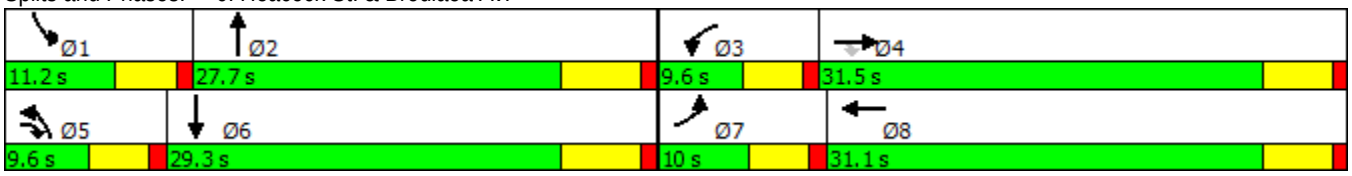
Intersection Summary	
HCM 2010 Ctrl Delay	128.0
HCM 2010 LOS	F

Notes

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	32	96	26	23	80	26	872	59	1000
Future Volume (vph)	32	96	26	23	80	26	872	59	1000
Turn Type	Prot	NA	pm+ov	Prot	NA	Prot	NA	Prot	NA
Protected Phases	7	4	5	3	8	5	2	1	6
Permitted Phases			4						
Detector Phase	7	4	5	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	10.0	5.0	5.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	9.6	31.1	9.6	9.6	31.1	9.6	23.8	9.6	25.8
Total Split (s)	10.0	31.5	9.6	9.6	31.1	9.6	27.7	11.2	29.3
Total Split (%)	12.5%	39.4%	12.0%	12.0%	38.9%	12.0%	34.6%	14.0%	36.6%
Yellow Time (s)	3.6	4.1	3.6	3.6	4.1	3.6	4.8	3.6	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.1	4.6	4.6	5.1	4.6	5.8	4.6	5.8
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	5.5	14.7	21.3	5.3	12.9	5.3	29.1	6.2	30.0
Actuated g/C Ratio	0.10	0.26	0.37	0.09	0.23	0.09	0.51	0.11	0.53
v/c Ratio	0.20	0.21	0.04	0.14	0.30	0.16	0.51	0.32	0.58
Control Delay	32.9	18.9	0.1	32.9	17.8	33.1	18.4	33.2	18.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.9	18.9	0.1	32.9	17.8	33.1	18.4	33.2	18.6
LOS	C	B	A	C	B	C	B	C	B
Approach Delay		18.7			20.2		18.8		19.4
Approach LOS		B			C		B		B

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 57.1	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.58	
Intersection Signal Delay: 19.2	Intersection LOS: B
Intersection Capacity Utilization 62.2%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 6: Heacock St. & Brodiaea Av.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	32	96	26	23	80	41	26	872	23	59	1000	35
Future Volume (veh/h)	32	96	26	23	80	41	26	872	23	59	1000	35
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	34	101	16	24	84	20	27	918	20	62	1053	35
Adj No. of Lanes	1	1	1	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	67	352	349	50	261	62	56	1332	29	100	1403	47
Arrive On Green	0.04	0.19	0.19	0.03	0.18	0.18	0.03	0.37	0.37	0.06	0.39	0.39
Sat Flow, veh/h	1810	1900	1615	1810	1480	352	1810	3612	79	1810	3565	118
Grp Volume(v), veh/h	34	101	16	24	0	104	27	459	479	62	533	555
Grp Sat Flow(s),veh/h/ln	1810	1900	1615	1810	0	1832	1810	1805	1886	1810	1805	1879
Q Serve(g_s), s	1.0	2.5	0.4	0.7	0.0	2.7	0.8	11.9	11.9	1.9	14.1	14.1
Cycle Q Clear(g_c), s	1.0	2.5	0.4	0.7	0.0	2.7	0.8	11.9	11.9	1.9	14.1	14.1
Prop In Lane	1.00		1.00	1.00		0.19	1.00		0.04	1.00		0.06
Lane Grp Cap(c), veh/h	67	352	349	50	0	323	56	666	695	100	710	739
V/C Ratio(X)	0.51	0.29	0.05	0.48	0.00	0.32	0.49	0.69	0.69	0.62	0.75	0.75
Avail Cap(c_a), veh/h	176	905	819	163	0	860	163	713	745	216	765	797
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.2	19.4	17.2	26.5	0.0	19.9	26.4	14.8	14.8	25.6	14.5	14.5
Incr Delay (d2), s/veh	2.2	0.4	0.1	2.6	0.0	0.6	2.4	2.6	2.5	2.3	3.9	3.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	1.4	0.2	0.4	0.0	1.4	0.4	6.3	6.6	1.0	7.7	8.0
LnGrp Delay(d),s/veh	28.4	19.9	17.3	29.1	0.0	20.5	28.9	17.4	17.3	27.9	18.3	18.2
LnGrp LOS	C	B	B	C		C	C	B	B	C	B	B
Approach Vol, veh/h		151			128			965			1150	
Approach Delay, s/veh		21.5			22.1			17.7			18.8	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.7	26.2	6.1	15.4	6.3	27.6	6.6	14.9
Change Period (Y+Rc), s	4.6	5.8	4.6	5.1	4.6	5.8	4.6	5.1
Max Green Setting (Gmax), s	6.6	21.9	5.0	26.4	5.0	23.5	5.4	26.0
Max Q Clear Time (g_c+I1), s	3.9	13.9	2.7	4.5	2.8	16.1	3.0	4.7
Green Ext Time (p_c), s	0.0	6.1	0.0	1.1	0.0	5.7	0.0	1.1

Intersection Summary	
HCM 2010 Ctrl Delay	18.7
HCM 2010 LOS	B

APPENDIX 7.2:

HORIZON YEAR (2040) WITH PROJECT CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

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Intersection	
Int Delay, s/veh	2.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	53	10	17	181	18	39
Future Vol, veh/h	53	10	17	181	18	39
Conflicting Peds, #/hr	0	3	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	155	-	145	0
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	75	75	75	75	75	75
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	71	13	23	241	24	52

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	87	0	367	80
Stage 1	-	-	-	-	80	-
Stage 2	-	-	-	-	287	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1522	-	637	986
Stage 1	-	-	-	-	948	-
Stage 2	-	-	-	-	766	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1522	-	626	983
Mov Cap-2 Maneuver	-	-	-	-	655	-
Stage 1	-	-	-	-	945	-
Stage 2	-	-	-	-	754	-

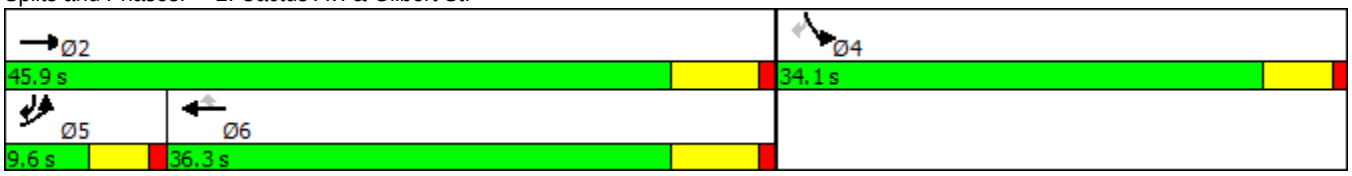
Approach	EB	WB	NB
HCM Control Delay, s	0	0.6	9.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	655	983	-	-	1522	-
HCM Lane V/C Ratio	0.037	0.053	-	-	0.015	-
HCM Control Delay (s)	10.7	8.9	-	-	7.4	-
HCM Lane LOS	B	A	-	-	A	-
HCM 95th %tile Q(veh)	0.1	0.2	-	-	0	-

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	46	1981	3280	13	15	31
Future Volume (vph)	46	1981	3280	13	15	31
Turn Type	Prot	NA	NA	Perm	Prot	pm+ov
Protected Phases	5	2	6		4	5
Permitted Phases				6		4
Detector Phase	5	2	6	6	4	5
Switch Phase						
Minimum Initial (s)	5.0	10.0	10.0	10.0	5.0	5.0
Minimum Split (s)	9.6	16.2	29.2	29.2	34.1	9.6
Total Split (s)	9.6	45.9	36.3	36.3	34.1	9.6
Total Split (%)	12.0%	57.4%	45.4%	45.4%	42.6%	12.0%
Yellow Time (s)	3.6	5.2	5.2	5.2	4.1	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	6.2	6.2	6.2	5.1	4.6
Lead/Lag	Lead		Lag	Lag		Lead
Lead-Lag Optimize?	Yes		Yes	Yes		Yes
Recall Mode	None	None	None	None	Min	None
Act Effct Green (s)	5.2	36.5	31.3	31.3	9.3	19.8
Actuated g/C Ratio	0.09	0.63	0.54	0.54	0.16	0.34
v/c Ratio	0.29	0.61	1.19	0.01	0.05	0.06
Control Delay	34.3	8.8	107.4	8.7	20.1	13.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.3	8.8	107.4	8.7	20.1	13.2
LOS	C	A	F	A	C	B
Approach Delay		9.4	107.0		15.4	
Approach LOS		A	F		B	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 57.6	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.19	
Intersection Signal Delay: 69.4	Intersection LOS: E
Intersection Capacity Utilization 77.0%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 2: Cactus Av. & Gilbert St.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	46	1981	3280	13	15	31
Future Volume (veh/h)	46	1981	3280	13	15	31
Number	5	2	6	16	7	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	47	2021	3347	13	15	25
Adj No. of Lanes	1	3	3	1	1	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	85	3631	2949	918	167	224
Arrive On Green	0.05	0.70	0.57	0.57	0.09	0.09
Sat Flow, veh/h	1810	5358	5358	1615	1810	1615
Grp Volume(v), veh/h	47	2021	3347	13	15	25
Grp Sat Flow(s),veh/h/ln	1810	1729	1729	1615	1810	1615
Q Serve(g_s), s	1.4	10.4	30.9	0.2	0.4	0.7
Cycle Q Clear(g_c), s	1.4	10.4	30.9	0.2	0.4	0.7
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	85	3631	2949	918	167	224
V/C Ratio(X)	0.56	0.56	1.13	0.01	0.09	0.11
Avail Cap(c_a), veh/h	167	3790	2949	918	966	937
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.3	4.0	11.7	5.1	22.6	20.5
Incr Delay (d2), s/veh	2.1	0.2	65.4	0.0	0.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	4.9	32.3	0.1	0.2	0.7
LnGrp Delay(d),s/veh	27.5	4.2	77.1	5.1	22.8	20.7
LnGrp LOS	C	A	F	A	C	C
Approach Vol, veh/h		2068	3360		40	
Approach Delay, s/veh		4.7	76.9		21.5	
Approach LOS		A	E		C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		44.2		10.1	7.1	37.1		
Change Period (Y+Rc), s		6.2		5.1	4.6	6.2		
Max Green Setting (Gmax), s		39.7		29.0	5.0	30.1		
Max Q Clear Time (g_c+I1), s		12.4		2.7	3.4	32.9		
Green Ext Time (p_c), s		25.6		0.1	0.0	0.0		

Intersection Summary	
HCM 2010 Ctrl Delay	49.2
HCM 2010 LOS	D

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	11	80	193	3	1	5
Future Vol, veh/h	11	80	193	3	1	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	12	87	210	3	1	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	213	0	-	0	322	211
Stage 1	-	-	-	-	211	-
Stage 2	-	-	-	-	111	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1369	-	-	-	676	834
Stage 1	-	-	-	-	829	-
Stage 2	-	-	-	-	919	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1369	-	-	-	670	834
Mov Cap-2 Maneuver	-	-	-	-	699	-
Stage 1	-	-	-	-	829	-
Stage 2	-	-	-	-	911	-

Approach	EB	WB	SB
HCM Control Delay, s	0.9	0	9.5
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1369	-	-	-	808
HCM Lane V/C Ratio	0.009	-	-	-	0.008
HCM Control Delay (s)	7.7	-	-	-	9.5
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	8	73	193	6	3	3
Future Vol, veh/h	8	73	193	6	3	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	9	79	210	7	3	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	216	0	-	0	310	213
Stage 1	-	-	-	-	213	-
Stage 2	-	-	-	-	97	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1366	-	-	-	687	832
Stage 1	-	-	-	-	827	-
Stage 2	-	-	-	-	932	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1366	-	-	-	682	832
Mov Cap-2 Maneuver	-	-	-	-	706	-
Stage 1	-	-	-	-	827	-
Stage 2	-	-	-	-	926	-

Approach	EB	WB	SB
HCM Control Delay, s	0.8	0	9.8
HCM LOS			A

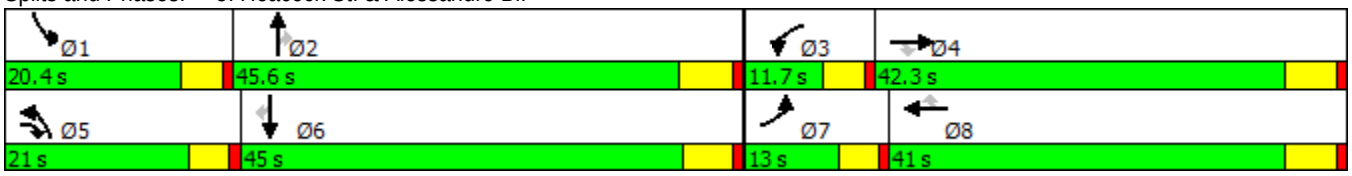
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1366	-	-	-	764
HCM Lane V/C Ratio	0.006	-	-	-	0.009
HCM Control Delay (s)	7.7	-	-	-	9.8
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	126	902	103	82	1959	295	253	763	111	282	483	258
Future Volume (vph)	126	902	103	82	1959	295	253	763	111	282	483	258
Turn Type	Prot	NA	pm+ov	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	5	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	5.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	9.6	32.8	9.6	9.6	32.8	32.8	9.6	44.8	44.8	9.6	44.4	44.4
Total Split (s)	13.0	42.3	21.0	11.7	41.0	41.0	21.0	45.6	45.6	20.4	45.0	45.0
Total Split (%)	10.8%	35.3%	17.5%	9.8%	34.2%	34.2%	17.5%	38.0%	38.0%	17.0%	37.5%	37.5%
Yellow Time (s)	3.6	4.8	3.6	3.6	4.8	4.8	3.6	4.8	4.8	3.6	4.4	4.4
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.8	4.6	4.6	5.8	5.8	4.6	5.8	5.8	4.6	5.4	5.4
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	8.4	36.7	54.3	7.1	35.3	35.3	16.4	31.3	31.3	15.8	31.1	31.1
Actuated g/C Ratio	0.08	0.33	0.49	0.06	0.32	0.32	0.15	0.28	0.28	0.14	0.28	0.28
v/c Ratio	0.98	0.56	0.13	0.76	1.26	0.49	1.00	0.80	0.22	1.16	0.51	0.49
Control Delay	125.3	33.1	5.1	90.9	155.2	15.3	105.0	43.5	6.3	150.6	35.4	16.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	125.3	33.1	5.1	90.9	155.2	15.3	105.0	43.5	6.3	150.6	35.4	16.8
LOS	F	C	A	F	F	B	F	D	A	F	D	B
Approach Delay		40.8			135.3			53.6			62.5	
Approach LOS		D			F			D			E	

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 111.7
Natural Cycle: 120
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.26
Intersection Signal Delay: 86.6 — Intersection LOS: F
Intersection Capacity Utilization 100.9% — ICU Level of Service G
Analysis Period (min) 15

Splits and Phases: 5: Heacock St. & Alessandro Bl.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	126	902	103	82	1959	295	253	763	111	282	483	258
Future Volume (veh/h)	126	902	103	82	1959	295	253	763	111	282	483	258
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	1.00		0.98	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	133	949	71	86	2062	274	266	803	98	297	508	201
Adj No. of Lanes	1	3	1	1	3	1	1	2	1	1	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	134	1676	748	109	1605	489	261	1065	467	251	1046	462
Arrive On Green	0.07	0.32	0.32	0.06	0.31	0.31	0.14	0.30	0.30	0.14	0.29	0.29
Sat Flow, veh/h	1810	5187	1593	1810	5187	1580	1810	3610	1584	1810	3610	1594
Grp Volume(v), veh/h	133	949	71	86	2062	274	266	803	98	297	508	201
Grp Sat Flow(s),veh/h/ln	1810	1729	1593	1810	1729	1580	1810	1805	1584	1810	1805	1594
Q Serve(g_s), s	8.4	17.2	2.8	5.3	35.2	16.5	16.4	22.9	5.3	15.8	13.2	11.7
Cycle Q Clear(g_c), s	8.4	17.2	2.8	5.3	35.2	16.5	16.4	22.9	5.3	15.8	13.2	11.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	134	1676	748	109	1605	489	261	1065	467	251	1046	462
V/C Ratio(X)	1.00	0.57	0.09	0.79	1.28	0.56	1.02	0.75	0.21	1.18	0.49	0.44
Avail Cap(c_a), veh/h	134	1676	748	113	1605	489	261	1263	554	251	1257	555
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.7	31.9	16.9	52.7	39.3	32.8	48.7	36.4	30.1	49.0	33.4	32.8
Incr Delay (d2), s/veh	76.3	0.4	0.1	27.0	133.0	1.4	60.9	2.2	0.2	114.9	0.4	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.0	8.3	1.2	3.5	36.4	7.4	12.5	11.7	2.3	15.8	6.6	5.2
LnGrp Delay(d),s/veh	129.0	32.4	17.0	79.8	172.3	34.3	109.7	38.5	30.4	163.9	33.7	33.5
LnGrp LOS	F	C	B	E	F	C	F	D	C	F	C	C
Approach Vol, veh/h		1153			2422			1167			1006	
Approach Delay, s/veh		42.6			153.4			54.1			72.1	
Approach LOS		D			F			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	20.4	39.4	11.5	42.5	21.0	38.8	13.0	41.0
Change Period (Y+Rc), s	4.6	5.8	4.6	5.8	4.6	* 5.8	4.6	5.8
Max Green Setting (Gmax), s	15.8	39.8	7.1	36.5	16.4	* 40	8.4	35.2
Max Q Clear Time (g_c+I1), s	17.8	24.9	7.3	19.2	18.4	15.2	10.4	37.2
Green Ext Time (p_c), s	0.0	8.1	0.0	15.8	0.0	10.5	0.0	0.0

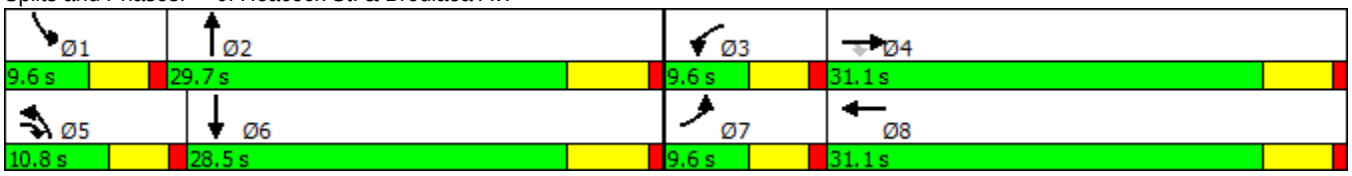
Intersection Summary	
HCM 2010 Ctrl Delay	96.8
HCM 2010 LOS	F

Notes

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	25	28	23	15	121	50	1075	19	592
Future Volume (vph)	25	28	23	15	121	50	1075	19	592
Turn Type	Prot	NA	pm+ov	Prot	NA	Prot	NA	Prot	NA
Protected Phases	7	4	5	3	8	5	2	1	6
Permitted Phases			4						
Detector Phase	7	4	5	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	10.0	5.0	5.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	9.6	31.1	9.6	9.6	31.1	9.6	23.8	9.6	25.8
Total Split (s)	9.6	31.1	10.8	9.6	31.1	10.8	29.7	9.6	28.5
Total Split (%)	12.0%	38.9%	13.5%	12.0%	38.9%	13.5%	37.1%	12.0%	35.6%
Yellow Time (s)	3.6	4.1	3.6	3.6	4.1	3.6	4.8	3.6	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.1	4.6	4.6	5.1	4.6	5.8	4.6	5.8
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	5.2	15.1	21.6	5.2	13.4	5.9	29.7	5.2	24.9
Actuated g/C Ratio	0.09	0.26	0.37	0.09	0.23	0.10	0.50	0.09	0.42
v/c Ratio	0.18	0.06	0.04	0.11	0.43	0.31	0.67	0.13	0.46
Control Delay	32.7	16.7	0.1	31.9	20.2	33.1	17.8	32.3	17.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.7	16.7	0.1	31.9	20.2	33.1	17.8	32.3	17.0
LOS	C	B	A	C	C	C	B	C	B
Approach Delay		16.9			21.2		18.5		17.4
Approach LOS		B			C		B		B

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 59.1	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.67	
Intersection Signal Delay: 18.3	Intersection LOS: B
Intersection Capacity Utilization 65.4%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 6: Heacock St. & Brodiaea Av.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	28	23	15	121	47	50	1075	15	19	592	29
Future Volume (veh/h)	25	28	23	15	121	47	50	1075	15	19	592	29
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	28	31	15	17	134	28	56	1194	13	21	658	30
Adj No. of Lanes	1	1	1	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	57	363	388	38	274	57	94	1477	16	45	1324	60
Arrive On Green	0.03	0.19	0.19	0.02	0.18	0.18	0.05	0.40	0.40	0.02	0.38	0.38
Sat Flow, veh/h	1810	1900	1589	1810	1519	317	1810	3658	40	1810	3512	160
Grp Volume(v), veh/h	28	31	15	17	0	162	56	589	618	21	338	350
Grp Sat Flow(s),veh/h/ln	1810	1900	1589	1810	0	1837	1810	1805	1893	1810	1805	1867
Q Serve(g_s), s	0.9	0.8	0.4	0.5	0.0	4.4	1.7	16.2	16.2	0.6	8.0	8.0
Cycle Q Clear(g_c), s	0.9	0.8	0.4	0.5	0.0	4.4	1.7	16.2	16.2	0.6	8.0	8.0
Prop In Lane	1.00		1.00	1.00		0.17	1.00		0.02	1.00		0.09
Lane Grp Cap(c), veh/h	57	363	388	38	0	331	94	729	764	45	680	704
V/C Ratio(X)	0.49	0.09	0.04	0.45	0.00	0.49	0.60	0.81	0.81	0.47	0.50	0.50
Avail Cap(c_a), veh/h	162	883	823	162	0	854	201	771	809	162	733	758
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.6	18.6	16.2	27.1	0.0	20.6	25.9	14.7	14.8	26.9	13.4	13.4
Incr Delay (d2), s/veh	2.4	0.1	0.0	3.1	0.0	1.1	2.2	6.1	5.9	2.8	0.6	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.4	0.2	0.3	0.0	2.4	0.9	9.3	9.7	0.4	4.0	4.2
LnGrp Delay(d),s/veh	29.0	18.7	16.2	30.2	0.0	21.7	28.2	20.9	20.6	29.7	13.9	13.9
LnGrp LOS	C	B	B	C		C	C	C	C	C	B	B
Approach Vol, veh/h		74			179			1263			709	
Approach Delay, s/veh		22.1			22.5			21.1			14.4	
Approach LOS		C			C			C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.0	28.4	5.8	15.8	7.5	26.9	6.4	15.2
Change Period (Y+Rc), s	4.6	5.8	4.6	5.1	4.6	5.8	4.6	5.1
Max Green Setting (Gmax), s	5.0	23.9	5.0	26.0	6.2	22.7	5.0	26.0
Max Q Clear Time (g_c+I1), s	2.6	18.2	2.5	2.8	3.7	10.0	2.9	6.4
Green Ext Time (p_c), s	0.0	4.4	0.0	1.0	0.0	8.4	0.0	1.0

Intersection Summary	
HCM 2010 Ctrl Delay	19.1
HCM 2010 LOS	B

Intersection	
Int Delay, s/veh	1.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	136	10	35	128	10	28
Future Vol, veh/h	136	10	35	128	10	28
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	155	-	145	0
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	166	12	43	156	12	34

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	178	0	413	172
Stage 1	-	-	-	-	172	-
Stage 2	-	-	-	-	241	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1410	-	599	877
Stage 1	-	-	-	-	863	-
Stage 2	-	-	-	-	804	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1410	-	581	877
Mov Cap-2 Maneuver	-	-	-	-	637	-
Stage 1	-	-	-	-	863	-
Stage 2	-	-	-	-	779	-

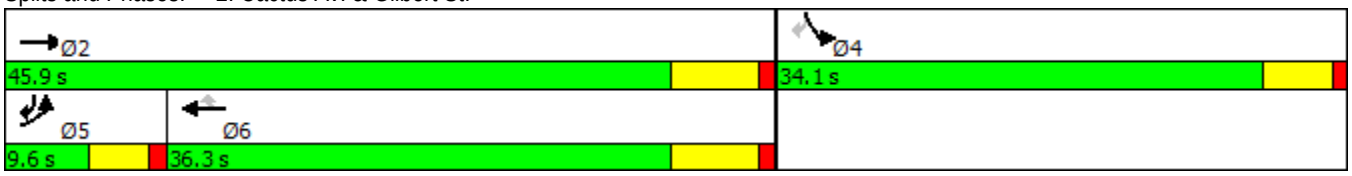
Approach	EB	WB	NB
HCM Control Delay, s	0	1.6	9.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	637	877	-	-	1410	-
HCM Lane V/C Ratio	0.019	0.039	-	-	0.03	-
HCM Control Delay (s)	10.8	9.3	-	-	7.6	-
HCM Lane LOS	B	A	-	-	A	-
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0.1	-

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	19	3945	1881	10	10	30
Future Volume (vph)	19	3945	1881	10	10	30
Turn Type	Prot	NA	NA	Perm	Prot	pm+ov
Protected Phases	5	2	6		4	5
Permitted Phases				6		4
Detector Phase	5	2	6	6	4	5
Switch Phase						
Minimum Initial (s)	5.0	10.0	10.0	10.0	5.0	5.0
Minimum Split (s)	9.6	16.2	29.2	29.2	34.1	9.6
Total Split (s)	9.6	45.9	36.3	36.3	34.1	9.6
Total Split (%)	12.0%	57.4%	45.4%	45.4%	42.6%	12.0%
Yellow Time (s)	3.6	5.2	5.2	5.2	4.1	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	6.2	6.2	6.2	5.1	4.6
Lead/Lag	Lead		Lag	Lag		Lead
Lead-Lag Optimize?	Yes		Yes	Yes		Yes
Recall Mode	None	None	None	None	Min	None
Act Effct Green (s)	5.1	40.5	34.9	34.9	9.4	19.7
Actuated g/C Ratio	0.08	0.66	0.57	0.57	0.15	0.32
v/c Ratio	0.13	1.20	0.67	0.01	0.04	0.06
Control Delay	31.9	109.3	14.3	7.3	19.9	13.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.9	109.3	14.3	7.3	19.9	13.1
LOS	C	F	B	A	B	B
Approach Delay		108.9	14.2		14.7	
Approach LOS		F	B		B	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 61.4	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.20	
Intersection Signal Delay: 77.9	Intersection LOS: E
Intersection Capacity Utilization 89.8%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 2: Cactus Av. & Gilbert St.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	19	3945	1881	10	10	30
Future Volume (veh/h)	19	3945	1881	10	10	30
Number	5	2	6	16	7	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.98	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	20	4109	1959	10	10	28
Adj No. of Lanes	1	3	3	1	1	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	43	3677	3127	953	162	183
Arrive On Green	0.02	0.71	0.60	0.60	0.09	0.09
Sat Flow, veh/h	1810	5358	5358	1580	1810	1615
Grp Volume(v), veh/h	20	4109	1959	10	10	28
Grp Sat Flow(s),veh/h/ln	1810	1729	1729	1580	1810	1615
Q Serve(g_s), s	0.6	39.7	13.5	0.1	0.3	0.9
Cycle Q Clear(g_c), s	0.6	39.7	13.5	0.1	0.3	0.9
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	43	3677	3127	953	162	183
V/C Ratio(X)	0.46	1.12	0.63	0.01	0.06	0.15
Avail Cap(c_a), veh/h	162	3677	3127	953	937	875
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.0	8.1	7.1	4.4	23.4	22.4
Incr Delay (d2), s/veh	2.8	57.1	0.4	0.0	0.2	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	37.5	6.5	0.1	0.1	0.8
LnGrp Delay(d),s/veh	29.8	65.3	7.5	4.4	23.5	22.8
LnGrp LOS	C	F	A	A	C	C
Approach Vol, veh/h		4129	1969		38	
Approach Delay, s/veh		65.1	7.5		23.0	
Approach LOS		E	A		C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		45.9		10.1	5.9	40.0		
Change Period (Y+Rc), s		6.2		5.1	4.6	6.2		
Max Green Setting (Gmax), s		39.7		29.0	5.0	30.1		
Max Q Clear Time (g_c+I1), s		41.7		2.9	2.6	15.5		
Green Ext Time (p_c), s		0.0		0.1	0.0	14.6		

Intersection Summary	
HCM 2010 Ctrl Delay	46.4
HCM 2010 LOS	D

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	6	158	149	2	4	14
Future Vol, veh/h	6	158	149	2	4	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	7	172	162	2	4	15

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	164	0	-	0	348	163
Stage 1	-	-	-	-	163	-
Stage 2	-	-	-	-	185	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1427	-	-	-	653	887
Stage 1	-	-	-	-	871	-
Stage 2	-	-	-	-	852	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1427	-	-	-	650	887
Mov Cap-2 Maneuver	-	-	-	-	689	-
Stage 1	-	-	-	-	871	-
Stage 2	-	-	-	-	848	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	9.4
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1427	-	-	-	834
HCM Lane V/C Ratio	0.005	-	-	-	0.023
HCM Control Delay (s)	7.5	-	-	-	9.4
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	4	158	143	3	6	8
Future Vol, veh/h	4	158	143	3	6	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	4	172	155	3	7	9

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	159	0	-	0	337	157
Stage 1	-	-	-	-	157	-
Stage 2	-	-	-	-	180	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1433	-	-	-	663	894
Stage 1	-	-	-	-	876	-
Stage 2	-	-	-	-	856	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1433	-	-	-	661	894
Mov Cap-2 Maneuver	-	-	-	-	696	-
Stage 1	-	-	-	-	876	-
Stage 2	-	-	-	-	854	-

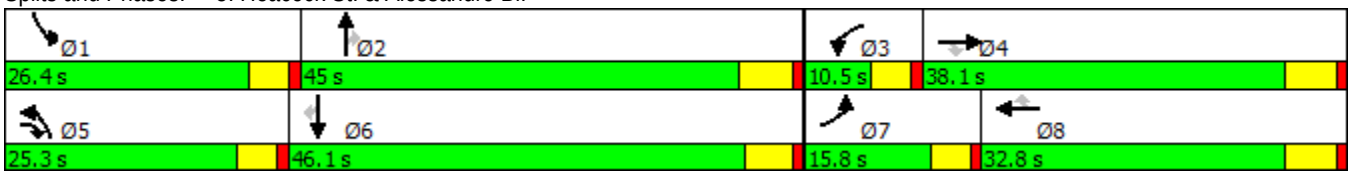
Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	9.6
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1433	-	-	-	797
HCM Lane V/C Ratio	0.003	-	-	-	0.019
HCM Control Delay (s)	7.5	-	-	-	9.6
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	184	1987	215	114	1452	354	269	643	159	425	759	195
Future Volume (vph)	184	1987	215	114	1452	354	269	643	159	425	759	195
Turn Type	Prot	NA	pm+ov	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	5	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	5.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	9.6	32.8	9.6	9.6	32.8	32.8	9.6	44.8	44.8	9.6	44.4	44.4
Total Split (s)	15.8	38.1	25.3	10.5	32.8	32.8	25.3	45.0	45.0	26.4	46.1	46.1
Total Split (%)	13.2%	31.8%	21.1%	8.8%	27.3%	27.3%	21.1%	37.5%	37.5%	22.0%	38.4%	38.4%
Yellow Time (s)	3.6	4.8	3.6	3.6	4.8	4.8	3.6	4.8	4.8	3.6	4.4	4.4
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.8	4.6	4.6	5.8	5.8	4.6	5.8	5.8	4.6	5.4	5.4
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	11.2	32.4	53.0	5.9	27.1	27.1	19.4	29.0	29.0	21.9	31.9	31.9
Actuated g/C Ratio	0.10	0.29	0.48	0.05	0.25	0.25	0.18	0.26	0.26	0.20	0.29	0.29
v/c Ratio	1.03	1.34	0.28	1.22	1.17	0.61	0.87	0.70	0.31	1.22	0.75	0.34
Control Delay	125.3	190.6	11.6	207.6	124.0	14.4	72.2	40.5	7.6	161.6	40.4	7.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	125.3	190.6	11.6	207.6	124.0	14.4	72.2	40.5	7.6	161.6	40.4	7.3
LOS	F	F	B	F	F	B	E	D	A	F	D	A
Approach Delay		169.4			108.7			43.5			73.1	
Approach LOS		F			F			D			E	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 110.1	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.34	
Intersection Signal Delay: 112.6	Intersection LOS: F
Intersection Capacity Utilization 106.0%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 5: Heacock St. & Alessandro Bl.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	184	1987	215	114	1452	354	269	643	159	425	759	195
Future Volume (veh/h)	184	1987	215	114	1452	354	269	643	159	425	759	195
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	190	2048	176	118	1497	314	277	663	132	438	782	136
Adj No. of Lanes	1	3	1	1	3	1	1	2	1	1	2	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	181	1496	731	95	1251	378	305	1005	447	352	1099	491
Arrive On Green	0.10	0.29	0.29	0.05	0.24	0.24	0.17	0.28	0.28	0.19	0.30	0.30
Sat Flow, veh/h	1810	5187	1590	1810	5187	1568	1810	3610	1605	1810	3610	1613
Grp Volume(v), veh/h	190	2048	176	118	1497	314	277	663	132	438	782	136
Grp Sat Flow(s),veh/h/ln	1810	1729	1590	1810	1729	1568	1810	1805	1605	1810	1805	1613
Q Serve(g_s), s	11.2	32.3	7.6	5.9	27.0	21.3	16.8	18.2	7.2	21.8	21.5	7.2
Cycle Q Clear(g_c), s	11.2	32.3	7.6	5.9	27.0	21.3	16.8	18.2	7.2	21.8	21.5	7.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	181	1496	731	95	1251	378	305	1005	447	352	1099	491
V/C Ratio(X)	1.05	1.37	0.24	1.24	1.20	0.83	0.91	0.66	0.30	1.24	0.71	0.28
Avail Cap(c_a), veh/h	181	1496	731	95	1251	378	334	1264	562	352	1312	586
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.4	39.8	18.5	53.0	42.5	40.3	45.7	35.7	31.8	45.1	34.6	29.6
Incr Delay (d2), s/veh	80.7	170.4	0.2	169.2	96.7	14.4	24.7	0.9	0.4	131.3	1.5	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.6	39.0	3.3	7.4	24.1	10.8	10.5	9.1	3.3	23.7	11.0	3.2
LnGrp Delay(d),s/veh	131.1	210.2	18.7	222.2	139.2	54.7	70.4	36.6	32.1	176.4	36.1	29.9
LnGrp LOS	F	F	B	F	F	D	E	D	C	F	D	C
Approach Vol, veh/h		2414			1929			1072			1356	
Approach Delay, s/veh		190.1			130.5			44.8			80.8	
Approach LOS		F			F			D			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	26.4	37.0	10.5	38.1	23.5	39.9	15.8	32.8
Change Period (Y+Rc), s	4.6	5.8	4.6	5.8	4.6	* 5.8	4.6	5.8
Max Green Setting (Gmax), s	21.8	39.2	5.9	32.3	20.7	* 41	11.2	27.0
Max Q Clear Time (g_c+I1), s	23.8	20.2	7.9	34.3	18.8	23.5	13.2	29.0
Green Ext Time (p_c), s	0.0	10.1	0.0	0.0	0.1	9.5	0.0	0.0

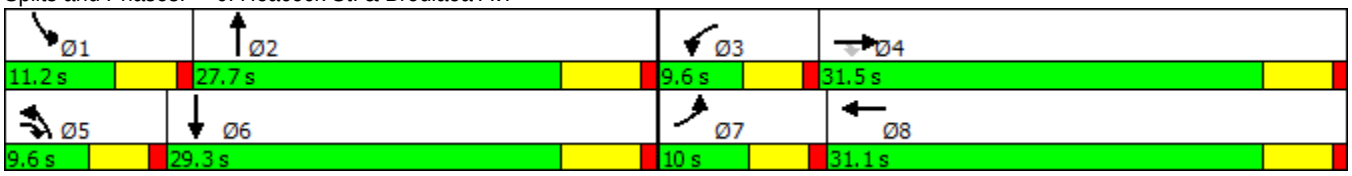
Intersection Summary	
HCM 2010 Ctrl Delay	128.2
HCM 2010 LOS	F

Notes

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	38	97	29	23	80	27	872	59	1000
Future Volume (vph)	38	97	29	23	80	27	872	59	1000
Turn Type	Prot	NA	pm+ov	Prot	NA	Prot	NA	Prot	NA
Protected Phases	7	4	5	3	8	5	2	1	6
Permitted Phases			4						
Detector Phase	7	4	5	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	10.0	5.0	5.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	9.6	31.1	9.6	9.6	31.1	9.6	23.8	9.6	25.8
Total Split (s)	10.0	31.5	9.6	9.6	31.1	9.6	27.7	11.2	29.3
Total Split (%)	12.5%	39.4%	12.0%	12.0%	38.9%	12.0%	34.6%	14.0%	36.6%
Yellow Time (s)	3.6	4.1	3.6	3.6	4.1	3.6	4.8	3.6	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.1	4.6	4.6	5.1	4.6	5.8	4.6	5.8
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	5.5	14.7	21.4	5.3	12.9	5.3	29.2	6.2	30.0
Actuated g/C Ratio	0.10	0.26	0.37	0.09	0.23	0.09	0.51	0.11	0.52
v/c Ratio	0.23	0.21	0.05	0.14	0.30	0.17	0.51	0.32	0.58
Control Delay	33.4	18.9	0.1	32.9	17.8	33.1	18.4	33.2	18.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.4	18.9	0.1	32.9	17.8	33.1	18.4	33.2	18.6
LOS	C	B	A	C	B	C	B	C	B
Approach Delay		18.9			20.2		18.8		19.4
Approach LOS		B			C		B		B

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 57.2	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.58	
Intersection Signal Delay: 19.2	Intersection LOS: B
Intersection Capacity Utilization 62.3%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 6: Heacock St. & Brodiaea Av.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	38	97	29	23	80	41	27	872	23	59	1000	38
Future Volume (veh/h)	38	97	29	23	80	41	27	872	23	59	1000	38
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	40	102	20	24	84	20	28	918	20	62	1053	38
Adj No. of Lanes	1	1	1	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	75	359	356	50	259	62	57	1330	29	100	1393	50
Arrive On Green	0.04	0.19	0.19	0.03	0.18	0.18	0.03	0.37	0.37	0.06	0.39	0.39
Sat Flow, veh/h	1810	1900	1615	1810	1480	352	1810	3612	79	1810	3554	128
Grp Volume(v), veh/h	40	102	20	24	0	104	28	459	479	62	535	556
Grp Sat Flow(s),veh/h/ln	1810	1900	1615	1810	0	1832	1810	1805	1886	1810	1805	1877
Q Serve(g_s), s	1.2	2.6	0.5	0.7	0.0	2.8	0.9	12.0	12.0	1.9	14.3	14.3
Cycle Q Clear(g_c), s	1.2	2.6	0.5	0.7	0.0	2.8	0.9	12.0	12.0	1.9	14.3	14.3
Prop In Lane	1.00		1.00	1.00		0.19	1.00		0.04	1.00		0.07
Lane Grp Cap(c), veh/h	75	359	356	50	0	321	57	664	694	100	707	736
V/C Ratio(X)	0.53	0.28	0.06	0.48	0.00	0.32	0.49	0.69	0.69	0.62	0.76	0.76
Avail Cap(c_a), veh/h	175	898	814	162	0	853	162	708	740	214	759	790
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.2	19.4	17.2	26.7	0.0	20.1	26.6	15.0	15.0	25.8	14.7	14.7
Incr Delay (d2), s/veh	2.2	0.4	0.1	2.6	0.0	0.6	2.4	2.7	2.5	2.3	4.1	3.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	1.4	0.2	0.4	0.0	1.4	0.5	6.4	6.6	1.0	7.8	8.1
LnGrp Delay(d),s/veh	28.4	19.8	17.2	29.3	0.0	20.7	29.0	17.6	17.5	28.1	18.8	18.6
LnGrp LOS	C	B	B	C		C	C	B	B	C	B	B
Approach Vol, veh/h		162			128			966			1153	
Approach Delay, s/veh		21.6			22.3			17.9			19.2	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.7	26.4	6.2	15.7	6.4	27.7	6.9	14.9
Change Period (Y+Rc), s	4.6	5.8	4.6	5.1	4.6	5.8	4.6	5.1
Max Green Setting (Gmax), s	6.6	21.9	5.0	26.4	5.0	23.5	5.4	26.0
Max Q Clear Time (g_c+I1), s	3.9	14.0	2.7	4.6	2.9	16.3	3.2	4.8
Green Ext Time (p_c), s	0.0	6.0	0.0	1.1	0.0	5.6	0.0	1.1

Intersection Summary	
HCM 2010 Ctrl Delay	19.0
HCM 2010 LOS	B

APPENDIX 7.3:

HORIZON YEAR (2040) WITHOUT PROJECT CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS

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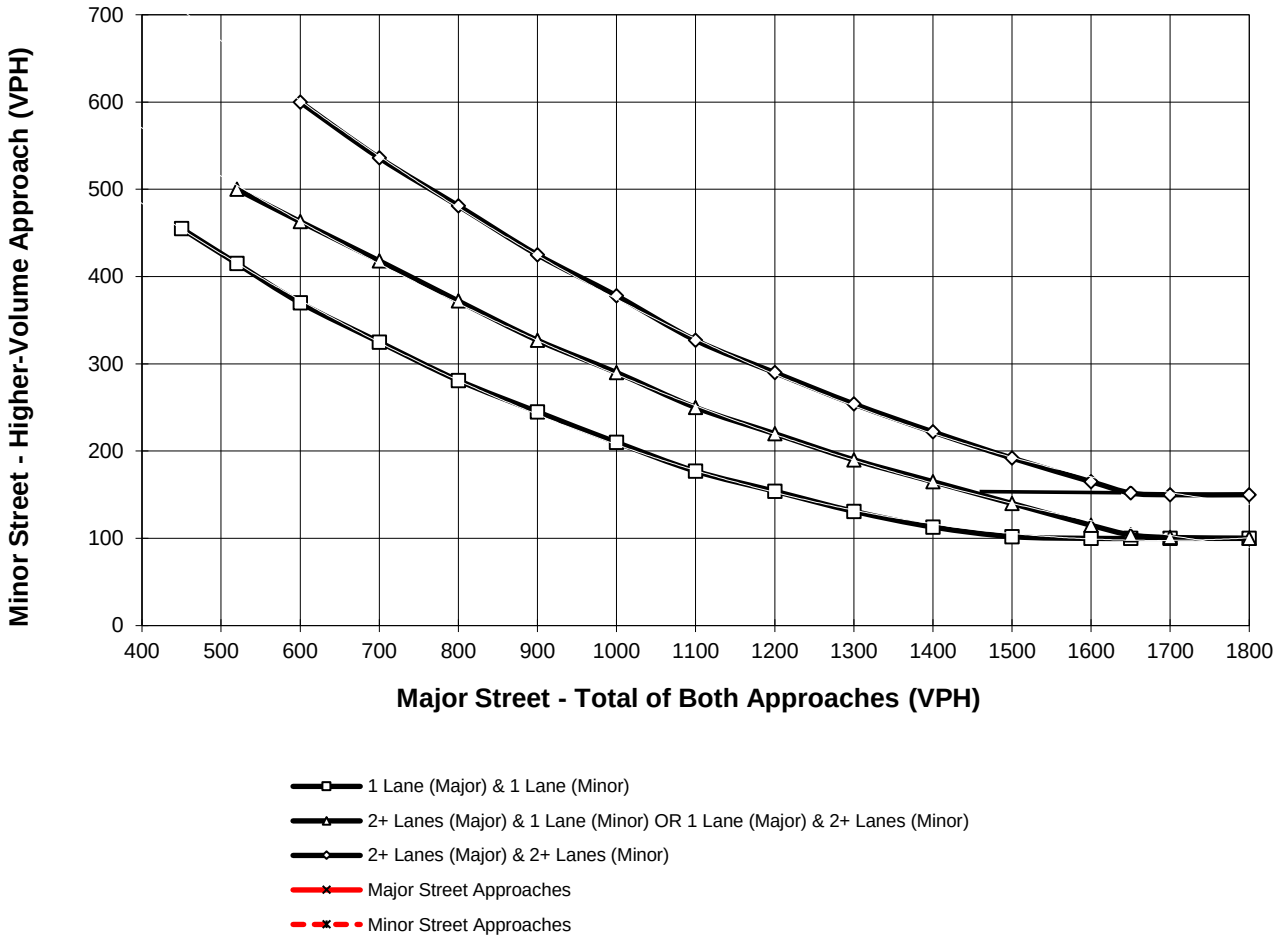
Figure 4C-3. Warrant 3, Peak Hour

Traffic Conditions = **Horizon Year (2040) Without Project Conditions - Weekday PM Peak Hour**

Major Street Name = **Brodiaea Avenue**
Total of Both Approaches (VPH) = **286**
Number of Approach Lanes on Major Street = **1**

Minor Street Name = **Gilbert Street**
High Volume Approach (VPH) = **29**
Number of Approach Lanes On Minor Street = **1**

SIGNAL WARRANT NOT SATISFIED



*Note: 150 vph applies as the lower threshold for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold for a minor-street approach with one lane

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APPENDIX 7.4:

HORIZON YEAR (2040) WITH PROJECT CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS

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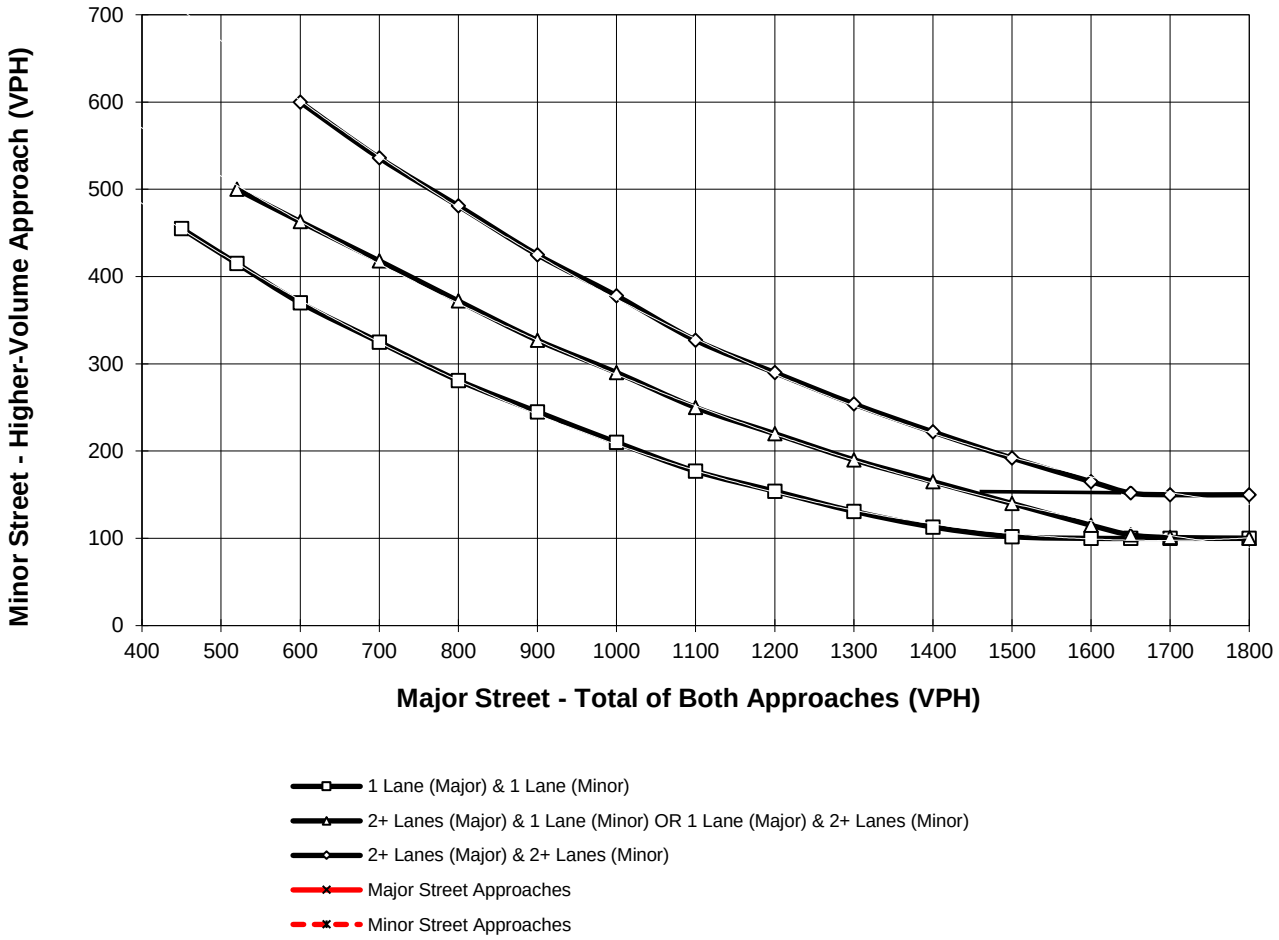
Figure 4C-3. Warrant 3, Peak Hour

Traffic Conditions = **Horizon Year (2040) With Project Conditions - Weekday PM Peak Hour**

Major Street Name = **Brodiaea Avenue**
Total of Both Approaches (VPH) = **309**
Number of Approach Lanes on Major Street = **1**

Minor Street Name = **Gilbert Street**
High Volume Approach (VPH) = **38**
Number of Approach Lanes On Minor Street = **1**

SIGNAL WARRANT NOT SATISFIED



*Note: 150 vph applies as the lower threshold for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold for a minor-street approach with one lane

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet
(Average Traffic Estimate Form)

___	___	___	___		TRAFFIC CONDITIONS		**HY 2040 WP**
DIST	CO	RTE	PM	CALC	BA	DATE	09/21/16
Jurisdiction:	**City of Moreno Valley**			CHK	BA	DATE	09/21/16
Major Street:	**Brodiaea Av.**				Critical Approach Speed (Major)		35 mph
Minor Street:	**Driveway 1**				Critical Approach Speed (Minor)		15 mph

Major Street Approach Lanes = **1** lane Minor Street Approach Lanes **1** lane

Major Street Future ADT = **3,720** vpd Minor Street Future ADT = **209** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); …….. [ ]

or **URBAN (U)**

In built up area of isolated community of < 10,000 population …… [ ]

(Based on Estimated Average Daily Traffic - See Note)

URBAN	RURAL	Minimum Requirements EADT			
XX					
CONDITION A - Minimum Vehicular Volume		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **3,720**	*1* **209**	8,000	5,600	2,400	1,680
2 +	*1*	9,600	6,720	2,400	1,680
2 +	*2 +*	9,600	6,720	3,200	2,240
1	*2 +*	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **3,720**	*1* **209**	12,000	8,400	1,200	850
2 +	*1*	14,400	10,080	1,200	850
2 +	*2 +*	14,400	10,080	1,600	1,120
1	*2 +*	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B					
Satisfied	Not Satisfied				
	XX	2 CONDITIONS 80%		2 CONDITIONS 80%	
No one condition satisfied, but following conditions fulfilled 80% of more …..	**A** **9%** **B** **17%**				

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet
(Average Traffic Estimate Form)

___	___	___	___		TRAFFIC CONDITIONS		**HY 2040 WP**
DIST	CO	RTE	PM	CALC	BA	DATE	09/21/16
Jurisdiction:	**City of Moreno Valley**			CHK	BA	DATE	09/21/16
Major Street:	**Brodiaea Av.**				Critical Approach Speed (Major)		35 mph
Minor Street:	**Driveway 2**				Critical Approach Speed (Minor)		15 mph

Major Street Approach Lanes = **1** lane Minor Street Approach Lanes **1** lane

Major Street Future ADT = **3,581** vpd Minor Street Future ADT = **136** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); …….. [ ]

or **URBAN (U)**

In built up area of isolated community of < 10,000 population …… [ ]

(Based on Estimated Average Daily Traffic - See Note)

URBAN	RURAL	Minimum Requirements EADT			
XX					
CONDITION A - Minimum Vehicular Volume		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **3,581**	*1* **136**	8,000	5,600	2,400	1,680
2 +	*1*	9,600	6,720	2,400	1,680
2 +	*2 +*	9,600	6,720	3,200	2,240
1	*2 +*	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **3,581**	*1* **136**	12,000	8,400	1,200	850
2 +	*1*	14,400	10,080	1,200	850
2 +	*2 +*	14,400	10,080	1,600	1,120
1	*2 +*	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B					
Satisfied	Not Satisfied				
	XX	2 CONDITIONS 80%		2 CONDITIONS 80%	
No one condition satisfied, but following conditions fulfilled 80% of more …..	**A** **6%** **B** **11%**				

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

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Brodiaea Commerce Center

ENERGY ANALYSIS

CITY OF MORENO VALLEY

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FEBRUARY 12, 2018

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LIST OF ABBREVIATED TERMS

(1)	Reference
AQIA	Air Quality Impact Analysis
ARB	Air Resources Board
CalEEMod	California Emissions Estimator Model
CARB	California Air Resources Board
CEC	California Energy Commission
CPUC	California Public Utilities Commission
EVs	Electric Vehicles
EMFAC	Emissions Factor
FERC	Federal Energy Regulatory Commission
GPA	General Plan Amendment
GWh	Gigawatt Hour
HHD	Heavy-Heavy Duty
ISO	Independent Service Operator
ISTEA	Intermodal Surface Transportation Efficiency Act
ITE	Institute of Transportation Engineers
LHD	Light-Heavy Duty
MHD	Medium-Heavy Duty
MPG	Miles Per Gallon
MPO	Metropolitan Planning Organization
Project	Brodiaea Commerce Center
SCE	Southern California Edison
SoCalGas	Southern California Gas
SF	Square Feet
TEA-21	Transportation Equity Act for the 21st Century
VMT	Vehicle Miles Traveled

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EXECUTIVE SUMMARY

For new development such as that proposed by the Brodiaea Commerce Center, compliance with California Building Standards Code Title 24 energy efficiency requirements (CalGreen), combined with the mitigation measures that are recommended by the Brodiaea Commerce Center Air Quality Impact Analysis, Greenhouse Gas Analysis, and Health Risk Assessment, are considered demonstrable evidence of efficient use of energy. As discussed below, the Project would provide for, and promote, energy efficiencies beyond those required under other applicable federal and State of California standards and regulations, and in so doing would meet or exceed all California Building Standards Code Title 24 standards. Moreover, energy consumed by the Project's operation is calculated to be comparable to, or less than, energy consumed by other industrial warehouse uses of similar scale and intensity that are constructed and operating in California. On this basis, the Project would not result in the inefficient, wasteful, or unnecessary consumption of energy. Further, the Project would not cause or result in the need for additional energy producing facilities or energy delivery systems.

1 INTRODUCTION

This report presents the results of the air energy analysis prepared by Urban Crossroads, Inc., for the proposed Brodiaea Commerce Center (referred to as "Project"). The purpose of this report is to ensure that energy implication is considered by the City of Moreno Valley, as the lead agency, and to quantify anticipated energy usage associated with construction and operation of the proposed Project, determine if the usage amounts are efficient, typical, or wasteful for the land use type, and to emphasize avoiding or reducing inefficient, wasteful, and unnecessary consumption of energy.

1.1 SITE LOCATION

The proposed Brodiaea Commerce Center site is located on the northwest corner of Heacock St. and Brodiaea Ave. in the City of Moreno Valley, as shown on Exhibit 1-A. The Project site is bounded by business park-designated land use to the south and west, residential land uses to the east, and commercial land use to the north. The March Air Reserve Base/Inland Port Airport (MARB/IPA) is located approximately a mile southwest of the Project site, and the Interstate 215 (I-215) Freeway is located roughly two miles to the west of the Project site.

1.2 STUDY AREA

The Project site is currently vacant. The City of Moreno Valley's General Plan Land Use designation for the Project site is Business Park/Light Industrial (BP/LI). The land uses and development proposed by the Project are permitted/conditionally permitted under the Project site's current BP/LI Land Use designations. The Project is proposed to consist of a 262,398 square-foot (sf) high-cube warehouse/distribution center use within a single building. As such, the Project's land uses and development are permitted/conditionally permitted under the City General Plan Land Use designations. The Project site is zoned Business Park-Mixed Use (MPX) with the "Mixed-Use Neighborhood" (MUN) overlay. The Project would change the zoning for this area to Light Industrial (LI) to match the rest of the Project site.

1.3 PROJECT DESCRIPTION

The Project is proposed to consist of a 262,398 square feet (sf) High-Cube Warehouse / Distribution Center use within a single building, as shown on Exhibit 1-A. The current site plan shows a total square footage of 261,807 sf, however, the higher square footage was evaluated for the purposes of this analysis in an effort to conduct a conservative analysis. The Project is anticipated to have an Opening Year of 2019[1].

[1] The Traffic Impact Analysis (TIA) prepared for the Project evaluates an Opening Year of 2022 since the City of Moreno Valley traffic study guidelines require the Opening Year to be a minimum of 5 years from baseline (2017) conditions. Utilizing a 2019 Opening Year for purposes of this GHGA would generate more emissions than if the Project utilized a 2022 Opening Year consistent with the traffic study because as the analysis year increases, vehicle emission factors would decrease as a result of emissions regulations becoming more stringent. Utilizing a

As part of the Project's design, all on-site outdoor cargo handling equipment (CHE) (including yard trucks, hostlers, yard goats, pallet jacks, forklifts, and other on-site equipment) will be powered by non-diesel fueled engines and all on-site indoor forklifts shall be powered by electricity, compressed natural gas, or propane.

1.4 CONSTRUCTION-SOURCE AIR POLLUTANT EMISSIONS MITIGATION MEASURES

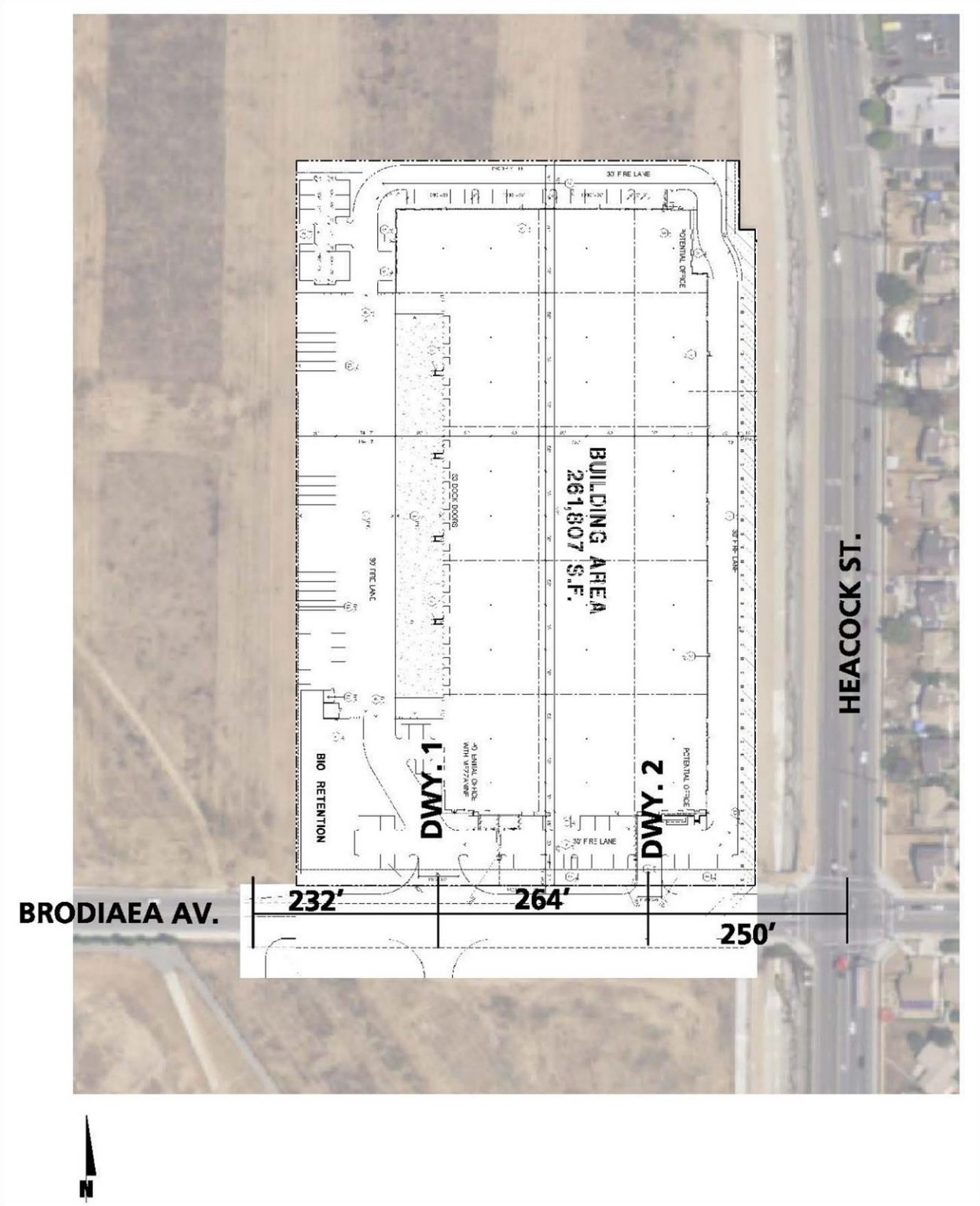
The Project Air Quality Impact Analysis (AQIA) establishes construction activity mitigation measures that would globally reduce air pollutant emissions generated by subsequent development proposals within the Project site. Although these measures could act to reduce energy consumption, there is insufficient data to support any reductions associated with the construction activity mitigation measures identified in the AQIA. Thus, as a conservative measure no reduction in energy consumption are taken for construction activity mitigation measures identified in the AQIA.

1.5 OPERATIONAL-SOURCE MITIGATION MEASURES

The Project would not result in an efficient, wasteful, or unnecessary consumption of energy. As such, no mitigation measures are proposed.

2019 Opening Year for purposes of the GHGA herein represents a conservative estimate of emissions compared to if a 2022 Opening Year, consistent with the traffic study, were utilized.

EXHIBIT 1-A: LOCATION MAP



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2 EXISTING CONDITIONS

This section provides an overview of the existing energy conditions in the Project area and region.

2.1 OVERVIEW

California's estimated annual energy use as of 2016 included:

- Approximately 290,567 gigawatt hours of electricity; (1)
- Approximately 2,177,467 million cubic feet of natural gas per year (2); and
- Approximately 18.5 billion gallons of transportation fuel (for the year 2014) (3).

As of 2015, the year of most recent data currently available by the United States Energy Information Administration (EIA), energy use in California by demand sector was:

- Approximately 39.3 percent transportation;
- Approximately 23.9 percent industrial;
- Approximately 17.7 percent residential; and
- Approximately 19.1 percent commercial. (4)

California's massive electricity in-state generation system generates approximately 198,227 gigawatt-hours each year and is transported over the state's 32,000 miles of transmission lines. In 2016, California produced close to 68% of the electricity it uses; the rest was imported from the Pacific Northwest (15%) and the U.S. Southwest (17%). Natural gas is the main source for electricity generation at 50% of the total in-state electric generation system power as shown in Table 2-1.

TABLE 2-1: TOTAL ELECTRICITY SYSTEM POWER (CALIFORNIA 2016)

Fuel Type	California In-State Generation (GWh)	Percent of California In-State Generation	Northwest Imports (GWh)	Southwest Imports (GWh)	California Power Mix (GWh)	Percent California Power Mix
Coal	324	0.16%	373	11,310	12,006	4.13%
Large Hydro	24,410	12.31%	3367	1,904	29,681	10.21%
Natural Gas	98,831	49.86%	41	7,120	105,992	36.48%
Nuclear	18,931	9.55%	0	7,739	26,670	9.18%
Oil	37	0.0%	0	0	37	0.01%
Other	394	0.2%	0	0	394	0.14%
Renewables	55,300	27.90%	11,710	6,952	73,961	25.45%
Biomass	5,868	2.96%	659	25	6,553	2.26%
Geothermal	11,582	5.84%	96	1038	12,717	4.38%
Small Hydro	4,567	2.30%	229	1	4,796	1.65%
Solar	19,783	9.98%	0	3,791	23,574	8.11%
Wind	13,500	6.81%	10,725	2,097	26,321	9.06%
Unspecified Sources of Power	N/A	N/A	26,888	14,937	41,825	14.39%
Total	**198,227**	**100.00%**	**42,378**	**49,963**	**290,567**	**100.00%**

Source: http://energyalmanac.ca.gov/electricity/total_system_power.html

A summary of, and context for energy consumption and energy demands within the State is presented in "U.S. Energy Information Administration, California State Profile and Energy Estimates, Quick Facts" excerpted below:

- Excluding federal offshore areas, California was the third-largest producer of petroleum among the 50 states in 2016, after Texas and North Dakota, and, as of January 2017, third in oil refining capacity, with a combined capacity of almost 2 million barrels per calendar day at the state's 18 operable refineries.
- In 2015, California accounted for one-fifth of the nation's jet fuel consumption.
- California's total energy consumption ranks amount the highest in the nation, but, in 2015, the state's per capita energy consumption ranked 49th, due in part to its mild climate and its energy efficiency programs.
- In 2016, California ranked third in the nation in conventional hydroelectric generation, second in net electricity generation from all other renewable energy resources combined, and first as a producer of electricity from solar, geothermal, and biomass resources.
- California leads the nation in solar thermal electricity capacity and generation. In 2016, California had 73% of the nation's capacity and produced 71% of the nation's utility-scale electricity generation from solar thermal resources (5).

As indicated above, California is one of the nation's leading energy-producing states, and California per capita energy use is among the nation's most efficient. Given the nature of the proposed Project being an industrial development, the remainder of this discussion will focus on

the three sources of energy that are most relevant to the project—namely, electricity and natural gas for industrial uses, and transportation fuel for vehicle trips associated with industrial uses planned for the Project.

2.2 ELECTRICITY

The Southern California region's electricity reliability has been of concern for the past several years due to the planned retirement of aging facilities that depend upon once-through cooling technologies, as well as the June 2013 retirement of the San Onofre Nuclear Generating Station (San Onofre). While the once-through cooling phase-out has been ongoing since the May 2010 adoption of the State Water Resources Control Board's once-through cooling policy, the retirement of San Onofre complicated the situation. California ISO studies had revealed the extent to which the Los Angeles Basin and San Diego region were vulnerable to low-voltage and post-transient voltage instability concerns. A preliminary plan to address these issues was detailed in the 2013 Integrative Energy Policy Report (2013 IEPR) after a collaborative process with other energy agencies, utilities, and air districts (6). If the resource development outlined in the preliminary plan continues as detailed, reliability in Southern California would likely be assured; however, tight resource margins have led energy agencies and the ARB to develop a contingency plan. This contingency plan was discussed at a public workshop in Los Angeles on August 20, 2014, and is detailed within this Section (7).

Electricity would be provided to the Project by Southern California Edison (SCE). SCE provides electric power to more than 14 million persons in 15 counties and in 180 incorporated cities, within a service area encompassing approximately 50,000 square miles. SCE derives electricity from varied energy resources including: fossil fuels, hydroelectric generators, nuclear power plants, geothermal power plants, solar power generation, and wind farms. SCE also purchases from independent power producers and utilities, including out-of-state suppliers. (8)

California's electricity industry is an organization of traditional utilities, private generating companies, and state agencies, each with a variety of roles and responsibilities to ensure that electrical power is provided to consumers. The California Independent Service Operator ("ISO") is a nonprofit public benefit corporation, and is the impartial operator of the State's wholesale power grid and is charged with maintaining grid reliability, and to direct uninterrupted electrical energy supplies to California residential and commercial users. While utilities [such as SCE] still own transmission assets, the ISO routes electrical power along these assets, maximizing the use of the transmission system and its power generation resources. The ISO matches buyers and sellers of electricity to ensure that sufficient power is available to meet demand. To these ends, every five minutes the ISO forecasts electrical demands, accounts for operating reserves, and assigns the lowest cost power plant unit to meet demands while ensuring adequate system transmission capacities and capabilities. (9)

Part of the ISO's charge is to plan and coordinate grid enhancements to ensure that electrical power is provided to California consumers. To this end, transmission owners (investor-owned utilities such as SCE) file annual transmission expansion/modification plans to accommodate the State's growing electrical needs. The ISO reviews and either approves or denies the proposed additions. In addition, and perhaps most importantly, the ISO works with other areas in the

western United States electrical grid to ensure that adequate power supplies are available to the State. In this manner, continuing reliable and affordable electrical power is assured to existing and new consumers throughout the State.

Table 2-2 identifies SCE's specific proportional shares of electricity sources in 2016. As indicated in Table 2-2, shows the 2016 SCE Power Mix has renewable energy at 25% of the overall energy resources. Geothermal is remaining steady at 4%. Wind power is remaining steady at 9%, decreasing from 10% in 2014. Large hydro is at 10%, having increased from 3% in 2014. Solar energy is at 8% having increased from 4% in 2014. Biomass and waste has increased to 2% from 1% in 2014. Coal is at 4% having increased from 0%, in 2014 and having decreased significantly from 6% in 2013 and from 7% in 2012. Natural gas is at 37% having increased from 27%, in 2014 and 28% in 2013.

TABLE 2-2: SCE 2014 POWER CONTENT MIX

Energy Resources	2016 SCE Power Mix
Eligible Renewable	**25%**
Biomass & waste	2%
Geothermal	4%
Small Hydroelectric	2%
Solar	8%
Wind	9%
Coal	**4%**
Large Hydroelectric	**10%**
Natural Gas	**37%**
Nuclear	**9%**
Other	**0%**
Unspecified Sources of power*	15%
Total	**100%**

* "Unspecified sources of power" means electricity from transactions that are not traceable to specific generation sources

2.3 NATURAL GAS

Natural gas would be provided to the Project by The Gas Company (Southern California Gas, SoCalGas). The following summary of natural gas resources and service providers, delivery systems, and associated regulation is excerpted from information provided by the California Public Utilities Commission (CPUC).

> "The California Public Utilities Commission (PUC) regulates natural gas utility service for approximately 10.8 million customers that receive natural gas from Pacific Gas and Electric (PG&E), Southern California Gas (SoCalGas), San Diego Gas & Electric (SDG&E), Southwest Gas, and several smaller natural gas utilities. The CPUC also regulates independent storage operators Lodi Gas Storage, Wild Goose Storage, Central Valley Storage and Gill Ranch Storage.

The vast majority of California's natural gas customers are residential and small commercial customers, referred to as "core" customers, who accounted for approximately 32% of the natural gas delivered by California utilities in 2012. Large consumers, like electric generators and industrial customers, referred to as "noncore" customers, accounted for approximately 68% of the natural gas delivered by California utilities in 2012.

The PUC regulates the California utilities' natural gas rates and natural gas services, including in-state transportation over the utilities' transmission and distribution pipeline systems, storage, procurement, metering and billing. Most of the natural gas used in California comes from out-of-state natural gas basins. In 2012, California customers received 35% of their natural gas supply from basins located in the Southwest, 16% from Canada, 40% from the Rocky Mountains, and 9% from basins located within California. California gas utilities may soon also begin receiving biogas into their pipeline systems.

Natural gas from out-of-state production basins is delivered into California via the interstate natural gas pipeline system. The major interstate pipelines that deliver out-of-state natural gas to California consumers are the Gas Transmission Northwest Pipeline, Kern River Pipeline, Transwestern Pipeline, El Paso Pipeline, the Ruby Pipeline, Questar Southern Trails and Mojave Pipeline. Another pipeline, the North Baja – Baja Norte Pipeline, takes gas off the El Paso Pipeline at the California/Arizona border, and delivers that gas through California into Mexico. While the Federal Energy Regulatory Commission (FERC) regulates the transportation of natural gas on the interstate pipelines, the PUC often participates in FERC regulatory proceedings to represent the interests of California natural gas consumers.

Most of the natural gas transported via the interstate pipelines, as well as some of the California-produced natural gas, is delivered into the PG&E and SoCalGas intrastate natural gas transmission pipeline systems (commonly referred to as California's "backbone" natural gas pipeline system). Natural gas on the utilities' backbone pipeline systems is then delivered into the local transmission and distribution pipeline systems, or to natural gas storage fields. Some large noncore customers take natural gas directly off the high pressure backbone pipeline systems, while core customers and other noncore customers take natural gas off the utilities' distribution pipeline systems. The PUC has regulatory jurisdiction over 150,000 miles of utility-owned natural gas pipelines, which transported 82% of the total amount of natural gas delivered to California's gas consumers in 2012.

SDG&E and Southwest Gas' southern division are wholesale customers of SoCalGas, and currently receive all of their natural gas from the SoCalGas system (Southwest Gas also provides natural gas distribution service in the Lake Tahoe area). Some other municipal wholesale customers are the cities of Palo Alto, Long Beach, and Vernon, which are not regulated by the CPUC.

Some of the natural gas delivered to California customers may be delivered directly to them without being transported over the regulated utility systems. For example, the Kern

River/Mojave pipeline system can deliver natural gas directly to some large customers, "bypassing" the utilities' systems. Much of California-produced natural gas is also delivered directly to large consumers.

PG&E and SoCalGas own and operate several natural gas storage fields that are located in northern and southern California. These storage fields, and four independently owned storage utilities – Lodi Gas Storage, Wild Goose Storage, Central Valley Storage, and Gill Ranch Storage – help meet peak seasonal natural gas demand and allow California natural gas customers to secure natural gas supplies more efficiently. (A portion of the Gill Ranch facility is owned by PG&E).

California's regulated utilities do not own any natural gas production facilities. All of the natural gas sold by these utilities must be purchased from suppliers and/or marketers. The price of natural gas sold by suppliers and marketers was deregulated by the FERC in the mid-1980's and is determined by "market forces." However, the PUC decides whether California' s utilities have taken reasonable steps in order to minimize the cost of natural gas purchased on behalf of their core customers." (10)

As indicated in the preceding discussions, natural gas is available from a variety of in-state and out-of-state sources and is provided throughout the state in response to market supply and demand. Complementing available natural gas resources, biogas may soon be available via existing delivery systems, thereby increasing the availability and reliability of resources in total. The PUC oversees utility purchases and transmission of natural gas to ensure reliable and affordable natural gas deliveries to existing and new consumers throughout the State.

2.4 TRANSPORTATION ENERGY RESOURCES

The Project would attract additional vehicle trips with resulting consumption of energy resources, predominantly gasoline and diesel fuel. As of 2012, there are more than 27 million registered vehicles in California, and those vehicles (as noted previously) consume an estimated 18 billion gallons of fuel each year. Gasoline (and other vehicle fuels) are commercially-provided commodities, and would be available to the Project patrons and employees via commercial outlets.

California's on-road transportation system includes 170,000 miles of highways and major roadways, more than 26 million passenger vehicles and light trucks, and almost 1 million medium- and heavy-duty vehicles. The most recent data available (2012) shows the transportation sector emits 36 percent of the total greenhouse gases in the state and about 83 percent of smog-forming oxides of nitrogen (NOx). While gasoline consumption has been declining since 2008 it is still by far the dominant fuel. Petroleum comprises about 92 percent of all transportation energy use, excluding fuel consumed for aviation and most marine vessels. Nearly 18 billion gallons of on-highway fuel are burned each year, including 14.5 billion gallons of gasoline (including ethanol) and 3.4 billion gallons of diesel fuel (including biodiesel and renewable diesel). In 2013, Californians also used 174 million therms of natural gas as a transportation fuel, or the equivalent of 142 million gallons of gasoline, and 841,345 megawatt hours of electricity for transportation, or about the equivalent of 25 million gallons of gasoline.

For 2013, combined alternative fuel use in California was slightly more than 7 percent of total transportation fuel use.

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3 REGULATORY BACKGROUND

Federal and state agencies regulate energy use and consumption through various means and programs. On the federal level, the United States Department of Transportation, the United States Department of Energy, and the United States Environmental Protection Agency are three federal agencies with substantial influence over energy policies and programs. On the state level, the PUC and the California Energy Commissions (CEC) are two agencies with authority over different aspects of energy. Relevant federal and state energy-related laws and plans are summarized below. Project consistency with applicable federal and state regulations is also presented in *italicized* text.

3.1 FEDERAL REGULATIONS

Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA)

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) promoted the development of inter-modal transportation systems to maximize mobility as well as address national and local interests in air quality and energy. ISTEA contained factors that Metropolitan Planning Organizations (MPOs) were to address in developing transportation plans and programs, including some energy-related factors. To meet the new ISTEA requirements, MPOs adopted explicit policies defining the social, economic, energy, and environmental values guiding transportation decisions. *Transportation and access to the Project site is provided primarily by the local and regional roadway systems. The Project would not interfere with, nor otherwise obstruct intermodal transportation plans or projects that may be realized pursuant to the ISTEA because SCAG is not planning for intermodal facilities on or through the Project site.*

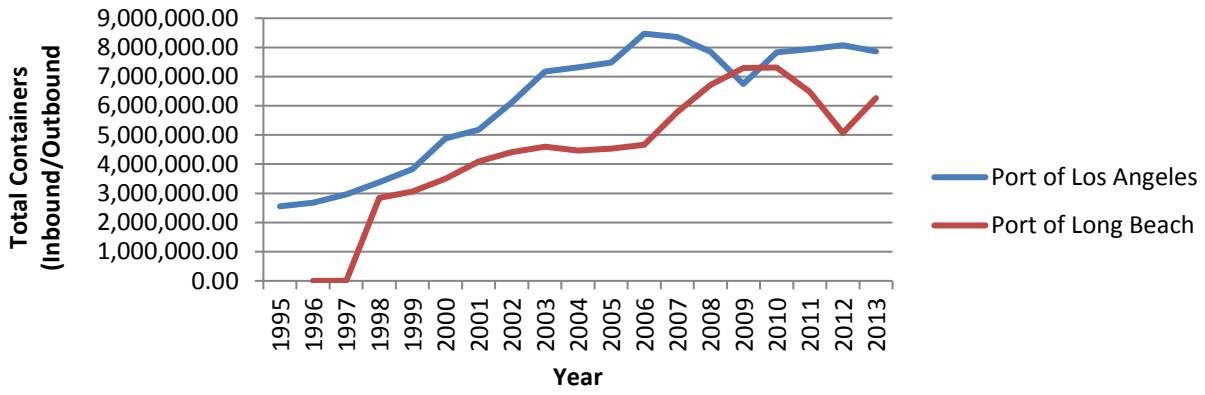
The Transportation Equity Act for the 21st Century (TEA-21)

The Transportation Equity Act for the 21st Century (TEA-21) was signed into law in 1998 and builds upon the initiatives established in the ISTEA legislation, discussed above. TEA-21 authorizes highway, highway safety, transit, and other efficient surface transportation programs. TEA-21 continues the program structure established for highways and transit under ISTEA, such as flexibility in the use of funds, emphasis on measures to improve the environment, and focus on a strong planning process as the foundation of good transportation decisions. TEA-21 also provides for investment in research and its application to maximize the performance of the transportation system through, for example, deployment of Intelligent Transportation Systems, to help improve operations and management of transportation systems and vehicle safety. *The Project site is located along major transportation corridors with proximate access to the Interstate freeway system. The site selected for the Project facilitates access, acts to reduce vehicle miles traveled, takes advantage of existing infrastructure systems, and promotes land use compatibilities through collocation of similar uses. The Project supports the strong planning processes emphasized under TEA-21. The Project is therefore consistent with, and would not otherwise interfere with, nor obstruct implementation of TEA-21.*

As shown on Exhibit 3-A, data from both the Port of Los Angeles and the Port of Long Beach shows that the receiving and shipping of containers have had a stable trend since the recession that hit in 2007 (11) (12)*. Therefore, truck transport from the ports is relatively stable and a Project of this type would not be increasing the amount of truck trips and consequently VMT than what would normally occur within the basin. As such, the estimation of the Brodiaea Commerce Center Project's vehicular-source emissions is likely overstated in that no credit for, or reduction in, emissions is assumed based on diversion of existing trips.*

Additionally, the Southern California Association of Governments' (SCAG's) 2012-2035 Regional Transportation Plan / Sustainable Communities Strategy (RTP/SCS) includes information on goods movement that clearly illustrates that of the port-related trips within the SCAG region, more than 85% have an origin or destination within Los Angeles County. As a result, the Project would serve to meet this demand and not be expected to increase trips or VMT in the air basin.

EXHIBIT 3-A: PORT OF LOS ANGELES/PORT OF LONG BEACH CONTAINER COUNTS



3.2 CALIFORNIA REGULATIONS

Integrated Energy Policy Report

Senate Bill 1389 (Bowen, Chapter 568, Statutes of 2002) requires the California Energy Commission to prepare a biennial integrated energy policy report that assesses major energy trends and issues facing the state's electricity, natural gas, and transportation fuel sectors and provides policy recommendations to conserve resources; protect the environment; ensure reliable, secure, and diverse energy supplies; enhance the state's economy; and protect public health and safety (Public Resources Code § 25301a]). The Energy Commission prepares these assessments and associated policy recommendations every two years, with updates in alternate years, as part of the Integrated Energy Policy Report.

The 2014 Integrated Energy Policy Report Update (2014 IEPR Update) focused on next steps for transforming transportation energy use in California. The 2014 Integrated Energy Policy Report Update provides the results of the California Energy Commission's assessments of a variety of energy issues currently facing California. These issues include the role of transportation in meeting state climate, air quality, and energy goals; the Alternative and Renewable Fuel and

Vehicle Technology Program; current and potential funding mechanisms to advance transportation policy; the status of statewide plug-in electric vehicle infrastructure; challenges and opportunities for electric vehicle infrastructure deployment; measuring success and defining metrics within the Alternative and Renewable Fuel and Vehicle Technology Program; market transformation benefits resulting from Alternative and Renewable Fuel and Vehicle Technology Program investments; the state of hydrogen, zero-emission vehicle, biofuels, and natural gas technologies over the next 10 years; transportation linkages with natural gas infrastructure; evaluation of methane emissions from the natural gas system and implications for the transportation system; changing trends in California's sources of crude oil; the increasing use of crude-by-rail in California; the integration of environmental information in renewable energy planning processes; an update on electricity reliability planning for Southern California energy infrastructure; and an update to the electricity demand forecast.

The 2015 Integrated Energy Policy Report (2015 IEPR) was published in February 2016 and continues to work towards improving electricity, natural gas, and transportation fuel energy use in California. The 2015 IEPR focuses on a variety of topics such as building efficiency standards; benchmarking under the Assembly Bill 758 Action Plan; the impact of drought on California's energy system; achieving 50 percent renewables by 2030; Renewable Action Plan status; the California Energy Demand Forecast; methane emissions; climate change vulnerability and adaptation options; an update on electricity infrastructure in Southern California; the California Independent System Operator energy imbalance market; and an update on California's nuclear plants.

State of California Energy Plan

The CEC is responsible for preparing the State Energy Plan, which identifies emerging trends related to energy supply, demand, conservation, public health and safety, and the maintenance of a healthy economy. The Plan calls for the state to assist in the transformation of the transportation system to improve air quality, reduce congestion, and increase the efficient use of fuel supplies with the least environmental and energy costs. To further this policy, the plan identifies a number of strategies, including assistance to public agencies and fleet operators and encouragement of urban designs that reduce vehicle miles traveled and accommodate pedestrian and bicycle access. *The Project site is located along major transportation corridors with proximate access to the Interstate freeway system. The site selected for the Project facilitates access, acts to reduce vehicle miles traveled, takes advantage of existing infrastructure systems, and promotes land use compatibilities through the introduction of commercial uses on a commercially-designated site. The Project therefore supports urban design and planning processes identified under the State of California Energy Plan, is consistent with, and would not otherwise interfere with, nor obstruct implementation of the State of California Energy Plan.*

California Code Title 24, Part 6, Energy Efficiency Standards

California Code Title 24, Part 6 (also referred to as the California Energy Code), was promulgated by the CEC in 1978 in response to a legislative mandate to create uniform building codes to reduce California's energy consumption. To these ends, the California Energy Code provides energy efficiency standards for residential and nonresidential buildings. According to the CEC,

the Energy Commission's energy efficiency standards have saved Californians more than $74 billion in reduced electricity bills since 1977. (13)

California's building efficiency standards are updated on an approximately three-year cycle. The 2013 Standards would continue to improve upon the current 2008 Standards for new construction of, and additions and alterations to, residential and nonresidential buildings. The 2013 Standards went into effect on July 1, 2014, following approval of the California Building Standards Commission.

The 2013 Energy Efficiency Standards in their entirety may be reviewed at: http://www.energy.ca.gov/title24/2013standards/. The 2013 Energy Efficiency Standards may also be reviewed at the California Energy Commission, 1516 Ninth Street, MS-37, Sacramento, CA 95814-5512. The Project would be designed, constructed and operated so as to meet or exceed incumbent Title 24 Energy Efficiency Standards. On this basis, the Project is determined to be consistent with, and would not interfere with, nor otherwise obstruct implementation of Title 24 Energy Efficiency Standards.

4 PROJECT ENERGY DEMANDS AND ENERGY EFFICIENCY MEASURES

4.1 EVALUATION CRITERIA

In compliance with Appendix F of the *State CEQA Guidelines,* (14) this report analyzes the project's anticipated energy use to determine if the Project would:

- Result in the wasteful, inefficient or unnecessary consumption of energy; or
- Result in a substantial increase in demand or transmission service, resulting in the need for new or expanded sources of energy supply or new or expanded energy delivery systems or infrastructure.

In addition, Appendix F of the State CEQA Guidelines states that the means of achieving the goal of energy conservation includes the following:

- Decreasing overall per capita energy consumption;
- Decreasing reliance on fossil fuels such as coal, natural gas and oil; and
- Increasing reliance on renewable energy sources.

4.2 METHODOLOGY

Information from the CalEEMod 2016.3.2 outputs for the Brodiaea Commerce Center Air Quality Impact Analysis, Urban Crossroads (2017) (15) was utilized in this analysis, detailing Project related construction equipment, transportation energy demands, and facility energy demands. These outputs can be referenced in Appendix 3.1.

4.3 CONSTRUCTION ENERGY DEMANDS

4.3.1 CONSTRUCTION EQUIPMENT ELECTRICITY USAGE ESTIMATES

The focus within this section is the energy implications of the construction process, specifically the power cost from on-site electricity consumption during construction of the proposed Project. Based on the 2015 National Construction Estimator, Richard Pray (2015) (16), the typical power cost per 1,000 square feet of building construction per month is estimated to be $2.28. For the Brodiaea Commerce Center development, the Project plans to develop 262,400 square feet of building space over the course of 13 months. Based on Table 4-1, the total power cost of the on-site electricity usage during the construction of the proposed Project is estimated to be approximately $8,375.81. Additionally, as of June 1, 2016, SCE's general service rate schedule (GS-1) for an industrial land use is $.08 per kWh of electricity (17). As shown on Table 4-2, the total electricity usage from on-site Project construction related activities is estimated to be approximately 104,698 kWh.

TABLE 4-1: PROJECT CONSTRUCTION POWER COST

Power Cost (per 1,000 SF of building per month of construction)	**Total Building Size** (1,000 SF)	**Construction Duration** (months)	**Total Project Construction Power Cost**
$2.28	262,400	14	$8,375.81

TABLE 4-2: PROJECT CONSTRUCTION ELECTRICITY USAGE

Cost per kWh	**Total Project Construction Electricity Usage (kWh)**
$0.08	104,698

[1]Assumes the Project will be under the GS-1 General Industrial service rate under SCE

4.3.2 CONSTRUCTION EQUIPMENT FUEL ESTIMATES

Fuel consumed by construction equipment would be the primary energy resource expended over the course of Project construction. Project construction activity timeline estimates, construction equipment schedules, equipment power ratings, load factors, and associated fuel consumption estimates are presented in Table 4-3. Eight-hour daily use of all equipment is assumed. The aggregate fuel consumption rate for all equipment is estimated at 18.5 hp-hr-gal., obtained from California Air Resources Board (CARB) 2013 Emissions Factors Tables and cited fuel consumption rate factors presented in Table D-24 of the Moyer guidelines. (18) For the purposes of this analysis, that the calculations are based on all construction equipment being diesel-powered which is standard practice consistent with industry standards. Diesel fuel would be supplied by existing commercial fuel providers serving the County and region.

As presented in Table 4-3, Project construction activities would consume an estimated 71,022 gallons of diesel fuel. Project construction would represent a “single-event” diesel fuel demand and would not require on-going or permanent commitment of diesel fuel resources for this purpose.

TABLE 4-3: CONSTRUCTION EQUIPMENT FUEL CONSUMPTION ESTIMATES

Activity/Duration	Equipment	HP Rating	Quantity	Usage Hours	Load Factor	HP-hrs/day	Total Fuel Consumption (gal. diesel fuel)
Site Preparation (10 days)	Crawler Tractors	212	4	8	0.43	2,917	1,577
	Rubber Tired Dozers	247	3	8	0.40	2,371	1,282
Grading (30 days)	Crawler Tractors	212	2	8	0.43	1,459	2,365
	Excavators	158	2	8	0.38	961	1,558
	Graders	187	1	8	0.41	613	995
	Rubber Tired Dozers	247	1	8	0.40	790	1,282
	Scrapers	367	2	8	0.48	2,819	4,571
Building Construction (230 days)	Cranes	231	1	8	0.29	536	6,663
	Crawler Tractors	212	3	8	0.43	2,188	27,200
	Forklifts	89	3	8	0.20	427	5,311
	Generator Sets	84	1	8	0.74	497	6,182
	Welders	46	1	8	0.45	166	2,059
Paving (20 days)	Pavers	130	2	8	0.42	874	944
	Paving Equipment	132	2	8	0.36	760	822
	Rollers	80	2	8	0.38	486	7,888
Architectural Coating (20 days)	Air Compressors	78	1	8	0.48	300	324
CONSTRUCTION FUEL DEMAND (gallons diesel fuel)							***71,022***

4.3.3 CONSTRUCTION WORKER FUEL ESTIMATES

It is assumed that all construction worker trips are from light duty autos (LDA) along area roadways. With respect to estimated VMT, the construction worker trips would generate an estimated 1,070,454 VMT (19). Data regarding Project related construction worker trips were based on CalEEMod 2016.3.2 model defaults utilized within the AQIA.

Vehicle fuel efficiencies for LDA were estimated using information generated within the 2014 version of the Emissions FACtor model (EMFAC) developed by the Air Resources Board (ARB). EMFAC 2014 is a mathematical model that was developed to calculate emission rates, fuel consumption, and VMT from motor vehicles that operate on highways, freeways, and local roads in California and is commonly used by the ARB to project changes in future emissions from on-road mobile sources (20). EMFAC 2014 was run for the LDA vehicle class within the California sub-area for a 2018 calendar year. Data from EMFAC 2014 is shown in Appendix 3.2.

As generated by EMFAC 2014, an aggregated fuel economy of LDAs ranging from model year 1974 to model year 2018 are estimated to have a fuel efficiency of 26.77 miles per gallon (MPG). Table 4-4 provides an estimated annual fuel consumption resulting from Project generated light duty autos related to construction worker trips. Based on Table 4-4, it is estimated that 28,236 gallons of fuel will be consumed related to construction worker trips after full construction of the proposed Project. Project construction worker trips would represent a “single-event” gasoline fuel demand and would not require on-going or permanent commitment of fuel resources for this purpose.

TABLE 4-4: CONSTRUCTION WORKER FUEL CONSUMPTION ESTIMATES

Construction Activity	Worker Trips / Day	Trip Length (miles)	Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
Site Preparation (10 days)	18	14.7	2,646	26.77	99
Grading (30 days)	20	2210	5,880	26.77	220
Building Construction (230 days)	216	14.7	730,296	26.77	27,280
Paving (20 days)	15	14.7	4,410	26.77	165
Architectural Coating (20 days)	43	14.7	12,642	26.77	472
TOTAL CONSTRUCTION WORKER FUEL CONSUMPTION					**28,236**

4.3.4 CONSTRUCTION VENDOR/HAULING FUEL ESTIMATES

With respect to estimated VMT, the construction vendor/h trips would generate an estimated 192,234 VMT along area roadways (15). It is assumed that 50% of all vendor trips are from medium-heavy duty trucks (MHD) and 50% are from heavy-heavy duty trucks (HHD). It is assumed that 100% of all hauling trips are from HHD. These assumptions are consistent with the 2016.3.2 CalEEMod defaults utilized within the Brodiaea Commerce Center Air Quality Impact Analysis. Vehicle fuel efficiencies for MHD and HHD trucks were estimated using information generated within EMFAC 2014. For purposes of this analysis, EMFAC 2014 was run for the MHD and HHD vehicle class within the California sub-area for a 2018 calendar year. Data from EMFAC 2014 is shown in Appendix 3.2.

As generated by EMFAC 2014, an aggregated fuel economy of MHD trucks ranging from model year 1974 to model year 2018 are estimated to have a fuel efficiency of 8.17 mpg. Additionally, HHD trucks are estimated to have a fuel efficiency of 5.77 mpg.

Table 4-5 and Table 4-6 shows the estimated fuel economy of MHD and HHD trucks accessing the Project site. Based on Table 4-5 and Table 4-6, fuel consumption from construction hauling and vendor trips (medium and heavy duty trucks) will total approximately 39,420 gallons. Project construction vendor trips would represent a “single-event” diesel fuel demand and would not require on-going or permanent commitment of diesel fuel resources for this purpose.

TABLE 4-5: CONSTRUCTION VENDOR FUEL CONSUMPTION ESTIMATES (MHD TRUCKS) [2]

Construction Activity	Vendor Trips / Day	Trip Length (miles)	Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
Building Construction (230 days)	84	6.9	133,308	8.17	16,317

TABLE 4-6: CONSTRUCTION VENDOR/HAULING FUEL CONSUMPTION ESTIMATES (HHD TRUCKS) [3]

Construction Activity	Vendor/Hauling Trips/ Day	Trip Length (miles)	Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
Building Construction (230 days)	84	6.9	133,308	5.77	23,104

4.3.5 CONSTRUCTION ENERGY EFFICIENCY/CONSERVATION MEASURES

The equipment used for Project construction would conform to CARB regulations and CA emissions standards and would evince related fuel efficiencies. There are no unusual Project characteristics or construction processes that would require the use of equipment that would be more energy intensive than is used for comparable activities; or equipment that would not conform to current emissions standards (and related fuel efficiencies). Equipment employed in construction of the Project would therefore not result in inefficient wasteful, or unnecessary consumption of fuel.

The Project would utilize construction contractors which practice compliance with applicable CARB regulation regarding retrofitting, repowering, or replacement of diesel off-road construction equipment. Additionally, CARB has adopted the Airborne Toxic Control Measure to limit heavy-duty diesel motor vehicle idling in order to reduce public exposure to diesel particulate matter and other Toxic Air Contaminants. Compliance with anti-idling and emissions regulations would result in a more efficient use of construction-related energy and the minimization or elimination of wasteful or unnecessary consumption of energy. Idling restrictions and the use of newer engines and equipment would result in less fuel combustion and energy consumption.

Additionally, certain incidental construction-source energy efficiencies would likely accrue through implementation of California regulations and best available control measures (BACM).

[2] Assumptions for the vendor trip length and vehicle miles traveled are consistent with 2013.2.2 model defaults utilized within the Brodiaea Commerce Center Air Quality Impact Analysis.

[3] Assumptions for the vendor trip length and vehicle miles traveled are consistent with 2013.2.2 model defaults utilized within the Brodiaea Commerce Center Air Quality Impact Analysis.

More specifically, California Code of Regulations Title 13, Motor Vehicles, section 2449(d)(3) Idling, limits idling times of construction vehicles to no more than five minutes, thereby precluding unnecessary and wasteful consumption of fuel due to unproductive idling of construction equipment. To this end, "grading plans shall reference the requirement that a sign shall be posted on-site stating that construction workers need to shut off engines at or before five minutes of idling." In this manner, construction equipment operators are informed that engines are to be turned off at or prior to five minutes of idling. Enforcement of idling limitations is realized through periodic site inspections conducted by County building officials, and/or in response to citizen complaints.

Indirectly, construction energy efficiencies and energy conservation would be achieved for the proposed development through energy efficiencies realized from bulk purchase, transport and use of construction materials.

A full analysis related to the energy needed to form construction materials is not included in this analysis due to a lack of detailed Project-specific information on construction materials. At this time an analysis of the energy needed to create Project-related construction materials would be extremely speculative and thus has not been prepared.

In general, the construction processes promote conservation and efficient use of energy by reducing raw materials demands, with related reduction in energy demands associated with raw materials extraction, transportation, processing and refinement. Use of materials in bulk reduces energy demands associated with preparation and transport of construction materials as transport and disposal of construction waste and solid waste in general, with corollary reduced demands on area landfill capacities and energy consumed by waste transport and landfill operations.

4.3.6 SUMMARY

The estimated power cost of on-site electricity usage during the construction of the proposed Project is assumed to be around $8,375.81. Additionally, based on the assumed power cost, it is estimated that the total electricity usage during construction, after full Project build-out, is calculated to be around 104,698 kWh.

Construction equipment used by the Project would result in single event consumption of approximately 71,022 gallons of diesel fuel. Construction equipment use of fuel would not be atypical for the type of construction proposed because there are no aspects of the Project's proposed construction process that are unusual or energy-intensive, and Project construction equipment would conform to the applicable CARB emissions standards, acting to promote equipment fuel efficiencies.

CCR Title 13, Title 13, Motor Vehicles, section 2449(d)(3) Idling, limits idling times of construction vehicles to no more than 5 minutes, thereby precluding unnecessary and wasteful consumption of fuel due to unproductive idling of construction equipment. Best available control measures inform construction equipment operators of this requirement. Enforcement of idling limitations is realized through periodic site inspections conducted by County building officials, and/or in response to citizen complaints.

Construction worker trips for full construction of the proposed Project would result in the estimated fuel consumption of 28,236 gallons of fuel. Additionally, fuel consumption from construction vendor trips (medium and heavy duty trucks) will total approximately 39,420 gallons. Diesel fuel would be supplied by County and regional commercial vendors. Indirectly, construction energy efficiencies and energy conservation would be achieved through the use of bulk purchases, transport and use of construction materials. The 2015 IEPR released by the California Energy Commission has shown that fuel efficiencies are getting better within on and off-road vehicle engines due to more stringent government requirements (21). As supported by the preceding discussions, Project construction energy consumption would not be considered inefficient, wasteful, or otherwise unnecessary.

4.4 OPERATIONAL ENERGY DEMANDS

Energy consumption in support of or related to Project operations would include transportation energy demands (energy consumed by employee and patron vehicles accessing the Project site) and facilities energy demands (energy consumed by building operations and site maintenance activities).

4.4.1 TRANSPORTATION ENERGY DEMANDS

Energy that would be consumed by Project-generated traffic is a function of total VMT and estimated vehicle fuel economies of vehicles accessing the Project site.

LIGHT DUTY AUTOS

With respect to estimated VMT, and based on the trip frequency and trip length methodologies cited in the Project's Air Quality Impact Analysis, the Project would generate an estimated 1,648,934 annual VMT along area roadways for all passenger cars with full build-out of the Project (15). As generated by EMFAC 2014, an aggregated fuel economy of LDAs ranging from model year 1974 to model year 2018 are estimated to have a fuel efficiency of 26.77 mpg. Table 4-7 provides an estimated range of annual fuel consumption resulting from Project generated LDAs. Based on Table 4-7, it is estimated that 61,596 gallons of fuel will be consumed from Project generated LDA trips.

TABLE 4-7: PROJECT-GENERATED PASSENGER CAR TRAFFIC ANNUAL FUEL CONSUMPTION

Annual Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Annual Fuel Consumption (gallons)
1,648,934	26.77	61,596

LIGHT-HEAVY DUTY TRUCKS

With respect to estimated VMT, and based on the trip frequency and trip length methodologies cited in the Project's Air Quality Impact Analysis, the Project would generate an estimated 821,460 annual VMT along area roadways for all LHD trucks with full build-out of the Project (15). As generated by EMFAC 2014, an aggregated fuel economy of LHD trucks ranging from model year 1974 to model year 2018 are estimated to have a fuel efficiency of 12.94 mpg. Table 4-8

provides an estimated range of annual fuel consumption resulting from Project generated LHD trucks. Based on Table 4-8, it is estimated that 63,483 gallons of fuel will be consumed from Project generated LHD truck trips.

TABLE 4-8: PROJECT-GENERATED LHD TRUCK TRAFFIC ANNUAL FUEL CONSUMPTION

Annual Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Annual Fuel Consumption (gallons)
821,466	12.94	63,483

MEDIUM-HEAVY DUTY TRUCKS

With respect to estimated VMT, and based on the trip frequency and trip length methodologies cited in the Project's Air Quality Impact Analysis, the Project would generate an estimated 750,957 annual VMT along area roadways for all MHD trucks with full build-out of the Project (15). As generated by EMFAC 2014, an aggregated fuel economy of MHD trucks ranging from model year 1974 to model year 2018 are estimated to have a fuel efficiency of 8.17 mpg. Table 4-9 provides an estimated range of annual fuel consumption resulting from Project generated MHD trucks. Based on Table 4-9, it is estimated that 80,602 gallons of fuel will be consumed from Project generated MHD truck trips.

TABLE 4-9: PROJECT-GENERATED MHD TRUCK TRAFFIC ANNUAL FUEL CONSUMPTION

Annual Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Annual Fuel Consumption (gallons)
658,510	8.17	80,602

HEAVY-HEAVY DUTY TRUCKS

With respect to estimated VMT, and based on the trip frequency and trip length methodologies cited in the Project's Air Quality Impact Analysis, the Project would generate an estimated 1,959,019 annual VMT along area roadways for all HHD trucks with full build-out of the Project (15). As generated by EMFAC 2014, an aggregated fuel economy of HHD trucks ranging from model year 1974 to model year 2018 are estimated to have a fuel efficiency of 5.77 mpg. Table 4-10 provides an estimated range of annual fuel consumption resulting from Project generated HHD trucks. Based on Table 4-10, it is estimated that 389,752 gallons of fuel will be consumed from Project generated HHD truck trips.

TABLE 4-10: PROJECT-GENERATED HHD TRUCK TRAFFIC ANNUAL FUEL CONSUMPTION

Annual Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Annual Fuel Consumption (gallons)
2,248,870	5.77	389,752

As summarized on Table 4-11, the Project will result in 5,377,798 annual VMT and an estimated annual fuel consumption of 595,433 gallons of fuel.

TABLE 4-11: PROJECT-GENERATED TRAFFIC ANNUAL FUEL CONSUMPTION (ALL VEHICLES)

Vehicle Type	Annual Miles Traveled	Estimated Annual Fuel Consumption (gallons)
Light Duty Autos	1,648,947	61,597
LHD Trucks	821,466	63,483
MHD Trucks	658,515	80,602
HHD Trucks	2,248,870	389,752
Total (All Vehicles)	**5,377,798**	**595,433**

4.4.2 FACILITY ENERGY DEMANDS

Project building operations and Project site maintenance activities would result in the consumption of natural gas and electricity. Natural gas would be supplied to the Project by The Gas Company; electricity would be supplied to the Project by Southern California Edison. Annual natural gas and electricity demands of the Project are summarized in Table 4-12.

Energy use in buildings is divided into energy consumed by the built environment and energy consumed by uses that are independent of the construction of the building such as in plug-in appliances. In California, the California Building Standards Code Title 24 governs energy consumed by the built environment, mechanical systems, and some types of fixed lighting (22). Non-building energy use, or "plug-in" energy use can be further subdivided by specific end-use (refrigeration, cooking, appliances, etc.).

TABLE 4-12: PROJECT ANNUAL OPERATIONAL ENERGY DEMAND SUMMARY

Natural Gas Demand	kBTU/year
Parking Lot	0
Unrefrigerated Warehouse	532,672
Total Project Natural Gas Demand	**532,672**

Electricity Demand	kWh/year
Parking Lot	88,361
Unrefrigerated Warehouse	619,264
Total Project Electricity Demand	**707,625**

4.4.3 OPERATIONAL ENERGY EFFICIENCY/CONSERVATION MEASURES

Energy efficient/energy conserving design features and operational programs that would be implemented under the Project are summarized below. Also noted in the following discussions, energy efficiency/energy conservation attributes of the Project would be complemented by increasingly stringent state and federal regulatory actions addressing vehicle fuel economies and vehicle emissions standards; and enhanced building/utilities energy efficiencies mandated under California building codes (e.g., Title24, California Green Building Code).

The Project would also not result in a substantial increase in demand or transmission service, resulting in the need for new or expanded sources of energy supply or new or expanded energy delivery systems or infrastructure.

Enhanced Vehicle Fuel Efficiencies

Estimated annual fuel consumption estimates presented previously in Table 4-11 represent likely potential maximums that would occur in the Project. Under subsequent future conditions, average fuel economies of vehicles accessing the Project site can be expected to improve as older, less fuel efficient vehicles are removed from circulation, and in response to fuel economy and emissions standards imposed on newer vehicles entering the circulation system.

4.5 SUMMARY

4.5.1 TRANSPORTATION ENERGY DEMANDS

Annual vehicular trips and related VMT generated by the Project would result in an estimated 61,597 gallons of fuel consumption per year for LDAs. Additionally, the Project would result in an estimated 63,483 gallons of fuel consumption per year for LHD trucks. In regards to MHD trucks, the Project would result in an estimated 80,602 gallons of fuel consumption per year. For HHD trucks an estimated 389,752 gallons of fuel consumption per year is estimated for the year 2019. The total estimated annual fuel consumption from Project generated VMT would result in a fuel demand 595,433 gallons of fuel.

Fuel would be provided by current and future commercial vendors. Trip generation and VMT generated by the Project are consistent with other warehouse uses of similar scale and configuration, as reflected respectively in the Institute of Transportation Engineers (ITE) Trip Generation Manual (9th Ed., 2012); and California Emissions Estimator Model (CalEEMod) v2016.3.2. That is, the Project does not propose uses or operations that would inherently result in excessive and wasteful vehicle trips and VMT, nor associated excess and wasteful vehicle energy consumption.

Enhanced fuel economies realized pursuant to federal and state regulatory actions, and related transition of LDVs and HDVs to alternative energy sources (e.g., electricity, natural gas, bio fuels, hydrogen cells) would likely decrease future gasoline fuel demands per VMT. Location of the Project proximate to regional and local roadway systems tends to reduce VMT within the region, acting to reduce regional vehicle energy demands. The Project would also implement sidewalks, facilitating and encouraging pedestrian access. Facilitating pedestrian and bicycle access would reduce VMT and associated energy consumption. As supported by the preceding discussions, Project transportation energy consumption would not be considered inefficient, wasteful, or otherwise unnecessary.

4.5.2 FACILITY ENERGY DEMANDS

Project facility operational energy demands are estimated at: 532,672 kBTU/year of natural gas; and 707,625 kWh/year of electricity. Natural gas would be supplied to the Project by The Gas Company; electricity would be supplied by Southern California Edison. The Project proposes

conventional warehouse uses reflecting contemporary energy efficient/energy conserving designs and operational programs. Uses proposed by the Project are not inherently energy intensive, and the Project energy demands in total would be comparable to, or less than, other warehouse projects of similar scale and configuration.

Various energy conserving features and operational programs that would be realized under the Project are discussed previously. Based on the preceding, Project facilities energy demands and energy consumption would not be considered inefficient, wasteful, or otherwise unnecessary.

4.6 CONCLUSIONS

As supported by the preceding analyses, Project construction and operations would not result in the inefficient, wasteful or unnecessary consumption of energy. Further, the energy demands of the Project can be accommodated within the context of available resources and energy delivery systems. The Project would therefore not cause or result in the need for additional energy producing or transmission facilities. The Project would not engage in wasteful or inefficient uses of energy and aims to achieve energy conservations goals within the State of California. Notwithstanding, the Project proposes warehousing land use and will not have any long-term effects on an energy provider's future energy development or future energy conservation strategies.

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6 CERTIFICATION

The contents of this air study report represent an accurate depiction of the environmental impacts associated with the proposed Brodiaea Commerce Center Project. The information contained in this air quality impact report is based on the best available data at the time of preparation. If you have any questions, please contact me directly at (949) 336-5987.

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EDUCATION

Master of Science in Environmental Studies
California State University, Fullerton • May, 2010

Bachelor of Arts in Environmental Analysis and Design
University of California, Irvine • June, 2006

PROFESSIONAL AFFILIATIONS

AEP – Association of Environmental Planners
AWMA – Air and Waste Management Association
ASTM – American Society for Testing and Materials

PROFESSIONAL CERTIFICATIONS

Environmental Site Assessment – American Society for Testing and Materials • June, 2013
Planned Communities and Urban Infill – Urban Land Institute • June, 2011
Indoor Air Quality and Industrial Hygiene – EMSL Analytical • April, 2008
Principles of Ambient Air Monitoring – California Air Resources Board • August, 2007
AB2588 Regulatory Standards – Trinity Consultants • November, 2006
Air Dispersion Modeling – Lakes Environmental • June, 2006

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APPENDIX 3.1:

CALEEMOD EMISSIONS MODEL OUTPUTS

Brodiaea Warehouse (Construction - Mitigated)

South Coast AQMD Air District, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Unrefrigerated Warehouse-No Rail	262.40	1000sqft	6.02	262,400.00	0
Parking Lot	252.46	1000sqft	5.80	252,460.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	10			**Operational Year**	2019
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Construction schedule adjusted as per Client.

Off-road Equipment - Crawler Tractors used in lieu of Tractors/Loaders/Backhoes.

Off-road Equipment - Crawler Tractors used in lieu of Tractors/Loaders/Backhoes.

Off-road Equipment - Crawler Tractors used in lieu of Tractors/Loaders/Backhoes.

Off-road Equipment -

Off-road Equipment - Hours are based on an 8-hour workday.

Grading -

Vehicle Trips - Construction (Unmitigated) Run Only.

Fleet Mix - Construction (Unmitigated) Run Only.

Energy Use - Construction (Unmitigated) Run Only.

Water And Wastewater - Construction (Unmitigated) Run Only.

Solid Waste - Construction (Unmitigated) Run Only.

Construction Off-road Equipment Mitigation -

Architectural Coating - Use Low VOC Paint (50 g/L)

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	100.00	50.00
tblArchitecturalCoating	EF_Nonresidential_Interior	100.00	50.00
tblArchitecturalCoating	EF_Parking	100.00	50.00
tblConstructionPhase	NumDays	300.00	230.00
tblConstructionPhase	PhaseEndDate	11/11/2019	7/8/2019
tblConstructionPhase	PhaseEndDate	9/16/2019	5/13/2019
tblConstructionPhase	PhaseEndDate	7/23/2018	6/25/2018
tblConstructionPhase	PhaseEndDate	10/14/2019	6/10/2019
tblConstructionPhase	PhaseEndDate	6/11/2018	5/14/2018

tblConstructionPhase	PhaseStartDate	10/15/2019	6/11/2019
tblConstructionPhase	PhaseStartDate	7/24/2018	6/26/2018
tblConstructionPhase	PhaseStartDate	6/12/2018	5/15/2018
tblConstructionPhase	PhaseStartDate	9/17/2019	5/14/2019
tblConstructionPhase	PhaseStartDate	5/29/2018	5/1/2018
tblEnergyUse	LightingElect	0.35	0.00
tblEnergyUse	LightingElect	1.17	0.00
tblEnergyUse	NT24E	0.82	0.00
tblEnergyUse	NT24NG	0.03	0.00
tblEnergyUse	T24E	0.37	0.00
tblEnergyUse	T24NG	2.00	0.00
tblFleetMix	HHD	0.03	0.00
tblFleetMix	HHD	0.03	0.00
tblFleetMix	LDA	0.55	1.00
tblFleetMix	LDA	0.55	1.00
tblFleetMix	LDT1	0.04	0.00
tblFleetMix	LDT1	0.04	0.00
tblFleetMix	LDT2	0.20	0.00
tblFleetMix	LDT2	0.20	0.00
tblFleetMix	LHD1	0.02	0.00
tblFleetMix	LHD1	0.02	0.00
tblFleetMix	LHD2	5.8700e-003	0.00
tblFleetMix	LHD2	5.8700e-003	0.00
tblFleetMix	MCY	4.7240e-003	0.00
tblFleetMix	MCY	4.7240e-003	0.00
tblFleetMix	MDV	0.12	0.00
tblFleetMix	MDV	0.12	0.00

tblFleetMix	MH	9.9100e-004	0.00
tblFleetMix	MH	9.9100e-004	0.00
tblFleetMix	MHD	0.02	0.00
tblFleetMix	MHD	0.02	0.00
tblFleetMix	OBUS	1.9990e-003	0.00
tblFleetMix	OBUS	1.9990e-003	0.00
tblFleetMix	SBUS	7.0400e-004	0.00
tblFleetMix	SBUS	7.0400e-004	0.00
tblFleetMix	UBUS	2.0270e-003	0.00
tblFleetMix	UBUS	2.0270e-003	0.00
tblOffRoadEquipment	OffRoadEquipmentType		Crawler Tractors
tblOffRoadEquipment	OffRoadEquipmentType		Crawler Tractors
tblOffRoadEquipment	OffRoadEquipmentType		Crawler Tractors
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblSolidWaste	SolidWasteGenerationRate	246.66	0.00
tblVehicleTrips	CC_TL	8.40	0.00
tblVehicleTrips	CC_TL	8.40	0.00
tblVehicleTrips	CNW_TL	6.90	0.00
tblVehicleTrips	CNW_TL	6.90	0.00
tblVehicleTrips	CNW_TTP	41.00	0.00
tblVehicleTrips	CW_TL	16.60	0.00
tblVehicleTrips	CW_TL	16.60	0.00

tblVehicleTrips	CW_TTP	59.00	0.00
tblVehicleTrips	DV_TP	5.00	0.00
tblVehicleTrips	PB_TP	3.00	0.00
tblVehicleTrips	PR_TP	92.00	0.00
tblVehicleTrips	ST_TR	1.68	0.00
tblVehicleTrips	SU_TR	1.68	0.00
tblVehicleTrips	WD_TR	1.68	0.00
tblWater	IndoorWaterUseRate	60,680,000.00	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2018	0.4774	4.9162	2.8132	7.3200e-003	0.4363	0.1950	0.6313	0.1593	0.1816	0.3409	0.0000	668.7244	668.7244	0.1199	0.0000	671.7208
2019	0.8925	2.5684	1.6492	4.5600e-003	0.1441	0.1002	0.2443	0.0388	0.0937	0.1325	0.0000	413.5978	413.5978	0.0660	0.0000	415.2482
Maximum	**0.8925**	**4.9162**	**2.8132**	**7.3200e-003**	**0.4363**	**0.1950**	**0.6313**	**0.1593**	**0.1816**	**0.3409**	**0.0000**	**668.7244**	**668.7244**	**0.1199**	**0.0000**	**671.7208**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2018	0.4774	4.9162	2.8132	7.3200e-003	0.2922	0.1950	0.4871	0.0950	0.1816	0.2766	0.0000	668.7240	668.7240	0.1199	0.0000	671.7204
2019	0.8925	2.5684	1.6492	4.5600e-003	0.1441	0.1002	0.2443	0.0388	0.0937	0.1325	0.0000	413.5975	413.5975	0.0660	0.0000	415.2480
Maximum	**0.8925**	**4.9162**	**2.8132**	**7.3200e-003**	**0.2922**	**0.1950**	**0.4871**	**0.0950**	**0.1816**	**0.2766**	**0.0000**	**668.7240**	**668.7240**	**0.1199**	**0.0000**	**671.7204**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**24.84**	**0.00**	**16.46**	**32.43**	**0.00**	**13.57**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**5-1-2018**	**7-31-2018**	2.1294	2.1294
2	**8-1-2018**	**10-31-2018**	1.9528	1.9528
3	**11-1-2018**	**1-31-2019**	1.9094	1.9094
4	**2-1-2019**	**4-30-2019**	1.7537	1.7537
5	**5-1-2019**	**7-31-2019**	1.0887	1.0887
		Highest	2.1294	2.1294

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1.0903	6.0000e-005	6.6400e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0128	0.0128	3.0000e-005	0.0000	0.0136
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.0903**	**6.0000e-005**	**6.6400e-003**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0128**	**0.0128**	**3.0000e-005**	**0.0000**	**0.0136**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1.0903	6.0000e-005	6.6400e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0128	0.0128	3.0000e-005	0.0000	0.0136
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.0903**	**6.0000e-005**	**6.6400e-003**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0128**	**0.0128**	**3.0000e-005**	**0.0000**	**0.0136**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	5/1/2018	5/14/2018	5	10	
2	Grading	Grading	5/15/2018	6/25/2018	5	30	
3	Building Construction	Building Construction	6/26/2018	5/13/2019	5	230	
4	Paving	Paving	5/14/2019	6/10/2019	5	20	
5	Architectural Coating	Architectural Coating	6/11/2019	7/8/2019	5	20	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 105

Acres of Paving: 5.8

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 393,600; Non-Residential Outdoor: 131,200; Striped Parking Area: 15,148 (Architectural Coating – sqft)

OffRoad Equipment

Brodiaea Warehouse (Construction - Mitigated) - South Coast AQMD Air District, Annual

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	8.00	78	0.48
Site Preparation	Crawler Tractors	4	0.00	212	0.43
Grading	Crawler Tractors	2	8.00	212	0.43
Grading	Excavators	2	8.00	158	0.38
Building Construction	Cranes	1	8.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Paving	Pavers	2	8.00	130	0.42
Paving	Rollers	2	8.00	80	0.38
Building Construction	Crawler Tractors	3	8.00	212	0.43
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Grading	Graders	1	8.00	187	0.41
Grading	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Paving	Paving Equipment	2	8.00	132	0.36
Site Preparation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Building Construction	Welders	1	8.00	46	0.45
Grading	Scrapers	2	8.00	367	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	216.00	84.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	43.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Site Preparation - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0903	0.0000	0.0903	0.0497	0.0000	0.0497	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0175	0.1884	0.0657	1.3000e-004		9.1600e-003	9.1600e-003		8.4300e-003	8.4300e-003	0.0000	11.7050	11.7050	3.6400e-003	0.0000	11.7961
Total	**0.0175**	**0.1884**	**0.0657**	**1.3000e-004**	**0.0903**	**9.1600e-003**	**0.0995**	**0.0497**	**8.4300e-003**	**0.0581**	**0.0000**	**11.7050**	**11.7050**	**3.6400e-003**	**0.0000**	**11.7961**

3.2 Site Preparation - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.8000e-004	3.9000e-004	4.2000e-003	1.0000e-005	9.9000e-004	1.0000e-005	1.0000e-003	2.6000e-004	1.0000e-005	2.7000e-004	0.0000	0.9473	0.9473	3.0000e-005	0.0000	0.9481
Total	**4.8000e-004**	**3.9000e-004**	**4.2000e-003**	**1.0000e-005**	**9.9000e-004**	**1.0000e-005**	**1.0000e-003**	**2.6000e-004**	**1.0000e-005**	**2.7000e-004**	**0.0000**	**0.9473**	**0.9473**	**3.0000e-005**	**0.0000**	**0.9481**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0352	0.0000	0.0352	0.0194	0.0000	0.0194	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0175	0.1884	0.0657	1.3000e-004		9.1600e-003	9.1600e-003		8.4300e-003	8.4300e-003	0.0000	11.7050	11.7050	3.6400e-003	0.0000	11.7961
Total	**0.0175**	**0.1884**	**0.0657**	**1.3000e-004**	**0.0352**	**9.1600e-003**	**0.0444**	**0.0194**	**8.4300e-003**	**0.0278**	**0.0000**	**11.7050**	**11.7050**	**3.6400e-003**	**0.0000**	**11.7961**

3.2 Site Preparation - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.8000e-004	3.9000e-004	4.2000e-003	1.0000e-005	9.9000e-004	1.0000e-005	1.0000e-003	2.6000e-004	1.0000e-005	2.7000e-004	0.0000	0.9473	0.9473	3.0000e-005	0.0000	0.9481
Total	**4.8000e-004**	**3.9000e-004**	**4.2000e-003**	**1.0000e-005**	**9.9000e-004**	**1.0000e-005**	**1.0000e-003**	**2.6000e-004**	**1.0000e-005**	**2.7000e-004**	**0.0000**	**0.9473**	**0.9473**	**3.0000e-005**	**0.0000**	**0.9481**

3.3 Grading - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1460	0.0000	0.1460	0.0557	0.0000	0.0557	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0876	1.0691	0.5360	1.0700e-003		0.0436	0.0436		0.0401	0.0401	0.0000	97.9715	97.9715	0.0305	0.0000	98.7340
Total	**0.0876**	**1.0691**	**0.5360**	**1.0700e-003**	**0.1460**	**0.0436**	**0.1896**	**0.0557**	**0.0401**	**0.0958**	**0.0000**	**97.9715**	**97.9715**	**0.0305**	**0.0000**	**98.7340**

3.3 Grading - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.5900e-003	1.3000e-003	0.0140	3.0000e-005	3.2900e-003	3.0000e-005	3.3200e-003	8.7000e-004	2.0000e-005	9.0000e-004	0.0000	3.1575	3.1575	1.1000e-004	0.0000	3.1602
Total	**1.5900e-003**	**1.3000e-003**	**0.0140**	**3.0000e-005**	**3.2900e-003**	**3.0000e-005**	**3.3200e-003**	**8.7000e-004**	**2.0000e-005**	**9.0000e-004**	**0.0000**	**3.1575**	**3.1575**	**1.1000e-004**	**0.0000**	**3.1602**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0569	0.0000	0.0569	0.0217	0.0000	0.0217	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0876	1.0691	0.5360	1.0700e-003		0.0436	0.0436		0.0401	0.0401	0.0000	97.9714	97.9714	0.0305	0.0000	98.7339
Total	**0.0876**	**1.0691**	**0.5360**	**1.0700e-003**	**0.0569**	**0.0436**	**0.1005**	**0.0217**	**0.0401**	**0.0618**	**0.0000**	**97.9714**	**97.9714**	**0.0305**	**0.0000**	**98.7339**

3.3 Grading - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.5900e-003	1.3000e-003	0.0140	3.0000e-005	3.2900e-003	3.0000e-005	3.3200e-003	8.7000e-004	2.0000e-005	9.0000e-004	0.0000	3.1575	3.1575	1.1000e-004	0.0000	3.1602
Total	**1.5900e-003**	**1.3000e-003**	**0.0140**	**3.0000e-005**	**3.2900e-003**	**3.0000e-005**	**3.3200e-003**	**8.7000e-004**	**2.0000e-005**	**9.0000e-004**	**0.0000**	**3.1575**	**3.1575**	**1.1000e-004**	**0.0000**	**3.1602**

3.4 Building Construction - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2682	2.8926	1.3323	2.9000e-003		0.1359	0.1359		0.1270	0.1270	0.0000	259.8608	259.8608	0.0703	0.0000	261.6172
Total	**0.2682**	**2.8926**	**1.3323**	**2.9000e-003**		**0.1359**	**0.1359**		**0.1270**	**0.1270**	**0.0000**	**259.8608**	**259.8608**	**0.0703**	**0.0000**	**261.6172**

3.4 Building Construction - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0246	0.7010	0.1806	1.4700e-003	0.0357	5.0500e-003	0.0408	0.0103	4.8300e-003	0.0152	0.0000	141.6274	141.6274	0.0101	0.0000	141.8794
Worker	0.0775	0.0634	0.6805	1.7000e-003	0.1600	1.3000e-003	0.1613	0.0425	1.2000e-003	0.0437	0.0000	153.4549	153.4549	5.2400e-003	0.0000	153.5858
Total	**0.1021**	**0.7644**	**0.8611**	**3.1700e-003**	**0.1957**	**6.3500e-003**	**0.2021**	**0.0528**	**6.0300e-003**	**0.0588**	**0.0000**	**295.0823**	**295.0823**	**0.0153**	**0.0000**	**295.4652**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2682	2.8926	1.3323	2.9000e-003		0.1359	0.1359		0.1270	0.1270	0.0000	259.8605	259.8605	0.0703	0.0000	261.6169
Total	**0.2682**	**2.8926**	**1.3323**	**2.9000e-003**		**0.1359**	**0.1359**		**0.1270**	**0.1270**	**0.0000**	**259.8605**	**259.8605**	**0.0703**	**0.0000**	**261.6169**

3.4 Building Construction - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0246	0.7010	0.1806	1.4700e-003	0.0357	5.0500e-003	0.0408	0.0103	4.8300e-003	0.0152	0.0000	141.6274	141.6274	0.0101	0.0000	141.8794
Worker	0.0775	0.0634	0.6805	1.7000e-003	0.1600	1.3000e-003	0.1613	0.0425	1.2000e-003	0.0437	0.0000	153.4549	153.4549	5.2400e-003	0.0000	153.5858
Total	**0.1021**	**0.7644**	**0.8611**	**3.1700e-003**	**0.1957**	**6.3500e-003**	**0.2021**	**0.0528**	**6.0300e-003**	**0.0588**	**0.0000**	**295.0823**	**295.0823**	**0.0153**	**0.0000**	**295.4652**

3.4 Building Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1731	1.8846	0.9094	2.0400e-003		0.0863	0.0863		0.0806	0.0806	0.0000	180.4461	180.4461	0.0490	0.0000	181.6702
Total	**0.1731**	**1.8846**	**0.9094**	**2.0400e-003**		**0.0863**	**0.0863**		**0.0806**	**0.0806**	**0.0000**	**180.4461**	**180.4461**	**0.0490**	**0.0000**	**181.6702**

3.4 Building Construction - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0157	0.4652	0.1167	1.0200e-003	0.0252	3.0400e-003	0.0282	7.2600e-003	2.9100e-003	0.0102	0.0000	98.7808	98.7808	6.8400e-003	0.0000	98.9517
Worker	0.0496	0.0394	0.4278	1.1600e-003	0.1126	8.9000e-004	0.1135	0.0299	8.2000e-004	0.0307	0.0000	104.5794	104.5794	3.2700e-003	0.0000	104.6611
Total	**0.0652**	**0.5046**	**0.5444**	**2.1800e-003**	**0.1377**	**3.9300e-003**	**0.1417**	**0.0372**	**3.7300e-003**	**0.0409**	**0.0000**	**203.3602**	**203.3602**	**0.0101**	**0.0000**	**203.6128**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1731	1.8846	0.9094	2.0400e-003		0.0863	0.0863		0.0806	0.0806	0.0000	180.4459	180.4459	0.0490	0.0000	181.6700
Total	**0.1731**	**1.8846**	**0.9094**	**2.0400e-003**		**0.0863**	**0.0863**		**0.0806**	**0.0806**	**0.0000**	**180.4459**	**180.4459**	**0.0490**	**0.0000**	**181.6700**

3.4 Building Construction - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0157	0.4652	0.1167	1.0200e-003	0.0252	3.0400e-003	0.0282	7.2600e-003	2.9100e-003	0.0102	0.0000	98.7808	98.7808	6.8400e-003	0.0000	98.9517
Worker	0.0496	0.0394	0.4278	1.1600e-003	0.1126	8.9000e-004	0.1135	0.0299	8.2000e-004	0.0307	0.0000	104.5794	104.5794	3.2700e-003	0.0000	104.6611
Total	**0.0652**	**0.5046**	**0.5444**	**2.1800e-003**	**0.1377**	**3.9300e-003**	**0.1417**	**0.0372**	**3.7300e-003**	**0.0409**	**0.0000**	**203.3602**	**203.3602**	**0.0101**	**0.0000**	**203.6128**

3.5 Paving - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0145	0.1524	0.1467	2.3000e-004		8.2500e-003	8.2500e-003		7.5900e-003	7.5900e-003	0.0000	20.4752	20.4752	6.4800e-003	0.0000	20.6371
Paving	7.6000e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0221**	**0.1524**	**0.1467**	**2.3000e-004**		**8.2500e-003**	**8.2500e-003**		**7.5900e-003**	**7.5900e-003**	**0.0000**	**20.4752**	**20.4752**	**6.4800e-003**	**0.0000**	**20.6371**

3.5 Paving - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.2000e-004	5.8000e-004	6.2500e-003	2.0000e-005	1.6500e-003	1.0000e-005	1.6600e-003	4.4000e-004	1.0000e-005	4.5000e-004	0.0000	1.5289	1.5289	5.0000e-005	0.0000	1.5301
Total	**7.2000e-004**	**5.8000e-004**	**6.2500e-003**	**2.0000e-005**	**1.6500e-003**	**1.0000e-005**	**1.6600e-003**	**4.4000e-004**	**1.0000e-005**	**4.5000e-004**	**0.0000**	**1.5289**	**1.5289**	**5.0000e-005**	**0.0000**	**1.5301**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0145	0.1524	0.1467	2.3000e-004		8.2500e-003	8.2500e-003		7.5900e-003	7.5900e-003	0.0000	20.4752	20.4752	6.4800e-003	0.0000	20.6371
Paving	7.6000e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0221**	**0.1524**	**0.1467**	**2.3000e-004**		**8.2500e-003**	**8.2500e-003**		**7.5900e-003**	**7.5900e-003**	**0.0000**	**20.4752**	**20.4752**	**6.4800e-003**	**0.0000**	**20.6371**

3.5 Paving - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.2000e-004	5.8000e-004	6.2500e-003	2.0000e-005	1.6500e-003	1.0000e-005	1.6600e-003	4.4000e-004	1.0000e-005	4.5000e-004	0.0000	1.5289	1.5289	5.0000e-005	0.0000	1.5301
Total	**7.2000e-004**	**5.8000e-004**	**6.2500e-003**	**2.0000e-005**	**1.6500e-003**	**1.0000e-005**	**1.6600e-003**	**4.4000e-004**	**1.0000e-005**	**4.5000e-004**	**0.0000**	**1.5289**	**1.5289**	**5.0000e-005**	**0.0000**	**1.5301**

3.6 Architectural Coating - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.6257					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.5500e-003	0.0245	0.0246	4.0000e-005		1.7200e-003	1.7200e-003		1.7200e-003	1.7200e-003	0.0000	3.4043	3.4043	2.9000e-004	0.0000	3.4115
Total	**0.6292**	**0.0245**	**0.0246**	**4.0000e-005**		**1.7200e-003**	**1.7200e-003**		**1.7200e-003**	**1.7200e-003**	**0.0000**	**3.4043**	**3.4043**	**2.9000e-004**	**0.0000**	**3.4115**

3.6 Architectural Coating - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.0800e-003	1.6500e-003	0.0179	5.0000e-005	4.7200e-003	4.0000e-005	4.7600e-003	1.2500e-003	3.0000e-005	1.2900e-003	0.0000	4.3830	4.3830	1.4000e-004	0.0000	4.3864
Total	**2.0800e-003**	**1.6500e-003**	**0.0179**	**5.0000e-005**	**4.7200e-003**	**4.0000e-005**	**4.7600e-003**	**1.2500e-003**	**3.0000e-005**	**1.2900e-003**	**0.0000**	**4.3830**	**4.3830**	**1.4000e-004**	**0.0000**	**4.3864**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.6257					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.5500e-003	0.0245	0.0246	4.0000e-005		1.7200e-003	1.7200e-003		1.7200e-003	1.7200e-003	0.0000	3.4043	3.4043	2.9000e-004	0.0000	3.4115
Total	**0.6292**	**0.0245**	**0.0246**	**4.0000e-005**		**1.7200e-003**	**1.7200e-003**		**1.7200e-003**	**1.7200e-003**	**0.0000**	**3.4043**	**3.4043**	**2.9000e-004**	**0.0000**	**3.4115**

3.6 Architectural Coating - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.0800e-003	1.6500e-003	0.0179	5.0000e-005	4.7200e-003	4.0000e-005	4.7600e-003	1.2500e-003	3.0000e-005	1.2900e-003	0.0000	4.3830	4.3830	1.4000e-004	0.0000	4.3864
Total	**2.0800e-003**	**1.6500e-003**	**0.0179**	**5.0000e-005**	**4.7200e-003**	**4.0000e-005**	**4.7600e-003**	**1.2500e-003**	**3.0000e-005**	**1.2900e-003**	**0.0000**	**4.3830**	**4.3830**	**1.4000e-004**	**0.0000**	**4.3864**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Parking Lot	0.00	0.00	0.00		
Unrefrigerated Warehouse-No Rail	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Parking Lot	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0
Unrefrigerated Warehouse-No Rail	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Parking Lot	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Unrefrigerated Warehouse-No Rail	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	1.0903	6.0000e-005	6.6400e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0128	0.0128	3.0000e-005	0.0000	0.0136
Unmitigated	1.0903	6.0000e-005	6.6400e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0128	0.0128	3.0000e-005	0.0000	0.0136

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.1251					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.9645					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	6.3000e-004	6.0000e-005	6.6400e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0128	0.0128	3.0000e-005	0.0000	0.0136
Total	**1.0903**	**6.0000e-005**	**6.6400e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0128**	**0.0128**	**3.0000e-005**	**0.0000**	**0.0136**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.1251					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.9645					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	6.3000e-004	6.0000e-005	6.6400e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0128	0.0128	3.0000e-005	0.0000	0.0136
Total	**1.0903**	**6.0000e-005**	**6.6400e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0128**	**0.0128**	**3.0000e-005**	**0.0000**	**0.0136**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Brodiaea Warehouse (Operations - Passenger Cars)

South Coast AQMD Air District, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Unrefrigerated Warehouse-No Rail	262.40	1000sqft	6.02	262,400.00	0
Parking Lot	252.46	1000sqft	5.80	252,460.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	10			**Operational Year**	2019
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Operations (Passenger Car) Run Only.

Off-road Equipment - Operations (Passenger Car) Run Only.

Trips and VMT - Operations (Passenger Car) Run Only.

Architectural Coating -

Vehicle Trips - Operations (Passenger Car) Run Only. Trip Rates based on ITE 9th Edition.

Fleet Mix - Operations (Passenger Car) Run Only.

Energy Use -

Water And Wastewater -

Solid Waste -

Operational Off-Road Equipment - Operational equipment provided by the Client.

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	10.00	1.00
tblConstructionPhase	PhaseEndDate	6/11/2018	5/1/2018
tblConstructionPhase	PhaseStartDate	5/29/2018	5/1/2018
tblFleetMix	HHD	0.03	0.00
tblFleetMix	HHD	0.03	0.00
tblFleetMix	LDA	0.55	1.00
tblFleetMix	LDA	0.55	1.00
tblFleetMix	LDT1	0.04	0.00
tblFleetMix	LDT1	0.04	0.00
tblFleetMix	LDT2	0.20	0.00
tblFleetMix	LDT2	0.20	0.00
tblFleetMix	LHD1	0.02	0.00
tblFleetMix	LHD1	0.02	0.00

tblFleetMix	LHD2	5.8700e-003	0.00
tblFleetMix	LHD2	5.8700e-003	0.00
tblFleetMix	MCY	4.7240e-003	0.00
tblFleetMix	MCY	4.7240e-003	0.00
tblFleetMix	MDV	0.12	0.00
tblFleetMix	MDV	0.12	0.00
tblFleetMix	MH	9.9100e-004	0.00
tblFleetMix	MH	9.9100e-004	0.00
tblFleetMix	MHD	0.02	0.00
tblFleetMix	MHD	0.02	0.00
tblFleetMix	OBUS	1.9990e-003	0.00
tblFleetMix	OBUS	1.9990e-003	0.00
tblFleetMix	SBUS	7.0400e-004	0.00
tblFleetMix	SBUS	7.0400e-004	0.00
tblFleetMix	UBUS	2.0270e-003	0.00
tblFleetMix	UBUS	2.0270e-003	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOperationalOffRoadEquipment	OperHoursPerDay	8.00	4.00
tblOperationalOffRoadEquipment	OperHoursPerDay	8.00	4.00
tblOperationalOffRoadEquipment	OperLoadFactor	0.20	0.20
tblOperationalOffRoadEquipment	OperLoadFactor	0.37	0.37
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00
tblVehicleTrips	CNW_TTP	41.00	0.00
tblVehicleTrips	CW_TTP	59.00	100.00
tblVehicleTrips	DV_TP	5.00	0.00

tblVehicleTrips	PB_TP	3.00	0.00
tblVehicleTrips	PR_TP	92.00	100.00
tblVehicleTrips	ST_TR	1.68	1.04
tblVehicleTrips	SU_TR	1.68	1.04
tblVehicleTrips	WD_TR	1.68	1.04

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2018	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2018	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
		Highest		

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1.0903	6.0000e-005	6.6400e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0128	0.0128	3.0000e-005	0.0000	0.0136
Energy	2.8700e-003	0.0261	0.0219	1.6000e-004		1.9800e-003	1.9800e-003		1.9800e-003	1.9800e-003	0.0000	253.8899	253.8899	9.8500e-003	2.4500e-003	254.8654
Mobile	0.0703	0.1316	1.5544	5.4700e-003	0.6148	4.1300e-003	0.6189	0.1632	3.8100e-003	0.1670	0.0000	495.2369	495.2369	0.0114	0.0000	495.5225
Offroad	0.0255	0.2446	0.2271	3.0000e-004		0.0173	0.0173		0.0159	0.0159	0.0000	27.0288	27.0288	8.5500e-003	0.0000	27.2426
Waste						0.0000	0.0000		0.0000	0.0000	50.0698	0.0000	50.0698	2.9590	0.0000	124.0457
Water						0.0000	0.0000		0.0000	0.0000	19.2510	251.7473	270.9983	1.9877	0.0488	335.2432
Total	**1.1890**	**0.4024**	**1.8101**	**5.9300e-003**	**0.6148**	**0.0235**	**0.6383**	**0.1632**	**0.0218**	**0.1850**	**69.3207**	**1,027.9158**	**1,097.2365**	**4.9766**	**0.0513**	**1,236.9332**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1.0903	6.0000e-005	6.6400e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0128	0.0128	3.0000e-005	0.0000	0.0136
Energy	2.8700e-003	0.0261	0.0219	1.6000e-004		1.9800e-003	1.9800e-003		1.9800e-003	1.9800e-003	0.0000	253.8899	253.8899	9.8500e-003	2.4500e-003	254.8654
Mobile	0.0703	0.1316	1.5544	5.4700e-003	0.6148	4.1300e-003	0.6189	0.1632	3.8100e-003	0.1670	0.0000	495.2369	495.2369	0.0114	0.0000	495.5225
Offroad	0.0255	0.2446	0.2271	3.0000e-004		0.0173	0.0173		0.0159	0.0159	0.0000	27.0288	27.0288	8.5500e-003	0.0000	27.2426
Waste						0.0000	0.0000		0.0000	0.0000	50.0698	0.0000	50.0698	2.9590	0.0000	124.0457
Water						0.0000	0.0000		0.0000	0.0000	19.2510	251.7473	270.9983	1.9877	0.0488	335.2432
Total	**1.1890**	**0.4024**	**1.8101**	**5.9300e-003**	**0.6148**	**0.0235**	**0.6383**	**0.1632**	**0.0218**	**0.1850**	**69.3207**	**1,027.9158**	**1,097.2365**	**4.9766**	**0.0513**	**1,236.9332**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	5/1/2018	5/1/2018	5	1	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 5.8

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Site Preparation	Rubber Tired Dozers	0	8.00	247	0.40

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	0	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Site Preparation - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.2 Site Preparation - 2018

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0703	0.1316	1.5544	5.4700e-003	0.6148	4.1300e-003	0.6189	0.1632	3.8100e-003	0.1670	0.0000	495.2369	495.2369	0.0114	0.0000	495.5225
Unmitigated	0.0703	0.1316	1.5544	5.4700e-003	0.6148	4.1300e-003	0.6189	0.1632	3.8100e-003	0.1670	0.0000	495.2369	495.2369	0.0114	0.0000	495.5225

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Parking Lot	0.00	0.00	0.00		
Unrefrigerated Warehouse-No Rail	272.90	272.90	272.90	1,648,947	1,648,947
Total	272.90	272.90	272.90	1,648,947	1,648,947

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Unrefrigerated Warehouse-No	16.60	8.40	6.90	100.00	0.00	0.00	100	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Parking Lot	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Unrefrigerated Warehouse-No Rail	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	225.4645	225.4645	9.3100e-003	1.9300e-003	226.2711
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	225.4645	225.4645	9.3100e-003	1.9300e-003	226.2711
NaturalGas Mitigated	2.8700e-003	0.0261	0.0219	1.6000e-004		1.9800e-003	1.9800e-003		1.9800e-003	1.9800e-003	0.0000	28.4254	28.4254	5.4000e-004	5.2000e-004	28.5943
NaturalGas Unmitigated	2.8700e-003	0.0261	0.0219	1.6000e-004		1.9800e-003	1.9800e-003		1.9800e-003	1.9800e-003	0.0000	28.4254	28.4254	5.4000e-004	5.2000e-004	28.5943

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	532672	2.8700e-003	0.0261	0.0219	1.6000e-004		1.9800e-003	1.9800e-003		1.9800e-003	1.9800e-003	0.0000	28.4254	28.4254	5.4000e-004	5.2000e-004	28.5943
Total		**2.8700e-003**	**0.0261**	**0.0219**	**1.6000e-004**		**1.9800e-003**	**1.9800e-003**		**1.9800e-003**	**1.9800e-003**	**0.0000**	**28.4254**	**28.4254**	**5.4000e-004**	**5.2000e-004**	**28.5943**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	532672	2.8700e-003	0.0261	0.0219	1.6000e-004		1.9800e-003	1.9800e-003		1.9800e-003	1.9800e-003	0.0000	28.4254	28.4254	5.4000e-004	5.2000e-004	28.5943
Total		**2.8700e-003**	**0.0261**	**0.0219**	**1.6000e-004**		**1.9800e-003**	**1.9800e-003**		**1.9800e-003**	**1.9800e-003**	**0.0000**	**28.4254**	**28.4254**	**5.4000e-004**	**5.2000e-004**	**28.5943**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Parking Lot	88361	28.1537	1.1600e-003	2.4000e-004	28.2544
Unrefrigerated Warehouse-No Rail	619264	197.3108	8.1500e-003	1.6900e-003	198.0167
Total		**225.4645**	**9.3100e-003**	**1.9300e-003**	**226.2711**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Parking Lot	88361	28.1537	1.1600e-003	2.4000e-004	28.2544
Unrefrigerated Warehouse-No Rail	619264	197.3108	8.1500e-003	1.6900e-003	198.0167
Total		**225.4645**	**9.3100e-003**	**1.9300e-003**	**226.2711**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	1.0903	6.0000e-005	6.6400e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0128	0.0128	3.0000e-005	0.0000	0.0136
Unmitigated	1.0903	6.0000e-005	6.6400e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0128	0.0128	3.0000e-005	0.0000	0.0136

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.1251					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.9645					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	6.3000e-004	6.0000e-005	6.6400e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0128	0.0128	3.0000e-005	0.0000	0.0136
Total	**1.0903**	**6.0000e-005**	**6.6400e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0128**	**0.0128**	**3.0000e-005**	**0.0000**	**0.0136**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.1251					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.9645					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	6.3000e-004	6.0000e-005	6.6400e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0128	0.0128	3.0000e-005	0.0000	0.0136
Total	**1.0903**	**6.0000e-005**	**6.6400e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0128**	**0.0128**	**3.0000e-005**	**0.0000**	**0.0136**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	270.9983	1.9877	0.0488	335.2432
Unmitigated	270.9983	1.9877	0.0488	335.2432

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	60.68 / 0	270.9983	1.9877	0.0488	335.2432
Total		**270.9983**	**1.9877**	**0.0488**	**335.2432**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	60.68 / 0	270.9983	1.9877	0.0488	335.2432
Total		**270.9983**	**1.9877**	**0.0488**	**335.2432**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	50.0698	2.9590	0.0000	124.0457
Unmitigated	50.0698	2.9590	0.0000	124.0457

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	246.66	50.0698	2.9590	0.0000	124.0457
Total		**50.0698**	**2.9590**	**0.0000**	**124.0457**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	246.66	50.0698	2.9590	0.0000	124.0457
Total		**50.0698**	**2.9590**	**0.0000**	**124.0457**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
Forklifts	1	4.00	260	89	0.20	Diesel
Tractors/Loaders/Backhoes	1	4.00	260	97	0.37	Diesel

UnMitigated/Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Equipment Type	tons/yr										MT/yr					
Forklifts	0.0105	0.0933	0.0780	1.0000e-004		7.2300e-003	7.2300e-003		6.6500e-003	6.6500e-003	0.0000	8.9675	8.9675	2.8400e-003	0.0000	9.0385
Tractors/Loaders/Backhoes	0.0151	0.1513	0.1491	2.0000e-004		0.0101	0.0101		9.2900e-003	9.2900e-003	0.0000	18.0613	18.0613	5.7100e-003	0.0000	18.2042
Total	**0.0255**	**0.2446**	**0.2271**	**3.0000e-004**		**0.0173**	**0.0173**		**0.0159**	**0.0159**	**0.0000**	**27.0288**	**27.0288**	**8.5500e-003**	**0.0000**	**27.2426**

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Brodiaea Warehouse (Operations - Trucks)

South Coast AQMD Air District, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Unrefrigerated Warehouse-No Rail	262.40	1000sqft	6.02	262,400.00	0
Parking Lot	252.46	1000sqft	5.80	252,460.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	10			**Operational Year**	2019
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Operations (Truck) Run Only.

Off-road Equipment - Operations (Truck) Run Only.

Trips and VMT - Operations (Truck) Run Only.

Architectural Coating -

Vehicle Trips - Operations (Passenger Car) Run Only. Trip Rates based on ITE 9th Edition.

Fleet Mix - Operations (Truck) Run Only.

Energy Use -

Water And Wastewater -

Solid Waste -

Operational Off-Road Equipment - Operational equipment provided by the Client.

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	10.00	1.00
tblConstructionPhase	PhaseEndDate	5/14/2018	5/1/2018
tblFleetMix	HHD	0.03	0.60
tblFleetMix	LDA	0.55	0.00
tblFleetMix	LDT1	0.04	0.00
tblFleetMix	LDT2	0.20	0.00
tblFleetMix	LHD1	0.02	0.22
tblFleetMix	LHD2	5.8700e-003	0.00
tblFleetMix	MCY	4.7240e-003	0.00
tblFleetMix	MDV	0.12	0.00
tblFleetMix	MH	9.9100e-004	0.00
tblFleetMix	MHD	0.02	0.18
tblFleetMix	OBUS	1.9990e-003	0.00

tblFleetMix	SBUS	7.0400e-004	0.00
tblFleetMix	UBUS	2.0270e-003	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOperationalOffRoadEquipment	OperHoursPerDay	8.00	4.00
tblOperationalOffRoadEquipment	OperHoursPerDay	8.00	4.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00
tblVehicleTrips	CNW_TTP	41.00	0.00
tblVehicleTrips	CW_TL	16.60	61.00
tblVehicleTrips	CW_TTP	59.00	100.00
tblVehicleTrips	DV_TP	5.00	0.00
tblVehicleTrips	PB_TP	3.00	0.00
tblVehicleTrips	PR_TP	92.00	100.00
tblVehicleTrips	ST_TR	1.68	0.64
tblVehicleTrips	SU_TR	1.68	0.64
tblVehicleTrips	WD_TR	1.68	0.64

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2018	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2018	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
		Highest		

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1.0903	6.0000e-005	6.6400e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0128	0.0128	3.0000e-005	0.0000	0.0136
Energy	2.8700e-003	0.0261	0.0219	1.6000e-004		1.9800e-003	1.9800e-003		1.9800e-003	1.9800e-003	0.0000	253.8899	253.8899	9.8500e-003	2.4500e-003	254.8654
Mobile	0.5765	16.4150	4.3947	0.0532	1.6264	0.1204	1.7468	0.4574	0.1152	0.5726	0.0000	5,150.1761	5,150.1761	0.2461	0.0000	5,156.3288
Offroad	0.0255	0.2448	0.2273	3.0000e-004		0.0173	0.0173		0.0160	0.0160	0.0000	27.0577	27.0577	8.5600e-003	0.0000	27.2718
Waste						0.0000	0.0000		0.0000	0.0000	50.0698	0.0000	50.0698	2.9590	0.0000	124.0457
Water						0.0000	0.0000		0.0000	0.0000	19.2510	251.7473	270.9983	1.9877	0.0488	335.2432
Total	**1.6952**	**16.6859**	**4.6506**	**0.0536**	**1.6264**	**0.1397**	**1.7661**	**0.4574**	**0.1331**	**0.5905**	**69.3207**	**5,682.8838**	**5,752.2046**	**5.2112**	**0.0513**	**5,897.7685**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1.0903	6.0000e-005	6.6400e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0128	0.0128	3.0000e-005	0.0000	0.0136
Energy	2.8700e-003	0.0261	0.0219	1.6000e-004		1.9800e-003	1.9800e-003		1.9800e-003	1.9800e-003	0.0000	253.8899	253.8899	9.8500e-003	2.4500e-003	254.8654
Mobile	0.5765	16.4150	4.3947	0.0532	1.6264	0.1204	1.7468	0.4574	0.1152	0.5726	0.0000	5,150.1761	5,150.1761	0.2461	0.0000	5,156.3288
Offroad	0.0255	0.2448	0.2273	3.0000e-004		0.0173	0.0173		0.0160	0.0160	0.0000	27.0577	27.0577	8.5600e-003	0.0000	27.2718
Waste						0.0000	0.0000		0.0000	0.0000	50.0698	0.0000	50.0698	2.9590	0.0000	124.0457
Water						0.0000	0.0000		0.0000	0.0000	19.2510	251.7473	270.9983	1.9877	0.0488	335.2432
Total	**1.6952**	**16.6859**	**4.6506**	**0.0536**	**1.6264**	**0.1397**	**1.7661**	**0.4574**	**0.1331**	**0.5905**	**69.3207**	**5,682.8838**	**5,752.2046**	**5.2112**	**0.0513**	**5,897.7685**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	5/1/2018	5/1/2018	5	1	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 5.8

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Site Preparation	Rubber Tired Dozers	0	8.00	247	0.40

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	0	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Site Preparation - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.2 Site Preparation - 2018

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.5765	16.4150	4.3947	0.0532	1.6264	0.1204	1.7468	0.4574	0.1152	0.5726	0.0000	5,150.1761	5,150.1761	0.2461	0.0000	5,156.3288
Unmitigated	0.5765	16.4150	4.3947	0.0532	1.6264	0.1204	1.7468	0.4574	0.1152	0.5726	0.0000	5,150.1761	5,150.1761	0.2461	0.0000	5,156.3288

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Parking Lot	0.00	0.00	0.00		
Unrefrigerated Warehouse-No Rail	167.94	167.94	167.94	3,728,851	3,728,851
Total	167.94	167.94	167.94	3,728,851	3,728,851

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Unrefrigerated Warehouse-No	61.00	8.40	6.90	100.00	0.00	0.00	100	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Parking Lot	0.546418	0.044132	0.199182	0.124467	0.017484	0.005870	0.020172	0.031831	0.001999	0.002027	0.004724	0.000704	0.000991
Unrefrigerated Warehouse-No Rail	0.000000	0.000000	0.000000	0.000000	0.220000	0.000000	0.180000	0.600000	0.000000	0.000000	0.000000	0.000000	0.000000

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	225.4645	225.4645	9.3100e-003	1.9300e-003	226.2711
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	225.4645	225.4645	9.3100e-003	1.9300e-003	226.2711
NaturalGas Mitigated	2.8700e-003	0.0261	0.0219	1.6000e-004		1.9800e-003	1.9800e-003		1.9800e-003	1.9800e-003	0.0000	28.4254	28.4254	5.4000e-004	5.2000e-004	28.5943
NaturalGas Unmitigated	2.8700e-003	0.0261	0.0219	1.6000e-004		1.9800e-003	1.9800e-003		1.9800e-003	1.9800e-003	0.0000	28.4254	28.4254	5.4000e-004	5.2000e-004	28.5943

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	532672	2.8700e-003	0.0261	0.0219	1.6000e-004		1.9800e-003	1.9800e-003		1.9800e-003	1.9800e-003	0.0000	28.4254	28.4254	5.4000e-004	5.2000e-004	28.5943
Total		**2.8700e-003**	**0.0261**	**0.0219**	**1.6000e-004**		**1.9800e-003**	**1.9800e-003**		**1.9800e-003**	**1.9800e-003**	**0.0000**	**28.4254**	**28.4254**	**5.4000e-004**	**5.2000e-004**	**28.5943**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	532672	2.8700e-003	0.0261	0.0219	1.6000e-004		1.9800e-003	1.9800e-003		1.9800e-003	1.9800e-003	0.0000	28.4254	28.4254	5.4000e-004	5.2000e-004	28.5943
Total		**2.8700e-003**	**0.0261**	**0.0219**	**1.6000e-004**		**1.9800e-003**	**1.9800e-003**		**1.9800e-003**	**1.9800e-003**	**0.0000**	**28.4254**	**28.4254**	**5.4000e-004**	**5.2000e-004**	**28.5943**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Parking Lot	88361	28.1537	1.1600e-003	2.4000e-004	28.2544
Unrefrigerated Warehouse-No Rail	619264	197.3108	8.1500e-003	1.6900e-003	198.0167
Total		**225.4645**	**9.3100e-003**	**1.9300e-003**	**226.2711**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Parking Lot	88361	28.1537	1.1600e-003	2.4000e-004	28.2544
Unrefrigerated Warehouse-No Rail	619264	197.3108	8.1500e-003	1.6900e-003	198.0167
Total		**225.4645**	**9.3100e-003**	**1.9300e-003**	**226.2711**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	1.0903	6.0000e-005	6.6400e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0128	0.0128	3.0000e-005	0.0000	0.0136
Unmitigated	1.0903	6.0000e-005	6.6400e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0128	0.0128	3.0000e-005	0.0000	0.0136

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.1251					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.9645					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	6.3000e-004	6.0000e-005	6.6400e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0128	0.0128	3.0000e-005	0.0000	0.0136
Total	**1.0903**	**6.0000e-005**	**6.6400e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0128**	**0.0128**	**3.0000e-005**	**0.0000**	**0.0136**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.1251					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.9645					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	6.3000e-004	6.0000e-005	6.6400e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0128	0.0128	3.0000e-005	0.0000	0.0136
Total	**1.0903**	**6.0000e-005**	**6.6400e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0128**	**0.0128**	**3.0000e-005**	**0.0000**	**0.0136**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	270.9983	1.9877	0.0488	335.2432
Unmitigated	270.9983	1.9877	0.0488	335.2432

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	60.68 / 0	270.9983	1.9877	0.0488	335.2432
Total		**270.9983**	**1.9877**	**0.0488**	**335.2432**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	60.68 / 0	270.9983	1.9877	0.0488	335.2432
Total		**270.9983**	**1.9877**	**0.0488**	**335.2432**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	50.0698	2.9590	0.0000	124.0457
Unmitigated	50.0698	2.9590	0.0000	124.0457

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	246.66	50.0698	2.9590	0.0000	124.0457
Total		**50.0698**	**2.9590**	**0.0000**	**124.0457**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	246.66	50.0698	2.9590	0.0000	124.0457
Total		**50.0698**	**2.9590**	**0.0000**	**124.0457**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
Forklifts	1	4.00	260	89	0.20	Diesel
Tractors/Loaders/Backhoes	1	4.00	260	97	0.37	Diesel

UnMitigated/Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Equipment Type	tons/yr										MT/yr					
Forklifts	0.0104	0.0928	0.0776	1.0000e-004		7.1900e-003	7.1900e-003		6.6200e-003	6.6200e-003	0.0000	8.9229	8.9229	2.8200e-003	0.0000	8.9935
Tractors/Loaders/Backhoes	0.0151	0.1519	0.1497	2.0000e-004		0.0101	0.0101		9.3300e-003	9.3300e-003	0.0000	18.1348	18.1348	5.7400e-003	0.0000	18.2783
Total	**0.0255**	**0.2448**	**0.2273**	**3.0000e-004**		**0.0173**	**0.0173**		**0.0160**	**0.0160**	**0.0000**	**27.0577**	**27.0577**	**8.5600e-003**	**0.0000**	**27.2718**

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

APPENDIX 3.2:

EMFAC 2014 MODEL OUTPUTS

Activity/Duration	Equipment	HP Rating	Quantity	Usage Hours	Load Factor	HP-hrs/day	Total Fuel Consumption (gal. diesel fuel)
Site Preparation (10 days)	Crawler Tractors	212	4	8	0.43	2,917	1,577
	Rubber Tired Dozers	247	3	8	0.40	2,371	1,282
Grading (30 days)	Crawler Tractors	212	2	8	0.43	1,459	2,365
	Excavators	158	2	8	0.38	961	1,558
	Graders	187	1	8	0.41	613	995
	Rubber Tired Dozers	247	1	8	0.40	790	1,282
	Scrapers	367	2	8	0.48	2,819	4,571
Building Construction (230 days)	Cranes	231	1	8	0.29	536	6,663
	Crawler Tractors	212	3	8	0.43	2,188	27,200
	Forklifts	89	3	8	0.20	427	5,311
	Generator Sets	84	1	8	0.74	497	6,182
	Welders	46	1	8	0.45	166	2,059
Paving (20 days)	Pavers	130	2	8	0.42	874	944
	Paving Equipment	132	2	8	0.36	760	822
	Rollers	80	2	8	0.38	486	7,888
Architectural Coating (20 days)	Air Compressors	78	1	8	0.48	300	324
CONSTRUCTION FUEL DEMAND (gallons diesel fuel)							***71,022***

Construction Worker Trips (Light Duty Autos)

Construction Activity	Worker Trips / Day	Trip Length (miles)	Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
Site Preparation (10 days)	18	14.7	2,646	26.77	99
Grading (30 days)	20	14.7	5,880	26.77	220
Building Construction (230 days)	216	14.7	730,296	26.77	27,280
Paving (20 days)	15	14.7	4,410	26.77	165
Architectural Coating (20 days)	43	14.7	12,642	26.77	472
TOTAL CONSTRUCTION WORKER FUEL CONSUMPTION					**28,236**

Construction Vendor Trips (Medium Duty Trucks)

Construction Activity	Vendor Trips / Day	Trip Length (miles)	Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
Building Construction (230 days)	84	6.9	133,308	8.17	16,317

Construction Vendor/Hauling Trips (Heavy Duty Trucks)

Construction Activity	Vendor/ Hauling Trips/ Day	Trip Length (miles)	Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
Building Construction (230 days)	84	6.9	133,308	5.77	23,104
PROJECT MEDIUM DUTY & HEAVY DUTY TRUCK TOTAL					**39,420**

Passenger Cars (Light Duty Autos)

Annual Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Annual Fuel Consumption (gallons)
1,648,947	26.77	61,597

Light Heavy Duty Trucks

Annual Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Annual Fuel Consumption (gallons)
821,466	12.94	63,483

Medium Heavy Duty Trucks

Annual Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Annual Fuel Consumption (gallons)
658,515	8.17	80,602

Heavy Heavy Duty Trucks

Annual Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Annual Fuel Consumption (gallons)
2,248,870	5.77	389,752

5,377,798 595,433