INITIAL STUDY

Hawthorne Residential Project (TTM 37032)
9170 Indiana Avenue
City of Riverside

Prepared for:

City of Riverside Community & Economic Development Department
Planning Division

Prepared by:

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INTRODUCTION

California Environmental Quality Act Compliance

This document serves as the Initial Study (IS) for the Hawthorne Residential Project Tentative Tract Map (TTM) 37032 (proposed project or project) in the City of Riverside (City), California. The City, through its Community & Economic Development Department, Planning Division (Division), is the lead agency responsible for the review and approval of the proposed project.

This Initial Study has been prepared by LSA Associates, Inc. (LSA) on behalf of the Division and is in conformance with Sections 15063 and 15064 of the California Environmental Quality Act (CEQA) Guidelines (14 CCR 15000 et seq.). The purpose of the Initial Study Environmental Evaluation is to provide the Lead Agency (the Division) with information to use as the basis for deciding whether to prepare an Environmental Impact Report (EIR) or a Negative Declaration.

As identified in the following analyses, project impacts related to various environmental issues either do not occur, are less than significant (when measured against established significance thresholds), or have been rendered less than significant through implementation of mitigation measures. Based on these analytical conclusions, this IS supports adoption of a Mitigated Negative Declaration (MND) for the proposed project as all potential significant impacts can be reduced to less than significant or less than significant with mitigation incorporated.

ENVIRONMENTAL CHECKLIST

1. **Case Numbers:** P16-0111, P16-0112, P16-0113, P16-0114, and P16-0883
2. **Project Title:** Hawthorne Residential Project Tentative Tract Map 37032
3. **Lead Agency:** City of Riverside
Community & Economic Development Department
Planning Division
3900 Main Street, 3rd Floor
Riverside, California 92522
4. **Contact Person:** Stephanie Tang, Senior Planner
Phone Number: (951) 826-3965
stang@riversideca.gov
5. **Project Location:** 9170 Indiana Avenue, Riverside, California 92503
6. **Project Applicant/Project Sponsor's Name and Address:** Steven Walker Communities, Inc.
Attn: Steve Berzansky
7111 Indiana Avenue, Suite 300
Riverside, California 92504
7. **General Plan Designation:** B/OP – Business/Office Park
8. **Zoning:** PF – Public Facilities
9. **Description of Project**:

The project site (TTM 37032) is located at 9170 Indiana Avenue, Riverside, California, in western Riverside County. The site consists of Assessor's Parcel Numbers (APNs) 233-170-001 and 233-180-007. The project site is located within an unsectioned portion of Township 3 South, Range 5 West within the *Riverside West, California* 7.5-minute quadrangle, as mapped by the U.S. Geological Survey (USGS).

The site is currently occupied by the former Hawthorne Elementary School, which was vacated in December 2008. The Superior Court of California, County of Riverside has used the site for the overflow of court hearings (civil jury trials) in the former elementary school classrooms from approximately 2010 to 2012. The vacant school complex

includes eight buildings, several shade structures, playground equipment, many large trees, asphalt basketball courts, and several vacant and overgrown areas. The school's frontage along Indiana Avenue also features a surface parking lot and bus turnouts. Covered walkways link existing buildings. The site includes foundation slabs that previously accommodated portable classroom buildings, which have been removed. The main buildings total approximately 23,295 square feet. The project includes the demolition of all existing on-site classroom buildings and associated school facilities.

Subsequent to demolition activities, the project proposes the construction of 54 single-family detached homes and associated improvements on 6.85 acres. The proposed single-family lot size ranges from 2,853 square feet to 5,434 square feet. As detailed in Table 1.A, three floor plans are proposed ranging in size from 1,835 to 2,107 square feet. The project includes a central paseo to provide pedestrian access to a meandering trail located within the southern portion of the site. Recreational amenities located in this area include a tot lot, picnic tables, and shade structures.

Table 1.A: Proposed Residential Development

Plan	Units	Square Footage/unit	Total Square Footage
1	19	1,835	34,865
2	19	2,107	40,033
3	16	2,098	33,568
TOTAL	**54**		**108,466**

Nearly all of the runoff generated by this project will be routed to pervious, landscaped areas where it will infiltrate into the ground. The project would install four retention basins: two (1,715 and 1,827 square feet) located on either side of the entrance to the site, one (3,952 square feet) on the northwestern portion of the site (adjacent to Lot 22 along Indiana Avenue), and one (15,410 square feet) on the southern boundary of the site, adjacent to the Burlington Northern Santa Fe (BNSF) Railway.

The project site is surrounded primarily by residential development. The nearest residential use east of the project site has a garage located approximately 7.5 feet from the property line and the residence is located approximately 25 feet from the property line. Single-family residential development is located directly east of the site and across Indiana Avenue, to the north. State Route 91 (SR-91) parallels Indiana Avenue north of these residential uses. The BNSF Railway and a small segment of the Upper Riverside Canal are located directly south of the site. A Southern California Edison (SCE) electrical substation and storage yard and single-family residences are located south of the railway. The parcel west of the site is undeveloped.

In order to allow the proposed use, the project includes a General Plan (GP) Amendment from B/OP – Business/ Office Park to MDR – Medium Density Residential and a rezone from PF – Public Facilities to R-1-7000 – Single-Family Residential. The existing on-site and surrounding land use is identified below in Table 1.B.

10. **Surrounding land uses and setting: Briefly describe the project's surroundings:**

Table 1.B: Existing Land Uses and Land Use Designations

	Existing Land Use	General Plan Designation	Zoning Designation
Project Site	Vacant school	B/OP – Business/Office Park	PF – Public Facilities
North	Single-family homes	B/OP – Business/Office Park	R-1-7000 – Single-Family Residential
East	Single-family homes	B/OP – Business/Office Park	R-1-7000 – Single-Family Residential and PF – Public Facilities
South	BNSF Railway, SCE electrical substation, vacant land, and single-family residential homes further south	B/OP – Business/Office Park and MDR – Medium Density Residential	RWY – Railway, PF – Public Facilities, and R-1-7000 – Single-Family Residential
West	Vacant land	PF – Public Facilities	R-1-7000 – Single-Family Residential

11. **Other public agencies whose approval is required (e.g., permits, financial approval, or participation agreement.):**

    a. City of Riverside
    b. Regional Water Quality Control Board (RWQCB), Santa Ana Region – National Pollutant Discharge Elimination System (NPDES) Construction General Permit
    c. RWQCB, Santa Ana Region – Storm Water Pollution Prevention Plan (SWPPP)
    d. RWQCB, Santa Ana Region – 401 Water Quality Certification – Waste Discharge Requirement (WDR)
    e. South Coast Air Quality Management District (SCAQMD) – Dust Control Plan

12. **Other Reviews Incorporated by Reference in this Review:**

    a. City of Riverside General Plan 2025 (GP 2025)
    b. City of Riverside General Plan 2025 Final Program EIR (FPEIR)
    c. Title 19, Zoning Code
    d. Title 20, Cultural Resources

13. **Acronyms**

AB ..... Assembly Bill
AERMOD ..... American Meteorological Society/Environmental Protection Agency Regulatory Model
APN ..... Assessor's Parcel Number
AQMP ..... Air Quality Management Plan
ARB ..... California Air Resources Board
ASHRAE ..... American Society of Heating, Refrigerating and Air Conditioning Engineers
ASTM ..... American Society for Testing and Materials
Basin ..... South Coast Air Basin
BAU ..... Business As Usual
BMP ..... Best Management Practice
BNSF…….. Burlington Northern Santa Fe
B/OP..... Business/Office Park
C&D..... Construction and Demolition
CalRecycle ..... California Department of Resources Recycling and Recovery
CAP..... Climate Action Plan
CAPCOA ..... California Air Pollution Control Officers Association
CBC ..... California Building Code
CCR ..... California Code of Regulations
CEC..... California Energy Commission
CEQA..... California Environmental Quality Act
CHL ..... California Historical Landmarks
CHRIS..... California Historical Resources Information System
City..... City of Riverside
CMP ..... Congestion Management Plan
CNEL ..... Community Noise Equivalent Level
CO ..... Carbon monoxide
CPHI ..... California Points of Historical Interest
CREC ..... Controlled Recognized Environmental Conditions
DAMP ..... Drainage Area Management Plan
dBA ..... A-weighted decibels
Division..... Planning Division
DOC ..... California Department of Conservation
DPM..... diesel particulate matter
EIC ..... Eastern Information Center
EIR ..... Environmental Impact Report
EO ..... Executive Order
EOP ..... Emergency Operations Plan
EPA ..... United States Environmental Protection Agency
ESA ..... Environmental Site Assessment
FEMA ..... Federal Emergency Management Agency
FIND ..... Facility Information Detail
FPEIR..... Final Programmatic Environmental Impact Report
FRA..... Federal Railroad Administration
FTA..... Federal Transit Administration
GAP ..... Green accountability performance
GCC ..... Global Climate Change
GHG..... Greenhouse Gas

GIS ..... Geographic Information System
GP ..... General Plan
GP 2025 ..... General Plan 2025
HCM ..... Highway Capacity Manual
HCP..... Habitat Conservation Plan
HRA ..... Health Risk Assessment
HREC..... Historic Recognized Environmental Conditions
HRI..... Historic Resource Inventory
HVAC ..... Heating, Ventilation and Air-Conditioning
IS ..... Initial Study
Lbs/day..... Pounds per day
LHMP ..... Local Hazard Mitigation Plan
L_{max}..... maximum noise level
LOS ..... Level of Service
LSA ..... LSA Associates, Inc.
LST ..... Localized Significance Threshold
MATES ..... Multiple Air Toxics Exposure Studies
MBTA ..... Migratory Bird Treaty Act
MDR ..... Medium Density Residential
MERV ..... Minimum Efficiency Reporting Value
MLD..... Most Likely Descendant
MND ..... Mitigated Negative Declaration
MS4..... Municipal Separate Storm Sewer Systems
MSHCP ..... Western Riverside County Multiple Species Habitat Conservation Plan
MT CO_2e ..... metric tons of carbon dioxide-equivalent gases
NAHC ..... Native American Heritage Commission
NPDES ..... National Pollutant Discharge Elimination System
NO_X..... Nitrogen oxides
OEM..... Office of Emergency Services
PEV ..... plug-in electric vehicle
PF ..... Public Facilities
PM_{10} ..... Particulate matter less than 10 microns in size
$PM_{2.5}$..... Particulate matter less than 2.5 microns in size
ppm ..... parts per million
R-1-7000 ..... Single-Family Residential
RCALUCP ..... Riverside County Airport Land Use Compatibility Plan
RCP ..... Regional Comprehensive Plan
RCTC ..... Riverside County Transportation Commission
REC..... Recognized Environmental Conditions
ROC ..... Reactive Organic Compounds
RPU..... Riverside Public Utilities
RRG ..... Riverside Restorative Growthprint
RRG-CAP ..... Riverside Restorative Growthprint Climate Action Plan
RRG-EPAP ..... Riverside Restorative Growthprint Economic Prosperity Action Plan
RTP ..... Regional Transportation Plan
RUSD..... Riverside Unified School District
RWQCB ..... Regional Water Quality Control Board
RWY ..... Railway
SCAG..... Southern California Association of Governments
SCAQMD ..... South Coast Air Quality Management District
SCE ..... Southern California Edison
SCRRA ..... Southern California Regional Rail Authority
SKR..... Stephens' Kangaroo Rat
SO_X ..... Sulfur oxides

SR-91 ..... State Route 91
SWPPP..... Storm Water Pollution Prevention Plan
SWRCB ..... State Water Resources Control Board
TAC ..... Toxic Air Contaminants
TTM..... Tentative Tract Map
USGS ..... United States Geological Survey
UWMP..... Urban Water Management Plan
VOC..... Volatile Organic Compounds
WDR..... Waste Discharge Requirement
WRCOG..... Western Riverside Council of Governments

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FIGURE 1

Legend

Project Boundary

N

0 250 500
FEET

SOURCE: Bing Aerial, 2016; ESRI Streetmap, 2013/Riverside County, 2015.

I:\SWK1602\Reports\IS_MND\fig1_RegLoc.mxd (10/19/2016)

Hawthorne Residential Project
Initial Study/Mitigated Negative Declaration

Regional and Project Location

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FIGURE 2

0 60 120
FEET

SOURCE: KTGY Group, Inc. Architecture+Planning, 2/9/2016; ESRI World Imagery, 2015

I:\SWK1602\Reports\IS_MND\fig2_SitePlan.mxd (2/8/2017)

Hawthorne Residential Project
Initial Study/Mitigated Negative Declaration

Illustrative Site Plan

Photograph 1: *South view.*

Photograph 2: *Southeast view.*

Photograph 3: *Northwest view.*

Photograph 4: *Playground/Railroad view.*

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FIGURE 3

Hawthorne Residential Project
Initial Study/Mitigated Negative Declaration

Site Photographs

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	☐ Agriculture & Forest Resources	☐ Air Quality
☐ Biological Resources	☐ Cultural Resources	☐ Geology and Soils
☐ Greenhouse Gas Emissions	☐ Hazards and Hazardous Materials	☐ Hydrology and Water Quality
☐ Land Use and Planning	☐ Mineral Resources	☐ Noise
☐ Population and Housing	☐ Public Service	☐ Recreation
☐ Transportation and Traffic	☐ Tribal Cultural Resources	☐ Utility Systems
☐ Mandatory Findings of Significance		

DETERMINATION (To be completed by the Lead Agency)

On the basis of this initial evaluation, which reflects the independent judgment of the City of Riverside, it is recommended that:

The City of Riverside finds that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared. ☐

The City of Riverside finds 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. ☒

The City of Riverside finds that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required. ☐

The City of Riverside finds that the proposed project MAY have a "potentially 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. ☐

The City of Riverside finds that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately 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 Stephanie Tang Date August 23, 2017

Printed Name & Title Stephanie Tang For City of Riverside

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: Less Than Significant With Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than 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 Analyses," as described in (5) below, may be cross-referenced).

5) Earlier analyses 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 that 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) The explanation of each issue should identify:

   a. The significance criteria or threshold, if any, used to evaluate each question; and

   b. The mitigation measure identified, if any, to reduce the impact to less than significance.

9) Have California Native American tribes traditionally and culturally affiliated with the project area requested consultation pursuant to Public Resources Code Section 21080.3.1? If so, has consultation begun?

Note: Conducting consultation early in the CEQA process allows tribal governments, lead agencies, and project proponents to discuss the level of environmental review, identify and address potential adverse impacts to tribal cultural resources, and reduce the potential for delay and conflict in the environmental review process. (See Public Resources Code section 21083.3.2.) Information may also be available from the California Native American Heritage Commission's Sacred Lands File per Public Resources Code Section 5097.96 and the California Historical Resources Information System administered by the California Office of Historic Preservation. Please also note that Public Resources Code Section 21082.3(c) contains provisions specific to confidentiality.

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
1. AESTHETICS. Would the project:				
a. Have a substantial adverse effect on a scenic vista?	☐	☐	☐	☒

1a. Response: ***(Source: General Plan 2025 Figure CCM-4 – Master Plan of Roadways, General Plan 2025 FPEIR Figure 5.1-1 – Scenic and Special Boulevards and Parkways, Table 5.1-A – Scenic and Special Boulevards, and Table 5.1-B – Scenic Parkways)***

No Impact. There are no scenic vistas visible from the project site. The project site is located within an urbanized area surrounded by existing development. Views from public areas in the vicinity of the project site are dominated by vacant lands mixed with single-family homes, a substation, ornamental landscape, and utility poles. Therefore, the project will have **no impact** directly, indirectly, or cumulatively to scenic vistas. No mitigation is required.

b. Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☒

1b. Response: ***(Source: General Plan 2025 Figure CCM-4 – Master Plan of Roadways, General Plan 2025 FPEIR Figure 5.1-1 – Scenic and Special Boulevards and Parkways, Table 5.1-A – Scenic and Special Boulevards, Table 5.1-B – Scenic Parkways, the City's Urban Forest Tree Policy Manual, Title 20 – Cultural Resources, and Caltrans 2011)***

No Impact. There are no state scenic highways located near the project site. As designated by the City's GP 2025, the proposed project is not located along or within view of a scenic boulevard, parkway, or special boulevard. The nearest scenic boulevard to the project site is Van Buren Boulevard, which is located approximately 0.3 mile west of the project site. Existing development immediately west, northwest, and southwest of the project site blocks views of the site from Van Buren Boulevard. Therefore, the project will have **no impact** directly, indirectly, or cumulatively to scenic resources within a state scenic highway. No mitigation is required.

c. Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☒	☐

1c. Response: ***(Source: General Plan 2025, General Plan 2025 FPEIR, Zoning Code, and Citywide Design Guidelines and Sign Guidelines)***

Less Than Significant Impact. The site is currently developed with a vacant school. The existing land uses adjacent to the project site include single-family homes to the north and east; BNSF Railway followed by a substation, vacant land, and single-family homes to the south; and vacant land followed by single-family homes to the west. The proposed project includes demolition of the existing school facilities and construction of 54 single-family homes and associated improvements within an existing residential area. Therefore, the proposed project would not degrade the existing visual character of the area. The project will have a **less than significant impact** directly, indirectly, and cumulatively related to visual character and quality of the site and surrounding area. No mitigation is required.

d. Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☒	☐

1d. Response: ***(Source: General Plan 2025, Chapter 19.556 – Lighting, Citywide Design Guidelines and Sign Guidelines, and Title 19 – Article VIII – Chapter 19.710 – Design Review)***

Less Than Significant Impact. The project site is located in an area with existing outdoor lighting sources. Currently, sources of nighttime light originate from the vacant school, railroad operations, residential uses and streetlights. New sources of light and glare may be present during project construction, but would be temporary and would cease upon construction completion. The proposed lighting on the project site would include lighting typical of a residential neighborhood, including lights from inside and outside the homes, entrance lighting, and streetlights. The proposed lighting would be directed, oriented, and shielded to prevent light from shining onto the adjacent properties. Although the lighting proposed by the project would increase lighting on the project site compared to current conditions, the lighting would not result in substantial

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact

light or glare compared to surrounding development. Any new lighting proposed or required for the project will be constructed in accordance with *Chapter 19.556 – Lighting* of the City's Municipal Code. Additionally, any exterior building materials would be constructed in accordance with *Chapter 19.710 – Design Review* of the City's Municipal Code. As such, the project will have **less than significant impacts** directly, indirectly, or cumulatively that would adversely affect day or nighttime views due to glare and lighting. No mitigation is required.

2. AGRICULTURE AND FOREST 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 (DOC) as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information complied by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and the forest carbon measurement methodology provided in the Forest Protocols adopted by the California Air Resources Board. 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?	☐	☐	☐	☒

2a. Response: ***(Source: General Plan 2025 – Figure OS-2 – Agricultural Suitability and Department of Conservation 2016a)***

No Impact. The proposed project will be constructed within the existing vacant school site. The subject site is designated "Urban and Built-Up Land" by the DOC Farmland Mapping and Monitoring Program and as depicted in Figure OS-2, Agricultural Suitability, in the City's General Plan 2025. The DOC defines "Urban and Built-Up Land" as occupied structures with a building density of at least one unit to 1.5 acres, or approximately six structures to a 10-acre parcel. Since the site is already developed and is not located on any designated Farmland, no conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to non-agricultural use would occur. Therefore, the project will have **no impact** directly, indirectly, or cumulatively to Farmland. No mitigation is required.

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

2b. Response: ***(Source: CADME, General Plan 2025– Figure OS-3 - Williamson Act Preserves, General Plan 2025 FPEIR – Figure 5.2-4 – Proposed Zones Permitting Agricultural Uses, Title 19, and Department of Conservation 2016b)***

No Impact. The project site is zoned PF – Public Facilities; thus, the site is not zoned for agricultural use. According to the DOC's Williamson Act map and Figure OS-3, Williamson Act Preserves, in the City's General Plan 2025, there are no Williamson Act contracts on the project site. Therefore, the project will have **no impact** directly, indirectly, or cumulatively to agricultural use or Williamson Act contract lands. No mitigation is required.

c. Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)) timberland (as defined in Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☐	☒

2c. Response: ***(Source: GIS Map – Forest Data)***

No Impact. The project site is zoned PF – Public Facilities; thus, the site is not zoned for forest land. No forest land, timberland, or Timberland Production areas are on the project site as the site is currently developed with a vacant school. Therefore, **no impacts** to forest land or timberland will occur from this project directly, indirectly, or cumulatively. No mitigation is required.

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
d. Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒

2d. Response: ***(Source: GIS Map – Forest Data)***

No Impact. The project site is currently developed with a vacant school and is not considered forest land. Therefore, **no impacts** to forest land will occur from this project directly, indirectly, or cumulatively. No mitigation is required.

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?	☐	☐	☐	☒

2e. Response: ***(Source: General Plan 2025 – Figure OS-2 – Agricultural Suitability, Figure OS-3 – Williamson Act Preserves, General Plan 2025 FPEIR – Appendix I – Designated Farmland Table, Title 19 – Article V – Chapter 19.100 – Residential Zones – RC Zone and RA-5 Zone)***

No Impact. The proposed project will be constructed within the existing vacant school site. The subject site is designated "Urban and Built-Up Land" by the DOC Farmland Mapping and Monitoring Program and as depicted in Figure OS-2, Agricultural Suitability, in the City's General Plan 2025. Since the site is already developed and is not located on any designated Farmland, no conversion of Farmland to non-agricultural use would occur. No forest land is on site; therefore, **no impacts** will occur from this project directly, indirectly, or cumulatively related to conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use. No mitigation is required.

3. 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?	☐	☐	☒	☐

3a. Response: ***(Sources: Air Quality and Greenhouse Gas Analysis (Appendix A); General Plan 2025*, LU – 141 Land Use)**

Less Than Significant Impact. The project site is located in the South Coast Air Basin (Basin), which is under the jurisdiction of the South Coast Air Quality Management District (SCAQMD). The Basin includes all of Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino Counties. The SCAQMD and the SCAG are responsible for formulating and implementing the Air Quality Management Plan (AQMP), which has a 20-year horizon for the Basin. The SCAQMD and SCAG must update the AQMP every three years. The current regional air quality plan is the Final 2016 AQMP adopted by the SCAQMD on March 10, 2017. The Final 2016 AQMP proposes policies and measures currently contemplated by responsible agencies to achieve Federal standards for healthful air quality in the Basin and those portions of the Salton Sea Air Basin that are under SCAQMD jurisdiction. This Final Plan also addresses several Federal planning requirements and incorporates significant new scientific data, primarily in the form of updated emissions inventories, ambient measurements, new meteorological episodes, and new air quality modeling tools. This Final Plan builds upon the approaches taken in the 2012 AQMP for the Basin for the attainment of the Federal ozone air quality standard.[1] The Basin is currently a Federal and State nonattainment area for particulate matter less than 10 microns in size (PM_{10}), particulate matter less than 2.5 microns in size ($PM_{2.5}$), and ozone.

The Final 2016 AQMP proposes attainment demonstration of the Federal $PM_{2.5}$ standards through a more focused control of sulfur oxides (SO_X), directly-emitted $PM_{2.5}$, and nitrogen oxides (NO_X) supplemented with volatile organic compounds (VOC) by 2015. The 8-hour ozone control strategy builds upon the $PM_{2.5}$ strategy, augmented with additional NOx and VOC reductions to meet the standard by 2024 assuming a bump-up[2] is obtained.

[1] *Final 2013 Air Quality Management Plan*, South Coast Air Quality Management District, February 2014.
[2] A "bump-up" is a voluntary reclassification of a nonattainment area to a higher classification allowing for an extension of an attainment deadline.

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact

Consistency with the AQMP for the Basin means that a project would be consistent with the goals, objectives, and assumptions in the respective plan to achieve the Federal and State air quality standards. Pursuant to the methodology provided in Chapter 12 of the 1993 SCAQMD *CEQA Air Quality Handbook*, consistency with the AQMP is affirmed when a project:

(1) does not increase the frequency or severity of an air quality standards violation or cause a new violation; and

(2) is consistent with the growth assumptions in the AQMP. For the proposed project to be consistent with the AQMP adopted by the SCAQMD, the pollutants emitted from the project should not exceed the SCAQMD daily threshold or cause a significant impact on air quality, or the project must already have been included in the AQMP projections. Additionally, if feasible mitigation measures are implemented and shown to reduce the impact level from significant to less than significant, a project may be deemed consistent with the AQMP. The proposed uses are not currently consistent with the zoning designation for the project site, which is PF – Public Facilities or the existing General Plan designation, which is B/OP – Business/Office Park. The project, if approved, would rezone the site to R-1-7000 – Single-Family Residential and predesignate the General Plan land use to MDR – Medium Density Residential. Properties directly east, south, and north (across Indiana Avenue) of the site are designated B/OP – Business Office Park Designation or PF – Public Facilities. Despite this designation, single-family uses have been developed east and north of Indiana Avenue.

According to the *CEQA Air Quality Handbook*, consistency with AQMP growth assumptions must be analyzed for new or amended General Plan elements, Specific Plans, and significant projects. The proposed project will build new residential uses in close proximity to existing residential uses.

Although the existing General Plan land use designation of the site (B/OP – Business Office Park) allows the development and operation of a variety of non-residential uses (e.g., research/development and related flexible space, laboratories, offices; support commercial, and light industrial uses[3]), it is not intended to accommodate the proposed residential uses. The General Plan currently designates properties to the southeast (across the railroad tracks) and east (across Jackson Street) as MDR – Medium Density Residential. The proposed change in General Plan is generally consistent with nearby residential designation(s).

The City's General Plan 2025 is consistent with the SCAG Regional Comprehensive Plan Guidelines and the SCAQMD AQMP. In addition, the proposed project is not considered a significant project (e.g., airports, electrical generating facilities, petroleum and gas refineries, designation of oil drilling districts, water ports, solid waste disposal sites, and offshore drilling facilities). It is reasonable that school or business/office park uses (the existing General Plan land use designation for the site) were assumed in the development of the AQMP. Comparing traffic generated by former school uses to that occurring with development of the project, a 35 percent reduction in daily trips (from 787 to 514 daily trips) and a proportional reduction in air pollutant emissions would occur. As vehicle emissions generate a greater share of air pollutants than stationary uses, it is reasonable to conclude the air pollutant emissions from the proposed project are within the amount previously assumed for the site in the AQMP; therefore, the project (including the change in land use designation) would be consistent with the AQMP. Furthermore, as discussed in Response 3b, below, the project-specific short-term construction and long-term pollutant emissions would be less than the emissions thresholds established in the SCAQMD's *CEQA Air Quality Handbook*; therefore, the project would not result in an increase in the frequency or severity of any air quality standards violation and will not cause a new air quality standard violation.

For these reasons, the proposed project is consistent with the regional AQMP. Therefore, the project will have a **less than significant impact** directly, indirectly, or cumulatively to the implementation of an AQMP. No mitigation is required.

b. Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☒	☐	☐

[3] The Business/Office Park (B/OP) designation provides for single or mixed light industrial uses that do not create nuisances due to odor, dust, noise or heavy truck traffic. Suitable uses include corporate and general business offices, research and development, light manufacturing, light industrial, and small warehouse uses (up to 10,000 square feet per site). Although most business parks are controlled through deed restrictions or single ownership of multi-tenant space, business park standards can be applied to existing parcels in separate ownership. Common features of business parks are high quality design, building materials, landscaping, and absence of nuisances. The maximum intensity of development is a floor-area ratio of 1.5.

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact

3b. Response: ***(Source: Air Quality and Greenhouse Gas Analysis (Appendix A); Health Risk Assessment (Appendix B); CEQA Air Quality Handbook, South Coast Air Quality Management District (SCAQMD), April 1993; Traffic Impact Analysis, Hawthorne Residential Project (Appendix I))***

Less Than Significant With Mitigation Incorporated. The proposed project would generate pollutant emissions associated with construction activities, vehicle trip generation, power and gas consumption, and stationary activities. However, the discussion below demonstrates the proposed project will implement **Standard Conditions AQ-1 through AQ-4** (listed at the end of this response) to ensure compliance with pertinent SCAQMD, applicable California Code of Regulations (CCR), and California Department of Resources Recycling and Recovery (CalRecycle) Sustainable (Green) Building Program regulations. With implementation of **Standard Conditions AQ-1 through AQ-4**, the project will not exceed SCAQMD significance thresholds. Specific criteria for determining whether the potential air quality impacts of a project are significant are set forth in the SCAQMD's *CEQA Air Quality Handbook* (April 1993). The criteria include emission thresholds and compliance with State and national air quality standards.

The SCAQMD has conducted four Multiple Air Toxics Exposure Studies (MATES), the most recent being MATES IV (SCAQMD, 2015).[4] These are monitoring and evaluation studies conducted in the Basin. The MATES IV Study includes a monitoring program, an updated emissions inventory of toxic air contaminants (TAC), and a modeling effort to characterize risk across the Basin. The MATES studies do not provide land use development recommendations. The modeling program includes a network of 10 fixed sites used to monitor TACs once every six days for one year. The nearest MATES IV fixed monitoring station was located at 5888 Mission Boulevard in the City of Jurupa Valley, approximately 5.9 miles northwest of the site. In addition to the 10 fixed sites, mobile monitoring platforms were deployed that focused on local scale studies at locations for short time periods. For the modeling analysis conducted for the MATES IV study, emissions over the Basin were estimated and allocated to 2 kilometer by 2 kilometer (1.2 mile × 1.2 mile) geographic grids. A regional dispersion model was used to estimate the annual average concentrations in each grid cell.

The MATES IV Study data for the project vicinity comprehensively reflect increased TAC-source cancer risks affecting the City and project site, including increased cancer risks due to freeway, roadway, and rail line pollutant sources. Based on the SCAQMD's MATES IV Carcinogenic Risk Interactive Map[5] (refer to Figure 4), the northern corner of the site is located within a grid cell with an estimated carcinogenic risk of 801 to 1,000 per million. The balance of the site has an estimated carcinogenic risk of 501 to 800 per million. While these are very high risk levels, the average risk level is now about 65 percent lower than the estimated risk shown in the MATES III report for the 2004–2006 time period, which reflects the success of various control strategies to reduce exposure to air toxics in the region.

The project proposes single-family residential land uses that would be located approximately 200 feet southeast of the 10-lane State Route 91. Additionally, the project is approximately 50 feet north of an existing double-tracked rail line utilized by BNSF Railway trains, Amtrak passenger rail, and the Riverside Transit Agency Metrolink passenger rail. The 2005 ARB guidance noted information made available through the MATES-IV Study, City's Policy AQ-1.3, and configuration and design of the project would suggest that further assessment of the existing freeway-source and railroad-source pollutant impacts are warranted. An Air Toxic Health Risk Assessment (HRA) (Appendix B) has been prepared for the project. This HRA is intended to:[6]

- Disaggregate potential freeway-source and railroad-source air pollutant health effects from other background conditions identified in the MATES IV Study;
- Comply with the City's Air Quality Element of the *General Plan 2025*; and
- Identify means to reduce the specific effects of freeway-source and railroad-source pollutants at the project site.

[4] Final Report, *Multiple Air Toxics Exposure Study in the South Coast Air Basin*, South Coast Air Quality Management District, May 2015.

[5] http://www3.aqmd.gov/webappl/OI.Web/OI.aspx?jurisdictionID=AQMD.gov&shareID=73f55d6b-82cc-4c41-b779-4c48c9a8b15b, site accessed March 1, 2017.

[6] In 2009, the California Air Pollution Control Officers Association (CAPCOA) published guidance on assessing the health risk impacts from and to proposed land use projects, focusing on the acute, chronic, and cancer impacts of sources affected by California Environmental Quality Act (CEQA) and recommending procedures to identify when a project should undergo further risk evaluation, how to conduct the HRA, how to engage the public, what to do with the results from the HRA, and what mitigation measures may be appropriate for various land use projects. In 2015, six years after the CAPCOA guidance document was released in 2009, an important CEQA case (*California Building Industry Association v. Bay Area Air Quality Management District* (2015) 62 Cal.4th 369) established that CEQA does not require the analysis of the existing air environment on a project.

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact

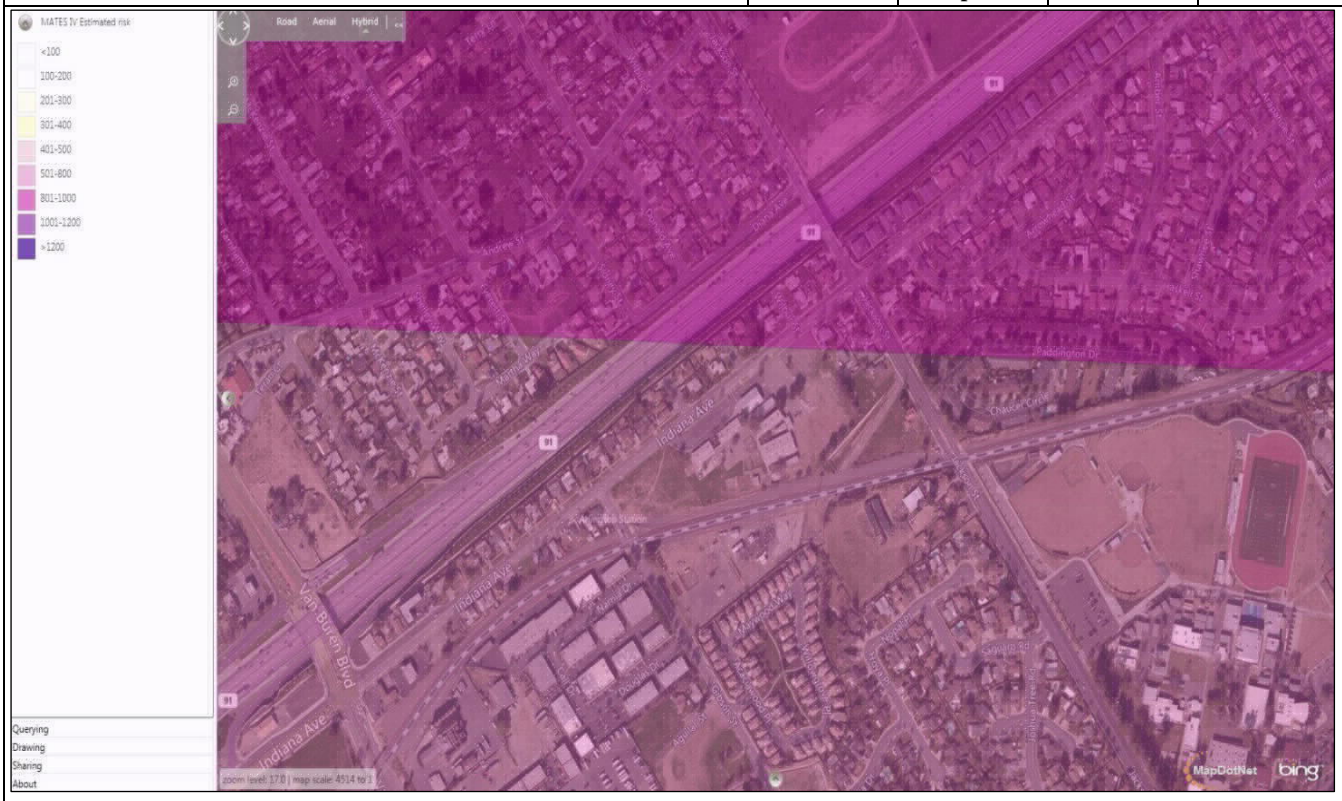

Figure 4: MATES IV Interactive Map – Project Site

As directed by the SCAQMD, all stationary sources of TAC within 0.25 mile of the project are included in the HRA. A survey of the SCAQMD Facility Information Detail (FIND) database shows that there are no permitted facilities emitting TAC within 0.25 mile of the site. Vehicle traffic on Indiana Avenue and SR-91 is a TAC source within range of the project site. The total daily traffic for Indiana Avenue is sourced from the project Traffic Study (LSA 2017) and for SR-91, it was sourced from Caltrans for 2014 (the most recent year available). The most important TAC to consider in an HRA is Diesel Particulate Matter (DPM); therefore, it was assumed the percentage of diesel-powered vehicles was consistent with the EMFAC2014[7] data for the region. It was further assumed that all the trucks were the type that resulted in the greatest exhaust emissions and highest health risk levels.

Trains passing on the tracks to the south of the project site are also sources of TACs within range of the project site. Emissions data from the United States Environmental Protection Agency (EPA)[8] were used to characterize these train emissions. Based on communications received from the Southern California Regional Rail Authority (SCRRA),[9] 25 Metrolink, 2 Amtrak, and 74 BNSF Railway trains pass the project site daily. Metrolink began transitioning to Tier 4 locomotives in 2013, so for this HRA, locomotives are assumed to be a mixture of Tiers 1 through 4. Tier 4 locomotives reduce particulate matter and nitrogen oxide emissions by up to 85 percent compared to the lower tiers. It was assumed Amtrak locomotives are the same as Metrolink. BNSF Railway freight trains typically have multiple 4400 HP locomotives per train. For this HRA, an average of two locomotives per BNSF Railway freight train was assumed. Further, for the purpose of this HRA, while BNSF has already upgraded its locomotives to perform at Tier 2 levels, it was assumed that over the 30-year period of this HRA, BNSF would continue to upgrade its locomotive performance levels. For this HRA, it was assumed that using 75 percent of the locomotives as Tier 2 and 25 percent as Tier 4 was representative.

[7] The ARB maintains the Emission Factors (EMFAC) model, which is approved by EPA for developing on-road motor vehicle emission inventories and conformity analyses in California. EMFAC models on-road mobile source emissions under multiple temporal and spatial scales; it produces composite emission factors for specific California geographic areas.

[8] United States Locomotive Emissions Standards, www.dieselnet.com/standards/us/loco.php (accessed December 2016).

[9] Correspondence from SCRRA to Stephanie Tang, January 10, 2017.

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact

In order to assess the impact of TAC emissions on individuals who will live in the proposed residences, air dispersion modeling utilizing the American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) was performed. The model is approved by the EPA when estimating the air quality impacts associated with point and fugitive sources in simple and complex terrain. The model was used to calculate the annual average and short duration (i.e., 1 hour) pollutant concentrations associated with each emitting source. The ARB's HARP 2 model is a tool that assists with the programmatic requirements of the Air Toxics "Hot Spots" Program (AB 2588). HARP 2 was used to translate the TAC concentrations from AERMOD into long-term carcinogenic and chronic and short-term acute health risk levels following the guidance in the SCAQMD Risk Assessment Guidelines. Refer to Appendix B for input files and locations of all emissions sources and receptors.

Per the site-specific HRA, a child living at the proposed project site for nine years would be exposed to an unmitigated inhalation cancer risk of no more than 813 in 1 million. An adult living at the proposed project site for 30 years would be exposed to an unmitigated inhalation cancer risk of no more than 1,170 in 1 million. The Chronic Hazard Index for both the children and adults would be 0.26 (see Table 3.A).

Table 3.A: Health Risk Levels for the Residents of the Proposed Project

Location	Maximum Cancer Risk (risk per million)[1][2]	Maximum Noncancer Chronic Risk[1]	Maximum Noncancer Acute Risk (Hazard Index)
Children (9-year exposure)	813	0.26	0.014
Adults (30-year exposure) (MICR)	1170		

Source: Table A, *Health Risk Assessment* (Appendix B).
Note:
[1] The Maximum Cancer Risk and Maximum Noncancer Risks noted in the table represents the ambient/baseline, as the proposed project does not add any emissions of Toxic Air Contaminant (TAC). Thus, there is no marginal/incremental increase of TAC with implementation of the proposed project.
[2] Based on the South Coast Air Quality Management District's MATES IV Study, the project site is located within a grid cell with an estimated carcinogenic risk of 501 to 1,000 per million. The California Environmental Quality Act (CEQA) case (California Building Industry Association v. Bay Area Air Quality Management District (2015) 62 Cal.4th 369) established that CEQA does not require the analysis of the existing air environment on a project. As noted above, the proposed project does not add any emissions of TAC.
MICR = maximum individual cancer risk

It should be noted that though the results of this HRA are higher than the SCAQMD threshold for carcinogenic health risk of 10 in a million, the health risk level is attributed to the existing sources such as frequent nearby Metrolink and BNSF freight trains and heavy traffic on the nearby SR-91 freeway. As described above, the project area has been measured to have a carcinogenic risk level of 501 to 1,000 per million in the MATES IV study.[10]

For perspective, the estimated incidence of cancer over a lifetime in the U.S. population is in the range of 1 in 4 to 1 in 3. This translates into a risk of about 300,000 in a million. It has also been estimated that the bulk of cancers from known risk factors are associated with lifestyle factors such as tobacco use, diet, and being overweight. As stated in the Final MATES IV Report, it is estimated that of all cancers associated with known risk factors; approximately 30 percent were related to tobacco, while approximately 30 percent were related to diet and obesity. Exposure to environmental pollution was associated with approximately 2 percent of all cancers.[11]

Although the proposed project will not add any emissions of TAC, a feasible measure that could be implemented to reduce these health risks would be to install air filtration systems in the residences to provide protection while indoors (**Mitigation Measure AQ-1**). The health risk levels shown in Table 3.A assume no protection from being indoors, as typical homes provide little filtration of TACs. Air filtration systems are available with efficiencies equal to or exceeding a Minimum Efficiency Reporting Value (MERV) 16 as defined by the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) Standard 52.2. The average particle size efficiency (PSE) removal based on ASHRAE Standard 52.2 for MERV 16 is approximately 95% for 0.3 to 1.0 $\mu g/m^3$ (DPM) and 95% for 1.0 to 10 $\mu g/m^3$ (PM_{10} and $PM_{2.5}$). The project shall install such systems on the residences to reduce the exposure to the ambient TACs. Table 3.B shows the reduced health

[10] South Coast Air Quality Management District (SCAQMD), 2015, *MATES IV Multiple Air Toxics Exposure Study.* http://www.aqmd.gov/home/library/air-quality-data-studies/health-studies/mates-iv (accessed December 2016).
[11] Page 1-3, *Final Report, Multiple Air Toxics Exposure Study in the South Coast Air Basin*, South Coast Air Quality Management District, May 2015.

risk levels that would result. With MERV 16 filtration, the exposure to TACs for these residents would be substantially lower than the ambient/baseline TAC concentration levels.

The incidence of cancer in any person is significantly more dependent on lifestyle choices rather than environmental factors. The sources of the pollutants are out of the control of the project. The only way to reduce the health risk levels is to reduce the exposure. As detailed in Table 3.B, the installation of in-house filtration systems would significantly reduce health risk exposures within the project site. While there is no certainty that house filtration systems will be optimally maintained, these systems represent the only feasible means of reducing the exposure.

Table 3.B: Health Risk Levels for the Residents of the Proposed Project with MERV 16 Air Filtration Systems

Location	Maximum Cancer Risk (risk per million)[1][2]	Maximum Noncancer Chronic Risk[2]	Maximum Noncancer Acute Risk (Hazard Index)
Children (9-year exposure)	41	0.013	0.0007
Adults (30-year exposure) (MICR)	58		

Source: Table B, *Health Risk Assessment* (Appendix B).
Note:
[1] Based on the South Coast Air Quality Management District's MATES IV Study, the project site is located within a grid cell with an estimated carcinogenic risk of 501 to 1,000 per million. The California Environmental Quality Act (CEQA) case (California Building Industry Association v. Bay Area Air Quality Management District (2015) 62 Cal.4th 369) established that CEQA does not require the analysis of the existing air environment on a project. The proposed project does not add any emissions of TAC.
[2] The Maximum Cancer Risk with MERV 16 Air Filtration Systems substantially reduces the ambient/baseline Toxic Air Contaminant concentration levels shown in Table A.
MICR = maximum individual cancer risk

The health risks identified are only an approximation of potential health risk. Additionally, **Mitigation Measure AQ-2** would ensure the buyers of homes within the project site are provided sufficient notice on potential health risk. Although the proposed project does not add any emissions of TAC, implementation of **Mitigation Measures AQ-1 and AQ-2** would ensure impacts are **less than significant.**

Short-Term (Construction) Emissions. Air quality impacts could occur during construction of the proposed project from demolition activities, site preparation, soil disturbance, building construction, architectural coating, paving, and emissions from equipment exhaust. Major sources of emissions during grading and site preparation include (1) exhaust emissions from construction vehicles, (2) equipment and fugitive dust generated by construction vehicles and equipment traveling over exposed surfaces, and (3) soil disturbances from grading and backfilling. The following summarizes construction emissions and associated impacts of the proposed project.

Equipment Exhaust and Related Construction Activities. Construction activities produce combustion emissions from various sources (e.g., demolition, grading, site preparation, utility engines, tenant improvements, and motor vehicles transporting the construction crew). Exhaust emissions from construction activities envisioned on site would vary daily as construction activity levels change. The use of construction equipment on site would result in localized exhaust emissions. Construction emissions were calculated using the California Emissions Estimator Model (CalEEMod Version 2016.3.1) and are summarized in Table 3.C.

As specified in **Standard Conditions AQ-1 through AQ-4**, below, the proposed project construction is required to comply with SCAQMD Rules 402 and 403, applicable California Code of Regulations, and CalRecycle Sustainable (Green) Building Program regulations, which include implementation of standard control measures for fugitive dust and construction equipment emissions. Table 3.C details that by complying with SCAQMD's standard control measures, construction equipment/vehicle emissions during construction periods would not exceed any of the SCAQMD-established daily emissions thresholds. Therefore, with implementation of **Standard Conditions AQ-1 through AQ-4**, short-term (construction) air quality impacts would be **less than significant**, and no mitigation is required.

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact

Table 3.C: Short-Term Regional Construction Emissions

	Total Regional Pollutant Emissions (lbs/day)							
	VOC	NO_X	CO	SO_X	Fugitive PM_{10}	Exhaust PM_{10}	Fugitive $PM_{2.5}$	Exhaust $PM_{2.5}$
Year 2017	5.08	52.36	24.47	0.04	8.33	2.88	4.52	2.65
Year 2018	7.60	26.22	20.71	0.03	0.30	1.66	0.08	1.57
Maximum daily emissions	**7.60**	**52.36**	**24.47**	**0.04**	**8.33**	**2.88**	**4.52**	**2.65**
SCAQMD Pollutant Thresholds	**75**	**100**	**550**	**150**	**150**	**150**	**55**	**55**
Threshold exceeded?	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**

Source: Table H, *Air Quality and Greenhouse Gas Analysis* (Appendix A)
Notes: These estimates reflect control of fugitive dust required by SCAQMD Rule 403.
The values shown are the maximum summer or winter daily emissions results from CalEEMod.

CO = carbon monoxide
lbs/day = pounds per day
NO_X = nitrogen oxides
$PM_{2.5}$ = particulate matter less than 2.5 microns in size
PM_{10} = particulate matter less than 10 microns in size
SCAQMD = South Coast Air Quality Management District
SO_X = sulfur dioxide
VOC = volatile organic compounds

Fugitive Dust. Fugitive dust emissions are generally associated with land clearing and exposure of soils to the air and wind, as well as cut-and-fill grading operations. Dust generated during construction varies substantially on a project-by-project basis, depending on the level of activity, the specific operations, and weather conditions at the time of construction. In accordance with **Standard Condition AQ-1**, the proposed project will be required to comply with SCAQMD Rules 402 and 403 to control fugitive dust. Table 3.C, above, lists total construction emissions (i.e., fugitive dust emissions and construction equipment exhausts). Since construction operations on site must comply with dust control and other measures prescribed by SCAQMD Rules 402 and 403 to ensure that short-term construction impacts are minimized, compliance with these rules is assumed in Table 3.C. Compliance with SCAQMD Rules 402 and 403, as specified in **Standard Condition AQ-1**, would ensure that fugitive dust (PM_{10} and $PM_{2.5}$) generation would be **less than significant**, and no mitigation is required.

Architectural Coatings. Architectural coatings contain volatile organic compounds (VOC) that are similar to reactive organic compounds (ROC) and are part of the ozone (O_3) precursors. Based on the proposed project, application of the architectural coatings, in conjunction with demolition, site preparation, grading, building construction, and paving, for the proposed peak construction day is estimated to result in a combined peak of 7.6 lbs/day of VOC. Therefore, this VOC emission would not exceed the SCAQMD VOC threshold of 75 lbs/day. Therefore, impacts due to application of architectural coating would be **less than significant**, and no mitigation is required.

Localized Impacts Analysis. The project site is surrounded primarily by residential development. The nearest residential use east of the project site has a garage located approximately 7.5 feet from the property line and the residence is located approximately 25 feet from the property line. As per the SCAQMD Localized Significance Threshold (LST) guidance, for receptors less than 82 feet (25 meters) away, LST screening thresholds at 82 feet (25 meters) are used as the SCAQMD-recommended LST thresholds. Table 3.D identifies the on-site construction emissions of CO, NOx, PM_{10}, and $PM_{2.5}$ and demonstrates that all concentrations of pollutants would be below the SCAQMD thresholds of significance. Therefore, short-term LST significant air quality impacts would be **less than significant**, and no mitigation is required.

Table 3.D: Construction Localized Significance Threshold Impacts

Emissions Sources	NOx	CO	PM_{10}	$PM_{2.5}$
On-site Emissions (lbs/day)	52	23	11	7.1
LST Thresholds	**253**	**1,461**	**12.0**	**7.3**
Significant Emissions?	**No**	**No**	**No**	**No**

Source: Table I, *Air Quality and Greenhouse Gas Analysis* (Appendix A)

Source Receptor Area: Metropolitan Riverside County Area, 4.5 acres, 25 meter (82 feet) distance.

CO = carbon monoxide
lbs/day = pounds per day
LST = localized significance threshold
NOx = nitrogen oxides
$PM_{2.5}$ = particulate matter less than 2.5 microns in size
PM_{10} = particulate matter less than 10 microns in size

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact

Naturally Occurring Asbestos. The proposed project is located in the City of Riverside, Riverside County, which is among the counties found to have serpentine and ultramafic rock in their soils. However, no such rock materials have been found in the project area in the past 25 years. By following standard nuisance and dust control measures, as required by SCAQMD Rules 402 and 403 (refer to **Standard Condition AQ-1**), any naturally occurring asbestos that might be disturbed would not become airborne. Therefore, the potential risk for naturally occurring asbestos during project construction is small and **less than significant.** No mitigation is required.

Long-Term Project Operational Emissions. Long-term air pollutant emission impacts are those associated with stationary sources and mobile sources involving any project-related changes. The proposed project would result in area-, energy-, and mobile-source emissions. The stationary-source emissions would come from many sources, including the use of consumer products, landscape equipment, general energy, and solid waste.

As part of the *Air Quality and Greenhouse Gas Analysis* (Appendix A), long-term operational emissions associated with the existing site and the proposed project were calculated using CalEEMod Version 2016.3.1 and are shown in Table 3.E. Area sources include architectural coatings, consumer products, hearths, and landscaping. Energy sources include natural gas consumption for heating and cooking. Mobile-source emissions usually result from vehicle trips associated with a project. Table 3.E shows that the increase of all criteria pollutants as a result of the proposed project would not exceed the corresponding SCAQMD daily emission thresholds for any criteria pollutants.

In addition, the project design will incorporate **Standard Condition AQ-4** to ensure compliance with Title 24 of the California Code of Regulations established by the California Energy Commission (CEC) regarding energy conservation and green building standards. The project will include low-emission water heaters, and exterior windows will have window treatments for efficient energy conservation to reduce operational air pollutant emissions. Therefore, with implementation of **Standard Condition AQ-4**, project-related long-term air quality impacts would be **less than significant** and no mitigation is required.

Table 3.E: Opening Year Regional Operational Emissions

Source	Pollutant Emissions, lbs/day					
	VOC	NOx	CO	SOx	PM_{10}	$PM_{2.5}$
Proposed Scenario						
Area	2.58	0.95	4.86	<0.01	0.10	0.10
Energy	0.06	0.51	0.22	<0.01	0.04	0.04
Mobile	1.28	9.11	15.49	0.056	3.96	1.10
Total Project Emissions	**3.92**	**10.57**	**20.57**	**0.056**	**4.1**	**1.24**
SCAQMD Thresholds	**55**	**55**	**550**	**150**	**150**	**55**
Significant?	**No**	**No**	**No**	**No**	**No**	**No**

Source: Table J, *Air Quality and Greenhouse Gas Analysis* (Appendix A)
Note: The values provided are the maximum summer or winter daily emissions results from CalEEMod.

CO = carbon monoxide
lbs/day = pounds per day
NOx = nitrogen oxides
$PM_{2.5}$ = particulate matter less than 2.5 microns in size
PM_{10} = particulate matter less than 10 microns in size
SCAQMD = South Coast Air Quality Management District
SOx = sulfur oxides
VOC = volatile organic compounds

Localized Impacts Analysis. Table 3.F details the calculated emissions for the proposed operational activities compared with the appropriate LSTs. By design, the localized impacts analysis only includes on-site sources; however, CalEEMod outputs do not separate on-site and off-site emissions for mobile sources. For a worst-case scenario assessment, the emissions shown in Table 3.F include all on-site project-related stationary sources and 5 percent of the project-related new mobile sources, which is an estimate of the amount of project-related new vehicle traffic that would occur on site. A total of 5 percent is considered conservative because the average trip lengths assumed are 14.7 miles for home to work, 5.9 miles for home to shopping, and 8.7 miles for other types of trips.[12] Table 3.F demonstrates the operational emission rates would not exceed the

[12] CalEEMod was developed for the California Air Pollution Officers Association (CAPCOA) in collaboration with the California Air Districts. Default data (e.g., emission factors, trip lengths, meteorology, source inventory, etc.) have been provided by the various California Air Districts to account for local requirements and conditions. http://www.aqmd.gov/caleemod/, site accessed August 16, 2017.

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact

NOx, CO, PM_{10}, and $PM_{2.5}$ LSTs for the existing sensitive receptors located within the 82-foot minimum distance for LST analyses. Therefore, locally significant air quality impacts would be **less than significant** and no mitigation is required.

Table 3.F: Long-Term Operational Localized Significance Thresholds

Emissions Sources	NOx	CO	PM_{10}	$PM_{2.5}$
On-site emissions (lbs/day)	1	6	0.29	0.15
LST Thresholds	**270**	**1,577**	**4**	**2**
Significant Emissions?	**No**	**No**	**No**	**No**

Source: Table K, *Air Quality and Greenhouse Gas Analysis* (Appendix A)

Source Receptor Area: Metropolitan Riverside County Area, 5 acres, 25 meter (82 feet) distance, on-site traffic 5 percent of total.

CO = carbon monoxide
lbs/day = pounds per day
LST = localized significance thresholds
NOx = nitrogen oxides
$PM_{2.5}$ = particulate matter less than 2.5 microns in size
PM_{10} = particulate matter less than 10 microns in size

Long-Term Microscale (CO Hotspot) Analysis. Local ambient air quality is most affected by CO emissions from motor vehicles. CO is typically the contaminant of greatest concern because it is the pollutant created in greatest abundance by motor vehicles and does not readily disperse into the air. Because CO does not readily disperse into the atmosphere, areas of vehicle congestion create pockets of high CO concentrations called "hotspots." These pockets have the potential to exceed the state 1-hour standard of 20 parts per million (ppm) of CO and/or the 8-hour standard of 9.0 ppm.

Vehicular trips associated with the proposed project would contribute to congestion at intersections and along roadway segments in the project vicinity. Under certain extreme meteorological conditions, CO concentrations near a congested roadway or intersection may reach unhealthful levels, affecting local sensitive receptors (e.g., residents, schoolchildren, the elderly, and hospital patients). In areas with high ambient background CO concentrations, modeling is recommended to determine a project's effect on local CO levels.

An assessment of project-related impacts on localized ambient air quality requires that future ambient air quality levels be projected. Existing CO concentrations in the immediate project vicinity are not available. Ambient CO levels monitored in the Riverside area station, showed a highest recorded 1-hour concentration of 4.1 ppm (the state standard is 20 ppm) and a highest 8-hour concentration of 2.0 ppm (the state standard is 9 ppm) during the past 3 years. The highest CO concentrations would normally occur during peak traffic hours; hence, CO impacts calculated under peak traffic conditions represent a worst-case analysis.

As described in the *Traffic Impact Analysis for the Hawthorne Residential Project* (Appendix I), all study area intersections currently operate at a satisfactory level of service (LOS). With addition of the project in the existing setting with recommended improvements, all study area intersections would continue to operate at satisfactory LOS.

CO levels have dropped dramatically throughout the basin over the last several decades. The entire basin is in attainment for the State standards for CO. The basin is designated as an attainment area under the State CO standards and as an attainment/maintenance area under the Federal CO standards. Baseline levels can accommodate substantial local emission increases without the creation of any CO "hotspots." It has been demonstrated in the regional CO attainment/maintenance plan that even the most congested intersection with the highest traffic volumes anywhere in the Basin no longer poses any risk of a CO "hotspot." Given the extremely low level of CO concentrations in the project area and the mitigation of traffic impacts at all study area intersections, project-related vehicles are not expected to contribute significantly to CO concentrations exceeding the State or Federal CO standards. Because no CO hotspot would occur, air quality impacts related to CO concentrations would be **less than significant**, and no mitigation is required.

Standard Conditions. The following Standard Conditions are regulatory requirements that would be implemented to reduce air quality impacts during construction.

Standard Condition AQ-1: **Compliance with SCAQMD Rules 402 and 403.** During construction, the construction contractor shall comply with the South Coast Air Quality Management District (SCAQMD) Rules 402 and 403 for controlling fugitive dust emissions and construction equipment

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact

emissions. In compliance with Rule 403, fugitive dust shall be controlled with best-available control measures so that the presence of such dust does not remain visible in the atmosphere beyond the property line of the emission source. In addition, dust suppression techniques shall be implemented to prevent fugitive dust from creating a nuisance off site. The following applicable dust suppression techniques from Rule 403 shall be implemented during project construction:

- Nontoxic chemical soil stabilizers shall be applied according to manufacturers' specifications to all inactive construction areas (previously graded areas inactive for 10 days or more).
- Active sites shall be watered at least twice daily. (Locations where grading is to occur shall be thoroughly watered prior to earthmoving.)
- All trucks hauling dirt, sand, soil, or other loose materials shall be covered, or at least 2 feet (0.6 meter) of freeboard (vertical space between the top of the load and the top of the trailer) shall be maintained in accordance with the requirements of California Vehicle Code (CVC) Section 23114.
- Construction access roads shall be paved at least 100 feet (30 meters) onto the site from the main road.
- Traffic speeds on all unpaved roads shall be reduced to 15 miles per hour (mph) or less.

Additionally, the following construction emissions control measures from the SCAQMD CEQA Handbook are required to further minimize fugitive dust emissions:

- Disturbed areas shall be revegetated as quickly as possible.
- All excavating and grading operations shall be suspended when wind speeds (as instantaneous gusts) exceed 25 mph.
- All streets shall be swept once per day if visible soil materials are carried to adjacent streets (recommend water sweepers with reclaimed water).
- Wheel washer devices shall be installed at locations where vehicles enter and exit unpaved roads onto paved roads, or vehicles and any equipment leaving the site shall be washed each trip.
- All on-site roads shall be paved as soon as feasible, watered periodically, or chemically stabilized.
- The area disturbed by clearing, grading, earthmoving, or excavation operations shall be minimized at all times.
- The construction contractor shall select the construction equipment used on site based on low-emission factors and high-energy efficiency. The construction contractor shall ensure that construction-grading plans include a statement that all construction equipment will be tuned and maintained in accordance with the manufacturers' specifications.
- The construction contractor shall utilize electric or diesel-powered equipment in lieu of gasoline-powered engines where feasible.
- The construction contractor shall ensure that construction-grading plans include a statement that work crews will shut off equipment when not in use. During smog season (May through October), the overall length of the construction period will be extended, thereby decreasing the size of the area prepared each day, to minimize vehicles and equipment operating at the same time.
- The construction contractor shall time the construction activities so as to not interfere with peak-hour traffic and minimize obstruction of through traffic lanes adjacent to the

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact

site; if necessary, a flagperson shall be retained to maintain safety adjacent to existing roadways.

- The construction contractor shall support and encourage ridesharing and transit incentives for the construction crew.

Standard Condition AQ-2: **Compliance with Title 13, California Code of Regulations, Section 2449(d)(d).** Operators of applicable off-road vehicles (self-propelled diesel-fueled vehicles 25 horsepower and up that were not designed to be driven on-road) must limit idling to no more than five (5) minutes:

- All construction vehicles shall be prohibited from idling in excess of five (5) minutes, both on and off site.

Standard Condition AQ-3: **Compliance with applicable California Department of Resources Recycling and Recovery (CalRecycle) Sustainable (Green) Building Program Measures.**

- At least 50 percent of construction materials (including, but not limited to, soil, mulch, vegetation, concrete, lumber, metal, and cardboard) shall be recycle/reused.
- "Green building materials" (e.g., those materials that are rapidly renewable or resource-efficient, and recycled and manufactured in an environmentally friendly way) shall be used for at least 10 percent of the project, as specified on the California Department of Resources Recycling and Recovery website.

Standard Condition AQ-4: **Compliance with Title 24, Energy Conservation and Green Building Standards**. Project design shall comply with Title 24 of the California Code of Regulations established by the California Energy Commission (CEC) regarding energy conservation and green building standards. The project applicant shall incorporate the following into the final project building plans:

- Low-emission water heaters shall be used. Solar water heaters are encouraged.
- Exterior windows shall utilize window treatments for efficient energy conservation.

Mitigation Measures.

Mitigation Measure AQ-1 Prior to the issuance of building permits, the applicant shall provide to the City for review and approval, evidence that in-house filtration systems with efficiencies equal to or exceeding a Minimum Efficiency Reporting Value (MERV) 16 as defined by the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) Standard 52.2 are installed in on-site residential structures.

Mitigation Measure AQ-2 Prior to the issuance of building permits, the applicant shall provide to the City for review and approval, a copy of a *Toxic Air Contaminant Disclosure* that will be presented to prospective buyers of real estate within the project site. The *Toxic Air Contaminant Disclosure* shall convey information to prospective buyers about potential TAC exposure at the project site. As approved by the City, the *Toxic Air Contaminant Disclosure* shall contain the language dictated by State law in conjunction with real estate transfer.

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)?	☐	☐	☒	☐

3c. Response: ***(Source: Air Quality and Greenhouse Gas Analysis (Appendix A), Traffic Impact Analysis for Hawthorne Residential Project (Appendix I))***

Less Than Significant Impact. The cumulative impacts analysis is based on projections in the regional AQMP. As described in the consistency analysis presented in Response 3a, above, the proposed project is consistent with the growth assumptions

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact

in the City's General Plan 2025 and the regional AQMP. Although the existing General Plan land use designation of the site (B/OP – Business Office Park) allows the development and operation of a variety of non-residential uses (e.g., research/development and related flexible space, laboratories, offices; support commercial, and light industrial uses[13]), it is not intended to accommodate the proposed residential uses. The General Plan currently designates properties to the southeast (across the railroad tracks) and east (across Jackson Street) as MDR – Medium Density Residential. The proposed change in General Plan is generally consistent with nearby residential designation(s).

The City's General Plan 2025 is consistent with the SCAG Regional Comprehensive Plan Guidelines and the SCAQMD AQMP. In addition, the proposed project is not considered a significant project (e.g., airports, electrical generating facilities, petroleum and gas refineries, designation of oil drilling districts, water ports, solid waste disposal sites, and offshore drilling facilities). It is reasonable that school or business/office park uses (the existing General Plan land use designation for the site) were assumed in the development of the AQMP. Comparing traffic generated by former school uses to that occurring with development of the project, a 35 percent reduction in daily trips (from 787 to 514 daily trips) and a proportional reduction in air pollutant emissions would occur. As vehicle emissions generate a greater share of air pollutants than stationary uses, it is reasonable to conclude the air pollutant emissions from the proposed project are within the amount previously assumed for the site in the AQMP; therefore, the project (including the change in land use designation) would be consistent with the AQMP.

Further, as discussed in Response 3b, the proposed project does not increase the frequency or severity of an air quality standards violation or cause a new violation. This study area is described as the appropriate tool to evaluate discrete project-related circulation impacts for the City that encompasses the air quality impacts from the proposed project. As shown in the *Traffic Impact Analysis for Hawthorne Residential Project* (Appendix I), the proposed project would not result in any significant LOS change or intersection delay with the implementation of the recommended improvements detailed in Section 16-Traffic. Thus, the combined effects of the related projects would be less than significant. Because there is no cumulative significant impact and the proposed project is consistent with the growth assumptions in the 2012 RTP/SCS and the AQMP, the combined effects are not cumulatively significant. Therefore, there would be no cumulatively considerable net increase of the criteria pollutants that are in nonattainment status in the South Coast Air Basin. Long-term cumulative air quality impacts would be **less than significant** and no mitigation is required.

d. Expose sensitive receptors to substantial pollutant concentrations?	☐	☒	☐	☐

3d. Response: ***(Source: Air Quality and Greenhouse Gas Analysis (Appendix A); Health Risk Assessment (Appendix B))***

Less Than Significant With Mitigation Incorporated. The SCAQMD recommends the evaluation of localized NO_x, CO, PM_{10}, and $PM_{2.5}$ concentration-related impacts to sensitive receptors in the immediate vicinity of the project site. Sensitive receptors include but are not limited to residential land uses, schools, open space and parks, recreational facilities, hospitals, resident care facilities, daycare facilities, or other facilities that may house individuals with health conditions that would be affected by poor air quality.

The project site is surrounded primarily by single-family homes. The nearest residential use is located east of the project site with a garage located approximately 7.5 feet from the property line and the residence located approximately 25 feet from the property line. As per the SCAQMD LST guidance, for receptors less than 82 feet (25 meters) away, LST screening thresholds at 82 feet (25 meters) are used as the SCAQMD-recommended LST thresholds. Table 3.D above identifies the on-site construction emissions of CO, NOx, PM_{10}, and $PM_{2.5}$ and demonstrates that all concentrations of pollutants would be below the SCAQMD thresholds of significance. Therefore, short-term LST significant air quality impacts would be **less than significant**, and no mitigation is required.

[13] The Business/Office Park (B/OP) designation provides for single or mixed light industrial uses that do not create nuisances due to odor, dust, noise or heavy truck traffic. Suitable uses include corporate and general business offices, research and development, light manufacturing, light industrial, and small warehouse uses (up to 10,000 square feet per site). Although most business parks are controlled through deed restrictions or single ownership of multi-tenant space, business park standards can be applied to existing parcels in separate ownership. Common features of business parks are high quality design, building materials, landscaping, and absence of nuisances. The maximum intensity of development is a floor-area ratio of 1.5.

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact

Table 3.F above details the calculated emissions for the proposed operational activities compared with the appropriate LSTs. Table 3.F demonstrates the operational emission rates would not exceed the NOx, CO, PM_{10}, and $PM_{2.5}$ LSTs for the existing sensitive receptors located within the 82-foot minimum distance for LST analyses. Therefore, locally significant air quality impacts would be **less than significant** and no mitigation is required.

Construction of the proposed project would include the use of diesel-powered equipment that releases DPM, a toxic air contaminant with known carcinogenic and chronic health effects. For construction analyses, the emission of DPM is included in the exhaust PM_{10} emissions. Table 3.C, presented in Response 3.b, above, confirms that the exhaust PM_{10} emissions from construction would vary between year 2017 and 2018 of project construction. This DPM emissions rate is very low and, to determine the carcinogenic and chronic health risk levels, this emissions rate would be spread over a 30-year exposure period. This low average DPM emissions rate combined with the fact that the nearest sensitive receptors are approximately 25 feet from the project site means the construction health risk levels are very low and well below thresholds of significance.[14]

The SCAQMD health risk threshold is typically applicable to projects generating emissions that would affect nearby sensitive receptors. The basis for these thresholds is that if a project increases the health risk level relative to baseline conditions by less than the threshold itself, the impact would be less than significant. Specifically, CEQA court case California Building Industry Association v. Bay Area Air Quality Management District (2015) 62 Cal.4th 369 established that CEQA does not require the analysis of the existing air environment on a project. As previously stated, the project does not add any emissions of TAC.

As indicated in Figure 4: *MATES IV Interactive Map – Project Site*, the proposed project would not expose individuals to health risk levels greater than those to which any individual in a residence near the project site would be exposed. The extreme northern corner of the project site is located within a grid cell with an estimated carcinogenic risk of 801 to 1,000 per million and the balance of the site has an estimated carcinogenic risk of 501 to 800 per million. According to the HRA (Appendix B), a child living at the proposed project for nine years would be exposed to an unmitigated inhalation cancer risk of no more than 813 in 1 million. Any adult at the proposed project for 30 years would be exposed to an unmitigated inhalation cancer risk of no more than 1,170 in 1 million. The results of this site-specific HRA are higher than the SCAQMD threshold for carcinogenic health risk of 10 in 1 million, but these health risk levels assume no protection from being indoors. As typical homes provide little filtration of TACs, and all individuals living in the vicinity of the proposed project would be exposed to these cancer risk levels. To address this issue, **Mitigation Measures AQ-1** and **AQ-2,** are presented to significantly reduce potential cancer risk with implementation of the proposed project.

With implementation of **Mitigation Measures AQ-1** and **AQ-2**, children would be exposed to a cancer risk of 41 in 1 million and adults would be exposed to a cancer risk of 58 in 1 million. As previously stated, the incidence of cancer in any person is significantly more dependent on lifestyle choices rather than environmental factors. As detailed in Table 3.B, the installation of in-house filtration systems would significantly reduce health risk exposures within the project site and thus substantially reduce TAC concentration levels from ambient/baseline conditions. **Mitigation Measure AQ-2** would ensure the buyers of homes within the project site are provided sufficient notice on potential health risk; therefore, in tandem with the substantial reduction in TAC achieved through implementation of **Mitigation Measure AQ-1**, implementation of the proposed project will result in **a less than significant impact**.

e. Create objectionable odors affecting a substantial number of people?	☐	☐	☒	☐

3e. Response: ***(Source: Air Quality and Greenhouse Gas Analysis (Appendix A))***

Less Than Significant Impact. Heavy-duty equipment operating on the project site during construction would emit odors, primarily from equipment exhaust. However, odors associated with the construction activity would be limited to the project site, would disperse quickly, and would cease to occur after construction is completed. Additionally, it is not likely that odors from construction would be noticeable beyond the project boundaries. No other sources of objectionable odors have been identified. The proposed project is a residential development, which does not typically produce objectionable odors. Therefore, project impacts related to objectionable odors would be **less than significant** and no mitigation is required.

[14] Although garages are 10 feet away from the project boundary, residential structures are approximately 25 feet away from the project boundary.

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
4. 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?	☐	☒	☐	☐

4a. Response: ***(Source: General Plan 2025 – Figure OS-6 – Stephens' Kangaroo Rat (SKR) Core Reserve and Other Habitat Conservation Plans (HCP), Figure OS-7 – MSHCP Cores and Linkages, Figure OS-8 – MSHCP Cell Areas, General Plan 2025 FPEIR Figure 5.4-2 – MSHCP Area Plans, Figure 5.4-4 – MSHCP Criteria Cells and Subunit Areas, Figure 5.4-6 – MSHCP Narrow Endemic Plant Species Survey Area, Figure 5.4-7 – MSHCP Criteria Area Species Survey Area, Figure 5.4-8 – MSHCP Burrowing Owl Survey Area, Riverside County Integrated Project Conservation Summary Report Generator, Results of Burrowing Owl Habitat Assessment for the Hawthorne School Site (Appendix C))***

Less Than Significant With Mitigation Incorporated. The project site is located on a previously developed/improved site within an urbanized area. A search of the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP) database identified no potential for candidate, sensitive, special-status species, or suitable habitat for such species on site. Existing parking areas contain ornamental landscaping, including trees, which may provide nesting habitat for birds.

Common native urban bird species that may nest in ornamental landscaping include lesser goldfinch (*Carduelis psaltria*), Brewer's blackbird (*Euphagus cyanocephalus*), northern mockingbird (*Mimus polyglottos*), common raven (*Corvus corax*), American crow (*Corvus brachyrhynchos*), Anna's hummingbird (*Calypte anna*), house finch (*Carpodacus mexicanus*), and hooded oriole (*Icterus cucullatus*). In addition, there is reasonable potential for existing buildings to support nesting opportunities for native birds that are common in urbanized areas, such as American kestrel (*Falco sparverius*), house finch, black phoebe (*Sayornis nigricans*), cliff swallow (*Petrochelidon pyrrhonota*), northern rough-winged swallow (*Stelgidopteryx serripennis*), and white-throated swift (*Aeronautes saxatalis*). A habitat assessment was conducted on April 4, 2016 by LSA to determine the site's suitability to accommodate the burrowing owl (*Athene cunicularia*). The project site is developed and paved with unsuitable habitat conditions for burrowing owl due to the presence of several mature ornamental trees, tall dense vegetation, compacted soils, and lack of adjacent foraging grassland areas. No burrows potentially occupied by burrowing owl were found during the initial survey. Therefore, focused burrowing owl surveys are not required for the project because of the unsuitable site conditions. The site is unsuitable for burrowing owls due to lack of foraging areas on site and in the adjacent areas and the numerous buildings and trees that provide cover for avian and mammalian predators and increase risk of predation.

The ornamental trees and shrubs that occur in the developed area of the site may support nests utilized by birds protected under the Migratory Bird Treaty Act (MBTA) or the California Fish and Game Code (Sections 3503, 3503.5, and 3515). Thus, the potential exists for direct and indirect construction-related disturbance for nesting birds. **Mitigation Measure BIO-1** requires that a nesting bird survey be conducted prior to any ground-disturbing or demolition activities. The project will have a **less than significant impact with implementation of mitigation** directly, indirectly, and cumulatively on biological resources.

The project may have direct and indirect effects to migratory birds. Direct effects may result from the removal and destruction of nesting bird habitat (e.g., trees and shrubs) and indirect effects may result from increased noise and human presence during construction activities that may cause birds to abandon nests or that may negatively affect nestlings.

Mitigation Measure BIO-1: If project activities are planned during the bird nesting season (February 15 to August 31), nesting bird survey(s) consisting of up to three (3) site visits within the week prior to clearing and demolition activities shall be conducted to ensure birds protected under the MBTA are not disturbed by on-site activities. Any such survey(s) shall be conducted by a qualified biologist. If no active nests are found, no additional measures are required. If active nests are found, the nest locations shall be mapped by the biologist. The nesting bird species shall be documented and, to the degree feasible, the nesting stage (e.g., incubation of eggs, feeding of young, near

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
fledging) determined. Based on the species present and surrounding habitat, a no-disturbance buffer shall be established around each active nest. The buffer shall be identified by a qualified biologist and confirmed by the City. No construction or ground disturbance activities shall be conducted within the buffer until the biologist has determined the nest is no longer active and has informed the City and construction supervisor that activities may resume.				
b. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☐	☐	☐	☒
4b. Response: ***(Source: General Plan 2025 – Figure OS-6 – Stephens' Kangaroo Rat (SKR) Core Reserve and Other Habitat Conservation Plans (HCP), Figure OS-7 – MSHCP Cores and Linkages, Figure OS-8 – MSHCP Cell Areas, General Plan 2025 FPEIR Figure 5.4-2 – MSHCP Area Plans, Figure 5.4-4 – MSHCP Criteria Cells and Subunit Areas, Figure 5.4-6 – MSHCP Narrow Endemic Plant Species Survey Area, Figure 5.4-7 – MSHCP Criteria Area Species Survey Area, Figure 5.4-8 – MSHCP Burrowing Owl Survey Area, MSHCP Section 6.1.2 – Protection of Species Associated with Riparian/Riverine Areas and Vernal Pools)*** **No Impact.** The project is located on a previously developed/improved site within an urbanized area. No riparian habitat or other sensitive natural community exists on site or within proximity to the project site. The project will have **no impact** on any 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 directly, indirectly, or cumulatively, and no mitigation is required.				
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?	☐	☐	☐	☒
4c. Response: ***(Source: City of Riverside GIS/CADME USGS Quad Map Layer)*** **No Impact.** The project is located on a previously developed/improved site within an urbanized area. The project site does not contain any drainage courses, inundated areas, wetland vegetation, or hydric soils and thus does not include U.S. Army Corps of Engineers jurisdictional drainages or wetlands. The proposed project would have **no impact** on Federally protected wetlands as defined by Section 404 of the Clean Water Act directly, indirectly, or cumulatively, and no mitigation is required.				
d. Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☐	☒
4d. Response: ***(Source: MSHCP, General Plan 2025 – Figure OS-7 – MSHCP Cores and Linkage)*** **No Impact.** The project is located in an urbanized area and will not result in a barrier to the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites. Therefore, the project will have **no impact** to wildlife movement directly, indirectly, or cumulatively, and no mitigation is required.				
e. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☒	☐
4e. Response: ***(Source: Urban Forestry Policy Manual)*** **Less Than Significant Impact.** The project site is located within an urbanized area and has been previously graded and developed. The project is required to comply with Riverside Municipal Code Section 16.72.040 establishing the MSHCP mitigation fee and Section 16.40.040 establishing the Threatened and Endangered Species Fees.				

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact

Any project within the City of Riverside's boundaries that proposes planting a street tree within a City right-of-way must follow the *Urban Forestry Policy Manual*, which documents guidelines for the planting, pruning, preservation, and removal of all trees in City rights-of-way. The specifications in the Manual are based on national standards for tree care established by the International Society of Arboriculture, the National Arborists Association, and the American National Standards Institute. Any future project will be in compliance with the *Urban Forestry Policy Manual* when planting a tree within a City right-of-way. The *Urban Forestry Policy Manual* does not relate to the ornamental landscaping on the project site. Therefore, impacts will be **less than significant**, and no mitigation is required.

f. Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

4f. Response: ***(Source: MSHCP, General Plan 2025 – Figure OS-6 – Stephens' Kangaroo Rat (SKR) Core Reserve and Other Habitat Conservation Plans (HCP), Stephens' Kangaroo Rat Habitat Conservation Plan, Lake Mathews Multiple Species Habitat Conservation Plan and Natural Community Conservation Plan, and El Sobrante Landfill Habitat Conservation Plan)***

No Impact. The project site is located on a previously developed/improved site within an urbanized area. The City is a Permittee under the MSHCP; therefore, the project is subject to applicable provisions of the MSHCP. The project site is not located in an area subject to Cell Criteria under the MSHCP and, therefore, has no Conservation requirements toward building out the MSHCP Reserve. Therefore, the project will have **no impact** on the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or State habitat conservation plan directly, indirectly, or cumulatively. No mitigation is required.

5. CULTURAL RESOURCES. Would the project:				
a. Cause a substantial adverse change in the significance of a historical resource as defined in § 15064.5 of the CEQA Guidelines?	☐	☐	☐	☒

5a. Response: ***(Source: Cultural Resources Assessment-Hawthorne Elementary School Project, (Appendix D))***

No Impact. CEQA defines a "historical resource" as a resource that meets one or more of the following criteria: (1) is listed in, or determined eligible for listing in, the California Register of Historical Resources (California Register); (2) is listed in a local register of historical resources as defined in Public Resources Code (PRC) Section 5020.1(k); (3) is identified as significant in a historical resource survey meeting the requirements of PRC Section 5024.1(g); or (4) is determined to be a historical resource by a project's Lead Agency (PRC Section 21084.1 and *State CEQA Guidelines* Section 15064.5[a]). A "substantial adverse change" to a historical resource, according to PRC §5020.1(q), "means demolition, destruction, relocation, or alteration such that the significance of a historical resource would be impaired."

The project site is currently developed with the closed Hawthorne Elementary School and its related parking, various walkways, and playgrounds. The project proposal includes demolition of the existing vacant elementary school and construction of 54 new single-family detached homes and related site improvements.

As part of the *Cultural Resources Assessment* (Appendix D) conducted for the project, it was determined that one historic-period resource, the former Hawthorne Elementary School, was identified within the project area and evaluated. It was determined that this built environment resource does not meet any of the criteria for listing in the National Register of California Register or for local designation. Therefore, it is not a "historical resource" as defined by CEQA. No archaeological resources were identified within the project area, which is both severely disturbed and partially obscured; therefore, the sensitivity of the site for potential subsurface resources is negligible. A segment of the Upper Riverside Canal (33-4495H) is adjacent to the southern boundary of the site and was found to be abandoned; this segment has sustained alterations and has lost integrity. Therefore, it is not historically significant individually and does not contribute to the significance of the larger resource. No further cultural resource investigations or monitoring are recommended. There are **no impacts** related to the demolition of the former Hawthorne Elementary School and no mitigation is required.

ISSUES (AND SUPPORTING INFORMATION SOURCES):	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 archeological resource pursuant to § 15064.5 of the CEQA Guidelines?	☐	☐	☒	☐

5b. Response: ***(Source: General Plan 2025 FPEIR – Figures 5.5-1 Archaeological Sensitivity and 5.5-2 Prehistoric Cultural Resource Sensitivity; Cultural Resources Assessment-Hawthorne Elementary School Project, (Appendix D))***

Less Than Significant Impact. According to the Riverside General Plan 2025 FPEIR Figures 5.5-1 and 5.5-2, the project site is in an area of unknown archaeological and low prehistoric cultural resource sensitivity. As part of the *Cultural Resources Assessment* (Appendix D), a records search for the project was conducted at the Eastern Information Center (EIC), located at University of California, Riverside, on August 18, 2016. The records search included a review of all recorded historic and prehistoric archaeological sites within the 1-mile radius of the project site, as well as a review of known cultural resource survey and excavation reports. The EIC houses the pertinent archaeological and historic site and survey information necessary to determine whether cultural resources are known to exist within the project area. In addition, a pedestrian survey of all accessible exposed areas on the project site was conducted on August 31, 2016 The purpose of this survey was to identify and document, prior to the beginning of ground-disturbing activities, any cultural resources and thus also to identify any area(s) that might be sensitive for buried cultural resources.

The records search indicated that 12 cultural resources studies have been conducted and 26 cultural resources documented within one mile of the project site. These sites include 17 residences, 2 commercial properties, 1 utility building, the Arlington Branch Library and Fire Hall, 2 water conveyance canals, and 2 historic roads. No cultural resources have been documented on the project site. The results of the records search indicate that there are no previously recorded archaeological or historic resources within or near the project site. The entire project site has been previously disturbed and developed with school uses. No evidence of native soils was present in the project area. No archaeological resources were identified during the time of the pedestrian survey. Thus, the sensitivity of the project site for potential subsurface cultural resources is negligible. In the unlikely event that cultural resources are identified during earthmoving activities, those activities would be halted in the vicinity of the find until it can be assessed for significance by a qualified archaeologist (**Standard Condition CR-1**). With implementation of **Standard Condition CR-1**, impacts related to previously undiscovered archaeological resources would be **less than significant** and no mitigation is required.

Standard Conditions: No mitigation is required; however, the following Standard Condition is a regulatory requirement that would be implemented to reduce impacts related to discovery of unknown archaeological resources during construction.

Standard Condition CR-1: **Discovery of Archeological Resources.** Prior to commencement of grading activities, the City of Riverside Director of Building & Safety, or designee, shall verify that all project grading and construction plans include notes specifying that if inadvertent archaeological resources are discovered during excavation, grading, or construction activities, work shall cease in the area of the find until a qualified archaeologist has evaluated the find in accordance with federal, state, and local guidelines, including those set forth in California Public Resources Code (PRC) Section 21083.2. Construction personnel shall not collect or move any archaeological materials and associated materials. Construction activity may continue unimpeded on other portions of the project site. The found deposits would be treated in accordance with federal, state, and local guidelines, including those set forth in PRC Section 21083.2.

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

5c. Response: ***(Source: General Plan 2025 Policy HP-1.3)***

Less Than Significant With Mitigation Incorporated. The project site area contains artificial fills and older alluvial fan deposits. Artificial fills may contain fossils, but such fossils have been removed from their original location and are thus out of stratigraphic context. For this reason, they are not considered important for scientific study and have no paleontological sensitivity. Older alluvial fan deposits contain fossils including mammoths, mastodons, horses, bison, camels, saber-toothed cats, coyotes, deer, and sloths, as well as smaller animals like rodents, rabbits, birds, reptiles, and fish. For this reason, these

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact

deposits are considered to have high paleontological sensitivity. Ground-disturbing activities for the project are expected to extend into older alluvial fan deposits with high paleontological sensitivity. This is considered a significant impact. Impacts to paleontological resources would be reduced to **less than significant with implementation of Mitigation Measure PAL-1**.

Mitigation Measure PAL-1: A paleontologist shall be hired to develop a Paleontological Resource Impact Mitigation Program (PRIMP) for this project. The PRIMP shall include the methods that will be used to protect paleontological resources that may exist within the project area, as well as procedures for monitoring, fossil preparation and identification, curation into a repository, and preparation of a report at the conclusion of grading.

- Excavation and grading activities in deposits with high paleontological sensitivity (Older Alluvial Fan Deposits) shall be monitored by a paleontological monitor following a PRIMP. No monitoring is required for excavations in rocks with no paleontological sensitivity (Artificial Fill).
- If paleontological resources are encountered during the course of ground disturbance, the paleontological monitor shall have the authority to temporarily redirect construction away from the area of the find in order to assess its significance.
- Collected resources shall be prepared to the point of identification, identified to the lowest taxonomic level possible, cataloged, and curated into the permanent collections of a scientific institution.
- At the conclusion of the monitoring program, a report of findings shall be prepared to document the results of the monitoring program.
- In the event that paleontological resources are encountered when a paleontological monitor is not present, work in the immediate area of the find shall be redirected and a paleontologist should be contacted to assess the find for significance. If determined to be significant, the fossil shall be collected from the field.

d. Disturb any human remains, including those interred outside of dedicated cemeteries?	☐	☐	☒	☐

5d. Response: ***(Source: General Plan 2025 FPEIR Figure 5.5-1 – Archaeological Sensitivity and Figure 5.5-2 – Prehistoric Cultural Resources Sensitivity)***

Less Than Significant Impact. No known human remains are present on the project site and there are no facts or evidence to support the idea that Native Americans or people of European descent are buried on the project site. In the unlikely event that human remains are encountered during project grading, the proper authorities would be notified, and standard procedures for the respectful handling of human remains during the earthmoving activities would be followed. Construction contractors are required to adhere to California Code of Regulations (CCR) Section 15064.5(e), PRC Section 5097, and Section 7050.5 of the State Health and Safety Code. To ensure proper treatment of burials, in the event of an unanticipated discovery of a burial, human bone, or suspected human bone, the law requires that all excavation or grading in the vicinity of the find halt immediately, the area of the find be protected, and the contractor immediately notify the County Coroner of the find. The construction contractor, developer, and the County Coroner are required to comply with the provisions of CCR Section 15064.5(e), PRC Section 5097.98, and Section 7050.5 of the State Health and Safety Code. Compliance with these provisions (specified in **Standard Condition CR-2**) would ensure that any potential impacts to unknown buried human remains would be **less than significant** by ensuring appropriate examination, treatment, and protection of human remains as required by State law. No mitigation is required.

Standard Condition: No mitigation is required; however, the following Standard Condition is a regulatory requirement that would be implemented to reduce impacts related to discovery of human remains during construction.

Standard Condition CR-2: **Discovery of Human Remains.** Consistent with the requirements of California Code of Regulations (CCR) Section 15064.5(e), if human remains are encountered, work within 25 feet of the discovery shall be redirected and the Riverside County Coroner notified

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
immediately. State Health and Safety Code Section 7050.5 states that no further disturbance shall occur until the County Coroner has made a determination of origin and disposition pursuant to Public Resources Code (PRC) Section 5097.98. If the remains are determined to be Native American, the County Coroner shall notify the Native American Heritage Commission (NAHC), which shall determine and notify a Most Likely Descendant (MLD). With the permission of the property owner, the MLD may inspect the site of the discovery. The MLD shall complete the inspection within 48 hours of notification by the NAHC. The MLD may recommend scientific removal and nondestructive analysis of human remains and items associated with Native American burials. Consistent with CCR Section 15064.5(d), if the remains are determined to be Native American and an MLD is notified, the City shall consult with the MLD as identified by the NAHC to develop an agreement for treatment and disposition of the remains. As determined necessary by the City and MLD, **Mitigation Measures TRI-1 through TRI-3** shall apply (See response 17b.).				
6. 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:				
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.	☐	☐	☒	☐

6i. Response: ***(Source: General Plan 2025 Figure PS-1 – Regional Fault Zones and Preliminary Soil Investigation Report (Appendix E))***

Less Than Significant Impact. Seismic activity is expected in Southern California; however, the project site is not located within an Alquist-Priolo zone. The project site does not contain any known fault; therefore, potential for on-site fault rupture is very low. The site is located approximately 9.7 miles northeast of the Elsinore Fault. Proper engineering design and construction in conformance with the California Building Code (CBC) standards and project-specific Geotechnical recommendations (**Standard Condition GEO-1**) would ensure that seismic ground shaking would be reduced to **less than significant** levels directly, indirectly, and cumulatively, and no mitigation is required.

Standard Condition: No mitigation is required; however, the following Standard Condition is a regulatory requirement that would be implemented to reduce impacts related to seismic activity.

Standard Condition GEO-1: Compliance with applicable California Building Code and Project-specific Geotechnical Recommendations. Prior to the approval of grading and/or building permits, the applicant shall provide evidence to the City for review and approval that on-site structures, features and facilities have been designed and will be constructed in conformance with applicable provisions of the California Building Code and the recommendations cited in the project-specific geotechnical investigation.

ii. Strong seismic ground shaking?	☐	☐	☒	☐

6ii. Response: ***(Source: General Plan 2025 FPEIR and Preliminary Soil Investigation Report (Appendix E))***

Less Than Significant Impact. The San Jacinto Fault Zone, located in the northeastern portion of the City, and the Elsinore Fault Zone, located in the southern portion of the City's Sphere of Influence, have the potential to cause moderate to large earthquakes that would cause intense ground shaking. Because the proposed project must comply with CBC regulations that protect habitable structures from seismic hazards, direct, indirect, or cumulative impacts associated with strong seismic ground shaking will have **a less than significant impact**, and no mitigation is required.

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
iii. Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐

6iii. Response: ***(Source: General Plan 2025 Figure PS-1 – Regional Fault Zones, Figure PS-2 – Liquefaction Zones, General Plan 2025 Figure PS-3 – Soils with High Shrink-Swell Potential, and Preliminary Soil Investigation Report (Appendix E))***

Less Than Significant Impact. The project site is located in an area with high potential for liquefaction. However, the project site has been disturbed and is currently developed with school uses. On-site alluvial and silty sands are not considered susceptible to liquefaction. Furthermore, the incorporation of recommended design measures and adherence to CBC regulations will ensure that impacts related to seismic-related ground failure, including liquefaction, are less than significant. It is reasonable to conclude that the project will have low seismic-related ground failure and seismic-related risk has been reduced to **less than significant** levels directly, indirectly, and cumulatively. No mitigation is required.

iv. Landslides?	☐	☐	☐	☒

6iv. Response: ***(Source: General Plan 2025 FPEIR Figure 5.6-1 – Areas Underlain by Steep Slope, Title 18 – Subdivision Code, Title 17 – Grading Code, and Preliminary Soil Investigation Report (Appendix E))***

No Impact. The Geology and Soils section of the City's General Plan 2025 FPEIR states that "areas of high susceptibility to seismically induced landslides and rockfalls correspond to steep slopes in excess of 30 percent." Figure 5.6-1 of the General Plan 2025 FPEIR indicates that the project area is located on land identified as having a 0 to 10 percent slope, which is the lowest of the four potential categories. Additionally, the project site has been previously excavated, filled, graded, and leveled. Therefore, there will be **no impact** related to landslides directly, indirectly, or cumulatively, and no mitigation is required.

b. Result in substantial soil erosion or the loss of topsoil?	☐	☐	☒	☐

6b. Response: ***(Source: General Plan 2025 FPEIR Figure 5.6-1 – Areas Underlain by Steep Slope, Figure 5.6-4 – Soils, Table 5.6-B – Soil Types, Title 18 – Subdivision Code, and Title 17 – Grading Code)***

Less Than Significant Impact. On-site soils consist of alluvial and silty sands. Native alluvial soils, medium dense silty fine to medium sands and fine sandy silts are present underneath superficial sediments. During grading and construction, disturbance of soil by heavy construction equipment could result in erosion. State and Federal requirements call for the preparation and implementation of a Storm Water Pollution Prevention Plan (SWPPP) establishing erosion and sediment controls for construction activities. The project must also comply with the National Pollutant Discharge Elimination System (NPDES) regulations. In addition, with the erosion control standards with which all development activity must comply (Title 18), the Grading Code (Title 17) also requires the implementation of measures designed to minimize soil erosion. Compliance with State and Federal requirements as well as with Titles 18 and 17 will ensure that soil erosion or loss of topsoil will be a **less than significant impact** directly, indirectly, and cumulatively, and no mitigation is required.

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?	☐	☐	☒	☐

6c. Response: ***(Source: General Plan 2025 Figure PS-1 – Regional Fault Zones, Figure PS-2 – Liquefaction Zones, Figure PS-3 – Soils with High Shrink-Swell Potential; General Plan 2025 FPEIR Figure 5.6-1 – Areas Underlain by Steep Slope, Figure 5.6-4 – Soils, Table 5.6-B – Soil Types, and Preliminary Soil Investigation Report (Appendix E))***

Less Than Significant Impact. The project site has been previously excavated, filled, graded, and leveled. The site is generally flat, with less than 10 feet of elevation difference across the site. Native alluvial soils, medium dense silty fine to medium sands and fine sandy silts are present underneath superficial deposits. Liquefaction occurs primarily in saturated, loose, fine-to-medium grained alluvial soils in areas where the groundwater table is within 50 feet of the surface. Shaking suddenly causes soils to lose strength and behave as a liquid. Liquefaction-related effects include loss of bearing strength, lateral spreading, and flow failures or slumping. Seven exploratory boreholes were drilled by GeoMat engineer on January 14, 18, 19, 20, and 21, 2017 and one borehole was drilled on October 24, 2015, to a maximum depth of 50 feet below existing ground surface (Appendix E). Groundwater was not encountered by the GeoMat engineer in exploratory borings drilled at the

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact

site up to 50 feet below ground surface. Based on available groundwater data, a historic high groundwater of greater than 100 feet below ground surface is estimated.[15] Per the project specific soils report (Appendix E), "… a potential for loss of bearing capacity due to liquefaction is not expected at the site since there is not an upper potentially liquefiable layer at a depth shallower than the estimated depth where the induced vertical stress in the soil is 10% of the bearing pressure imposed by the proposed foundation systems."

While the City of Riverside General Plan 2025 FPEIR identifies the site as being with an area of "high" liquefaction potential, recent (2017) and historic reports anticipate groundwater deeper than 100 feet below ground level. Due to the depth of groundwater, compliance with the City's codes will sufficiently ensure that impacts related to geologic conditions are reduced to **less than significant impacts** level directly, indirectly, and cumulatively, and no mitigation is required.

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?	☐	☐	☐	☒

6d. Response: ***(Source: General Plan 2025 FPEIR Figure 5.6-4 – Soils, Figure 5.6-4 – Soils, Table 5.6-B – Soil Types, Figure 5.6-5 – Soils with High Shrink-Swell Potential, Preliminary Soil Investigation Report (Appendix E), and California Building Code as adopted by the City of Riverside and set out in Title 16 of the Riverside Municipal Code)***

No Impact. Expansive soils, defined under CBC, expand when wet and shrink when dry. The amount or type of clay present in soil determines its shrink-swell potential. On-site soils are mostly sands and silts, and have very low to no potential for expansion. Therefore, the project site does not have expansive soils, there will be **no impact** directly, indirectly, or cumulatively, and there will be no mitigation required.

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?	☐	☐	☐	☒

6e. Response: ***(Source: Project plans)***

No Impact. The proposed project will be served by sewer infrastructure. **No impact** will occur, and no mitigation is required.

7. GREENHOUSE GAS EMISSIONS. Would the project:				
a. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☒	☐

7a. Response***: (Source: Air Quality and Greenhouse Gas Analysis– (Appendix A), SCAQMD 2010)***

Less Than Significant Impact. "Greenhouse gases" (GHGs) emitted by human activity are implicated in global climate change, commonly referred to as "global warming." GHGs contribute to an increase in the temperature of the Earth's atmosphere by transparency to short wavelength visible sunlight, but near opacity to outgoing terrestrial long wavelength heat radiation in some parts of the infrared spectrum. The principal GHGs are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), O_3, and water vapor. For purposes of planning and regulation, Section 15364.5 of the CCR defines GHGs to include, but are not limited to, CO_2, CH_4, N_2O, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). Fossil fuel consumption in the transportation sector (e.g., on-road motor vehicles, off-highway mobile sources, and aircraft) is the single largest source of GHG emissions, accounting for approximately half of GHG emissions globally. Industrial and commercial sources are the second largest contributors of GHG emissions with about one-fourth of total emissions.

State CEQA Guidelines Section 15064(b) provides that the "determination of whether a project may have a significant effect on the environment calls for careful judgment on the part of the public agency involved, based to the extent possible on scientific and factual data," and further states that an "ironclad definition of significant effect is not always possible because the significance of an activity may vary with the setting."

[15] *Preliminary Soil Investigation Report, Hawthorne Heights Project, Single Family Homes, APNs 233-170-001 and 233-180-007, City of Riverside, California*, GeoMat Testing Laboratories, Inc., January 23, 2017 (Appendix E).

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact

The City adopted its Riverside Restorative Growthprint (RRG) Economic Prosperity Action Plan (RRG-EPAP) and Climate Action Plan (RRG-CAP) in January 2016. In 2014, the City was one of 12 that collaborated with the Western Riverside Council of Governments (WRCOG) on a Subregional Climate Action Plan (Subregional CAP) that includes 36 measures to guide the City's GHG reduction efforts through 2020. Through the WRCOG Subregional CAP process, the City has committed to a 2020 emissions target of 2,224,908 metric tons of carbon dioxide-equivalent gases (MT CO_2e), which is 26.4 percent below the City's 2007 baseline and 15 percent below 2010 emissions. This represents a reduction of 779,304 MT CO_2e from the City's 2020 business-as-usual (BAU) forecast. The City is aiming for a 2035 emissions target of 1,542,274 MT CO_2e, which is 49 percent below the 2007 baseline and represents a reduction of 2,120,931 MT CO_2e from the 2035 BAU forecast.

The RRG-CAP expands upon the efforts of the WRCOG Subregional CAP, employing local measures to help the City achieve deep GHG reductions through the year 2035. To further develop local GHG reduction measures for the RRG-CAP, the City conducted a detailed assessment of local strategies and actions related to the measures identified in the Subregional CAP and expanded the discussion and analysis with respect to implementation (particularly post-2020), costs and funding, performance metrics, and local co-benefits. Importantly, the discussions identify local economic and entrepreneurship opportunities that can be integrated with local, regional, and global GHG reductions (e.g., the development of green enterprise zones).

Currently, there is no statewide GHG emissions threshold used to determine potential GHG emissions impacts of a project. Air districts in the State are still developing and revising threshold methodology and thresholds. To provide guidance to local lead agencies on determining significance for GHG emissions in their CEQA documents, SCAQMD convened a GHG CEQA Significance Threshold Working Group (Working Group). Based on the last Working Group meeting (Meeting No. 15) held in September 2010, SCAQMD is proposing to adopt a tiered approach for evaluating GHG emissions for development projects where the SCAQMD is not the lead agency. This concept is equivalent to the existing consistency determination requirements in *CEQA Guidelines* Sections 15064(h)(3), 15125(d), or 15152(a). The SCAQMD has continued to consider adoption of significance thresholds for residential and general development projects. The most recent proposal issued in September 2010 (SCAQMD 2010) uses the following tiered approach to evaluate potential GHG impacts from various uses:

Tier 1 – Determine if CEQA categorical exemptions are applicable. If not, move to Tier 2.

Tier 2 – Consider whether or not the proposed project is consistent with a locally adopted GHG reduction plan that has gone through public hearing and CEQA review, that has an approved inventory, includes monitoring, etc. If not, move to Tier 3.

Tier 3 – Consider whether the proposed project generates GHG emissions in excess of screening thresholds for individual land uses. A 10,000 MT CO_2e/yr threshold for industrial uses would be recommended for use by all lead agencies. Under Option 1, separate screening thresholds are proposed for residential projects (3,500 MT CO_2e/yr), commercial projects (1,400 MT CO_2e/yr), and mixed-use projects (3,000 MT CO_2e/yr). Under Option 2, a single numerical screening threshold of 3,000 MT CO_2e/yr would be used for all non-industrial projects. If the project generates emissions in excess of the applicable screening threshold, move to Tier 4.

Tier 4 – Establishes a decision tree approach that includes compliance options for projects that have incorporated design features into the project and/or implement GHG mitigation measures.

- Efficiency Target (2020 Targets)
- 4.8 MT CO_2e per service population, (the number of jobs and the number of residents provided by a project), for project level threshold (land use emissions only) and total residual emissions not to exceed 35,000 million tons per year CO_2e
- 6.6 MT CO_2e per service population for plan level thresholds (all sectors)
- Efficiency Target (2035 Targets)
- 3.0 MT CO_2e per service population for project level threshold
- 4.1 MT CO_2e per service population for plan level threshold

If a project fails to meet any of these emissions reduction targets and efficiency targets, the project would move to Tier 5.

Tier 5 – Consider the implementation of CEQA mitigation (including the purchase of GHG offsets) to reduce the project efficiency target to Tier 4 levels.

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact

The thresholds identified above have not been adopted by the SCAQMD or distributed for widespread public review and comment, and the working group tasked with developing the thresholds has not met since September 2010. The future schedule and likelihood adoption is uncertain.

For purposes of this analysis, Tier 3 Option 1 approach for residential projects (3,500 MT CO_2e/yr) is utilized in order to determine the significance for the proposed project's GHG emissions.

Construction and operation of the proposed project would generate GHG emissions, with the majority of energy consumption (and associated generation of GHG emissions) occurring during the project's operation (as opposed to during its construction). Typically, more than 80 percent of the total energy consumption takes place during the use of buildings and less than 20 percent of energy is consumed during construction. As of yet, there is no study that quantitatively assesses all of the GHG emissions associated with each phase of the construction and use of an individual development.

Overall, the following activities associated with the proposed project could directly or indirectly contribute to the generation of GHG emissions:

- **Construction Activities:** During construction of the project, GHGs would be emitted through the operation of construction equipment and from worker and vendor vehicles.
- **Gas, Electricity, and Water Use:** Natural gas use results in the emission of two GHGs: CH_4 (the major component of natural gas) and CO_2 (from the combustion of natural gas).
- **Solid Waste Disposal:** Solid waste generated by the project could contribute to GHG emissions in a variety of ways. Landfilling and other methods of disposal use energy for transporting and managing the waste, and they produce additional GHGs to varying degrees.
- **Motor Vehicle Use:** Transportation associated with the proposed project would result in GHG emissions from the combustion of fossil fuels in daily automobile and truck trips.

Table 7.A lists the annual CO_2 emissions for each of the planned demolition and construction phases.

Table 7.A: Construction Greenhouse Gas Emissions

Construction Phase		Total Regional Pollutant Emissions (MT/yr)			
		CO_2	CH_4	N_2O	CO_2e
2017	Demolition	41	0.01	0	41.3
	Site Preparation	19	<0.01	0	18.7
	Grading	29	<0.01	0	29.3
	Building Construction	48	0.01	0	48.3
2018	Building Construction	265	0.06	0	266.0
	Architectural Coating	22	<0.01	0	22.4
	Paving	22	<0.01	0	22.4
Total Construction Emissions		446	0.10	0	449[1]

Source: Table L, *Air Quality and Greenhouse Gas Analysis (Appendix A)*
Notes:
[1] Rounded to the nearest whole number.
CH_4 = methane CO_2 = carbon dioxide CO_2e = carbon dioxide equivalent
MT/yr = metric tons per year N_2O = nitrous oxide

Long-term operation of the proposed project would generate GHG emissions from area and mobile sources and indirect emissions from stationary sources associated with energy consumption. Mobile-source emissions of GHGs would include project-generated vehicle trips associated with on-site facilities and customers and visitors to the project site. Area-source emissions would be associated with activities (e.g., landscaping and maintenance of proposed land uses, natural gas for heating, and other sources). Increases in stationary-source emissions would also occur at off-site utility providers as a result of demand for electricity, natural gas, and water by the proposed uses. The GHG emission estimates presented in Table 7.B detail the emissions associated with the level of development envisioned by the proposed project at opening.

The remaining CO_2e emissions are primarily associated with building heating systems and increased regional power plant electricity generation due to the proposed project's electrical demands. Specific development projects proposed under the project would comply with existing State and Federal regulations regarding the energy efficiency of buildings, appliances, and lighting, which would reduce the project's electricity demand. The new buildings constructed in accordance with current energy efficiency standards would be more energy-efficient than older buildings. Since January 1, 2014, several new Building Codes have been enforced in California. All structures other than one- and two-family dwellings and townhomes will be built

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact

under the 2016 CBC 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.

Table 7.B: Operational Greenhouse Gas Emissions

Source	Pollutant Emissions, MT/yr					
	Bio-CO_2	NBio-CO_2	Total CO_2	CH_4	N_2O	CO_2e
Construction emissions amortized over 30 years	0	15	15	<0.01	0	15
Operational Emissions						
Area Sources	0	14	14	<0.01	<0.01	14
Energy Sources	0	411	411	<0.01	<0.01	412
Mobile Sources	0	851	851	0.047	0	852
Waste Sources	13	0	13	0.76	0	32
Water Usage	1.1	42	43	0.12	<0.01	47
Total Project Emissions[1]	**14**	**1,334**	**1,348**	**0.92**	**<0.01**	**1,373**

Source: Table M, *Air Quality and Greenhouse Gas Analysis (Appendix A)*
Notes:
[1] Numbers in table may not appear to add up correctly due to rounding of numbers.
Bio-CO_2 = biologically generated CO_2 CH_4 = methane CO_2 = carbon dioxide
CO_2e = carbon dioxide equivalent MT/yr = metric tons per year N_2O = nitrous oxide
NBio-CO_2 = Nonbiologically generated CO_2

At present, there is a Federal ban on chlorofluorocarbons (CFCs); therefore, it is assumed the project would not generate emissions of CFCs. The project may emit a small amount of HFCs from leakage and service of refrigeration and air-conditioning equipment and from disposal at the end of the life of the equipment. However, the details regarding refrigerants to be used at the project site are unknown at this time. PFCs and SF_6 are typically used in industrial applications, which would not occur on the project site. Therefore, the project is not anticipated to contribute significant emissions of these additional GHGs.

Because climate change impacts are cumulative in nature, no typical single project can result in emission of such a magnitude that it, in and of itself, would be significant on a project basis. The project's operational emissions of 1,373 MT CO_2e/yr is less than the SCAQMD-recommended interim threshold of 3,500 MT CO_2e/yr for residential uses. Therefore, the proposed project would not result in a significant impact on GHG emissions.

Furthermore, this analysis considers GHG emission significance by determining the project's consistency with the policies and goals in the RRG-EPAP and RRG-CAP. As discussed in Response 7.b, below, the project would be consistent with the strategies and goals from the RRG-CAP. In order to ensure that the proposed project complies with and would not conflict with or impede the implementation of reduction goals identified in Assembly Bill (AB) 32, Executive Order (EO) S-3-05, and other strategies to help reduce GHGs to the level proposed by the Governor, **Standard Condition GCC-1** shall be implemented. **Standard Condition GCC-1** includes implementation of reduction goals identified in the Riverside RRG-CAP, AB 32, EO S-3-05, and other strategies to help reduce GHGs. With implementation of **Standard Condition GCC-1**, project impacts related to greenhouse gas emissions would be **less than significant** and no mitigation is required.

Standard Condition: No mitigation is required; however, the following Standard Condition is a regulatory requirement that would be implemented to reduce impacts related to greenhouse gas emissions.

Standard Condition GCC-1 **Greenhouse Gas Reduction Strategies.** To ensure the proposed project complies with and would not conflict with or impede the implementation of reduction goals identified in the Riverside RRG-CAP, Assembly Bill (AB) 32, the Governor's Executive Order (EO) S-3-05, and other strategies to help reduce greenhouse gases (GHGs) to the level proposed by the Governor, the project will implement a variety of measures that will reduce its GHG emissions. To the extent feasible, and to the satisfaction of the City of Riverside (City), the following measures shall be incorporated into the design and construction of the project:

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact

Construction and Building Materials.

- Use locally produced and/or manufactured building materials for at least 10 percent of the construction materials used for the project.
- Recycle/reuse at least 50 percent of the demolished and/or grubbed construction materials (including, but not limited to, soil, vegetation, concrete, lumber, metal, and cardboard) if feasible.
- Use "green building materials," such as those materials that are resource-efficient and are recycled and manufactured in an environmentally friendly way, for at least 10 percent of the project.

Energy Efficiency Measures.

- Design all project buildings to meet or exceed the California Building Code's (CBC) Title 24 energy standard, including, but not limited to, any combination of the following:
  - Increase insulation such that heat transfer and thermal bridging is minimized;
  - Limit air leakage through the structure or within the heating and cooling distribution system to minimize energy consumption; and
  - Incorporate ENERGY STAR® or better rated windows, space heating and cooling equipment, light fixtures, appliances, or other applicable electrical equipment.
- Install efficient lighting and lighting control systems. Use daylight as an integral part of the lighting systems in buildings.
- Install "cool" roofs and cool pavements.
- Install energy-efficient heating and cooling systems, appliances and equipment, and control systems.
- Install solar lights or light-emitting diodes (LEDs) for outdoor lighting or outdoor lighting that meets the City Code.

Water Conservation and Efficiency Measures.

- Devise a comprehensive water conservation strategy appropriate for the project and its location. The strategy may include the following, plus other innovative measures that may be appropriate:
  - Create water-efficient landscapes within the development.
  - Install water-efficient irrigation systems and devices, such as soil moisture-based irrigation controls.
  - Use reclaimed water, if available, for landscape irrigation within the project. Install the infrastructure to deliver and use reclaimed water, if available.
  - Design buildings to be water-efficient. Install water-efficient fixtures and appliances, including low-flow faucets and waterless urinals.
  - Restrict watering methods (e.g., prohibit systems that apply water to non-vegetated surfaces) and control runoff.

Solid Waste Measures.

- To facilitate and encourage recycling to reduce landfill-associated emissions, among others, the project will provide trash enclosures that include additional enclosed area(s) for collection of recyclable materials. The recycling collection area(s) will be located within, near, or adjacent to each trash and rubbish disposal area. The recycling collection area will be a minimum of 50 percent of the area provided for the trash/rubbish enclosure(s) or as approved by the Waste Management Department of the City of Riverside.

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact

- Provide employee education on waste reduction and available recycling services.

Transportation Measures.

- To facilitate and encourage non-motorized transportation, bicycle racks shall be provided in convenient locations to facilitate bicycle access to the project area. The bicycle racks shall be shown on project landscaping and improvement plans submitted for Planning Department approval and shall be installed in accordance with those plans.
- Provide pedestrian walkway and connectivity requirements.

With implementation of **Standard Condition GCC-1**, the proposed project would not conflict with or impede implementation of the reduction goals identified in AB 32, EO S-3-05, and other strategies to help reduce GHGs to the level proposed by the Governor. Therefore, the proposed project would not generate greenhouse gas emissions, either directly or indirectly, which would have a significant impact on the environment. Associated impacts would be **less than significant** and no mitigation is required.

b. Conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☒	☐

7b. Response:

Less Than Significant Impact. As discussed in Response 7.a, above, the City adopted its RRG, RRG-EPAP and RRG-CAP in January 2016. This analysis considers GHG emission significance by determining the proposed project's consistency with the policies and goals in these plans. Table 7.C lists the applicable strategies and goals from the RRG-CAP and identifies how the proposed project achieves compliance. In order to ensure that the proposed project complies with and would not conflict with or impede the implementation of reduction goals identified in AB 32, EO S-3-05, and other strategies to help reduce GHGs to the level proposed by the Governor, **Standard Condition GCC-1** shall be implemented. **Standard Condition GCC-1** includes implementation of reduction goals identified in the Riverside RRG-CAP, AB 32, the EO S-3-05, and other strategies to help reduce GHGs.

The AQMP is based on regional growth projections developed by the SCAG. The proposed project is a residential development and is not defined as a regionally significant project under CEQA; therefore, it does not meet SCAG's Intergovernmental Review (IGR) criteria. As discussed in Response 3a, the proposed project would produce fewer vehicle miles traveled and thus lower operational emissions than the former elementary school based on the default trip rates and trip lengths in the Institute of Transportation Engineers *Trip Generation Manual*, Ninth Edition, for the previous elementary school and the proposed project. However, the project does require a General Plan Amendment (Planning Case P16-0112) from B/OP – Business/Office Park to MDR – Medium Density Residential and Zone Change (Planning Case P16-0113) from PF - Public Facilities to R-1-7000 - Single-Family Residential.

Pursuant to the methodology provided in Chapter 12 of the 1993 SCAQMD *CEQA Air Quality Handbook*, consistency with the AQMP is affirmed when a project: (1) does not increase the frequency or severity of an air quality standards violation or cause a new violation; and (2) is consistent with the growth assumptions in the AQMP. Consistency review is presented below:

1. The project would result in short-term construction and long-term pollutant emissions that are less than the CEQA significance emissions thresholds established by the SCAQMD, as demonstrated in Section 3b; therefore, the project could not result in an increase in the frequency or severity of any air quality standards violation and will not cause a new air quality standard violation.
2. The *CEQA Air Quality Handbook* indicates that consistency with AQMP growth assumptions must be analyzed for new or amended General Plan elements, Specific Plans, and significant projects. Significant projects include airports, electrical generating facilities, petroleum and gas refineries, designation of oil drilling districts, water ports, solid waste disposal sites, and offshore drilling facilities; therefore, the proposed project is not defined as significant.

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact

Table 7.C: Project Compliance with Greenhouse Gas Emission Reduction Strategies

Strategy	Project Compliance
Energy Efficiency Measures	
Measure SR-2: 2016 California Building Energy Efficiency Standards (Title 24, Part 6). Maximize energy efficiency building and appliance standards, and pursue additional efficiency efforts including new technologies, and new policy and implementation mechanisms. Pursue comparable investment in energy efficiency from all retail providers of electricity in California (including both investor-owned and publicly owned utilities). **Green Building Strategy.** Expand the use of green building practices to reduce the carbon footprint of California's new and existing inventory of buildings.	**Compliant.** The proposed project would comply with the requirements of Measure SR-2: 2016 California Building Energy Efficiency Standards (Title 24, Part 6)[1], including measures to incorporate energy-efficient building design features detailed in Subchapter 7 (Low-rise Residential Buildings) Section 150.0 (Mandatory Features and Devices.)
Water Conservation and Efficiency Measures	
Measure W-1: Water Use Efficiency. Reduce per capita water use by 20% by 2020. SB X7-7 is part of a California legislative package passed in 2009 that requires urban retail water suppliers to reduce per-capita water use by 10% from a baseline level by 2015, and to reduce per-capita water use by 20% by 2020. Green accountability performance (GAP) Goal 16 directly aligns with SB X7-7. In Southern California, energy costs and GHG emissions associated with the transport, treatment, and delivery of water from outlying regions are high. Therefore, the region has extra incentive to reduce water consumption. While this is considered a state measure, it is up to the local water retailers, jurisdictions, and water users to meet these targets.	**Compliant.** The project would comply with the requirements of Measure W-1: Water Use Efficiency. Water-efficient irrigation systems and devices and drought-tolerant landscaping would be installed on the project site.
Solid Waste Reduction Measures	
Measure SR-13: Construction and Demolition (C&D) Waste Diversion. Meet mandatory requirement to divert 50% of C&D waste from landfills by 2020 and exceed requirement by diverting 90% of C&D waste from landfills by 2035. Effective July 1, 2014, CALGreen, the State's Green Building Standards Code, requires jurisdictions to divert a minimum of 50% of their nonhazardous C&D waste from landfills. Reductions for the year 2020 assume that 100% of new construction and applicable retrofit projects meet the minimum diversion rates established by the state. For 2035, this measure assumes that C&D waste diversion would increase to 90% for new construction and retrofit projects. This increase is in line with GAP Goal 6.A which aims to develop measures to encourage that a minimum of 90% of recoverable waste from all construction sites be recycled throughout Riverside by 2015, beginning with 40% in 2010 and increasing by 10% each year thereafter.	**Compliant.** The project would comply with Measure SR-13: Construction and Demolition Waste Diversion. At least 50 percent of the demolished and/or grubbed construction materials (including, but not limited to, soil, vegetation, concrete, lumber, metal, and cardboard) would be reused/recycled.
Transportation and Motor Vehicle Measures	
Measure SR-6: Pavley and Low Carbon Fuel Standard (LCFS). ARB identified this measure as a Discrete Early Action Measure. This measure would reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020. **Measure SR-12: Electric Vehicle Plan and Infrastructure.** SCAG has developed a regional plug-in electric vehicle (PEV) readiness plan, and WRCOG has a similar sub regional plan for PEV readiness. Together, these plans identify viable locations for charging stations, changes to development codes, and other strategies to encourage the purchase and use of electric vehicles. This measure is anticipated to reduce nearly 82,000 MT CO_2e in participating WRCOG jurisdictions by 2020.	**Compliant.** The project does not involve the manufacture, sale, or purchase of vehicles. However, vehicles that operate within and access the project site would comply with Measure SR-6: Pavley and Low Carbon Fuel Standard. Per the Municipal Code (Section 16.07.020), the City has adopted the California Green Building Standards Code (2016) which requires the pre-wiring of new residential development to facilitate the installation and use of EV charging stations (Section 4.106.4); therefore, the project would comply with Measure SR-12: Electric Vehicle Plan and Infrastructure.
Measure E-2: Shade Trees. Strategically plant trees at new developments to reduce the urban heat island effect. Planting additional trees in urban environments has a number of benefits, including lowering peak-load energy demands during the hottest months, enhancing the visual aesthetic of a community, and naturally sequestering carbon dioxide. Properly selected and located shade trees can help keep indoor temperatures low, thereby reducing air conditioner demands and utility costs. Trees can also provide shade for parking lots and other paved areas, reducing urban heat island effect communitywide.	**Compliant.** The project would comply with Measure E-2: Shade Trees. Landscaping and shade trees would be provided throughout the project site.

Source: Riverside Restorative Growthprint, Climate Action Plan RRG – Part B, October 2015.

1. http://www.energy.ca.gov/2015publications/CEC-400-2015-037/CEC-400-2015-037-CMF.pdf, site accessed August 17, 2017.

ARB = California Air Resources Board GHG = greenhouse gas

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact

Therefore, based on the consistency analysis presented above, the proposed project is consistent with the current regional AQMP.

With implementation of **Standard Condition GCC-1**, impacts related to conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases would be **less than significant**, and no mitigation is required.

8. 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?	☐	☐	☒	☐

8a. Response:

Less Than Significant Impact. Construction of the project has the potential to create a hazard to the public or environment through the routine transportation, use, and disposal of construction-related hazardous materials such as fuels, oils, solvents, and other materials. These materials are typical of materials delivered to construction sites. The project shall comply with all applicable Federal, State, and local laws and regulations pertaining to the transport, use, disposal, handling, and storage of hazardous waste, including but not limited to Title 49 of the Code of Federal Regulations implemented by Title 13 of the CCR, which describes strict regulations for the safe transportation of hazardous materials. Compliance with all applicable Federal, State and local laws related to the transportation, use and storage of hazardous materials would reduce the likelihood and severity of accidents during transit, use and storage to a **less than significant impact** directly, indirectly, and cumulatively. No mitigation is required.

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?	☐	☒	☐	☐

8b. Response: ***(Source: Phase 1 Environmental Site Assessment (ESA) (Appendix F1); Phase 1 Hazmat Sampling and Testing Results (Appendix F2))***

Less Than Significant With Mitigation Incorporated. A Phase 1 Environmental Site Assessment (ESA) for the project was prepared in accordance with the standards and procedures outlined in the American Society for Testing and Materials (ASTM) E 1527-13, as applicable. The purpose of this Phase 1 ESA is to identify, to the extent feasible, and pursuant to the processes prescribed herein, recognized environmental conditions in connection with the property.

The subject property was used as a school from 1966 until December 2008. The Riverside County Environmental Health Department, Hazardous Materials Division, maintains a list of the underground tank cleanup sites and emergency response activity within the County and was contacted as part of the Phase 1 ESA work on the 6.85-acre Hawthorne property. The agency responded on January 5, 2017, and indicated that there were no files of any incidents or accidents involving hazardous materials on site. Furthermore, data from the Regional Water Quality Control Board indicate that there are no potential sites of contamination on or in the general area of the subject property.

A site reconnaissance was conducted on December 27, 2016 and concluded recognized environmental conditions (REC) may currently exist on the project site as a result of nearby railroad operations and past uses of the property for agriculture and as a school site. During the site reconnaissance, two pole-mounted transformers were observed on utility poles within the public right-of-way along the south side of Indiana Avenue adjacent to the northern boundary of the proposed project. Although it is not certain if the observed pole-mounted transformers contained PCBs, no indication of PCB leakage or contamination were observed on the subject property.

A review of government agency databases indicated no previously permitted on-site hazardous material use, generation, storage, or disposal. No underground storage tanks have been permitted for the site and no unauthorized releases of petroleum hydrocarbons have been reported for the site. Based on available information, it is concluded that there is low to moderate

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact

probability of the site to contain any REC, Controlled Recognized Environmental Conditions (CREC), Historic Recognized Environmental Conditions (HREC), or conditions that would threaten public health or safety. Due to the railroad tracks abutting the site to the south, past uses of agriculture on the subject property, and presence of a 1960s school complex on site, it was recommended that a hazardous materials Phase II subsurface soil investigation and asbestos and lead-based paint testing be conducted for the subject property. The subsurface soil investigation of the site was conducted in January and February 2017. Soil samples were retrieved from four locations spread evenly in an east-west direction across the site. None of the sampled locations showed elevated levels of contamination above established standards or exceeded recommended levels for residential properties. The Phase II testing indicates that no subsequent soil remediation is required prior to clearing/grubbing of the site.

The sampling effort indicated asbestos containing material (ACM) is present in some of the former school buildings. Due to the presence of ACMs and the potential presence of LBP in existing structures, the demolition of these structures may result in the release of hazardous materials into the environment. The following mitigation is required to reduce potential impacts to a **less than significant level with mitigation incorporated.**

Mitigation Measures: Mitigation is required to reduce potential hazardous material impacts associated with the demolition of existing on-site structures and grading on site. Full adherence to the requirements of the stated measures will ensure potential on-site hazardous material impacts are reduced to a less than significant level.

Mitigation Measure HAZ-1: Prior to the issuance of a demolition or grading permit, the applicant shall provide evidence to the City for review and approval testing for lead-based paint (LBP) has been conducted.

Mitigation Measure HAZ-2: Prior to issuance of a demolition or grading permit, the applicant shall submit to the City for review and approval, evidence that any on-site asbestos containing material (ACM) or lead based paint (LBP) contaminated material identified in any site-specific hazardous material investigation, has been removed, remediated and/or disposed of pursuant to the applicable local, regional, and/or State requirements. The removal and disposal of any such material shall be documented as part of a hazardous waste abatement report to be reviewed by the City prior to the issuance of demolition or grading permits.

c. Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☒	☐

8c. Response: ***(Source: General Plan 2025 Public Safety and Education Elements, General Plan 2025 FPEIR Table 5.7-D – CalARP RMP Facilities in the Project Area, Figure 5.13-2 – Riverside Unified School District (RUSD) Boundaries, Table 5.13-D RUSD Schools, Figure 5.13-4 – Other School District Boundaries, California Health and Safety Code, Title 49 of the Code of Federal Regulations, California Building Code)***

Less Than Significant Impact. Sherman Indian High School is located approximately 0.25 mile north of the project site, and Arlington High School is located approximately 1,000 feet southeast of the project site. The proposed development does pose a potential health risk to nearby existing or proposed schools; however, use of hazardous materials during demolition, construction, and occupation of the proposed project would be subject to all applicable existing Federal, State, and local statutes and regulations. Compliance would ensure that children, teachers, staff, and visitors at the nearby schools are not exposed to hazardous materials.

The proposed project would operate as a typical residential development and would not be expected to introduce a substantial risk to human health through the release of hazardous materials. Potential hazardous materials would include commercial household products and cleaning supplies. These substances would be stored in secure areas and would comply with all applicable storage, handling, usage, and disposal requirements. The potential risks posed by the use and storage of these hazardous materials are primarily limited to the immediate vicinity of the materials. Residents may dispose of household hazardous waste every non-holiday Saturday from 9:00 am to 2:00 pm at the Agua Mansa Permanent HHW Facility. As such, impacts associated with the exposure of schools to hazardous materials caused by this project and will result in a **less than significant impact** directly, indirectly, and cumulatively. No mitigation is required.

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
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?	☐	☒	☐	☐

8d. Response: ***(Source: General Plan 2025 Figure PS-5 – Hazardous Waste Sites, General Plan 2025 FPEIR Tables 5.7-A – CERCLIS Facility Information, Figure 5.7-B – Regulated Facilities in TRI Information and 5.7-C – DTSC EnviroStor Database Listed Sites)***

Less Than Significant With Mitigation Incorporated. No hazardous materials sites, compiled pursuant to Government Code Section 65962.5, are depicted on or adjacent to the project location on the EnviroStar online database. In addition, the General Plan 2025 FPEIR (Figure 5.7-1) does not list any hazardous waste sites on or adjacent to the project site. Although these databases indicate no known on-site hazardous material site, due to the railroad tracks abutting the site to the south and, past uses of agriculture on the property, soil sampling and laboratory testing was required. The results of the Phase II sampling and testing effort did not indicate any contamination above established standards or recommended levels for residential properties.

The sampling effort indicated ACM is present in some of the former school buildings. Full adherence to the requirements of **Mitigation Measures HAZ-1** through **HAZ-2** will ensure potential on-site hazardous material impacts are reduced to **a less than significant level with mitigation incorporated**.

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?	☐	☐	☐	☒

8e. Response: ***(Source: General Plan 2025 FPEIR Figure 5.7-2 – Airport Safety and Compatibility Zones and Riverside County Airport Land Use Compatibility Plan (RCALUCP).***

No Impact. The proposed project is not located within an Airport Safety Zone, as depicted in Figure 5.7-2 of the General Plan 2025 FPEIR. The project site is not within two miles of a public airport or public use airport. Because the project has not been found to be in an airport zone or within two miles of an airport, no further compliance is necessary with any airport plan. **No impacts** related to safety hazards for people residing or working in the project area directly, indirectly, or cumulatively would occur, and no mitigation is required.

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?	☐	☐	☐	☒

8f. Response: ***(Source: General Plan 2025 Figure PS-6 – Airport Safety Zones and Influence Areas, RCALUCP)***

No Impact. Because the proposed project is not located within proximity of a private airstrip and does not propose a private airstrip, it will not expose people residing or working in the City to safety hazards related to a private airstrip. **No impact** related to people residing or working in the project area directly, indirectly, or cumulatively would occur, and no mitigation is required.

g. Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐

8g. Response: (*City of Riverside's EOP)*

Less Than Significant Impact. The project is within an urbanized area and will be served by the surrounding network of existing, full improved streets. All streets have been designed to meet the Public Works and Fire Department specifications. The proposed project shall comply with the City's Emergency Operations Plan (EOP). Temporary street closure may be necessary during construction activities. Any street closure will be of short duration so as not to interfere or impede with any

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
emergency response or evacuation plan. Since the proposed project is designed to be located in a gated community, emergency responders will have access at the main entrance to the community as well as have access at the west edge of the site dedicated for emergency access. Therefore, the project will have a **less than significant impact** directly, indirectly, and cumulatively to an emergency response or evacuation plan. No mitigation is required.				
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?	☐	☐	☐	☒
8h. Response: ***(Source: General Plan 2025 Figure PS-7 – Fire Hazard Areas, GIS Map Layer VHFSZ 2010, City of Riverside's EOP, 2002, Riverside Operational Area – Multi-Jurisdictional Local Hazard Mitigation Plan (LHMP), 2004 Part 1/Part 2 and Office of Emergency Services' (OEM's) Strategic Plan)***				
No Impact. The proposed project is located in an urbanized area where no wildlands exist and the property is not located within a Very High Fire Severity Zone (VHFSZ) or adjacent to wildland areas; therefore, **no impact** related to wildland fires either directly, indirectly, or cumulatively from this project will occur. No mitigation is required.				
9. HYDROLOGY AND WATER QUALITY. Would the project:				
a. Violate any water quality standards or waste discharge requirements?	☐	☐	☒	☐
9a. Response: ***(Source: General Plan 2025 FPEIR Table 5.8-A – Beneficial Uses Receiving Water; Project Specific Water Quality Management Plan – SDH & Associates, Inc. (Appendix G))***				
Less Than Significant Impact. The project is located on a 6.85-acre property along Indiana Avenue. The site is currently developed with a vacant elementary school, which has several classroom buildings, playgrounds, and associated surface parking lots. The project consists of demolition of the existing school and construction of 54 single-family detached homes and associated improvements. The site clearing and grading phases will disturb vegetation and surface soils, potentially resulting in erosion and sedimentation. If left exposed and with no vegetative cover, the site's bare soil would be subject to wind and water erosion. Since the project involves more than one acre of ground disturbance, it is subject to NPDES requirements and must implement an SWPPP. Implementation of site-specific best management practices (BMPs) as established by the SWPPP will ensure all impacts related to erosion and sedimentation from ground disturbance are less than significant. The Municipal Storm Water Permitting Program regulates storm water discharges from municipal separate storm sewer systems (MS4), which has been added in two phases. Under Phase 1, the RWQCB has adopted an NPDES Permit for medium (serving between 100,000 and 250,000 people) and large (serving 250,000 people) municipalities. Under Phase 2, the State Water Resources Control Board (SWRCB) issued a General Permit for the discharge of storm water from small MS4s to provide permit coverage for smaller municipalities (California Environmental Protection Agency, State Water Resource Control Board). The project-specific WQMP identifies nine on-site drainage management areas (DMAs). Typical lot design includes a shallow vegetated swale around the perimeter of each house to intercept any runoff from the roof of the house and surrounding areas, which then is routed to four infiltration basins. Nearly all of the runoff generated by this project will be routed to pervious, landscaped areas where it will infiltrate into the ground. Hardscape has been minimized to reduce urban runoff. The southern portion of the site will generally drain to a large retention basin. Smaller basins are located in the northwest corner of the site and on either side of the main project entrance. The site will be graded to direct flow to a sump, with each sump providing drainage to infiltration facility for treatment. An overflow/outlet storm drain will connect and discharge to the existing city storm drain in the northwest corner. The City of Riverside is located in the Santa Ana River Region, which is within the Riverside County Drainage Area Management Plan (DAMP). The DAMP addresses the requirements of the MS4 permits issued to the Riverside County Co-Permittees by the Santa Ana RWQCB. These are the third MS4 permits issued by each RWQCB and are referred to as the "Third-term" MS4 Permits. The City is a permittee under the Third-term MS4 Permits. Under this permit, the City is required to enforce and comply with storm water discharge requirements.				

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
To address potential water contaminants, the project is required to comply with applicable Federal, State, and local water quality regulations, including the design and maintenance features detailed in the project-specific WQMP. The WQMP will be reviewed and approved as a routine action during the processing of the project by the City; therefore, it is reasonable that the required measures and features detailed in this plan to safeguard water quality will be incorporated into the proposed project. Given compliance with all applicable local, State, and Federal laws regulating surface water quality, the proposed project as designed is anticipated to result in a **less than significant impact** directly, indirectly, and cumulatively to any water quality standards or waste discharge. No mitigation is required.				
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)?	☐	☐	☒	☐

9b. Response: ***(Source: General Plan 2025 Table PF-1 – RPU Projected Domestic Water Supply (AC-FT/YR), Table PF-2 – RPU Projected Water Demand, RPU Map of Water Supply Basins, RPU Urban Water Management Plan. 2015)***

Less Than Significant Impact. Water service for the site will be provided by Riverside Public Utilities (RPU). RPU extracts groundwater from five groundwater basin, which accounts for the majority of RPU's supplies. Approximately 60 percent comes from the Bunker Hill Basin, within which water rights are adjudicated. RPU's water rights are based on the long-term yield of the basin estimated for normal, dry, and multiple-dry years. Pursuant to the 2015 Urban Water Management Plan (UWMP), the RPU maintains sufficient supplies of water (including groundwater) during normal, dry, and multiple-dry years. The UWMP bases its demand estimates on broad categories of uses (e.g., single-family residential, commercial/ industrial/institutional) and growth projections identified by the City. As the site has been previously developed with school uses, it is reasonable that a water demand for the site has been previously included in the estimates of future demand. RPU maintains sufficient water rights in local groundwater basins to meet current and projected future demands.

The proposed project site has been designed to maximize the landscape areas, thereby minimizing the impervious area to the maximum extent possible; runoff from the site will disperse into infiltration facilities or landscaped planted areas prior to discharging into the city storm drain. Additionally, the proposed project will utilize water conservation project design features such as low-flush toilets, low-flow faucets, and drought-tolerant landscaping. The project does not include wells or excavations at a depth that would interfere with groundwater recharge. Because local groundwater supplies are sufficient to supply project growth with the RPU service area, and because the UWMP anticipates adequate existing and future water supplies to accommodate this growth, the proposed project will result in a **less than significant impact** to groundwater supplies and recharge either directly, indirectly, or cumulatively. No mitigation is required.

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?	☐	☐	☒	☐

9c. Response:

Less Than Significant Impact. The project would not have any direct effects on a stream or river as none occurs on site. The project site is relatively flat-lying, with ground slopes limited to an average of less than 0.7 percent to the northwest. The existing project site does not have any other features or facilities promoting infiltration except those that occur as surface runoff flows across the barren dirt to the storm drain in the north. General sheet flow conditions would be maintained and the site would be designed with retention features and permeable areas to ensure runoff from regular rain events are retained on site. The proposed sump basins, where the site is designed to flow, will infiltrate the maximum volume of runoff feasible. The proposed site has been graded to direct flows to sump conditions. Each sump has an infiltration facility for treatment with an overflow/outlet storm drain that will connect and discharge to the existing city storm drain. The project is subject to NPDES requirements; areas of one acre or more of disturbance are subject to preparing and implementing an SWPPP for the prevention of runoff during construction activities. Therefore, the project will have a **less than significant impact** directly, indirectly, or cumulatively to existing drainage patterns, and no mitigation is required.

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
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 substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or off site?	☐	☐	☒	☐

9d. Response:

Less Than Significant Impact. The project would not have any direct effects on a stream or river, as none occurs on site. The existing project site does not have any features or facilities promoting infiltration except those which occur as surface runoff flows across the barren dirt to the storm drain in the north. The proposed sump basins to where the site is designed to flow will infiltrate the maximum volume of runoff feasible. The proposed site has been graded to direct flow to sump conditions. Each sump has an infiltration facility for treatment with an overflow/outlet storm drain that will connect and discharge to the existing city storm drain. Therefore, no flooding on or off-site as a result of the project will occur and there will be a **less than significant impact** directly, indirectly, and cumulatively that would substantially increase the rate or amount of surface runoff in a manner that would result in flooding on or off site. No mitigation is required.

e. Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☒	☐

9e. Response:

Less Than Significant Impact. The proposed project would include retention features that would help prevent increases in the rate or volume of storm water runoff leaving the site. The project is over one acre in size and is required to have coverage under the State's General Permit for Construction Activities (SWPPP). As stated in the permit, during and after construction, BMPs will be implemented to reduce/eliminate adverse water quality impacts resulting from development. All impacts related to runoff during site preparation, demolition, and grading will be addressed by the SWPPP. The site has been designed to maximize the landscape areas, thereby minimizing the impervious area to the maximum extent practicable. All runoff from the built project site will disperse into infiltration facilities or adjacent landscape planted areas prior to discharging into the storm drain. As any sources of storm water pollution will be mitigated through adherence to NPDES permit requirements, the project will not create or contribute runoff water exceeding the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff. For these reasons, there will be a **less than significant impact** directly, indirectly, or cumulatively from storm water exceeding the capacity of existing or planned storm water drainage systems or substantial additional sources of polluted runoff. No mitigation is required.

f. Otherwise substantially degrade water quality?	☐	☐	☒	☐

9f. Response:

Less Than Significant Impact. The project is over one acre in size and is required to have coverage under the State's General Permit for Construction Activities (SWPPP). As stated in the permit, during and after construction, BMPs will be implemented to reduce/eliminate adverse water quality impacts resulting from development. All impacts related to runoff during site preparation, demolition, and grading will be addressed by the SWPPP. The site has been designed to maximize the landscape areas, thereby minimizing the impervious area to the maximum extent practicable. All runoff from the built project site will disperse into infiltration facilities or adjacent landscape planted areas prior to discharging into the storm drain. As any sources of storm water pollution will be mitigated through adherence to NPDES permit requirements, the project will not create or contribute runoff water exceeding the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff. For these reasons, there will be a **less than significant impact** directly, indirectly, or cumulatively from sources of water quality degradation. No mitigation is required.

g. Place housing within a 100-year flood hazard area as mapped on a Federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☒

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact

9g. Response: ***(Source: General Plan 2025 Figure PS-4 – Flood Hazard Areas, and FEMA Flood Hazard Map Number 06065C0720G)***

No Impact. This project will consist of new housing not located in a 100-year flood zone; however, according to the Federal Flood Hazard Boundary, Flood Insurance Rate Map, the proposed site is within a 500-year flood area, which has a 0.2 percent annual chance of flood. There will be **no impact** caused by this project directly, indirectly, or cumulatively, as it will not place housing within a 100-year flood hazard area. No mitigation is required.

h. Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	☐	☐	☒

9h. Response: ***(Source: General Plan 2025 Figure PS-4 – Flood Hazard Areas, and FEMA Flood Hazard Number 06065C0720G)***

No Impact. Based on the Flood Hazard Areas and the National Insurance Map (Map Number 06065C0720G), the site is located in a 500-year flood area and has a 0.2 percent annual chance of flood. However, the project site is not located within or near a 100-year flood hazard area as depicted on General Plan 2025 FPEIR Figure 5.8-2 – Flood Hazard Areas and the National Flood Insurance Rate Map (Map Number 06065C0720G Effective Date August 28, 2008). Therefore, the project will not place a structure within a 100-year flood hazard area that would impede or redirect flood flows and **no significant impact** will occur directly, indirectly, or cumulatively. No mitigation is required.

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?	☐	☐	☒	☐

9i. Response: ***(Source: General Plan 2025 FPEIR Figure 5.8-2 – Flood Hazard Areas, and FEMA Flood Hazard Number 06065C0720G)***

Less Than Significant Impact. The project is located partially within the Mockingbird Canyon Dam inundation area, which may be affected in the event of a dam failure, as depicted on General Plan 2025 FPEIR Figure 5.8-2 – Flood Hazard Areas. In the event of a dam failure, first flow waters are expected to reach the site in 40 minutes. Therefore, the proposed project may expose people and/or structures to the risk of loss, injury, or death involving flooding as a result of the failure of a levee or dam.

The City Municipal Code, Title 18 – Subdivision Code, Chapter 18.210 – Development Standards, Section 18.210.100 – Flood Prone Lands and Drainage and Title 16 Buildings & Construction, Chapter 16.18 Flood Hazard Area & Implementation of Natural Flood Insurance Program, Sec. 16.8050 requires new construction located within flood hazard areas to mitigate flood hazards by including on-site drainage, anchoring methods to prevent floating structures, elevating buildings above flood levels, and flood proofing, which requires buildings to be inspected and certified by a professional engineer, surveyor, or building inspector. The proposed project will be conditioned to meet these requirements, including compliance with State Civil Code Section 1103 through 1103.4 requiring notification to those potentially affected of the risk involved in locating within a flood hazard or dam inundation area. Therefore, the potential to place a structure within an area that would expose people or structures to a significant risk of loss, injury, or death as a result of the failure of a levee or dam will be **less than significant** directly, indirectly, or cumulatively. No mitigation is required.

j. Expose people or structures to inundation by seiche, tsunami, or mudflow?	☐	☐	☒	☐

9j. Response: ***(Source: General Plan 2025 Chapter 7.5.8 – Hydrology and Water Quality; General Plan 2025, Open Space and Conservation Element, Figure OS-4)***

Less Than Significant Impact. The site is located inland and no larger bodies of water are located within the site's vicinity; therefore, the potential of tsunamis or seiches affecting the site is considered low. Further, the proposed project site and its surroundings have generally flat topography and are within an urbanized area not within proximity to Lake Mathews, Lake Evans, the Santa Ana River, Lake Hills, Norco Hills, Box Springs Mountain Area, or any of the nine arroyos that transverse the City and its sphere of influence. According to Figure OS-4 in the General Plan 2025, the closest arroyo is Mockingbird Canyon, located approximately one mile southeast of the proposed project. The project site is not located near slopes or mountainous

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
areas that would contribute to mudflow risks. Given the project's location and since there are no features nearby that would pose a threat from seiche, tsunami, or mudflow, impacts are considered **less than significant** either directly, indirectly, or cumulatively. No mitigation is required.				
10. LAND USE AND PLANNING. Would the project:				
a. Physically divide an established community?	☐	☐	☐	☒
10a. Response: ***(Source: General Plan 2025 Land Use and Urban Design Element, City of Riverside GIS/CADME map layers)***				
No Impact. The current General Plan land use designation for the project is B/OP – Business/Office Park. The project includes a General Plan Amendment to change the designation to MDR – Medium Density Residential. A zone change from PF – Public Facilities to R-1-7000 – Single-Family Residential is also proposed. While the proposed General Plan and zoning are different than current designations, the changes are compatible with uses around the project site, which consist primarily of single-family residential homes. The areas east, west, and north of the project site are zoned R-1-7000 – Single-Family Residential. The project is currently served by fully improved public streets and other infrastructure and does not involve the subdivision of land or the creation of streets that could alter the existing surrounding pattern of development or an established community. Therefore, **no impact** directly, indirectly, or cumulatively to an established community will occur. No mitigation is required.				
b. Conflict with any 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?	☐	☐	☐	☒
10b. Response: ***(Source: General Plan 2025 Figure LU-10 – Land Use Policy Map, Table LU-5 – Zoning/General Plan Consistency Matrix, Figure LU-7 – Redevelopment Areas, Title 18 – Subdivision Code, Title 7 – Noise Code, Title 17 – Grading Code, Title 20 – Cultural Resources Code, Title 16 – Buildings and Construction and Citywide Design Guidelines and Sign Guidelines)***				
No Impact. A closed elementary school site's land use designation will change, through a General Plan Amendment, from B/OP – Business/Office Park to MDR – Medium Density Residential. The new land use designation is compatible with the surrounding land uses, which consist primarily of single-family residential homes. The project is not located within other planned areas and it is not a project of statewide, regional, or area-wide significance. For these reasons, this project will have **no impact** on any applicable land use plan, policy, or regulation directly, indirectly, or cumulatively, and no mitigation is required.				
c. Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☒
10c. Response: (Source: ***Regional Conservation Authority, (http://www.wrc-rca.org/webimages/mshcpsize.pdf) General Plan 2025 – Figure OS-7 – MSHCP Core and Linkage*****)**				
No Impact. The project site is located on a previously developed/improved site within an urbanized area. The City is a Permittee under the MSHCP; therefore, the project is subject to applicable provisions of the MSHCP. The project site is not located in an area subject to Cell Criteria under the MSHCP and, therefore, has no Conservation requirements toward building out the MSHCP Reserve. Therefore, the project will have **no impact** on the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or State habitat conservation plan directly, indirectly, or cumulatively. No mitigation is required.				
11. 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?	☐	☐	☐	☒
11a. Response: ***(Source: General Plan 2025 Figure OS-1 – Mineral Resources; General Plan 2025 FPEIR Figure 5.10-1)***				

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact

No Impact. As depicted in Figure 5.10-1, Mineral Resources, of the General Plan 2025 FPEIR, the project site is located within MRZ-4, indicating there are insufficient data to determine whether mineral resources can be found on site. The project site has been previously excavated, filled, graded, and leveled and is currently developed with school uses. It is unlikely that demolition and construction under the project would affect significant mineral deposits. Therefore, the project will have **no impact** on regionally or statewide significant mineral resources directly, indirectly, or cumulatively. No mitigation 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?	☐	☐	☐	☒

11b. Response: ***(Source: General Plan 2025 Figure OS-1 – Mineral Resources; General Plan 2025 FPEIR Figure 5.10-1)***

No Impact. The General Plan 2025 FPEIR determined that there are no specific areas within the city limits that have locally-important mineral resource recovery sites and that the implementation of the General Plan 2025 would not significantly preclude the ability to extract State-designated resources. Therefore, the project will have **no impact** on locally significant mineral resources directly, indirectly, or cumulatively, and no mitigation is required.

12. 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?	☐	☒	☐	☐

12a. Response: ***(Source: Noise and Vibration Impact Analysis (Appendix H); City of Riverside Municipal Code, 2005; Traffic Impact Analysis (Appendix I))***

Less Than Significant With Mitigation Incorporated. The project will have a significant effect on the environment related to noise if it will substantially increase the ambient noise levels for adjoining areas or conflict with adopted environmental plans and goals of the community in which it is located. The applicable noise standards governing the project site are the noise criteria listed in the City's Municipal Code and in the Noise Element of the General Plan.

City of Riverside General Plan Noise Element. The Noise Element specifies the maximum allowable unmitigated exterior noise levels for new developments impacted by transportation noise sources such as arterial roads, freeways, airports, and railroads. In addition, the Noise Element identifies several policies to minimize the impacts of excessive noise levels throughout the community, and establishes noise level requirements for all land uses.

In its land use decisions, the City may consider its noise/land use compatibility guidelines. The *Noise/Land Use Compatibility Criteria* describes categories of compatibility and not specific noise standards. These guidelines generally identify conditions where development of a particular use may be "Normally Acceptable", "Conditionally Acceptable", "Normally Unacceptable" or "Conditionally Unacceptable." The development of infill residential uses is "Normally Acceptable" in areas with noise levels of 65 dBA CNEL or less, and "Conditionally Acceptable" in areas with a noise levels between 65 and 75 dBA CNEL. For "Conditionally Acceptable" single-family residential uses, new development should only be undertaken after an analysis of noise reduction requirements and identification of noise reduction/insulation feature. As stated in the City's General Plan 2025 Noise Element, ". . . Depending on the ambient environment of a particular community, these basic guidelines may be tailored to reflect existing noise and land use characteristics."

The City's General Plan 2025 identifies policies to address noise/land use compatibility issues, including:
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- Policy N–1.1: Continue to enforce noise abatement and control measures particularly within residential neighborhoods.
- Policy N–1.2: Require the inclusion of noise-reducing design features in development consistent with standards in the Municipal Code.
- Policy N–1.3: Enforce the City of Riverside Noise Control Code to ensure that stationary noise and noise emanating from construction activities, private developments/residences and special events are minimized.

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact

- Policy N–1-5: Avoid locating noise-sensitive land uses in existing and anticipated noise-impacted areas.
- Policy N–1.7: Evaluate noise impacts from roadway improvement projects by using the City's Acoustical Assessment Procedure.
- Policy N–1.8: Continue to consider noise concerns in evaluating all proposed development decisions and roadway projects.
- Policy N–4.1: Ensure that noise impacts generated by vehicular sources are minimized through the use of noise reduction features (e.g., earthen berms, landscaped walls, lowered streets, improved technology).
- Policy N–4.2: Investigate and pursue innovative approaches to reducing noise from railroad sources.

For the purposes of this noise impact analysis, single-family residential uses with outdoor active use areas (e.g., backyards or balconies) exposed to noise levels exceeding 65 dBA CNEL would require mitigation. In addition, interior noise levels for new residential development is required to comply with standards set forth in Title 24 of the State Health and Safety Code. New construction is required to incorporate special insulation, windows and sealants in order to ensure that interior noise levels meet Title 24 standards. The interior noise standard for residences is 45 dBA CNEL.

City of Riverside Municipal Code Noise Ordinance. The purpose of City's Municipal Code Noise Ordinance is to control unnecessary, excessive and/or annoying noises in the City by prohibiting such noise generated by the sources specified in Title 7 of the City's Municipal Code. It is the goal of the City to minimize noise levels and mitigate the effects of noise to provide a safe and healthy living environment. The City has incorporated the following standards in its Municipal Code to control loud, unnecessary, and unusual nuisance noises:

- **Exterior Sound Level Limits.** Unless a variance has been granted, it shall be unlawful for any person to cause or allow the creation of any noise which exceeds the following:
  - The exterior noise standard of the applicable land use category (see Table 12.A), up to 5 dB (up to 60 dBA during the day and up to 50 dBA during the night for residential uses), for a cumulative period of more than 30 minutes in an hour; or
  - The exterior noise standard of the applicable land use category, plus 5 dB (60 dBA during the day and 50 dBA during the night for residential uses), for a cumulative period of more than 15 minutes in any hour; or
  - The exterior noise standard of the applicable land use category, plus 10 dB (65 dBA during the day and 55 dBA during the night for residential uses), for a cumulative period of more than 5 minutes in any hour; or
  - The exterior noise standard of the applicable land use category, plus 15 dB (70 dBA during the day and 60 dBA during the night for residential uses), for a cumulative period of more than 1 minute in any hour; or
  - The exterior noise standard of the applicable land use category, plus 20 dB (75 dBA during the day and 65 dBA during the night for residential uses) or the maximum measured ambient noise level, for any period of time.
- **Interior Sound Level Limits.** No person shall operate or cause to be operated, any source of sound indoors that causes the noise level, when measured inside another dwelling unit, school, or hospital, to exceed:
  - The interior noise standard for the applicable noise category (see Table 12.A), up to 5 dB (up to 50 dBA during the day and up to 40 dBA during the night for residential uses), for a cumulative period of more than 5 minutes in any hour; or
  - The interior noise standard for the applicable land use category, plus 5 dB (50 dBA during the day and 40 dBA during the night for residential uses), for a cumulative period of more than 1 minute in any hour; or
  - The interior noise standard for the applicable land use category, plus 10 dB (55 dBA during the day and 45 dBA during the night for residential uses) or the maximum measured ambient noise level, for any period of time.

Based on Table 12.A and Sections 7.25.010 and 7.30.015 of the City Municipal Code, the maximum exterior noise level for residential uses is 75 dBA maximum noise level (L_{max}) (55 dB + 20 dB) during daytime hours and 65 dBA L_{max} (45 dB + 20 dB) during nighttime hours, or the maximum measured ambient noise level for any period of time. Similarly, the maximum interior nuisance noise level for residential uses is 55 dBA L_{max} (45 dB + 10 dB) during daytime hours and 45 dBA L_{max} (35 dB + 10 dB) during nighttime hours, or the maximum measured ambient noise level for any period of time.

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact

Table 12.A: City of Riverside Sound Level Limits (dBA)

Land Use Category	Time Period	Exterior Noise Standard	Interior Noise Standard
Residential	Night (10:00 p.m. to 7:00 a.m.) Day (7:00 a.m. to 10:00 p.m.)	45 55	35 45
School	7:00 a.m. to 10:00 p.m. (while school is in session)	N/A[1]	45
Hospital	Anytime	N/A	45
Office/Commercial	Anytime	65	N/A
Industrial	Anytime	70	N/A
Community Support	Anytime	60	N/A
Public Recreation Facility	Anytime	65	N/A
Non-urban	Anytime	70	N/A

Source: Municipal Code (City of Riverside 2005)
[1] N/A = Not Applicable. The City of Riverside has not established a sound level limit for this land use.
dBA = A-weighted decibels

Section 7.35.020.G, Exemptions, of the City's Noise Ordinance, states that "Noise sources associated with construction, repair, remodeling, or grading of any real property; provided a permit has been obtained from the City as required; and provided said activities do not take place between the hours of 7:00 p.m. and 7:00 a.m. on weekdays, between the hours of 5:00 p.m. and 8:00 a.m. on Saturdays, or at any time on Sunday or a federal holiday" are exempt from the noise level limits of the Municipal Code. On August 18, 2016, Ordinance 7341 was adopted by the Riverside City Council, amending the Noise Ordinance to exempt construction noise between the hours of 7:00 a.m. and 7:00 p.m. on weekdays and between the hours of 8:00 a.m. and 5:00 p.m. on Saturdays from the standards of the Noise Ordinance.

Existing Conditions. The project site is adjacent to SR-91, Indiana Avenue, and the BNSF railroad tracks. Noise associated with these mobile sources would potentially affect the project site. To assess the existing noise environment, short-term (15 minutes each) noise measurements were conducted at four locations (three on-site, one across Indiana Avenue from the project site) identified by City staff.

A summary of the measured ambient noise is provided below.

- **ST-1:** The measurements taken at this location were conducted at the southwest corner of the project site, near the railroad tracks. The noise levels measured at ST-1 were 67.2 dBA L_{eq} and 83.9 dBA L_{max}, with the primary noise sources coming from traffic on SR-91 and the railroad tracks. Another ambient noise measurement at this location was taken without a train passing by the site. The noise levels measured at this location without the train noise were 53.6 dBA L_{eq} and 66.9 dBA L_{max}, with the noise sources coming from traffic on SR-91.
- **ST-2:** The measurements taken at this location were conducted at the northwestern corner of the project site, south of Indiana Avenue near SR-91. The noise levels measured at ST-2 were 61.4 dBA L_{eq} and 79.4 dBA L_{max}, with primary noise sources coming from SR-91 and Indiana Avenue. No train pass-by noise was recorded.
- **ST-3:** The measurements taken at this location were conducted north of the project site along the north side of Indiana Avenue. The noise levels at ST-3 were 58.8 dBA L_{eq} and 79.3 dBA L_{max} with train noise and 56.4 dBA L_{eq} and 70.1 dBA L_{max} without train noise. Noise sources contributing to this measurement site included distant train noise and traffic on SR-91 and Indiana Avenue.
- **ST-4:** The measurements taken at this location were conducted at the northeastern corner of the project site next to the back yard of the residence located at 3418 Donald Avenue. The noise levels measured at this location were 67.5 dBA L_{eq} and 82.6 dBA L_{max} from vehicular and train noise adjacent to the project site, and 67.9 dBA L_{eq} and 81.4 dBA L_{max} without train noise.

These noise levels represent the noise environment in a snapshot of time at the stated locations during that time period. While these measurements should not be used to determine future noise impacts or as the basis for mitigation measures; they indicate the current noise environment on-site and in the project area.

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact

Demolition and Construction Impacts. Short-term noise impacts would be associated with demolition, grading, building construction, and paving activities for the proposed project. Construction-related short-term noise levels would be higher than existing ambient noise levels in the project area but would no longer occur once construction of the project is completed. Two types of short-term noise impacts could occur during the construction of the proposed project. First, construction crew commutes and the transport of construction and demolition equipment and materials to the site for the proposed project would incrementally increase noise levels on access roads leading to the site. Although there would be a relatively high single-event noise exposure potential causing intermittent noise nuisance (passing trucks at 50 feet would generate up to a maximum of 87 dBA L_{max}), the effect on longer term (hourly or daily) ambient noise levels would be small. Therefore, short-term construction-related impacts associated with worker commute and equipment transport to the project site would be **less than significant.**

The second type of short-term noise impact is related to noise generated during demolition, grading, building construction, and paving activities on the project site. Construction is completed in discrete steps, each of which has its own mix of equipment, and consequently, its own noise characteristics. These various sequential phases would change the character of the noise generated on the site, and therefore, the noise levels surrounding the site as construction progresses. Despite the variety in the type and size of construction equipment, similarities in the dominant noise sources and patterns of operation allow construction-related noise ranges to be categorized by work phase. The site preparation phase, which includes the excavation and grading of the site, tends to generate the highest noise levels because the noisiest construction equipment is earthmoving equipment. Earthmoving equipment includes excavating machinery (e.g., backfillers, bulldozers, draglines, and front loaders). Earthmoving and compacting equipment includes compactors, scrapers, and graders. Typical operating cycles for these types of construction equipment may involve 1 or 2 minutes of full power operation followed by 3 or 4 minutes at lower power settings.

The maximum noise level generated by each dozer is assumed to be approximately 85 dBA L_{max} at 50 ft from the dozer in operation. Each front-end loader would generate approximately 80 dBA L_{max} at 50 ft. The maximum noise level generated by water trucks/pickup trucks is approximately 55 dBA L_{max} at 50 ft from these vehicles. Each doubling of the sound source with equal strength increases the noise level by 3 dBA. Each piece of construction equipment operates as an individual point source. The worst-case composite noise level at the nearest residence during this phase of construction would be 86 dBA L_{max} (85 dBA + 80 dBA + 55 dBA = 86 dBA) at a distance of 50 feet from an active construction area. Based on a usage factor of 40 percent, the worst-case combined noise level during this phase of construction would be 82 dBA L_{eq} at a distance of 50 ft from the active construction area.

Construction-related short-term noise levels would be higher than existing ambient noise levels in the project area today, but would no longer occur once construction of the project is completed. The City's Noise Ordinance (Section 7.35.020.G, Exemptions) states that, ". . .*Noise sources associated with construction, repair, remodeling, or grading of any real property; provided a permit has been obtained from the City as required; and provided said activities do not take place between the hours of 7:00 p.m. and 7:00 a.m. on weekdays, between the hours of 5:00 p.m. and 8:00 a.m. on Saturdays, or at any time on Sunday or a federal holiday*" are exempt from the noise level limits of the Municipal Code. Construction activities would occur in accordance with the days and times allowed as described in Section 7.35.020.G of the City's Noise Ordinance; therefore, no significant construction noise impact would occur.

The proposed project would be required to comply with the construction hours specified in the City's Noise Ordinance to reduce construction-related noise impacts. As specified in **Standard Condition NOI-1**, construction activities within the City are restricted to between the hours of 7:00 a.m. and 7:00 p.m. Monday through Friday and between 8:00 a.m. and 5:00 p.m. on Saturdays, and are prohibited on Sundays and federal holidays. The construction contractor would be required to equip construction equipment with mufflers, position construction equipment to direct noise away from sensitive receptors, and place staging areas at the greatest distance possible from sensitive receptors. Through compliance with **Standard Condition NOI-1**, construction noise impacts to nearby sensitive receptors would be **less than significant**.

Operational Impacts. As discussed below, long-term noise associated with the project site would be generated from vehicle traffic, rail, and on-site stationary sources associated with single-family residential uses.

It must be noted that the project site is located in an area currently subjected to high levels of noise from adjacent roadways and rail operations. CEQA Guidelines section 15126.2(a) generally requires an evaluation of environmental conditions and hazards existing on a proposed project site if such conditions and hazards may cause substantial adverse impacts to future residents or users of the project. CEQA calls upon an agency to evaluate existing conditions in order to assess whether a project could exacerbate hazards that are already present. In *California Building Industry Association v. Bay Area Air Quality*

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact

Management District (2015), the California Supreme Court held that ". . .agencies subject to CEQA generally are not required to analyze the impact of existing environmental conditions on a project's future users or residents. But when a proposed project risks exacerbating those environmental hazards or conditions that already exist, an agency must analyze the potential impact of such hazards on future residents or users. In those specific instances, it is the project's impact on the environment -– and not the environment's impact on the project – that compels an evaluation of how future residents or users could be affected by exacerbated conditions."

Long-Term Vehicular Traffic Noise Impacts. Based on the Traffic Impact Analysis (Appendix I), the proposed project is expected to generate 514 average daily vehicle trips (ADT). Generally, a doubling of traffic is required to generate a perceptible increase (3 dBA) in noise. As detailed in Tables 12.C, 12.D, and 12.E the project-related traffic is not sufficiently extreme to generate a perceptible increase in noise the project area. Project-related traffic noise level increases would be 0.2 dBA or less and would not be discernible to the human ear in an outdoor environment.

The FHWA highway traffic noise prediction model (FHWA RD-77-108) was used to evaluate traffic-related noise conditions along the roadway segments in the project vicinity. Traffic volumes on Indiana Avenue projected in the Traffic Impact Analysis for the proposed project (Appendix I) were used to assess the potential traffic noise impacts along the street segments in the project vicinity. The project-related changes would be small enough to not have any significant impacts on off-site land uses along these roadway segments. Existing traffic volumes on SR 91 were projected to the 2017 and 2040 scenarios. These noise levels represent the worst-case scenario, which assumes that no shielding is provided.

Table 12.B: Existing Traffic Noise Levels

Roadway Segment	ADT	Centerline to 70 dBA CNEL (feet)	Centerline to 65 dBA CNEL (feet)	Centerline to 60 dBA CNEL (feet)	CNEL (dBA) 50 feet from Centerline of Outermost Lane
Indiana Avenue east of Donald Avenue	8,800	36[1,2]	78	167	67.2
Indiana Avenue west of Donald Avenue	8,700	36[1,2]	77	166	67.1
SR-91	176,500	1,022[2]	2,199	4,736	85.7

Source: Table I, *Noise and Vibration Impact Analysis* (Appendix H)
[1] Traffic noise within 50 ft of the roadway centerline was calculated manually.
[2] Indiana Avenue and SR-91 was modeled using Caltrans traffic percentages were modeled using Riverside County's traffic mix based on their roadway classification.

ADT = average daily traffic
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibels
SR-91 = State Route 91

The project site is approximately 45 feet from the centerline of Indiana Avenue and approximately 350 feet from the centerline of SR-91. As detailed in Table 12.B, traffic noise levels in the project vicinity varies from moderate (Indiana Avenue) to high (SR-91), with the 70 dBA CNEL currently extending to 36 feet from the centerline of Indiana Avenue and extending to 1,022 feet from the SR-91 centerline. The project site would be impacted by noise from Indiana Avenue reaching 69 dBA CNEL and 77 dBA CNEL from traffic on Indiana Avenue and SR-91, respectively. However, SR-91 in the project area is approximately 20 feet below the project site and existing residences are located between the project site and SR-91. There is an existing noise barrier along the edge of the freeway that is measured approximately 20 feet high on the freeway side and eight to ten feet high on the side facing adjacent residences. These factors, acting as noise barriers, would provide a minimum 15 dBA reduction, reducing the actual noise from traffic on SR-91 to 62 dBA CNEL (77 dBA – 15dBA) or lower. This level of noise, combined with the noise from traffic on Indiana Avenue, results in an **existing** noise level of 70 dBA CNEL at the northern project boundary.

Tables 12.C, 12.D, and 12.E provide the traffic noise levels along the roadways adjacent to the project site under the "without" and "with" project conditions for existing and future project scenarios. These noise levels represent the worst-case scenario, which assumes that no shielding is provided between the traffic and the location where the noise contours are drawn. These tables indicate that project-related traffic noise level increases would be small (0.2 dBA or less) and would not result in any significant traffic noise impacts to off-site land uses. Table 12.E reveals that noise levels from 2040 traffic volumes on Indiana Avenue and SR-91 would be the highest among the three scenarios; therefore, overall traffic noise levels under this scenario are used to determine the potential traffic noise impacts.

Table 12.C: Existing (2016) Traffic Noise Levels Without and With Project

Roadway Segment	Existing Without Project (Baseline)					Existing With Project						
	ADT	Centerline to 70 dBA CNEL (feet)	Centerline to 65 dBA CNEL (feet)	Centerline to 60 dBA CNEL (feet)	CNEL (dBA) 50 feet from Centerline of Outermost Lane	ADT	Change in ADT	Centerline to 70 dBA CNEL (feet)	Centerline to 65 dBA CNEL (feet)	Centerline to 60 dBA CNEL (feet)	CNEL (dBA) 50 feet from Centerline of Outermost Lane	Increase over Baseline CNEL (dBA) 50 feet from Centerline of Outermost Lane
Indiana Avenue east of Donald Avenue	8,800	36[1,2]	78	167	67.2	8,900	0	36	78	168	67.2	0.0
Indiana Avenue west of Donald Avenue	8,700	36[1,2]	77	166	67.1	9,100	400	37	80	171	67.3	0.2
SR-91	176,500	1,022[2]	2,199	4,736	85.7	176,500	0	1,022	2,199	4,736	85.7	0.0

Source: Table M, *Noise and Vibration Impact Analysis* (Appendix H)
[1] Traffic noise within 50 ft of the roadway centerline was calculated manually.
[2] Indiana Avenue and SR-91 was modeled using Riverside County's traffic mix based on their roadway classification.ADT = average daily traffic
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibels
dBA = A-weighted decibels
SR-91 = State Route 91

Table 12.D: 2017 Traffic Noise Levels Without and With Project

Roadway Segment	2017 Cumulative Without Project (Baseline)					2017 Cumulative With Project						
	ADT	Centerline to 70 dBA CNEL (feet)	Centerline to 65 dBA CNEL (feet)	Centerline to 60 dBA CNEL (feet)	CNEL (dBA) 50 feet from Centerline of Outermost Lane	ADT	Change in ADT	Centerline to 70 dBA CNEL (feet)	Centerline to 65 dBA CNEL (feet)	Centerline to 60 dBA CNEL (feet)	CNEL (dBA) 50 feet from Centerline of Outermost Lane	Increase over Baseline CNEL (dBA) 50 feet from Centerline of Outermost Lane
Indiana Avenue east of Donald Avenue	9,800	39[1,2]	84	179	67.6	10,000	200	39	85	182	67.7	0.1
Indiana Avenue west of Donald Avenue	9,800	39[1,2]	84	179	67.6	10,200	400	40	86	184	67.8	0.2
SR-91	178,300	1,029[2]	2,214	4,768	85.7	178,300	0	1,029	2,214	4,768	85.7	0.0

Source: Table N, *Noise and Vibration Impact Analysis* (Appendix H)
[1] Traffic noise within 50 ft of the roadway centerline was calculated manually.
[2] Indiana Avenue and SR-91 was modeled using Riverside County's traffic mix based on their roadway classification.
ADT = average daily traffic
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibels
dBA = A-weighted decibels
SR-91 = State Route 91

Table 12.E: 2040 Traffic Noise Levels Without and With Project

Roadway Segment	2040 Cumulative Without Project (Baseline)					2040 Cumulative With Project						
	ADT	Centerline to 70 dBA CNEL (feet)	Centerline to 65 dBA CNEL (feet)	Centerline to 60 dBA CNEL (feet)	CNEL (dBA) 50 feet from Centerline of Outermost Lane	ADT	Change in ADT	Centerline to 70 dBA CNEL (feet)	Centerline to 65 dBA CNEL (feet)	Centerline to 60 dBA CNEL (feet)	CNEL (dBA) 50 feet from Centerline of Outermost Lane	Increase over Baseline CNEL (dBA) 50 feet from Centerline of Outermost Lane
Indiana Avenue east of Donald Avenue	11,900	44[1,2]	95	204	68.5	12,000	100	45	96	205	68.5	0.0
Indiana Avenue west of Donald Avenue	11,900	44[1,2]	95	204	68.5	12,200	300	45	97	208	68.6	0.1
SR-91	224,100	1,198[2]	2,579	5,553	86.7	224,100	0	1,198	2,579	5,553	86.7	0.0

Source: Table O, *Noise and Vibration Impact Analysis* (Appendix H)
[1] Traffic noise within 50 ft of the roadway centerline was calculated manually.
[2] Indiana Avenue and SR-91 was modeled using Riverside County's traffic mix based on their roadway classification.
ADT = average daily traffic
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibels
dBA = A-weighted decibels
SR-91 = State Route 91

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact

Under the 2040 scenario, the noise level at the northern property boundary would be 70 dBA CNEL and 78 dBA CNEL from traffic on Indiana Avenue and SR-91, respectively. As with the existing condition, the depressed nature of SR-91 in this area and the presence of intervening structures would reduce noise from SR-91 to approximately 63 dBA CNEL (78 dBA – 15 dBA.) Combined, 2040 noise levels at the northern property boundary from traffic on Indiana Avenue and SR-91 would be 71 dBA CNEL, which exceeds the City's exterior noise standard of 65 dBA CNEL. The proposed project would expose persons to or generation of noise levels in excess of standards established in the City's General Plan 2025 and mitigation measures would be required. Outdoor active use areas (e.g., backyards) along the northern property boundary (Lots 1, 21 through 30) would require a noise barrier with a minimum height of 6 feet. This barrier would reduce noise levels associated with traffic from Indiana Avenue and SR-91 to the City's exterior noise standard of 65 dBA CNEL or below for residential uses.

Accounting for attenuation provided by typical construction in Southern California (12 dBA reduction windows/doors open, and 24 dBA reduction with windows/doors closed), interior noise levels for residences along the northern property boundary would range from 47 dBA CNEL (closed, 71 dBA – 24 dBA = 47 dBA) to 59 dBA CNEL (opened, 71 dBA – 12 dBA = 59 dBA) which could exceed the City's interior noise standard of 45 dBA CNEL. Building facade upgrades (e.g., windows with STC ratings higher than the STC-28 provided by standard building construction) would be required for residences along the northern property boundary (Lots 1, 21 through 30)[16].

Long-Term Train Noise Impacts. Noise from existing rail operations is an existing condition on-site and throughout the project area. While the proposed project does not include any feature, facility or method of operation that would increase or exacerbate the intensity, duration or frequency of railroad noise, the following discussion has been provided to provide full disclosure of the potential on-site noise environment that may result from the development of residential uses in proximity to a heavily used rail corridor.

The following discussion provides The Federal Transit Administration's 2006 *Transit Noise and Vibration Impact Assessment* manual was used in the determination of noise and vibration impacts on the site. Based on information provided by the Southern California Regional Rail Authority, approximately 25 Metrolink trains, two Amtrak passenger trains, and 74 BNSF freight trains operate daily on the rail line immediately adjacent to the proposed project. These trains operate 7 days per week and 24 hours per day. The current Metrolink schedule at the La Sierra train station indicates 15 trains run during daytime hours (between 7:00 a.m. and 7:00 p.m.); two train runs during evening hours (between 7:00 p.m. and 10:00 p.m.), and eight trains run during nighttime hours (between 10:00 p.m. and 7:00 a.m.) each day on weekdays. Similar to vehicular noise, train noise is a line source and assumed the train to be on the centerline of the train tracks so that it covers both direction and balance the train noise emissions. Train noise projected from the edge of the train tracks would be the same as train noise projected from the centerline of the train tracks, with a slight modification to the calculation process for the noise source and distance attenuation. Using the FTA's guidelines, it is calculated that train operations in the study area would result in a noise level of 74.8 dBA CNEL at 50 feet from the train tracks.

The project site is approximately 100 to 200 feet from the centerline of the train tracks. At this distance, train noise would be reduced to between 70.3 and 65.8 dBA CNEL, respectively, at the southern boundary of the site. Residences on the project perimeter would function as noise barriers and provide at least 10 dBA in noise attenuation to residences located in the middle of the project site. Exterior noise levels for residential buildings or units in the middle of the project site would be reduced to 60.3 dBA CNEL (70.3 dBA – 10 dBA = 60.3 dBA) and would not exceed the City's exterior noise standard of 65 dBA CNEL. Interior noise levels would be 48.3 and 36.3 dBA CNEL with windows and doors open and closed, respectively. Interior noise levels with windows and doors open would exceed the City's interior noise standard of 45 dBA CNEL while interior noise levels with windows and doors closed would not exceed the interior noise standard. Air conditioning will be required for residences to ensure that windows and doors can remain closed for a prolonged period of time to maintain the interior noise standard.

As previously stated, CEQA generally does not require an analysis of the environment's effect (existing train noise) on a project. Nonetheless, the recreation area(s) and residences on the south portion of the site would be exposed to existing

[16] Noise mitigation for the building facades should be based on the windows and doors closed scenario for practical and feasibility reasons, and not on the windows and doors open scenario whether the future residents prefer windows and doors open or not. If any residents choose to leave the windows and doors open, their interior noise would be higher than when the windows and doors are closed and would not meet the City's interior noise standard of 45 dBA CNEL

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact

railway noise ranging from 65.8 to 70.3 dBA CNEL (Figure 5A). A 10-foot high noise barrier would reduce noise at outdoor recreation area(s) to the City's exterior noise standard of 65.0 dBA CNEL or lower (the City's established exterior standard). The backyards of residences along the rear private property lines of Lots 1 through 9 and Lots 17 through 21; and south private property lines of Lots 8, 9, and 17 that are not shielded from intervening structures would require a minimum noise barrier height of 8 feet to reduce train noise levels to the City's exterior noise standard of 65 dBA CNEL or below. Backyard and/or balconies associated with residences along the south private property lines of Lots 10 through 16 and west private property line of Lot 16 would require a minimum noise barrier height of 6 feet to reduce train noise levels to the City's exterior noise standard of 65 dBA CNEL or below (Figure 5B). While existing on-site ambient noise levels from traffic and rail operations exceed the City's exterior noise standard of 65 dBA CNEL for residential uses, the incorporation of the recommended sound attenuation features (walls and building facade improvements), would implement City policies for reducing noise impacts at a "Conditionally Acceptable" use by, 1) enforcing noise abatement and control measures particularly within residential neighborhoods, 2) requiring the inclusion of noise-reducing design features in development consistent with standards in the Municipal Code, and 3) ensuring that noise impacts generated by transportation (vehicular and rail) noise sources are minimized through the use of noise reduction features. Thus, installation of these walls would improve the livability and quality of life for these residences.

Standard residential construction in Southern California provides at least 12 dBA of exterior-to-interior noise attenuation with windows and doors open and 24 dBA with windows and doors closed. The nearest residence located on the southern edge of the project site would be exposed to an interior noise level of 58.3 dBA CNEL (70.3 dBA – 12 dBA = 58.3 dBA) with windows and doors open. With windows and doors closed, interior noise levels the closest residence located on the southern edge of the project site would be exposed to an interior noise level of 46.3 dBA CNEL (70.3 dBA - 24 dBA = 46.3 dBA). The interior noise level with windows and doors open and closed would exceed the City's interior noise standard of 45 dBA CNEL; therefore, building facade upgrades (e.g., windows with sound transmission class [STC] ratings higher than the STC-28) and air conditioning would be required to ensure that windows and doors can remain closed for a prolonged period of time. Each air conditioning unit will be designed to comply with the City's Municipal Code noise standards regulating the heating, ventilation and air-conditioning (HVAC) equipment noise.

Noise from train horn occurs in a much shorter time periods, usually in seconds. Based on FTA's Transit Noise and Vibration Impact Assessment (FTA, May 2006), transit car horns could generate 78 to 90 dBA maximum noise level (L_{max}) at 50 feet, and locomotive horn can generate up to 110 dBA L_{max} at 50 feet. Even though it is higher in peak or maximum noise level, train horn noise usually is not used to determine the required noise mitigation due to the feasibility and lack of noise regulations associated with it. In addition, the project is located in an existing Federal Railroad Administration (FRA) approved quiet zone where locomotive engineers are not required to sound the train horns unless in case of emergencies (e.g., when tracks are obstructed).

On-Site Operational Stationary Source Noise Impacts. Potential long-term noise impacts would be associated with stationary sources. These activities are potential point sources of noise that could affect on-site residences. On-site noise-producing activities include ventilation, and air-conditioning equipment (HVAC). HVAC equipment associated with the project would be the primary noise source associated with the project. The noise sources could take the form of fans, pumps, air compressors and related equipment. HVAC operations would be required to meet all noise standards. For the purpose of this analysis, HVAC equipment was assumed to be located on the ground floor in the backyard area of the single-family residential units.

Precise details of HVAC equipment, including future location and sizing, are unknown at this time; therefore, for purposes of this analysis, 75 dBA at three feet was assumed to represent typical HVAC-related noise. Off-site noise-sensitive receptors are located approximately 25 feet from the proposed project. Adjusted for distance, the off-site residences would be exposed to a noise level of 57 dBA L_{eq} from on-site HVAC equipment. This noise level would exceed the City's exterior daytime L_{50} standard of 55 dBA and nighttime L_{50}, L_{25}, and L_8 standard of 45, 50, and 55 dBA, respectively. This noise level would not exceed the City's interior daytime and nighttime noise standard. An 8 foot high wall on the east side of the project would be required to reduce noise levels by 12 dBA, reducing noise levels generated from on-site HVAC equipment to a noise level of 45 dBA Leq (57 dBA – 12 dBA = 45 dBA). This noise level would not exceed the City's exterior daytime and nighttime noise standard. Therefore, long-term noise impacts from HVAC equipment would be less than significant with the implementation of an 8 ft high wall on the east side of the project.

LSA

FIGURE 5A

N

0 70 140
FEET

SOURCE: SDH and Associates, Inc. February, 2016.

Hawthorne Residential Development Project

Existing Traffic and Train Noise Levels

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LSA

LEGEND

- Minimum 10 ft High Noise Barrier
- Minimum 8 ft High Noise Barrier
- Minimum 6 ft High Noise Barrier
- STC-28 or Higher Windows

N

0 70 140

FEET

SOURCE: SDH and Associates, Inc. February, 2016.

FIGURE 5B

Hawthorne Residential Development Project

Noise Barrier Locations and Building Facade Upgrades

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ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact

Standard Conditions. The following Standard Condition is a regulatory requirement that would be implemented to reduce noise impacts during demolition and construction activities.

Standard Condition NOI-1: **Construction Noise.** Prior to issuance of building permits, Planning staff, or designee, shall verify that all construction plans include notes stipulating the following:

- Construction activities shall be restricted within the City of Riverside to the hours of 7:00 a.m. to 7:00 p.m., Monday through Friday, and 8:00 a.m. to 5:00 p.m. on Saturdays, and are prohibited on Sundays and federal holidays.
- During all project site demolition, excavation, and grading on site, the project contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers consistent with manufacturers' standards.
- The project contractor shall place all stationary construction equipment so that emitted noise is directed away from sensitive receptors nearest the project site.
- The construction contractor shall locate equipment staging in areas that will create the greatest distance between construction-related noise sources and noise-sensitive receptors nearest the project site during all project construction.

Implementation of **Standard Condition NOI-1** would reduce construction-related noise impacts to the nearby sensitive receptors to a less than significant level.

Mitigation Measures. Although the proposed project would be exposed to ambient noise levels above the City's noise standards, implementation of **Mitigation Measure NOI-1** would reduce the ambient noise levels to meet the City's noise standards thus improving the livability for the residences by reducing noise levels to "Conditionally Acceptable" noise levels and complying with the General Plan 2025 policies related to noise/land use compatibility.

Mitigation Measure NOI-1: **Traffic/Train Noise Impacts.** The following mitigation measures are required:

- An interior noise analysis shall be required upon completion of detailed floor plans and prior to issuance of building permits to ensure compliance with the noise standard and with installation of an air conditioning unit. If noise standards are not met, the Applicant shall be required to enhance the building facades such as double-paned windows to comply with the interior noise standards.
- Air conditioning, a form of mechanical ventilation, shall be required for all residences to ensure that windows and doors can remain closed for a prolonged period of time to maintain the interior noise standard.
- A minimum noise barrier height of 10 ft shall be required along the southern project property line and a portion of the east and west property lines around the recreational area to shield the playground and residences closest to the southern property line (Lots 10 through 16) from train related noises.
- A minimum noise barrier height of 8 ft shall be required along the rear private property lines of Lots 1 through 9 and Lots 17 through 21; and south private property lines of Lots 8, 9 and 17 to shield outdoor active use areas (e.g., backyards or balconies) from train related noises.
- A minimum 6 ft high noise barrier shall be required along the south private property lines of Lots 10 through 16 and west private property line of Lot 16 to shield the outdoor active use areas (e.g., backyards or balconies) from train related noises.
- A minimum noise barrier height of 6 ft shall be required along the private property line immediately south of Indiana Avenue (Lots 1, and 21 through 30) to shield outdoor active use areas such as backyards or balconies from traffic noise along Indiana Avenue and State Route 91 freeway.

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact

- Building facade upgrades (e.g., double-paned windows with a sound transmission class rating of STC-28 or higher) shall be required for all residences located south of Indiana Avenue (Lots 1, 21 through 30).
- Building facade upgrades (e.g., double-paned windows with a STC-28 or higher) shall be required for all residences facing the BNSF railroad tracks (Lots 1 through 21 and 43 through 48).

Mitigation Measure NOI-2: On-Site Operational Noise Impacts

A minimum noise barrier height of 8 feet along the east side of the project (Lots 1 through 8) shall be required to shield on-site ground floor HVAC equipment.

Implementation of **Mitigation Measure NOI-1** and **NO1-2** would reduce identified noise impacts to a less than significant level.

b. Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☒	☐	☐

12b. Response: ***(Source: Noise and Vibration Impact Analysis (Appendix H); Federal Transit Administration (FTA), Transit Noise and Vibration Impact Assessment (2006), https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/FTA_Noise_and_Vibration_Manual.pdf Website accessed April 2016; California Department of Transportation (Caltrans), Transportation-Related Earthborne Vibrations, Technical Advisory, 1992)***

Less Than Significant With Mitigation Incorporated. Vibration refers to groundborne noise and perceptible motion. Groundborne vibration is almost exclusively a concern inside buildings and is rarely perceived as a problem outdoors, where the motion may be discernible, but without the effects associated with the shaking of a building, there is less adverse reaction. Vibration propagation is more efficient in stiff, clay soils than in loose, sandy soils. Shallow rock concentrates the vibration energy close to the surface and can result in groundborne vibration problems at some distance from the source. Factors such as layering of the soil and depth to the water table can have significant effects on the propagation of groundborne vibration. Soft, loose, sandy soils tend to attenuate more vibration energy than hard, rocky materials. Vibration propagation through groundwater is more efficient than through sandy soils.

This construction vibration impact analysis discusses the level of human annoyance using vibration levels in VdB and will assess the potential for building damages using vibration levels in PPV (in/sec) because vibration levels calculated in RMS are best for characterizing human response to building vibration while vibration level in PPV is best used to characterize potential for damage. A vibration level up to 102 VdB (an equivalent to 0.5 in/sec in PPV) (FTA 2006) is considered safe for buildings consisting of reinforced concrete, steel, or timber (no plaster), and would not result in any construction vibration damage. For a non-engineered timber and masonry building, the construction vibration damage criterion is 94 VdB (0.2 in/sec in PPV).

Table 12.F identifies the PPV and VdB values at 25 feet from the construction vibration source. Bulldozers and other heavy-tracked construction equipment (except for pile drivers and vibratory rollers) generate approximately 87 VdB of ground-borne vibration when measured at 25 feet, based on the Transit Noise and Vibration Impact Assessment (FTA 2006). This level of ground-borne vibration levels would result in potential annoyance to residences and workers located adjacent to the project site, but would not cause any damage to the buildings. Construction vibration, similar to vibration from other sources, would not have any significant effects on outdoor activities (e.g., those outside of residences in the project vicinity). Outdoor site preparation for the project is expected to use a bulldozer and loaded truck. The greatest levels of vibration are anticipated to occur during the site preparation phase. All other phases are expected to result in lower vibration levels. The distance to the nearest buildings for vibration impact analysis is measured between the nearest off-site buildings and the project boundary (assuming the construction equipment would be used at or near the project boundary) because vibration impacts occur normally within the buildings.

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact

Table 12.F: Vibration Source Amplitudes for Construction Equipment

Equipment	Reference PPV/L_V at 25 ft	
	PPV (in/sec)	L_V (VdB)[1]
Pile Driver (Impact), Typical	0.644	104
Pile Driver (Sonic), Typical	0.170	93
Vibratory Roller	0.210	94
Hoe Ram	0.089	87
Large Bulldozer[2]	**0.089**	**87**
Caisson Drilling	0.089	87
Loaded Trucks	**0.076**	**86**
Jackhammer	0.035	79
Small Bulldozer	0.003	58

Table K, Source: Noise and Vibration Impact Analysis (Appendix H).
[1] RMS vibration velocity in decibels (VdB) is 1 µin/sec.
[2] Equipment shown in **bold** is expected to be used on site.
µin/sec = microinches per second
ft = feet
FTA = Federal Transit Administration
in/sec = inches per second
L_V = velocity in decibels
PPV = peak particle velocity
RMS = root-mean-square
VdB = vibration velocity decibels

Table 12.G lists the respective projected vibration level from various construction equipment expected to be used on the project site to the nearest buildings in the project vicinity. For typical construction activity, the equipment with the highest vibration generation potential is the large bulldozer, which would generate 87 VdB (0.089 PPV [in/sec]) at 25 feet. The closest residential property is located east of the project site and includes a garage located approximately 7.5 feet from the project construction boundary (property line). The residential building is located approximately 25 feet from the property line. As shown in Table 12.G, the garage building and residential building at the closest residential property would experience vibration levels of up to 103 VdB (0.54 PPV [in/sec]). Other adjacent buildings in the project area are farther away and would experience lower vibration levels.

Table 12.G: Summary of Construction Equipment and Activity Vibration

Receptor	Construction Equipment	Reference Vibration Level (VdB) at 25 ft	Reference Vibration Level (PPV) at 25 ft	Distance (ft)	Vibration Level (VdB)	Vibration Level (PPV)
Garage Building	Large Bulldozer	87	0.089	7.5	103	0.542
	Loaded Truck	86	0.076	7.5	102	0.463
Residential Building	Large Bulldozer	87	0.089	25	87	0.089
	Loaded Truck	86	0.076	25	86	0.076

Source: Table L, Noise and Vibration Impact Analysis (Appendix H).
Note: The FTA-recommended building damage threshold is 0.2 PPV (in/sec) or approximately 94 VdB at the receiving property structure or building.
ft = feet
in/sec = inches per second
FTA = Federal Transit Administration
PPV = peak particle velocity
VdB = vibration velocity decibels

Construction vibration levels at the garage building of the closest residential property would exceed the FTA threshold of 94 VdB (0.2 in/sec PPV) for building damage when bulldozers and loaded trucks operate within 7.5 feet of the property line. Although construction vibration levels at residential uses would have the potential to result in annoyance, these vibration levels would no longer occur once construction of the project is completed. The implementation of mitigation measure to use light construction equipment (e.g. small bulldozers and trucks) within 15 feet from the eastern property line would ensure that construction vibration levels would be below the FTA threshold of 94 VdB (0.2 in/sec PPV) for building damage.

Mitigation Measure NOI-3: Short-Term Construction Vibration Impacts

The construction contractor shall use light construction equipment (e.g., small bulldozers and trucks) within 15 feet of the eastern property line.

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
c. A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☒	☐

12c. Response: ***(Source: Noise and Vibration Impact Analysis (Appendix H))***

Less Than Significant Impact. The project site is adjacent to SR-91 and the BNSF railroad tracks. Noise associated with these mobile sources would potentially affect the project site. To assess the existing noise environment, four short-term (15 minutes each) noise measurements at four representative locations in the project area, as identified by City staff were conducted on December 13, 2016. The findings of these noise measurements follow:

- Ambient noise measurement for ST-1 was conducted at the southwest corner of the project site, near the railroad tracks. The short-term 15-minute measurement at ST-1 shows that noise levels measured at this location were 67.2 dBA L_{eq} and 83.9 dBA L_{max}, with the primary noise sources coming from traffic on SR-91 and the railroad tracks. Two sets of noise readings were recorded, one with train noise included and one without a train passing by the site. The noise levels measured at this location without the train noise were 53.6 dBA L_{eq} and 66.9 dBA L_{max}, with the noise sources coming from traffic on SR-91.
- Ambient noise measurement for ST-2 was conducted at the northwestern corner of the project site that is near SR-91 and is on the south side of Indiana Avenue. The noise levels measured were 61.4 dBA L_{eq} and 79.4 dBA L_{max}, with noise sources coming from SR-91 and Indiana Avenue and no train pass-by noise recorded.
- Ambient noise measurement for ST-3 was conducted north of the project site along the north side of Indiana Avenue and showed the noise levels were 58.8 dBA L_{eq} and 79.3 dBA L_{max} with train noise and 56.4 dBA L_{eq} and 70.1 dBA L_{max} without train noise. Noise sources contributing to this measurement site included distant train noise and traffic on SR-91 and Indiana Avenue.
- Ambient noise measurement for ST-4 was conducted at the northeastern corner of the project site next to the back yard of the residence located at 3418 Donald Avenue. The noise levels measured at this location were 67.5 dBA L_{eq} and 82.6 dBA L_{max} from vehicular and train noise adjacent to the project site, and 67.9 dBA L_{eq} and 81.4 dBA L_{max} without train noise.

These noise levels represent the noise environment in a snapshot of time at the identified locations during that time period. These measurements should not be used for the determination of future noise impacts or used as the basis for mitigation measures. As discussed in Response 12a, neither the long-term traffic nor stationary noise sources would cause an increase in ambient noise levels of more than 3 dBA at sensitive receptors in the vicinity of the project site; thus, the impact related to permanent increases in ambient noise levels would be **less than significant**, and no mitigation is required.

d. A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☒	☐

12d. Response: ***(Source: Noise and Vibration Impact Analysis (Appendix H))***

Less Than Significant Impact. As discussed in Response 12a above, implementation of the proposed project would include construction activities that would result in a substantial temporary increase in ambient noise levels in the project site vicinity above levels existing without the project, but would no longer occur once construction is completed. Sensitive receptors in the project vicinity are as close as 25 feet from proposed construction areas.[17] Compliance with the hours specified in the City's Municipal Code regarding construction activities, as well as implementation of noise reduction measures (e.g., those discussed in **Standard Condition NOI-1**), would help reduce construction noise impacts on adjacent noise-sensitive land uses when construction occurs near the project boundaries. Implementation of **Standard Condition NOI-1** would ensure construction noise levels remain **less than significant.**

[17] Although garages are 10 feet away from the project boundary, residential structures are approximately 25 feet away from the project boundary.

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
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?	☐	☐	☒	☐

12e. Response: ***(Sources: General Plan 2025 Figure PS-6 – Airport Safety Zones and Influence Areas; General Plan 2025 Figure N-8 – Riverside and Flabob Airport Noise Contours, Noise and Vibration Impact Analysis (Appendix H))***

Less Than Significant Impact. The project site is located approximately 2.4 miles south of the Riverside Municipal Airport and outside the 55 dBA noise contour for the Riverside Municipal Airport. Additionally, according to the *Noise and Vibration Impact Analysis* (Appendix H), the dominant source of ambient noise on the project site is traffic on SR-91, Indiana Avenue, and trains traveling on the BNSF railroad tracks. Therefore, the project would not expose people residing or working in the project area to excessive noise levels from a public airport or public use airport. The project would have a **less than significant** impact related to airport noise, and no mitigation 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?	☐	☐	☐	☒

12f. Response: ***(Source: General Plan 2025 Figure PS-6 – Airport Safety Zones and Influence Areas)***

No Impact. The project site is not within the vicinity of a private airstrip. Therefore, it would have **no impact** related to private airstrips, and no mitigation is required.

13. 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)?	☐	☐	☒	☐

13a. Response: ***(Source: General Plan 2025 Table LU-3 – Land Use Designations; General Plan 2025 FPEIR Section 5.12-Population and Housing, Table 5.12-A – SCAG Population and Households Forecast, Table 5.12-B – General Plan Population and Employment Projections–2025, Table 5.12-C – 2025 General Plan FPEIR and SCAG Comparisons, Table 5.12-D – General Plan Housing Projections 2025, Capital Improvement Program and SCAG's Regional Transportation Plan (RCP) and RTP; Population and Housing Estimates for Cities, Counties, and the State, January 1, 2011–2016, with 2010 Benchmark – California Department of Finance)***

Less Than Significant Impact. The current vacant elementary school will be replaced by 54 single-family residential homes. The project is in an urbanized area, would not induce substantial population growth as the addition of 54 single-family housing units represents 0.04 percent of the projected 127,692 housing units anticipated by 2025 in the City's General Plan. Based on a factor of 3.29 persons/household, the proposed project could increase the City's population by up to 178 persons. The 2015 and projected future (2040) population of the City, Riverside County, and the region are detailed in Table 13.A.

Table 13.A: SCAG Population and Projections

	2015		2040	
	Population	Employment	Population	Employment
City of Riverside	310,700	120,000	386,600	200,500
Riverside County	2,316,438	742,000	3,167,584	1,174,500
SCAG	18,779,123	8,006,030	18,779123	9,871,441

Source: Tables 8 and 11, Demographic and Growth Forecast, 2016-2040 RTP-SCS, Southern California Association of Governments, December 2015.

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact

The anticipated rate of population growth in the City (2.4 percent) is roughly similar to that of Riverside County (2.0 percent) and the SCAG region (2.5 percent) for the same period. The SCAG foresees that population will increase in the City and region over the next 25 years.

Most of the surrounding land is already developed, and cannot be further developed to induce additional population growth. The proposed project will be constructed in accordance with related General Plan policies designed to minimize adverse conditions to population and housing increases for the City. Therefore, this project will have **a less than significant impact** on population growth either directly or indirectly. No mitigation is required.

b. Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

13b. Response: ***(Source: CADME Land Use 2003 Layer, Google imaging etc.)***

No Impact. The existing project site contains a vacant elementary school and no housing. No housing will be displaced, eliminating the requirement of constructing replacement housing elsewhere. There will be **no impact** on existing housing either directly, indirectly, or cumulatively, and no mitigation is required.

c. Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

13c. Response: ***(Source: CADME Land Use 2003 Layer, Google imaging etc.)***

No Impact. Since the existing project site contains a vacant school and no residential uses, no people will be displaced and no construction of replacement housing is necessary. Therefore, the project will have **no impact**, necessitating the need for replacement housing either directly, indirectly, or cumulatively, and no mitigation is required.

14. PUBLIC SERVICES.

Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental 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?	☐	☐	☐	☒

14a. Response: ***(Source: General Plan 2025 FPEIR Table 5.13-B – Fire Station Locations, Table 5.13-C – Riverside Fire Department Statistics and Ordinance 5948 § 1)***

No Impact. The project is located in an urbanized area and includes the construction and operation of 54 single-family homes. Fire facilities and services are provided by Station 2 located at 9449 Andrew Street, located 0.7 mile from the project site. The City's Fire Department policy states that units will be located and staffed such that an effective response force of 4 units with 12 personnel minimum shall be available to all areas of the City within a maximum of 10 minutes (total response time). In addition, with implementation of General Plan 2025 policies and compliance with existing codes and standards, there will be **no impact** on the demand for additional fire facilities or services either directly, indirectly, or cumulatively, and no mitigation is required.

b. Police protection?	☐	☐	☐	☒

14b. Response: ***(Source: General Plan 2025 Figure PS-8 – Neighborhood Policing Centers)***

No Impact. The project may require police services during construction and operation of the proposed residential uses. Adequate police facilities and services are provided by Magnolia Neighborhood Policing Center, located at 10540-B Magnolia Avenue, to serve this project. The City of Riverside's police officers rotate through assignments rather than stay within one area. Incoming calls requesting police services are assigned by urgency. Priority 1 calls are typically of a life-threatening nature, such as a robbery in process or an accident involving bodily injury. Police officers strive to respond within 7 minutes to Priority 1 calls. Officers will respond to less-urgent Priority 2 calls within 12 minutes. These types of calls are not life threatening and include such incidents as burglary, petty theft, shoplifting, etc.

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
In addition, with implementation of General Plan 2025 policies, compliance with existing codes and standards, and through Police Department practices, there will be **no impact** on the demand for additional police facilities of services either directly, indirectly, or cumulatively. No mitigation is required.				
c. Schools?	☐	☐	☒	☐
14c. Response: ***(Source: General Plan 2025 FPEIR Figure 5.13-2 – RUSD Boundaries, Table 5.13-D – RUSD, Figure 5.13-4 – Other School District Boundaries, and School Facilities Needs Analysis – Riverside Unified School District-March 2016)***				
Less Than Significant Impact. The project is a residential use that will involve the addition of housing units that would increase numbers of school-age children. Even though there is a General Plan Amendment attached to this project, which would change the land use designation from B/OP – Business/Office Park to MDR – Medium Density Residential, the total housing unit count of 54 single-family residential units would not substantially change the direction of the land use patterns in the Riverside General Plan 2025. An increase in local school population of up to 38[18] students could result from development of the proposed project. Senate Bill 50, also known as Proposition 1A was enacted to direct development fees to local school districts for the expansion or construction of school facilities. The proposed project will be required to pay applicable local school fees as development occurs. The payment of required school fees will offset any impact to school services or facilities; therefore, a **less than significant** school impact would occur. No mitigation is required.				
d. Parks?	☐	☐	☒	☐
14d. Response: ***(Source: General Plan 2025 Figure PR-1 – Parks, Open Spaces and Trails, Table PR-4 – Park and Recreation Facilities, Parks Master Plan 2003, General Plan 2025 FPEIR Table 5.14-A – Park and Recreation Facility Types, and Table 5.14-C – Park and Recreation Facilities Funded in the Riverside Renaissance Initiative)***				
Less Than Significant Impact. An increase in population would occur due to the addition of housing for the project. The closest park to the project site is Arlington Park located at 3860 Van Buren Boulevard. As the population grows, the need for park and other recreational facilities rises due to the additional strain on upkeep and maintenance that is required from the City. The project includes a central paseo to provide pedestrian access to a meandering trail located within the southern portion of the site. Recreational amenities located in this area include a tot lot, picnic tables, and shade structures. In order to ensure that adequate park facilities are available for all residents, the City of Riverside requires all development projects to pay Park Development Impact Fees before issuing building permits. Through the payment of these fees, the funds needed to accommodate additional maintenance and upkeep of parks and other recreational services is fulfilled. Therefore, there will be a **less than significant impact** directly, indirectly, or cumulatively created by the construction of new or expansion of existing park facilities caused by the increase in the demand for park facilities or services. No mitigation is required.				
e. Other public facilities?	☐	☐	☐	☒
14e. Response: ***(Source: General Plan 2025 Figure LU-8 – Community Facilities, FPEIR Figure 5.13-5 – Library Facilities, Figure 5.13-6 – Community Centers, Table 5.3-F – Riverside Community Centers, Table 5.13-H – Riverside Public Library Service Standards)***				
No Impact. The project would develop residential uses within an urbanized area. Public facilities and services, including libraries and community centers, are provided in the neighborhood to serve this project. In addition, with implementation of General Plan 2025 policies, compliance with existing codes and standards, and through Park and Recreation and Community Services and Library practices, there will be **no impact** on the demand for additional public facilities or services either directly, indirectly, or cumulatively. No mitigation is required.				

[18] Student Population Increase: Elementary Students = 54 homes × 0.38 student generation rate = 20.5 students; Middle School Students = 54 homes × 0.11 student generation rate = 5.9 students; and High School Students = 54 homes × 0.21 student generation rate = 11.3 students.

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
15. RECREATION. Would the project:				
a. Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☒	☐

15a. Response: ***(Source: General Plan 2025 Figure PR-1 – Parks, Open Spaces and Trails, Table PR-4 – Park and Recreation Facilities, Figure CCM-6 – Master Plan of Trails and Bikeways, Parks Master Plan 2003; General Plan 2025 FPEIR Table 5.14-A – Park and Recreation Facility Types, and Table 5.14-C – Park and Recreation Facilities Funded in the Riverside Renaissance Initiative, Table 5.14-D – Inventory of Existing Community Centers, Riverside Municipal Code Chapter 16.60 – Local Park Development Fees, Bicycle Master Plan May 2007, Population and Housing Estimates for Cities, Counties, and the State, January 1, 2011–2016, with 2010 Benchmark-California Department of Finance)***

Less Than Significant Impact. New housing is proposed with this project; therefore, an increase in residents is expected. The City's adopted standard for developed park acreage of 3 acres per 1,000 residents will not be adversely affected by the increase of 178 residents. Additionally, the proposed project site is not located in an area of the City identified to have a parkland shortage.

The project includes a central paseo that provides pedestrian access to a meandering trail located within the southern portion of the site. Recreational amenities located in this area include a tot lot, picnic tables, and shade structures. While these features will be available to project residents, the use of existing park and recreation areas may also occur, causing an incremental impact to existing facilities. The project will be required to pay Park Development Impact Fees to cover the cost of elevated levels of maintenance; therefore, **a less than significant** direct, indirect, or cumulative impact on existing neighborhood and regional parks will occur. No mitigation is required.

b. Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☒	☐

15b. Response:

Less Than Significant Impact. The proposed project is an infill development containing a vacant elementary school along established transportation corridors in an area zoned for B/OP – Business/Office Park. The project includes a General Plan Amendment to change the land use designations to MDR – Medium Density Residential.

The proposed project will be developed in accordance with the City's General Plan 2025, Park and Recreation Master Plan, and all other applicable local, State, and/or Federal regulatory requirements. The project includes a central paseo that provides pedestrian access to a meandering trail located within the southern portion of the site. Recreational amenities located in this area include a tot lot, picnic tables, and shade structures. The project will also be required to pay Park Development Fees to cover the cost of elevated levels of park maintenance. Therefore, there will be **a less than significant impact** directly, indirectly, or cumulatively to the environment from the proposed construction of the single-family residences. No mitigation is required.

16. TRANSPORTATION AND TRAFFIC. Would the project result in:				
a. Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance 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?	☐	☒	☐	☐

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact

16a. Response: ***(Source: Traffic Impact Analysis (Appendix I))***

***Operation*. Less Than Significant With Mitigation Incorporated.** Roadway performance is most often controlled by the performance of intersections, specifically during peak traffic periods. Operating conditions at intersections are typically described in terms of level of service (LOS) with LOS A representing the best operating conditions (free-flow traffic) and LOS F the worst (traffic jammed). Table 16.A summarizes the relationship of delay and LOS at unsignalized and signalized intersections.

Table 16.A: Level of Service Criteria for Unsignalized and Signalized Intersections

Level of Service	Unsignalized Intersection Average Delay per Vehicle (sec.)	Signalized Intersection Average Delay per Vehicle (sec.)
A	≤ 10	≤ 10
B	> 10 and ≤ 15	> 10 and ≤ 20
C	> 15 and ≤ 25	> 20 and ≤ 35
D	> 25 and ≤ 35	> 35 and ≤ 55
E	> 35 and ≤ 50	> 55 and ≤ 80
F	> 50	> 80

Source: Table B, *Traffic Impact Analysis* (Appendix I)

The City's significance criteria are used for all study intersections under the City's jurisdiction. The City uses LOS D as its minimum level of service for intersections and roadways of Collector or higher classification; LOS C is to be maintained on other street intersections. For projects in conformance with the City's General Plan 2025, a significant project impact occurs at a study intersection when the peak hour LOS falls below D (E or F), which indicates that LOS D or better is to be maintained on Arterial Streets wherever possible. A significant project impact occurs when the peak hour LOS falls below D in this analysis.

The study area was approved by City staff via the City's scoping agreement process. Study intersections were selected based on discussion with City staff. The study includes locations where project traffic has potential to cause a significant impact. Based on the coordination with the City, one intersection, the Donald Avenue-Project Driveway/Indiana Avenue was identified for analysis. Consistent with the City's Traffic Impact Analysis guidelines, the 2010 *Highway Capacity Manual* (HCM) analysis methodologies were used to determine intersection levels of service for all study area intersections. The traffic analysis examined traffic operations in the vicinity of the proposed project under the following six scenarios:

- Existing traffic conditions;
- Existing with project traffic conditions;
- Project completion (2017) conditions;
- Project completion (2017) with project traffic conditions;
- Cumulative (2017) traffic conditions; and
- Cumulative (2017) with project traffic conditions.

For each scenario, traffic operations at study intersections are evaluated for the a.m. and p.m. peak hours. The a.m. peak hour is defined as the one hour of highest traffic volumes occurring between 7:00 and 9:00 a.m. The p.m. peak hour is defined as the one hour of highest traffic volumes occurring between 4:00 and 6:00 p.m.

Table 16.B summarizes the a.m. and p.m. peak hour and daily project trip generation and shows that the project is expected to generate 41 a.m. peak hour trips, 54 p.m. peak hour trips, and 514 daily trips.

Table 16.C summarizes the delay and LOS at the study intersection—Donald Avenue-Project Driveway/Indiana Avenue—without the project. Based on the City's significant impact criteria, a significant circulation impact (LOS D) occurs at the intersection Donald Avenue-Project Driveway/Indiana under build-out (2040) with project conditions (a.m. peak hour).

Table 16.B: Project Trip Generation

Land Uses	Units	A.M. Peak Hour			P.M. Peak Hour			Daily
		In	Out	Total	In	Out	Total	
Single Family Residential	**54 DU**							
Trips/Unit[1]		0.19	0.56	0.75	0.63	0.37	1.00	9.52
Trip Generation		10	31	41	34	20	54	514
Total Trip Generation		10	31	41	34	20	54	514

Source: Table D, *Traffic Impact Analysis (Appendix I)*
DU=Dwelling Units
[1] *Rates based on Land Use 210- "Single Family Detached Housing" from the Institute of Transportation Engineers (ITE)* Trip Generation Manual, *9th Edition.*

Table 16.C: Intersection of Donald Avenue-Project Driveway/Indiana Avenue LOS

Scenario	Control	Without Project				With Project				With Project With Recommended Improvements			
		A.M. Peak Hour		P.M. Peak Hour		A.M. Peak Hour		P.M. Peak Hour		A.M. Peak Hour		P.M. Peak Hour	
		Delay (sec.)	LOS	Delay (sec.)	LOS	Delay (sec.)	LOS	Delay (sec.)	LOS	Delay (sec.)	LOS	Delay (sec.)	LOS
Existing Conditions	TWSC	15.4	C	19.6	C	18.9	C	20.9	C	*No Improvements Required*			
Project Completion (2017) Conditions	TWSC	15.6	C	19.9	C	19.2	C	21.2	C				
Cumulative (2017) Conditions	TWSC	17.6	C	22.5	C	22.6	C	24.1	C				
Build-out (2040) Conditions	TWSC	21.2	C	30.4	D	**30.0**	**D** *	32.7	D	16.2	C	16.7	D

Source: Table E, *Traffic Impact Analysis (Appendix I)*
Notes:
TWSC = Two-Way Stop Control
Delay = Average control delay in seconds (For TWSC intersections, reported delay is for worst-case movement).
LOS = Level of Service
* A significant circulation impact occurs as the addition of project-related trips causes the a.m. peak hour delay to increase by more than 8.0 seconds when operating at LOS C.

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
To reduce the level of this impact, **Mitigation Measure TRA-1** has been identified. As detailed in Table 16.C, with the implementation of this measure, the project study area intersections would operate at a satisfactory LOS. No further mitigation is required. **Mitigation Measure TRA-1:** **Intersection of Donald Avenue-Project Driveway/Indiana Avenue.** Prior to issuance of a Certificate of Occupancy, the City of Riverside, Traffic Engineering Section City Engineer, or designee, shall verify that the Donald Avenue-Project Driveway/Indiana Avenue intersection has restriped Indiana Avenue to provide a two-way left-turn lane along the project frontage.				
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?	☐	☒	☐	☐
16b. Response: ***(Source: Traffic Impact Analysis (Appendix I) General Plan 2025 Figure CCM-4 – Master Plan of Roadways, General Plan 2025 FPEIR Figure 5.15-4 –Volume to Capacity (V/C) Ratio and Level of Service (LOS) (Typical 2025), Table 5.15-D – Existing and Future Trip Generation Estimates, Table 5.15-H – Existing and Typical Density Scenario Intersection Levels of Service, Table 5.15-I – Conceptual General Plan Intersection Improvement Recommendations, Table 5.15-J – Current Status of Roadways Projected to Operate at LOS E or F in 2025, Table 5.15.-K – Freeway Analysis Proposed General Plan SCAG's RTP)*** **Less Than Significant with Mitigation Incorporated.** The focus of a congestion management plan (CMP) is the development of an enhanced traffic monitoring system in which real-time traffic count data can be accessed by the Riverside County Transportation Commission to evaluate the condition of the congestion management system as well as meeting other monitoring requirements at the State and Federal levels. Per the CMP-adopted LOS standard of E, when a congestion management system segment falls to F, a deficiency plan is required. Preparation of a deficiency plan is the responsibility of the local agency where the deficiency is located. Agencies identified as contributors to the deficiency are required to coordinate with the development of the plan. The deficiency plan must contain mitigation measures, including transportation demand management strategies and transit alternatives, and a schedule of mitigating the deficiency. The City's General Plan 2025 requires LOS to conform to the CMP standards. Therefore, if the project is in compliance with the City's LOS standards, the project would be in compliance with the CMP. As discussed in Table 16.C and Response 16a above, with the implementation of **Mitigation Measures TRA-1**, the project study area intersections would operate at a satisfactory LOS. As such, the proposed project would not result in a direct, indirect, or cumulative impact to an existing LOS within the applicable study area. Impacts would be **less than significant with mitigation incorporated.**				
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?	☐	☐	☐	☒
16c. Response: ***(Source: General Plan 2025 Figure PS-6 – Airport Safety Zones and Influence Areas, General Plan 2025 FPEIR-Figure 5.7-2)*** **No Impact.** The project site is located approximately 2.4 miles south of the Riverside Municipal Airport and is not located within an Airport Safety Zone, as depicted in Figure 5.7-2 of the General Plan 2025 Program FPEIR. Because the project has not been found to be in an airport zone, no further compliance is necessary with any airport plan, there are **no impacts** from airports directly, indirectly, and cumulatively, and no mitigation is required.				
d. Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☒	☐

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact

16d. Response: ***(Source: Project Site Plans)***

Less Than Significant Impact. Vehicular access to the project site would be provided via one driveway on Donald Avenue at Indiana Avenue. Vehicular traffic to and from the project site would utilize the existing network of regional and local roadways that serve the project site area. The proposed project would introduce new roadways but would not introduce a land use that would conflict with existing urban land uses in the surrounding area. The project would include a new left-turn lane along Indiana Avenue at the project site entrance. Design of the proposed project, including curb cuts, ingress, egress, and other streetscape changes, would be subject to review by Traffic Engineering Section of the Public Works Department; therefore, it is reasonable that potential design hazards would be addressed during project review. Impacts related to hazardous design features would be **less than significant**, and no mitigation is required.

e. Result in inadequate emergency access?	☐	☐	☒	☐

16e. Response: ***(Source: California Department of Transportation Highway Design Manual, Municipal Code, and Fire Code)***

Less Than Significant Impact. Access for emergency vehicles would be provided via the main entrance to the community as well as at the west edge of the site dedicated for emergency access. Sufficient space and turning radius for fire trucks would be provided on the project site around the proposed buildings. The driveway to the project site would remain open during construction, and project site access would be maintained. Therefore, implementation of the proposed project would not result in inadequate emergency access. Impacts would be **less than significant impact** and no mitigation is required.

f. Conflict with adopted policies, plans or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities)?	☐	☐	☐	☒

16f. Response: ***(Source: General Plan 2025 Land Use and Urban Design, Circulation and Community Mobility and Education Elements, Bicycle Master Plan, School Safety Program – Walk Safe! – Drive Safe!)***

No Impact. The project would not affect adopted policies supporting alternative transportation and would be subject to compliance with policies, plans, and programs of the City and other applicable agencies regarding alternative modes of transportation. Pedestrians accessing the project may utilize pedestrian facilities (e.g., sidewalks and crosswalks) that are part of the surrounding street system. A sidewalk is located along Indiana Avenue and can be used to access the project site. Van Buren Boulevard, Indiana Avenue, and SR-91 are served by transit facilities (Riverside Transit Agency [RTA] Bus Routes 10, 14, and 21). Bus stops at the Indiana Avenue/Gibson Street intersection and the Indiana Avenue/Jackson Street intersection are the closest bus stops to the project site. The project would not remove or relocate any alternative transportation access points. Therefore, the project does not conflict with adopted plans, policies, or programs supporting alternative transportation. **No impact** related to public transit, bicycle, or pedestrian facilities plans would occur, and no mitigation is required.

17. 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)?	☐	☐	☐	☒

17a. Response: ***(Source: Cultural Resources Assessment-Hawthorne Elementary School Project (Appendix D); AB 52 Consultation)***

No Impact. A cultural resources records search was conducted for the project area and a one-mile radius around it at the Eastern Information Center (EIC) of the California Historical Resources Information System (CHRIS) located at the University

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact

of California, Riverside. The objectives of this research were (1) to establish the status and extent of previously recorded cultural resources sites, surveys, and studies, (2) to note the likelihood of encountering cultural resources and their type(s) based on previously recorded resources within one mile of the project area, and (3) to uncover relevant historical contexts. Data sources consulted at the EIC include archaeological site records, historic USGS topographic maps, reports from previous studies, and the State Historic Resource Inventory (HRI) for Riverside County, which contains listings for the National Register of Historic Places (National Register), California Register of Historical Resources (California Register), California Historical Landmarks (CHL), and California Points of Historical Interest (CPHI). Archival research was conducted in August 2016 and September 2016. Sources included, but were not limited to, online sources, published literature in local and regional history, historic aerial photographs, historic maps, and news articles. The project site has been developed with school uses since 1966 and is substantially surrounded by urban development. The site has not been identified as a Native American sacred place, landscape, or feature of significant tribal cultural value during project-related Native American consultation.

The school and associated features do not meet any of the criteria for listing in the National Register or California Register or for local designation. Therefore, it is not a historical resource as defined by CEQA. The segment of the Upper Riverside Canal (33-4495H) is adjacent to the southern boundary of the project area has sustained alterations and has lost integrity. Therefore, it is not historically significant individually and does not contribute the significance of the larger resource. **No impact** related to this issue would occur; therefore, no mitigation is warranted.

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 shall consider the significance of the resource to a California Native American tribe?	☐	☒	☐	☐

17b. Response: ***(Source: Cultural Resources Assessment-Hawthorne Elementary School Project (Appendix D); City AB 52 Consultation)***

Less Than Significant with Mitigation Incorporated. The project site has been developed with school uses since 1966 and is substantially surrounded by urban development. No on-site cultural resources were identified during the records search. The entire project area has been moderately to severely disturbed by the development of school and other urban uses. The playground area has been covered with a rubberized surface; the open space outside of the buildings has been used for recreation purposes. Mature trees and shrubbery were noted throughout the project area. No evidence of native soil was present in the project area. No archaeological resources were identified. The nearest resource to the project area is the Riverside Upper Canal (33-004495), which is adjacent to the southeastern project area boundary. A review of the Historic Property Directory revealed that numerous historic-period resources within the one-mile radius have been previously documented and/or evaluated, but none was determined to be historically significant.

Chapter 532, Statutes of 2014 (i.e., Assembly Bill [AB] 52), requires Lead Agencies to evaluate a project's potential to impact "tribal cultural resources." Such resources include "[s]ites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are eligible for inclusion in the California Register of Historical resources or included in a local register of historical resources." AB 52 also gives Lead Agencies the discretion to determine, supported by substantial evidence, whether a resource qualifies as a "tribal cultural resource." Per AB 52, the City sent out notices to interested California Native American tribes on August 12, 2016 and October 21, 2016. Five tribes (Viejas Band of Kumeyaay, Agua Caliente Band of Cahuilla Indians, Soboba Band of Luiseño Indians, Gabrielino Band of Mission Indians – Kizh Nation, and Morongo Band of Mission Indians) responded as part of the AB 52 consultation effort. Agua Caliente Band of Cahuilla Indians had no comments. Viejas Band of Kumeyaay Indians requested to be informed in the event inadvertent discovery of cultural artifacts, cremation sites, or human remains are encountered. The Soboba Band of Luiseño Indians requested Government to Government consultation and requested Native American Monitoring to be present during any ground disturbing activities and outlined procedures to be taken in the event cultural resources, and human remains are discovered. The Gabrielino Band of Missions requested consultation and Native American Monitoring during ground disturbing activities. The Morongo Band of Mission Indians provided standard conditions in the event human remains and Native American cultural resources are discovered.

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact

The State of California Governor's Office of Planning and Research developed Tribal Consultation Guidelines in order to provide guidance to cities and counties on the process for consulting with Native American tribes during the adoption or amendment of local general plans or specific plans (defined in Government Code Section 65450 et seq.), which is a component of this project as an amendment to the General Plan 2025 is proposed. Senate Bill (SB) 18 requires local agencies to consult with tribes prior to making certain planning decisions and to provide notice to tribes at certain key points in the planning process, thereby providing tribes an opportunity to participate in local land use decisions at an early planning stage. In accordance with SB 18, the City initiated consultation with the Native American tribes and interested parties from the list provided by the NAHC on April 11, 2016. Three tribes (Agua Caliente Band of Cahuilla Indians, Rincon Band of Luiseño Indians, and Soboba Band of Luiseño Indians) responded as part of the SB 18 process. Agua Caliente Band of Cahuilla Indians stated that the site is not located within the Tribe's Traditional Use Area. Rincon Band of Luiseño Indians stated that the site is not within Rincon's Historic Boundaries and deferred to the Pechanga Band of Luiseño Indians or Soboba Band of Luiseño Indians. Soboba Band of Luiseño Indians stated that the site falls within the bounds of the tribe's Tribal Traditional Use Areas and requested Government to Government consultation and requested Native American Monitor(s), and provided procedures in the event cultural resources or human remains are discovered. The consultation efforts with the Soboba Band of Luiseño Indians was done concurrently with the AB 52 process.

While no occurrence of historic or prehistoric resources has been recorded on site, based on the consultation effort with the Tribes, a potential for such resources cannot be discounted. At the request of the consulting tribe(s), the following measures have been identified to address this potential impact.

Mitigation Measure TRI-1: At least 30 days prior to filing of a grading permit, the project applicant shall contact and notify the consulting tribe(s) of anticipated grading and excavation activities. In conjunction with the City and the consulting tribe(s), the applicant shall develop a Tribal Cultural Resources Monitoring Agreement. A copy of the monitoring agreement shall be provided to the City prior to the issuance of any grading permit for the project. The agreement shall address the details, timing, and responsibility of all archaeological and cultural activities that will occur on the project site. Details in the Plan shall include:

- Project grading and development scheduling.
- The development of a rotating or simultaneous schedule in coordination with the applicant and the designated Native American Tribal Monitor(s) during grading, excavation, and ground-disturbing activities on the site, including the scheduling, safety requirements, duties, scope of work, reimbursement, and Native American Tribal Monitor(s)' authority to stop and redirect grading activities in coordination with a qualified archaeologist.
- The protocols and stipulations that the City, tribe(s) and qualified archaeologist will follow in the event of inadvertent discovery of tribal cultural resources (see Mitigation Measure TRI-2).

Mitigation Measure TRI-2: In the event of an inadvertent discovery of any tribal cultural resource(s), the landowner(s) shall relinquish ownership of all such resources, including (but not limited to) sacred items, burial goods, and related archaeological artifacts and burial remains. The applicant shall relinquish the artifacts through one or more of the following methods:

- A fully executed reburial agreement with the consulting Native American tribe(s) for discovery of tribal cultural resources. This shall include measures and provisions to protect the future reburial area from any future impacts. Reburial shall not occur until all cataloguing and recordation on appropriate Department of Parks and Recreation (DPR) 523-series forms have been completed. Non-tribal cultural resources will be addressed in coordination with the City and qualified archaeologist in accordance with professional standards.
- A curation agreement with an appropriate qualified repository within Riverside County that meets federal standards per 36 CFR Part 79. The collections and associated records shall be transferred, including title, to an appropriate curation facility within Riverside

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact

County be accompanied by payment of the fees necessary for permanent curation.

Mitigation Measure TRI-3: Prior to the issuance of grading permits, the applicant shall submit to the City for review and approval, evidence that planned on-site excavation activities conform to the applicable provisions of the Tribal Cultural Resources Monitoring Agreement.

With implementation of these measures, potential impacts to Native American cultural resources are reduced to a **less than significant with mitigation incorporated**.

18. UTILITIES AND SYSTEM SERVICES. Would the project:				
a. Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☒	☐

18a. Response: ***(Source: General Plan 2025 Figure PF-2 – Sewer Facilities Map, General Plan 2025 FPEIR Figure 5.16-5 – Sewer Service Areas, Table 5.16-K – Estimated Future Wastewater Generation for the City of Riverside's Sewer Service Area, Figure 5.8-1 – Watersheds, Wastewater Integrated Master Plan and Certified EIR)***

Less Than Significant Impact. Wastewater facilities would be provided by the City sewer system. The project is within the boundaries of the Santa Ana Regional Water Quality Control Board (RWQCB). Wastewater in the surrounding area is transported to the Riverside Regional Water Quality Control Plant. The primary sources of pollutants to storm water from the proposed project are construction and demolition activities and runoff from roofs and paved areas. All new development is required to comply with all provisions of the NPDES program and the City's Municipal Separate Sewer Permit (MS4), as enforced by the RWQCB. Therefore, the proposed project would not exceed applicable wastewater treatment requirements of the RWQCB with respect to discharges to the sewer system or storm water system within the City. Since the project will discharge its wastewater to a facility that is legally required to meet wastewater standards and because the proposed project is required to adhere to the above regulations related to wastewater treatment, the project will have a **less than significant impact**, and no mitigation is required.

b. Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☒	☐

18b. Response: ***(Source: General Plan 2025 Table PF-1 – RPU Projected Domestic Water Supply (AC-FT/YR); Table PF-2 – RPU Projected Water Demand, RPU; General Plan 2025 FPEIR Table 5.16-G – General Plan Projected Water Demand for RPU Including Water Reliability for 2025; Table 5.16-K – Estimated Future Wastewater Generation for the City of Riverside's Sewer Service Area; Figure 5.16-4 – Water Facilities and Figure 5.16-6 – Sewer Infrastructure and Wastewater Integrated Master Plan and Certified EIR; Urban Water Management Plan, City of Riverside Public Utilities, June 2016.; Riverside Wastewater Collection and Treatment Facilities Integrated Master Plan, February 2008)***

Less Than Significant Impact. The project will not result in the construction of new or expanded water or wastewater treatment facilities. The proposed project will be required to connect to existing water and wastewater infrastructure to provide the necessary construction and water/sewer needs for the project. The connection point for the lines would be from lines within existing adjacent roadways (Indiana Avenue). No new water and sewer infrastructure is anticipated with implementation of the project. The project is consistent with the Typical Growth Scenario of the General Plan 2025 wherein future water and wastewater generation was determined to be adequate (see Tables 5.16-E, 5.16-F, 5.16-G, 5.16-H, 5.16-I, 5.16-J and 5.16-K of the General Plan 2025 FPEIR).

The RPU's 2015 UWMP estimates water supply and demand during normal, dry and multiple-dry years (Table 18.A).

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact

Table 18.A: Projected Water Supply/Demand (acre-feet/year)

Condition	2020	2025	2030	2035	2040
Normal Year Supply Demand	 116,903 95,221	 121,093 96,534	 124,703 99,015	 124,703 101,589	 124,703 104,257
Dry Year Supply Demand	 96,288 95,221	 101,288 96,534	 104,088 99,015	 104,088 101,589	 104,088 104,257
Multiple-dry Year Supply Demand	 102,364 95,221	 107,364 96,534	 110,614 99,015	 110,164 101,589	 110,164 104,257

As detailed in response 13a, the project is located in an urbanized area and would not induce substantial population growth. The addition of 54 single-family housing units represents 0.04 percent of the projected 127,692 housing units anticipated by 2025 in the City's General Plan 2025 FPEIR. Demographic information from the General Plan 2025 and the SCAG were considered during the preparation of the UWMP.

The RPU's 2015 Urban Water Management Plan prepared by the City of Riverside estimated a daily per capita water demand of 206 gallons (gpcd). Based on an average household size of 3.29 persons per household,[19] the 54-unit project would result in a population of 178 persons, with an estimated water usage of 36,668 gallons per day (0.11 acre-foot). This represents 0.04 percent of anticipated RPU water supplies in 2020 through 2040 (assuming worst-case multiple dry years). As established in Table 18.A, sufficient water supplies are available to serve existing and projected future water demand under normal, dry and multiple-dry conditions. Water has been previously supplied to the now vacant school. The proposed project would tie into existing water mains located in adjacent streets. The proposed 54-unit project does not include the installation of any off-site conveyance, distribution, treatment or storage facilities. Due to the limited size of the project, and the presence of existing water facilities in the project area, no substantial upgrade or expansion of existing facilities is anticipated.

The Riverside Wastewater Collection and Treatment Facilities Integrated Master Plan projects future flow at 96.6 gallons per day per capita. This project would consequently use 17,195 gallons per day (178 residents × 96.6 gallons per pay), but would be under the 32.5 million gallons per day the plan projects for the city in 2025. Based on these data, no new wastewater facilities will need to be constructed or capacity added to existing facilities due to this project's projected population growth.

Therefore, the project will have a **less than significant impact** related to the construction of new water or wastewater treatment facilities or the expansion of existing facilities directly, indirectly, or cumulatively, and no mitigation is required.

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?	☐	☐	☒	☐

18c. Response: ***(Source: General Plan 2025; General Plan 2025 FPEIR Figure 5.16-2 – Drainage Facilities)***

Less Than Significant Impact. The proposed project will result in an increase in impervious surface areas. The Subdivision Code (Title 18, Section 18.48.020) requires drainage fees to be paid to the City for new construction. Fees are transferred into a drainage facilities fund that is maintained by Riverside County Flood Control and Water Conservation District. This section also complies with the California Government Code (Section 66483), which provides for the payment of fees for construction of drainage facilities. Fees are required to be paid as part of the conditions of approval/waiver for filing of a final map or parcel map.

General Plan 2025 Policies PF 4.1 and PF 4.3 require the City to continue to routinely monitor its storm drain system and to fund and improve those systems as identified in the City's Capital Improvement Plan. Implementation of these policies will

[19] California Department of Finance's *Demographic Research Unit's Population and Housing Estimates for Cities, Counties, and the State*. January 2017

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
ensure that the City is adequately served by drainage systems. The General Plan 2025 also includes policies and programs that will minimize the environmental effects of the development of such facilities. Therefore, the project will have a **less than significant impact** on existing storm water drainage facilities and would not require the expansion of existing facilities directly, indirectly, or cumulatively. No mitigation is required.				
d. Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☒	☐
18d. Response: ***(Source: General Plan 2025 FPEIR Figure 5.16-3 – Water Service Areas, Figure 5.16-4 – Water Facilities, Table 5.16-E – RPU Projected Domestic Water Supply AC-FT/YR, Table 5.16-F – Projected Water Demand, Table 5.16-G – General Plan Projected Water Demand for RPU including Water Reliability for 2025)***				
Less Than Significant Impact. The project will not exceed expected water supplies. As stated in Response 18b, there are approximately 3.29 persons per household in the City of Riverside in 2016 per the Department of Finance's *Demographic Research Unit's Population and Housing Estimates for Cities, Counties, and the State*. The development will only add 0.11 acre-feet to the 99,835 acre-feet per day. Sufficient water supplies will be available to the project and no new entitlements or resources will be needed. The project is consistent with the General Plan 2025 FPEIR Typical Growth Scenario where future water supplies were determined to be adequate (see Tables 5.16-E, 5.16-F, 5.16-G, 5.16-H, 5.16-I and 5.16-J of the General Plan 2025 FPEIR). Therefore, the project will have **less than significant impact** related to insufficient water supplies either directly, indirectly, or cumulatively, and no mitigation is required.				
e. Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒
18e. Response: ***(Source: General Plan 2025 FPEIR Figure 5.16-5 – Sewer Service Areas, Figure 5.16-6 – Sewer Infrastructure, Table 5.16-K – Estimated Future Wastewater Generation for the City of Riverside's Sewer Service Area, and Wastewater Integrated Master Plan and Certified EIR)***				
No Impact. The project will not exceed wastewater treatment requirements of the RWQCB. The Riverside Wastewater Collection and Treatment Facilities Integrated Master Plan projects future flow at 96.6 gallons per day per capita. This project would consequently use 17,195 gallons per day, but would be under the 32.5 million gallons per day the plan projects for Riverside in 2025. Based on these data, no new wastewater facilities will need to be constructed or capacity added to existing facilities due to this project's projected population growth. The project is consistent with the General Plan 2025 FPEIR Typical Growth Scenario wherein future wastewater treatment capacity was determined to be adequate (see Table 5.16-K of the General Plan 2025 FPEIR). Therefore, **no impact** related to wastewater treatment directly, indirectly, or cumulatively will occur. No mitigation is required.				
f. Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☒	☐
18f. Response: ***(Source: General Plan 2025 FPEIR Table 5.16-A – Existing Landfills and Table 5.16-M)***				
Less Than Significant Impact. The project includes the development of residential uses. Solid waste from demolition, construction and future operations will be transported to the Badlands Landfill, located east of the City of Moreno Valley. Badlands Landfill has a current remaining capacity of 9.8 million tons as of January 2015, a maximum daily load of 4,500 tons per day, and an average daily load of 2,500 tons per day, as specified via phone call by Andy Cortez (principal engineer at Badlands Landfill). The project would generate 1,780 lbs/day or 0.89 ton per day of solid waste when built. This is well below the Badlands Landfill daily capacity and the impact will be minimal. Construction of the project would also generate waste. Per the California Green Building Code, a minimum of 50 percent of this debris will be diverted to a material recycling facility. Impacts to landfill capacity directly, indirectly, and cumulatively will be **less than significant**, and no mitigation will be required.				

ISSUES (AND SUPPORTING INFORMATION SOURCES):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
g. Comply with Federal, State, and local statutes and regulations related to solid waste?	☐	☐	☐	☒

18g. Response: ***(Source: California Integrated Waste Management Board 2002 Landfill Facility Compliance Study)***

No Impact. The California Integrated Waste Management Act under the Public Resource Code requires that local jurisdictions divert at least 50 percent of all solid waste generated by January 1, 2000. The City is currently achieving a 60 percent diversion rate, well above state requirements. In addition, the California Green Building Code requires all developments to divert 50 percent of non-hazardous construction and demolition debris for all projects and all excavated soil beginning January 1, 2011. The proposed project must comply with the City's waste disposal requirements as well as the California Green Building Code. For these reasons, the project would not conflict with any Federal, State, or local regulations related to solid waste. **No impact** related to solid waste statutes will occur directly, indirectly, or cumulatively, and no mitigation will be required.

19. MANDATORY FINDINGS OF SIGNIFICANCE.				
a. Does the project have the potential to 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 an endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☒	☐	☐

19a. Response:

Less Than Significant With Mitigation Incorporated. The proposed project's impacts to biological resources and cultural resources were analyzed in this Initial Study and all direct and cumulative impacts were determined to have no impact, a less than significant impact, or rendered a less than significant impact with implementation of mitigation. Therefore, impacts to biological resources and cultural resources would be less than significant with implementation of mitigation and no additional mitigation is required.

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.)	☐	☒	☐	☐

19b. Response:

Less Than Significant With Mitigation Incorporated. The proposed project's potential cumulative impacts to air quality, biological resources, cultural resources, GHGs, hazards and hazardous materials, noise, traffic, and tribal cultural resources, were analyzed in this Initial Study, and all cumulative impacts were less than significant or rendered less than significant with mitigation.

c. Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☒	☐	☐

19c. Response:

Less Than Significant With Mitigation Incorporated. Impacts related to aesthetics, air quality, geology and soils, GHGs, hazards and hazardous materials, hydrology and water quality, land use and planning, noise, population and housing, public services, recreation, traffic, and utilities and service systems that could potentially affect human beings directly or indirectly were analyzed in this Initial Study. All direct and cumulative impacts were less than significant or rendered less than significant with implementation of mitigation measures.

Note: Authority cited: Sections 21083 and 21087, Public Resources Code. Reference: Sections 21080(c), 21080.1, 21080.3, 21082.1, 21083, 21083.3, 21093, 21094, 21151, Public Resources Code; *Sundstrom v. County of Mendocino*, 202 Cal.App.3d 296 (1988); *Leonoff v. Monterey Board of Supervisors*, 222 Cal.App.3d 1337 (1990).

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LSA Associates, Inc. 2017, *Health Risk Assessment* (Appendix B)

LSA Associates, Inc. 2017, *Noise and Vibration Impact Analysis* (Appendix H)

LSA Associates, Inc. 2017, *Phase 1 Environmental Site Assessment (*Appendix F1)

LSA Associates, Inc. 2017, *Traffic Impact Analysis* (Appendix I**)**

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South Coast Air Quality Management District (SCAQMD). 2010. *Greenhouse Gases CEQA Significance Thresholds Working Group Meeting No. 15.* September 28, 2010.

Mitigation Monitoring and Reporting Program

MITIGATION MONITORING AND REPORTING PROGRAM

This Mitigation Monitoring and Reporting Program has been prepared for use in implementing mitigation measures for the:

Hawthorne Residential Project (TTM 37032)

The program has been prepared in compliance with State law and the Mitigated Negative Declaration (MND) prepared for the project by the City of Riverside (City).

The California Environmental Quality Act (CEQA) (Section 15097) requires adoption of a reporting or monitoring program for those measures placed on a project to mitigate or avoid adverse effects on the environment (Public Resource Code Section 21081.6). The law states that the reporting or monitoring program shall be designed to ensure compliance during project implementation.

The monitoring program contains the following elements:

1) The mitigation measures are recorded with the action and procedure necessary to ensure compliance. In some instances, one action may be used to verify implementation of several mitigation measures.
2) A procedure for compliance and verification has been outlined for each action necessary. This procedure designates who will take action, what action will be taken and when, and to whom and when compliance will be reported.
3) The program has been designed to be flexible. As monitoring progresses, changes to compliance procedures may be necessary based upon recommendations by those responsible for the program. As changes are made, new monitoring compliance procedures and records will be developed and incorporated into the program.

This Mitigation Monitoring and Reporting Program includes mitigation measures identified in the MND. To facilitate the review of project requirements, the Standard Conditions identified in the MND have been incorporated into this MMRP.

MITIGATION MONITORING AND RESPONSIBILITIES

As the Lead Agency, the City is responsible for ensuring full compliance with the mitigation measures adopted for the proposed project. The City will monitor and report on all mitigation activities. Mitigation measures will be implemented at different stages of development throughout the project area. In this regard, the responsibilities for implementation have been assigned to the Applicant, Contractor, or a combination thereof. If during the course of project implementation, any of the mitigation measures identified herein cannot be successfully implemented, the City shall be immediately informed, and the City will then inform any affected responsible agencies. The City, in conjunction with any affected responsible agencies, will then determine if modification to the project is required and/or whether alternative mitigation is appropriate.

MITIGATION MONITORING AND REPORTING PROGRAM CHECKLIST

Project Name: Hawthorne Residential Project (TTM 37032) **Applicant: Steven Walker Communities**

Date: August 2017

Standard Condition/Mitigation Measure	Responsible for Monitoring	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
AIR QUALITY - STANDARD CONDITIONS					
Standard Condition AQ-1: Compliance with SCAQMD Rules 402 and 403. During construction, the construction contractor shall comply with the South Coast Air Quality Management District (SCAQMD) Rules 402 and 403 for controlling fugitive dust emissions and construction equipment emissions. In compliance with Rule 403, fugitive dust shall be controlled with best available control measures so that the presence of such dust does not remain visible in the atmosphere beyond the property line of the emission source. In addition, dust suppression techniques shall be implemented to prevent fugitive dust from creating a nuisance off site. The following applicable dust suppression techniques from Rule 403 shall be implemented during project construction: • Nontoxic chemical soil stabilizers shall be applied according to manufacturers' specifications to all inactive construction areas (previously graded areas inactive for 10 days or more).	City Planner or Director of Building and Safety (or designee)	During Plan Check. Prior to the issuance of a grading or building permit and during construction activities (as required).	Provide evidence that the construction plans include this restriction. Verification through site visit (as required).		Withhold grading and/or demolition permits. Issuance of a stop work order (as required).

Standard Condition/Mitigation Measure	Responsible for Monitoring	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
• Active sites shall be watered at least twice daily. (Locations where grading is to occur shall be thoroughly watered prior to earthmoving.) • All trucks hauling dirt, sand, soil, or other loose materials shall be covered, or at least 2 feet (0.6 meter) of freeboard (vertical space between the top of the load and the top of the trailer) shall be maintained in accordance with the requirements of California Vehicle Code (CVC) Section 23114. • Construction access roads shall be paved at least 100 feet (30 meters) onto the site from the main road. • Traffic speeds on all unpaved roads shall be reduced to 15 miles per hour (mph) or less. Additionally, the following construction emissions control measures from the SCAQMD CEQA Handbook are required to further minimize fugitive dust emissions: • Disturbed areas shall be revegetated as quickly as possible. • All excavating and grading operations shall be suspended when wind speeds (as instantaneous gusts) exceed 25 mph. • All streets shall be swept once per day if visible soil materials are carried to adjacent streets (recommend water sweepers with reclaimed water).					

Standard Condition/Mitigation Measure	Responsible for Monitoring	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
• Wheel washer devices shall be installed at locations where vehicles enter and exit unpaved roads onto paved roads, or vehicles and any equipment leaving the site shall be washed each trip. • All on-site roads shall be paved as soon as feasible, watered periodically, or chemically stabilized. • The area disturbed by clearing, grading, earthmoving, or excavation operations shall be minimized at all times. • The construction contractor shall select the construction equipment used on site based on low emission factors and high-energy efficiency. The construction contractor shall ensure that construction-grading plans include a statement that all construction equipment will be tuned and maintained in accordance with the manufacturers' specifications. • The construction contractor shall utilize electric or diesel-powered equipment in lieu of gasoline powered engines where feasible. • The construction contractor shall ensure that construction-grading plans include a statement that work crews will shut off equipment when not in use. During smog season (May through October), the overall length of the construction period will be extended, thereby decreasing the size of the					

Standard Condition/Mitigation Measure	Responsible for Monitoring	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
area prepared each day, to minimize vehicles and equipment operating at the same time. • The construction contractor shall time the construction activities so as to not interfere with peak hour traffic and minimize obstruction of through traffic lanes adjacent to the site; if necessary, a flagperson shall be retained to maintain safety adjacent to existing roadways. • The construction contractor shall support and encourage ridesharing and transit incentives for the construction crew.					
Standard Condition AQ-2: Compliance with Title 13, California Code of Regulations, Section 2449(d)(d). Operators of applicable off-road vehicles (self-propelled diesel-fueled vehicles 25 horsepower and up that were not designed to be driven on-road) must limit idling to no more than five (5) minutes: • All construction vehicles shall be prohibited from idling in excess of five (5) minutes, both on and off site.	City Planner or Director of Building and Safety (or designee)	During Plan Check. Prior to the issuance of a grading or building permit and during construction activities (as required).	Provide evidence that the construction plans include this restriction. Verification through site visit (as required).		Withhold grading and/or demolition permits. Issuance of a stop work order (as required).
Standard Condition AQ-3: Compliance with applicable California Department of Resources Recycling and Recovery (CalRecycle) Sustainable (Green) Building Program Measures. • At least 50 percent of construction materials (including, but not limited to, soil, mulch, vegetation, concrete, lumber, metal, and cardboard) shall be recycle/reused.	City Planner or Director of Building and Safety (or designee)	During Plan Check. Prior to the issuance of a grading or building permit and during construction activities (as required).	Provide evidence that the construction plans include this restriction. Verification through site visit (as required).		Withhold grading and/or demolition permits. Issuance of a stop work order (as required).

Standard Condition/Mitigation Measure	Responsible for Monitoring	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
• "Green building materials" (e.g., those materials that are rapidly renewable or resource-efficient, and recycled and manufactured in an environmentally friendly way) shall be used for at least 10 percent of the project, as specified on the California Department of Resources Recycling and Recovery website.					
Standard Condition AQ-4: Compliance with Title 24, Energy Conservation and Green Building Standards. Project design shall comply with Title 24 of the California Code of Regulations established by the California Energy Commission (CEC) regarding energy conservation and green building standards. The project applicant shall incorporate the following into the final project building plans: • Low-emission water heaters shall be used. Solar water heaters are encouraged. • Exterior windows shall utilize window treatments for efficient energy conservation.	Director of Building and Safety (or designee)	During Plan Check. Prior to the issuance of building permits.	Provide evidence that the project plans include the required features.		Withhold building permits.
Mitigation Measure AQ-1: Prior to the issuance of building permits, the applicant shall provide to the City for review and approval, evidence that in-house filtration systems with efficiencies equal to or exceeding a Minimum Efficiency Reporting Value (MERV) 16 as defined by the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) Standard 52.2 are installed in on-site residential structures.	City Planner or Designee	During Plan Check. Prior to the issuance of building permits.	Provide evidence that the required filtrations systems have been incorporated into project design.		Withhold building permits.

Standard Condition/Mitigation Measure	Responsible for Monitoring	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
Mitigation Measure AQ-2: Prior to the issuance of building permits, the applicant shall provide to the City for review and approval, a copy of a *Toxic Air Contaminant Disclosure* that will be presented to prospective buyers of real estate within the project site. The *Toxic Air Contaminant Disclosure* shall convey information to prospective buyers about potential TAC exposure at the project site. As approved by the City, the *Toxic Air Contaminant Disclosure* shall contain the language dictated by State law in conjunction with real estate transfer.	City Planner or Designee	During Plan Check. Prior to the issuance of building permits.	Submittal and approval of the required disclosure to be provided to all prospective buyers.		Withhold building permits.
BIOLGICAL RESOURCES					
Mitigation Measure BIO-1: If project activities are planned during the bird nesting season (February 15 to August 31), nesting bird survey(s) consisting of up to three (3) site visits within the week prior to clearing and demolition activities shall be conducted to ensure birds protected under the MBTA are not disturbed by on-site activities. Any such survey(s) shall be conducted by a qualified biologist. If no active nests are found, no additional measures are required. If active nests are found, the nest locations shall be mapped by the biologist. The nesting bird species shall be documented and, to the degree feasible, the nesting stage (e.g., incubation of eggs, feeding of young, near fledging) determined. Based on the species present and surrounding habitat, a no-disturbance buffer shall be established around each active nest. The buffer shall be identified by a qualified biologist and confirmed by the City. No construction or ground disturbance activities shall be conducted within the buffer until the	City Planner or Designee	No more than thirty (30) days prior to the commencement of ground disturbing activities.	Provide evidence that the required pre-construction survey has been completed.		Withhold grading permit.

Standard Condition/Mitigation Measure	Responsible for Monitoring	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
biologist has determined the nest is no longer active and has informed the City and construction supervisor that activities may resume.					
CULTURAL RESOURCES					
Standard Condition CR-1: Discovery of Archaeological Resources. Prior to commencement of grading activities, the City of Riverside Director of Building & Safety, or designee, shall verify that all project grading and construction plans include notes specifying that if archaeological resources are discovered during excavation, grading, or construction activities, work shall cease in the area of the find until a qualified archaeologist has evaluated the find in accordance with federal, state, and local guidelines, including those set forth in California Public Resources Code (PRC) Section 21083.2. Construction personnel shall not collect or move any archaeological materials and associated materials. Construction activity may continue unimpeded on other portions of the project site. The found deposits would be treated in accordance with federal, state, and local guidelines, including those set forth in PRC Section 21083.2.	City Building and Safety Department (or designee)	Prior to commencement of grading activities.	Provide evidence that the construction documents include instructions in the event archaeological resources are discovered. Provide evidence that appropriate buffer areas have been established.		Withhold grading permit and/or issuance of a stop work order.
Standard Condition CR-2: Discovery of Human Remains. Consistent with the requirements of California Code of Regulations (CCR) Section 15064.5(e), if human remains are encountered, work within 25 feet of the discovery shall be redirected and the Riverside County Coroner notified immediately. State Health and Safety Code Section 7050.5 states that no further	City Planner (or designee)	As soon as a discovery is made.	Provide evidence of notification to the Riverside County Coroner that discovery of human remains were found. If remains are Native American, provide evidence of notification to		Issuance of a stop work order.

Standard Condition/Mitigation Measure	Responsible for Monitoring	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
disturbance shall occur until the County Coroner has made a determination of origin and disposition pursuant to Public Resources Code (PRC) Section 5097.98. If the remains are determined to be Native American, the County Coroner shall notify the Native American Heritage Commission (NAHC), which shall determine and notify a Most Likely Descendant (MLD). With the permission of the property owner, the MLD may inspect the site of the discovery. The MLD shall complete the inspection within 48 hours of notification by the NAHC. The MLD may recommend scientific removal and nondestructive analysis of human remains and items associated with Native American burials. Consistent with CCR Section 15064.5(d), if the remains are determined to be Native American and an MLD is notified, the City shall consult with the MLD as identified by the NAHC to develop an agreement for treatment and disposition of the remains.			the Native American Heritage Commission.		
Mitigation Measure PAL-1: A paleontologist shall be hired to develop a Paleontological Resource Impact Mitigation Program (PRIMP) for this project. The PRIMP shall include the methods that will be used to protect paleontological resources that may exist within the project area, as well as procedures for monitoring, fossil preparation and identification, curation into a repository, and preparation of a report at the conclusion of grading. • Excavation and grading activities in deposits with high paleontological sensitivity (Older	City Planner (or designee)	During Plan Check. Prior to the issuance of grading/building permits and during construction activities.	Provide evidence that the Paleontological Resource Impact Mitigation Program has been prepared by a qualified paleontologist and to the satisfaction of the City Planner (or designee).		Withhold grading/ building permit and/or issuance of a stop work order.

Standard Condition/Mitigation Measure	Responsible for Monitoring	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
Alluvial Fan Deposits) shall be monitored by a paleontological monitor following a PRIMP. No monitoring is required for excavations in rocks with no paleontological sensitivity (Artificial Fill). • If paleontological resources are encountered during the course of ground disturbance, the paleontological monitor shall have the authority to temporarily redirect construction away from the area of the find in order to assess its significance. • Collected resources shall be prepared to the point of identification, identified to the lowest taxonomic level possible, cataloged, and curated into the permanent collections of a scientific institution. • At the conclusion of the monitoring program, a report of findings shall be prepared to document the results of the monitoring program. • In the event that paleontological resources are encountered when a paleontological monitor is not present, work in the immediate area of the find shall be redirected and a paleontologist should be contacted to assess the find for significance. If determined to be significant, the fossil shall be collected from the field.					
GEOLOGY AND SOILS					
Standard Condition GEO-1: Compliance with applicable California Building Code and Project-specific Geotechnical	City Building and Safety Department (or designee)	During Plan Check. Prior to the issuance of a	Verification that the project plans incorporate		Withhold grading and/or

Standard Condition/Mitigation Measure	Responsible for Monitoring	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
Recommendations. Prior to the approval of grading and/or building permits, the applicant shall provide evidence to the City for review and approval that on-site structures, features and facilities have been designed and will be constructed in conformance with applicable provisions of the California Building Code and the recommendations cited in the project-specific geotechnical investigation.		grading or building permit.	the applicable design recommendations.		building permits.
GREENHOUSE GAS EMISSIONS					
Standard Condition GCC-1: Greenhouse Gas Reduction Strategies. To ensure the proposed project complies with and would not conflict with or impede the implementation of reduction goals identified in the Riverside RRG-CAP, Assembly Bill (AB) 32, the Governor's Executive Order (EO) S-3-05, and other strategies to help reduce greenhouse gases (GHGs) to the level proposed by the Governor, the project will implement a variety of measures that will reduce its GHG emissions. To the extent feasible, and to the satisfaction of the City of Riverside (City), the following measures will be incorporated into the design and construction of the project: **Construction and Building Materials.** • Use locally produced and/or manufactured building materials for at least 10 percent of the construction materials used for the project. • Recycle/reuse at least 50 percent of the demolished and/or grubbed construction materials (including, but not limited to, soil,	City Planner (or designee)	During Plan Check. Prior to the issuance of a grading or building permit.	Provide verification that the project plans incorporate the recommended features and/follow applicable policies/practices.		Withhold building permits.

Standard Condition/Mitigation Measure	Responsible for Monitoring	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
vegetation, concrete, lumber, metal, and cardboard) if feasible. • Use "green building materials," such as those materials that are resource-efficient and are recycled and manufactured in an environmentally friendly way, for at least 10 percent of the project. **Energy Efficiency Measures.** • Design all project buildings to meet or exceed the California Building Code's (CBC) Title 24 energy standard, including, but not limited to, any combination of the following: ○ Increase insulation such that heat transfer and thermal bridging is minimized. ○ Limit air leakage through the structure or within the heating and cooling distribution system to minimize energy consumption. ○ Incorporate ENERGY STAR® or better rated windows, space heating and cooling equipment, light fixtures, appliances, or other applicable electrical equipment. • Install efficient lighting and lighting control systems. Use daylight as an integral part of the lighting systems in buildings. • Install "cool" roofs and cool pavements.					

Standard Condition/Mitigation Measure	Responsible for Monitoring	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance

• Install energy-efficient heating and cooling systems, appliances and equipment, and control systems.
• Install solar lights or light-emitting diodes (LEDs) for outdoor lighting or outdoor lighting that meets the City Code.
Water Conservation and Efficiency Measures.
• Devise a comprehensive water conservation strategy appropriate for the project and its location. The strategy may include the following, plus other innovative measures that may be appropriate:
  ○ Create water-efficient landscapes within the development.
  ○ Install water-efficient irrigation systems and devices, such as soil moisture-based irrigation controls.
  ○ Use reclaimed water, if available, for landscape irrigation within the project. Install the infrastructure to deliver and use reclaimed water, if available.
  ○ Design buildings to be water-efficient. Install water-efficient fixtures and appliances, including low-flow faucets and waterless urinals.
  ○ Restrict watering methods (e.g., prohibit systems that apply water to non-vegetated surfaces) and control runoff.
Solid Waste Measures.					

Standard Condition/Mitigation Measure	Responsible for Monitoring	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
• To facilitate and encourage recycling to reduce landfill-associated emissions, among others, the project will provide trash enclosures that include additional enclosed area(s) for collection of recyclable materials. The recycling collection area(s) will be located within, near, or adjacent to each trash and rubbish disposal area. The recycling collection area will be a minimum of 50 percent of the area provided for the trash/rubbish enclosure(s) or as approved by the Waste Management Department of the City of Riverside. • Provide employee education on waste reduction and available recycling services. **Transportation Measures.** • To facilitate and encourage non-motorized transportation, bicycle racks shall be provided in convenient locations to facilitate bicycle access to the project area. The bicycle racks shall be shown on project landscaping and improvement plans submitted for Planning Department approval and shall be installed in accordance with those plans. • Provide pedestrian walkway and connectivity requirements.					
HAZARDOUS MATERIALS					
Mitigation Measure HAZ-1: Prior to the issuance to the demolition or grading permit, the applicant shall provide evidence to the City for review and approval testing for lead-based paint (LBP) has been conducted.	City Planner or Designee	Prior to the issuance of demolition or grading permits.	Submittal of required lead based-pain (LBP) report.		Withhold grading and/or demolition permit.

Standard Condition/Mitigation Measure	Responsible for Monitoring	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
Mitigation Measure HAZ-2: Prior to issuance of a demolition or grading permit, the applicant shall submit to the City for review and approval, evidence that any on-site asbestos containing material (ACM) or lead based paint (LBP) contaminated material identified in any site-specific hazardous material investigation, has been removed, remediated and/or disposed of pursuant to the applicable local, regional, and/or State requirements. The removal and disposal of any such material shall be documented as part of a hazardous waste abatement report to be reviewed by the City prior to the issuance of demolition or grading permits.	City Planner or Designee	Prior to the issuance of demolition or grading permits.	Submittal and acceptance of final remediation/abatement report.		Withhold grading and/or demolition permit.
NOISE					
Standard Condition NOI-1: Construction Noise. Prior to issuance of building permits, Planning staff, or designee, shall verify that all construction plans include notes stipulating the following: • Construction activities shall be restricted within the City of Riverside to the hours of 7:00 a.m. to 7:00 p.m., Monday through Friday, and 8:00 a.m. to 5:00 p.m. on Saturdays, and are prohibited on Sundays and federal holidays. • During all project site demolition, excavation, and grading on site, the project contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers consistent with manufacturers' standards.	City Planner (or designee)	Prior to the issuance of grading and/or building permits and during construction activities.	Provide evidence that construction plans include the required measures and/or conduct site visits (as determined necessary by the City).		Withhold grading and/or building permit and/or issuance of a stop work order.

Standard Condition/Mitigation Measure	Responsible for Monitoring	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
• The project contractor shall place all stationary construction equipment so that emitted noise is directed away from sensitive receptors nearest the project site. • The construction contractor shall locate equipment staging in areas that will create the greatest distance between construction-related noise sources and noise-sensitive receptors nearest the project site during all project construction.					
Mitigation Measures NOI-1: Traffic/Train Noise Impacts. The following mitigation measures are required: • An interior noise analysis shall be required upon completion of detailed floor plans and prior to issuance of building permits to ensure compliance with the noise standard and with installation of an air conditioning unit. If noise standards are not met, the Applicant shall be required to enhance the building facades such as double-paned windows to comply with the interior noise standards. • Air conditioning, a form of mechanical ventilation, shall be required for all residences to ensure that windows and doors can remain closed for a prolonged period of time to maintain the interior noise standard. • A minimum noise barrier height of up to 10 feet shall be required along the southern project property line and a portion of the east and west property lines around the	City Planner (or designee)	Prior to the issuance of building permits. Prior to release Certificate of Occupancy.	Provide evidence that project plans include the recommended features. Provide results of the interior noise analysis. Site visit by City staff.		Withhold building permits. Withhold release Certificate of Occupancy.

Standard Condition/Mitigation Measure	Responsible for Monitoring	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
recreational area to shield the playground and residences closest to the southern property line (Lots 10 through 16) from train related noises. • A minimum noise barrier height of 8 feet shall be required along the rear private property lines of Lots 1 through 9 and Lots 17 through 21; and south private property lines of Lots 8, 9, and 17 to shield outdoor active use area (e.g., backyards or balconies) from train related noises. • A minimum noise barrier height of 6 feet shall be required along the south private property lines of Lots 10 through 16 and west private property line of Lot 16 to shield the outdoor active use areas such as backyards or balconies from traffic noise along Indiana Avenue and State Route 91 freeway. • A minimum noise barrier height of 6 feet shall be required along the private property line immediately south of Indiana Avenue (Lots 1, and 21 through 30) to shield outdoor active use areas such as backyards or balconies from traffic noise along Indiana Avenue and State Route 91 freeway. • Building façade upgrades (e.g., double-paned windows with a sound transmission class rating of STC-28 or higher) shall be required for all residences located south of Indiana Avenue (Lots 12, 21 through 30). • Building façade upgrades (e.g., double-paned windows with STC-28 or higher) shall be					

Standard Condition/Mitigation Measure	Responsible for Monitoring	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
required for all residences facing the BNSF railroad tracks (Lots 1 through 21 and 43 through 48).					
Mitigation Measure NOI-2: On-Site Operational Noise Impacts. A minimum noise barrier height of 8 feet along the east side of the project is required to shield on-site ground floor HVAC equipment.	City Planner or Director (or designee)	Prior to the issuance of building permits. Prior to release of Certificate of Occupancy.	Provide evidence that the project plans included the required wall. Site visit by City staff.		Withhold building permits. Withhold release of Certificate of Occupancy.
Mitigation Measure NOI-3: Short-Term Construction Vibration Impacts. The construction contractor shall use light construction equipment (e.g., small bulldozers and trucks) within 15 feet of the eastern property line.	City Planner or Director (or designee)	During Plan Check and during construction activities.	Provide evidence that the construction plans include this restriction. Verification through site visit (as required).		Withhold grading and/or demolition permits and/or issuance of a stop work order.
TRAFFIC					
Mitigation Measure TRA-1: Intersection of Donald Avenue-Project Driveway/Indiana Avenue. Prior to issuance of a Certificate of Occupancy, the City of Riverside, Traffic Engineering Section City Engineer, or designee, shall verify that the Donald Avenue-Project Driveway/Indiana Avenue intersection has restriped Indiana Avenue to provide a two way left-turn lane along the project frontage.	City Traffic Engineer (or designee)	Prior to the issuance of Certificate of Occupancy.	Provide evidence that the project applicant has restriped a two way left-turn lane along the project frontage.		Withhold Certificate of Occupancy.
TRIBAL CULTURAL RESOURCES					
Mitigation Measure TRI-1: At least 30 days prior to filing of a grading permit, the project applicant shall contact and notify the consulting tribe(s) of anticipated grading and excavation	City Planner (or designee)	At least 30 days prior to issuance of grading permit.	Provide approved Tribal Cultural Resources Management Agreement between the applicant and		Withhold grading permit.

Standard Condition/Mitigation Measure	Responsible for Monitoring	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
activities. In conjunction with the City and the consulting tribe(s), the applicant shall develop a Tribal Cultural Resources Monitoring Agreement. A copy of the monitoring agreement shall be provided to the City prior to the issuance of any grading permit for the project. The agreement shall address the details, timing, and responsibility of all archaeological and cultural activities that will occur on the project site. Details in the Plan shall include: • Project grading and development scheduling. • The development of a rotating or simultaneous schedule in coordination with the applicant and the designated Native American Tribal Monitor(s) during grading, excavation, and ground-disturbing activities on the site, including the scheduling, safety requirements, duties, scope of work, reimbursement, and Native American Tribal Monitor(s)' authority to stop and redirect grading activities in coordination with a qualified archaeologist. • The protocols and stipulations that the City, tribe(s) and qualified archaeologist will follow in the event of inadvertent discovery of tribal cultural resources (see Mitigation Measure TRI-2).			the affected Native American tribal governments.		
Mitigation Measure TRI-2: In the event of an inadvertent discovery of any tribal cultural resource(s), the landowner(s) shall relinquish ownership of all such resources, including (but not limited to) sacred items, burial goods, and	City Planner (or designee)	Upon discovery of inadvertent discovery and development of a reburial and/or	1) Submit and provide evidence that any inadvertent discovery of any tribal cultural resource has been		Issuance of a stop work order.

Standard Condition/Mitigation Measure	Responsible for Monitoring	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
related archaeological artifacts and burial remains. The applicant shall relinquish the artifacts through one or more of the following methods: • A fully executed reburial agreement with the consulting Native American tribe(s) for discovery of tribal cultural resources. This shall include measures and provisions to protect the future reburial area from any future impacts. Reburial shall not occur until all cataloguing and recordation on appropriate Department of Parks and Recreation (DPR) 523-series forms have been completed. Non-tribal cultural resources will be addressed in coordination with the City and qualified archaeologist in accordance with professional standards. • A curation agreement with an appropriate qualified repository within Riverside County that meets federal standards per 36 CFR Part 79. The collections and associated records shall be transferred, including title, to an appropriate curation facility within Riverside County be accompanied by payment of the fees necessary for permanent curation.		curation agreement.	appropriately and/or recorded, and relinquished to the consulting Native American tribe(s). 2) Submit an approved reburial agreement. 3) Submit an approved curation agreement.		

Standard Condition/Mitigation Measure	Responsible for Monitoring	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
Mitigation Measure TRI-3: Prior to the issuance of grading permits, the applicant shall submit to the City for review and approval, evidence that planned on-site excavation activities conform to the applicable provisions of the Tribal Cultural Resources Monitoring Agreement.	City Planner (or designee)	During Plan Check. Prior to the issuance of grading permits. Site visits during construction (as determined necessary by the City).	Provide evidence that the proposed excavation activities conform with the approved Tribal Cultural Resources Monitoring Agreement. Site visits (as warranted).		Withhold grading, demolition and/or building permits. Issuance of a stop work order (as warranted).

Appendix A:
Air Quality and Greenhouse Gas Impact Analysis

AIR QUALITY AND GREENHOUSE GAS IMPACT ANALYSIS

HAWTHORNE RESIDENTIAL DEVELOPMENT PROJECT

CITY OF RIVERSIDE, CALIFORNIA

Tung-chen Chung, Ph.D., INCE Board Certified

LSA

May 2017

AIR QUALITY AND GREENHOUSE GAS IMPACT ANALYSIS

HAWTHORNE RESIDENTIAL DEVELOPMENT PROJECT

CITY OF RIVERSIDE, CALIFORNIA

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Project No. SWK1502

LSA

May 2017

EXECUTIVE SUMMARY

LSA was retained to prepare an air quality and greenhouse gas (GHG) impact analysis for the proposed residential development project located at 9170 Indiana Avenue, in the City of Riverside, Riverside County, California.

This air quality and GHG impact analysis provides a discussion of the proposed project, the physical setting of the project area, and the regulatory framework for air quality. The report provides data on existing air quality and evaluates potential air quality and GHG impacts associated with the proposed project. Modeled air quality levels are based upon default trip generation for the proposed uses included in the project.

Regional emissions during project construction, calculated with the California Emission Estimation Model (CalEEMod; Version 2016.3.1), would not exceed criteria pollutant thresholds established by the South Coast Air Quality Management District (SCAQMD). Compliance with SCAQMD Rules and Regulations during construction will reduce construction-related air quality impacts from fugitive dust emissions and construction equipment emissions. Standard dust suppression measures have been identified for short-term construction to meet the SCAQMD emissions thresholds. The proposed project would also not exceed the localized significance thresholds (LSTs).

Pollutant emissions from project operation, also calculated with the CalEEMod model, would not exceed the SCAQMD thresholds for any criteria pollutants. LSTs would not be exceeded by long-term emissions from operation of the project. Historical air quality data show that existing carbon monoxide (CO) levels for the project area and the general vicinity do not exceed either State or federal ambient air quality standards. The CO concentrations in the project area are much lower than the federal and State CO standards. The proposed project would not result in any significant increase in CO concentrations at intersections in the project vicinity. Therefore, project-related traffic would not significantly affect local CO levels under future year conditions, and the CO concentrations would be below the State and federal standards. No significant impact on local CO levels would occur.

The proposed project is located in the City of Riverside, Riverside County, which is among the counties that are found to not have serpentine and ultramafic rock in their soils.[1] Therefore, the potential risk for naturally occurring asbestos during project construction is small and less than significant.

The potential of the project to affect global climate change (GCC) is also addressed. Short-term construction and long-term operational emissions of the principal GHGs, including carbon dioxide and methane, are quantified, and their significance relative to the California Air Resources Board (ARB) Scoping Plan is discussed. The proposed project will not exceed any proposed GHG emissions thresholds or conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions.

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[1] Department of Conservation Division of Mines and Geology. A general location guide for ultramafic rocks in California – Areas more likely to contain naturally occurring asbestos, August 2000. Website: ftp://ftp.consrv.ca.gov/pub/dmg/pubs/ofr/ofr_2000-019.pdf, accessed October 2016.

The proposed project will require a General Plan Amendment (Planning Case P16-0112) from B/OP – Business/Office Park to MDR – Medium Density Residential and a Zone Change (Planning Case P16-0113) from PF - Public Facilities to R-1-7000 - Single-family residential. The regional Air Quality Management Plan was developed with operational emissions from the previous elementary school on the project site. Based on the defaults trip rates and trip lengths in the Institute of Transportation Engineers Trip Generation Manual, Ninth Edition for the previous elementary school and the proposed project, the proposed project would produce a lower amount of vehicle miles traveled and thus lower operational emissions than the former elementary school. Therefore, the proposed uses are consistent with the regional Air Quality Management Plan.

The evaluation was prepared in conformance with appropriate standards, utilizing procedures and methodologies in the SCAQMD *California Environmental Quality Act (CEQA) Air Quality Handbook* (SCAQMD 1993) and associated updates. Air quality data posted on the respective websites of the California Air Resources Board and the United States Environmental Protection Agency are included to document the local air quality environment.

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APPENDIX

A: TRAFFIC DATA & CALEEMOD MODEL PRINTOUTS

ACRONYMS AND ABBREVIATIONS

°C	degrees Celsius
°F	degrees Fahrenheit
$\mu g/m^3$	micrograms per cubic meter
AAQS	ambient air quality standards
AB	Assembly Bill
ac	acre(s)
AQMP	Air Quality Management Plan
AR4	Fourth Assessment Report
ARB	California Air Resources Board
Basin	South Coast Air Basin
CAA	Clean Air Act
CAAQS	California ambient air quality standards
CalEEMod	California Emission Estimation Model
CalEPA	California Environmental Protection Agency
CAT	Climate Action Team
CCAA	California Clean Air Act
CCR	California Code of Regulations
CEC	California Energy Commission
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CFCs	chlorofluorocarbons
CH_4	Methane
City	City of Riverside
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalents
County	County of Riverside
Diesel RRP	Diesel Risk Reduction Plan
DPM	particulate matter from diesel-fueled engines
EO	Executive Order
EPA	United States Environmental Protection Agency

ft	foot/feet
GCC	global climate change
GHG	greenhouse gas
GPO	United States Government Printing Office
GWP	Global Warming Potential
H_2S	hydrogen sulfide
HFCs	hydrofluorocarbons
IGR	Intergovernmental Review
IPCC	Intergovernmental Panel on Climate Change
ITE	Institute of Transportation Engineers
lbs/day	pounds per day
LST	localized significance threshold
m	meter(s)
mg/m^3	milligrams per cubic meter
MMT	million metric tons
MMT CO_2e	million metric tons of carbon dioxide equivalent
MMT CO_2e/yr	million metric tons of carbon dioxide equivalent per year
mpg	miles per gallon
mph	miles per hour
MPO	Metropolitan Planning Organization
MT	metric tons
MT CO_2e	metric tons of carbon dioxide equivalent
MT CO_2e/yr	metric tons of carbon dioxide equivalent per year
MT/yr	metric tons per year
MW	megawatts
N_2O	nitrous oxide
NAAQS	national ambient air quality standards
NEPA	National Environmental Policy Act
NHTSA	National Highway Traffic Safety Administration
NO	nitric oxide
NO_2	nitrogen dioxide
NOA	naturally occurring asbestos
NO_X	nitrogen oxides

O_3	ozone
OMB	White House Office of Management and Budget
OPR	Office of Planning and Research
PFCs	perfluorocarbons
PM_{10}	particulate matter less than 10 microns in diameter
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
ppm	parts per million
PRC	Public Resource Code
project	residential development project
ROCs	reactive organic compounds
ROGs	reactive organic gases
RPS	Renewable Portfolio Standard
RPS Program	California Renewable Portfolio Standard Program
RTP	Regional Transportation Plan
SB	Senate Bill
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCS	Sustainable Communities Strategy
SF_6	sulfur hexafluoride
SIP	State Implementation Plan
SO_2	sulfur dioxide
SONGS	San Onofre Nuclear Generating Station
SRA	Source Receptor Area
TACs	toxic air contaminants
T-BACT	toxics best available control technology
UNFCCC	United Nations Framework Convention on Climate Change
USC	United States Code
VMT	vehicle miles traveled
VOC	volatile organic compounds

PROJECT DESCRIPTION

INTRODUCTION

This air quality and greenhouse gas (GHG) impact analysis has been prepared to evaluate the potential air quality and GHG impacts and mitigation measures associated with the proposed residential development project (project) located at 9170 Indiana Avenue, in the City of Riverside (City), County of Riverside (County), California. This report provides a project-specific air quality and GHG impact analysis by examining the impacts of the proposed uses on adjacent sensitive uses, as well as the impacts on the proposed uses on the project site, and evaluating the mitigation measures required as part of the project design. Guidelines identified by the South Coast Air Quality Management District (SCAQMD) in its *CEQA Air Quality Handbook* (SCAQMD 1993) and associated updates (SCAQMD, 2016) will be followed in this air quality and GHG impact analysis.

REGIONAL PROJECT LOCATION

The project site is a former elementary school located south of Indiana Avenue and north of existing railroad tracks, between Gibson Street and Jackson Street in the City of Riverside, Riverside County. Figure 1 shows the project location.

PROJECT CHARACTERISTICS

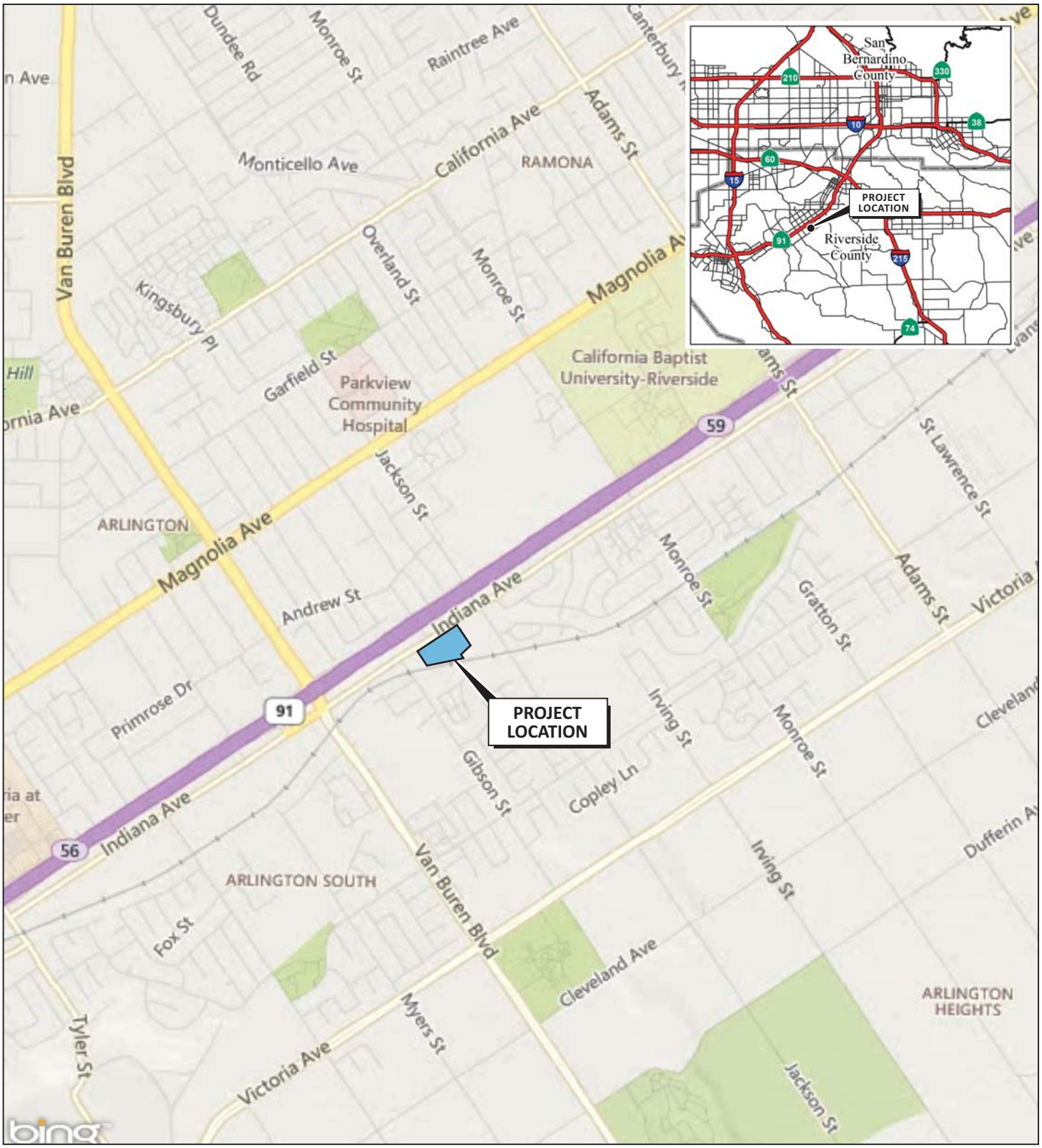
The project consists of the construction of 54 single-family dwelling units. Figure 2 illustrates the site plan.

The proposed uses are not consistent with the current General Plan land use and zoning designations and thus will require a General Plan Amendment (Planning Case P16-0112) from B/OP – Business/Office Park to MDR – Medium Design Residential and a Zone Change (Planning Case P16-0113) from PF - Public Facilities to R-1-7000 - Single-family residential.

LAND USES IN THE PROJECT VICINITY

The project site is surrounded primarily by residential development with the nearest residential use east of the project site having a garage located approximately 7 ½ feet from property line and the residence located approximately 25 feet from property line. The areas adjacent to the project site include the following uses:

- **North:** Residential uses on the north side of Indiana Avenue
- **East:** Vacant land and single-family residential development
- **South:** Burlington Northern Santa Fe (BNSF) Railway right-of-way with substation, vacant land and single-family residential development further south
- **West:** Vacant land, with Gibson Street and a single-family residential development further west



LSA

FIGURE 1

N

0 1000 2000

FEET

SOURCE: Bing Maps

Hawthorne Residential Development Project

Project Location Map

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LSA

FIGURE 2

N

0 70 140
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SOURCE: SDH and Associates, Inc. February, 2016.

I:\SWK1502\G\Site Plan.cdr (8/8/2017)

Hawthorne Residential Development Project

Site Plan

SETTING

REGIONAL AIR QUALITY

The project site is located in the City of Riverside in the non-desert portion of the County of Riverside, California, which is part of the South Coast Air Basin (Basin) and is under the jurisdiction of the SCAQMD. The air quality assessment for the proposed project includes estimating emissions associated with short-term construction and long-term operation of the proposed project.

A number of air quality modeling tools are available to assess the air quality impacts of projects. In addition, certain air districts, such as the SCAQMD, have created guidelines and requirements to conduct air quality analyses. The SCAQMD's current guidelines, included in its *CEQA Air Quality Handbook* (1993) and associated updates (SCAQMD, 2016), were adhered to in the assessment of air quality impacts for the proposed project.

Both the State of California and the federal government have established health-based ambient air quality standards (AAQS) for seven air pollutants. As detailed in Table A, these pollutants include ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter less than 10 microns in size (PM_{10}), particulate matter less than 2.5 microns in size ($PM_{2.5}$), and lead. In addition, the State has set standards for sulfates, hydrogen sulfide (H_2S), vinyl chloride, and visibility-reducing particles. These standards are designed to protect the health and welfare of the populace with a reasonable margin of safety.

In addition to setting out primary and secondary AAQS, the State of California has established a set of episode criteria for O_3, CO, NO_2, SO_2, and PM_{10}. These criteria refer to episode levels representing periods of short-term exposure to air pollutants that actually threaten public health. Health effects are progressively more severe as pollutant levels increase from Stage One to Stage Three. An alert level is that concentration of pollutants at which initial stage control actions are to begin. An alert will be declared when any one of the pollutant alert levels is reached at any monitoring site and meteorological conditions are such that the pollutant concentrations can be expected to remain at these levels for 12 or more hours or to increase; or, in the case of oxidants, the situation is likely to recur within the next 24 hours unless control actions are taken.

Pollutant alert levels:

- **O_3:** 392 micrograms per cubic meter ($\mu g/m^3$) (0.20 parts per million [ppm]), 1-hour average
- **CO:** 17 milligrams per cubic meter (mg/m^3) (15 ppm), 8-hour average
- **NO_2:** 1,130 $\mu g/m^3$ (0.6 ppm), 1-hour average; 282 $\mu g/m^3$ (0.15 ppm), 24-hour average
- **SO_2:** 800 $\mu g/m^3$ (0.3 ppm), 24-hour average
- **Particulates, measured as PM_{10}:** 350 $\mu g/m^3$, 24-hour average

Table A: Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[1]		Federal Standards[2]		
		Concentration[3]	Method[4]	Primary[3,5]	Secondary[3,6]	Method[7]
Ozone (O_3)	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 (PM_{10})[8]	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 ($PM_{2.5}$)[9]	24-Hour	No Separate State Standard		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		
Carbon Monoxide (CO)	8-Hour	9.0 ppm (10 mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	9 ppm (10 mg/m^3)	None	Non-Dispersive Infrared Photometry (NDIR)
	1-Hour	20 ppm (23 mg/m^3)		35 ppm (40 mg/m^3)		
	8-Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		—	—	—
Nitrogen Dioxide (NO_2)[10]	Annual Arithmetic Mean	0.030 ppm (57 µg/m^3)	Gas Phase Chemiluminescence	53 ppb (100 µg/m^3)	Same as Primary Standard	Gas Phase Chemiluminescence
	1-Hour	0.18 ppm (339 µg/m^3)		100 ppb (188 µg/m^3)	None	
Sulfur Dioxide (SO_2)[11]	Annual Arithmetic Mean	—	Ultraviolet Fluorescence	0.030 ppm (for certain areas)[10]		Ultraviolet Fluorescence; Spectrophotometry (Pararosaniline Method)
	24-Hour	0.04 ppm (105 µg/m^3)		0.14 ppm (for certain areas)[10]	—	
	3-Hour	—		—	0.5 ppm (1300 µg/m^3)	
	1-Hour	0.25 ppm (655 µg/m^3)		75 ppb (196 µg/m^3)	—	
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 Federal 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			

Source: Ambient Air Quality Standards (ARB 2016).
The footnotes for this table are provided on the following page.

Footnotes:

[1] California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1- and 24-hour), nitrogen dioxide, and particulate matter (PM_{10}, $PM_{2.5}$, 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 per year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over 3 years, is equal to or less than the standard. For PM_{10}, 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 1. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standard. Contact the 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 procedure which can be shown to the satisfaction of 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 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 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 $PM_{2.5}$ primary standard was lowered from 15 $\mu g/m^3$ to 12.0 $\mu g/m^3$. The existing national 24-hour $PM_{2.5}$ standards (primary and secondary) were retained at 35 $\mu g/^3$, as was the annual secondary standard of 15 $\mu g/m^3$. The existing 24-hour PM_{10} 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 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, the 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 1 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 1 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 standards 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 Basins, respectively.

°C = degrees Celsius
$\mu g/m^3$ = micrograms per cubic meter
ARB = California Air Resources Board
EPA = United States Environmental Protection Agency
mg/m^3 = milligrams per cubic meter
ppb = parts per billion
ppm = parts per million

Table B summarizes the primary health effects and sources of common air pollutants. Because the concentration standards were set at a level that protects public health with an adequate margin of safety (United States Environmental Protection Agency [EPA]), these health effects will not occur unless the standards are exceeded by a large margin or for a prolonged period of time. State AAQS are more stringent than federal AAQS. Among the pollutants, O_3 and particulate matter ($PM_{2.5}$ and PM_{10}) are considered regional pollutants, while the others have more localized effects.

Table B: Summary of Health Effects of the Major Criteria Air Pollutants

Pollutant	Health Effects	Examples of Sources
Particulate matter (PM_{10}: less than or equal to 10 microns)	• Increased respiratory disease • Lung damage • Premature death	• Cars and trucks, especially diesels • Fireplaces, wood stoves • Windblown dust from roadways, agriculture, and construction
Ozone (O_3)	• Breathing difficulties • Lung damage	Formed by chemical reactions of air pollutants in the presence of sunlight; common sources are motor vehicles, industries, and consumer products
Carbon monoxide (CO)	• Chest pain in heart patients • Headaches, nausea • Reduced mental alertness • Death at very high levels	Any source that burns fuel, such as cars, trucks, construction and farming equipment, and residential heaters and stoves
Nitrogen dioxide (NO_2)	Lung damage	See CO sources
Toxic air contaminants	• Cancer • Chronic eye, lung, or skin irritation • Neurological and reproductive disorders	• Cars and trucks, especially diesels • Industrial sources such as chrome platers • Neighborhood businesses such as dry cleaners and service stations • Building materials and products

Source: ARB Fact Sheet: Air Pollution and Health. Website: http://www.arb.ca.gov/research/health/fs/fs1/fs1.htm, accessed October 2016.
Notes:
ARB = California Air Resources Board

The California Clean Air Act (CCAA) provides SCAQMD and other air districts with the authority to manage transportation activities at indirect sources. Indirect sources of pollution include any facility, building, structure, or installation, or combination thereof, that attracts or generates mobile-source activity that results in emissions of any pollutant. In addition, area sources that are generated when minor sources collectively emit a substantial amount of pollution are also managed by the local air districts. Examples of this would be the motor vehicles at an intersection, a mall, and on highways. SCAQMD also regulates stationary sources of pollution throughout its jurisdictional area. Direct emissions from motor vehicles are regulated by the California Air Resources Board (ARB).

Climate/Meteorology

Air quality in the planning area is not only affected by various emission sources (mobile and industry, etc.), but also by atmospheric conditions such as wind speed, wind direction, temperature, and rainfall, etc. The combination of topography, low mixing height, abundant sunshine, and emissions from the second largest urban area in the United States gives the Basin the worst air pollution problem in the nation.

The annual average temperature varies little throughout the Basin, ranging from the low to middle 60s, measured in degrees Fahrenheit (°F). With a more pronounced oceanic influence, coastal areas

show less variability in annual minimum and maximum temperatures than inland areas. The climatological station closest to the site with complete weather data is the Riverside-Fire Station 3, which provides sufficient data for average temperatures in the project area. Riverside-Fire Station 3[1] shows that the monthly average maximum temperature recorded ranged from 66.8°F in January to 94.4°F in August, with an annual average maximum of 79.5°F. The monthly average minimum temperature recorded at this station ranged from 39.1°F in January to 59.6°F in August, with an annual average minimum of 48.6°F. January is typically the coldest month, and July and August are typically the warmest months in this area of the Basin.

The majority of annual rainfall in the Basin occurs between November and April. Summer rainfall is minimal and is generally limited to scattered thundershowers in coastal regions and slightly heavier showers in the eastern portion of the Basin and along the coastal side of the mountains. Riverside-Fire Station 3's monitored precipitation shows that average monthly rainfall varied from 2.20 inches in February to 0.44 inch or less from May to October, with an annual total of 10.21 inches. Patterns in monthly and yearly rainfall totals are unpredictable due to fluctuations in the weather.

The Basin experiences a persistent temperature inversion (increasing temperature with increasing altitude) as a result of the Pacific high. This inversion limits the vertical dispersion of air contaminants, holding them relatively near the ground. As the sun warms the ground and the lower air layer, the temperature of the lower air layer approaches the temperature of the base of the inversion (upper) layer until the inversion layer finally breaks, allowing vertical mixing with the lower layer. This phenomenon is observed in mid-afternoon to late afternoon on hot summer days, when the smog appears to clear up suddenly. Winter inversions frequently break by midmorning.

Winds in the vicinity of the project area blow predominantly from the south-southwest, with relatively low velocities. Wind speeds in the project area average about 5 miles per hour (mph). Summer wind speeds average slightly higher than winter wind speeds. Low average wind speeds, together with a persistent temperature inversion limit the vertical dispersion of air pollutants throughout the Basin. Strong, dry, north or northeasterly winds, known as Santa Ana winds, occur during the fall and winter months, dispersing air contaminants. The Santa Ana conditions tend to last for several days at a time.

The combination of stagnant wind conditions and low inversions produces the greatest pollutant concentrations. On days of no inversion or high wind speeds, ambient air pollutant concentrations are the lowest. During periods of low inversions and low wind speeds, air pollutants generated in urbanized areas are transported predominantly on shore into Riverside and San Bernardino Counties. In the winter, the greatest pollution problems are CO and nitrogen oxides (NO_X) because of extremely low inversions and air stagnation during the night and early morning hours. In the summer, the longer daylight hours and the brighter sunshine combine to cause a reaction between hydrocarbons and NO_X to form photochemical smog.

Description of Global Climate Change and Its Sources

Global climate change (GCC) is the observed increase in the average temperature of the Earth's atmosphere and oceans along with other significant changes in climate (such as precipitation or

[1] Western Regional Climate Center. Website: www.wrcc.dri.edu, accessed October 2016.

wind) that last for an extended period of time. The term "global climate change" is often used interchangeably with the term "global warming," but "global climate change" is preferred to "global warming" because it helps convey that there are other changes in addition to rising temperatures.

Climate change refers to any change in measures of weather (such as temperature, precipitation, or wind) lasting for an extended period (decades or longer). Climate change may result from natural factors, such as changes in the sun's intensity; natural processes within the climate system, (e.g., changes in ocean circulation); or human activities, such as the burning of fossil fuels, land clearing, or agriculture. The primary observed effect of GCC has been a rise in the average global tropospheric[1] temperature of 0.36°F per decade, determined from meteorological measurements worldwide between 1990 and 2005. Climate change modeling shows that further warming may occur, which may induce additional changes in the global climate system during the current century. Changes to the global climate system, ecosystems, and the environment of California could include higher sea levels, drier or wetter weather, changes in ocean salinity, changes in wind patterns, or more energetic aspects of extreme weather, including droughts, heavy precipitation, heat waves, extreme cold, and increased intensity of tropical cyclones. Specific effects in California might include a decline in the Sierra Nevada snowpack, erosion of California's coastline, and seawater intrusion in the San Joaquin Delta.

Global surface temperatures have risen by 1.33°F ±0.32°F over the last 100 years. The rate of warming over the last 50 years is almost double that over the last 100 years (IPCC 2013). The latest projections, based on state-of-the art climate models, indicate that temperatures in California are expected to rise 3–10.5°F by the end of the century (State of California 2013). The prevailing scientific opinion on climate change is that "most of the warming observed over the last 60 years is attributable to human activities" (IPCC 2013). Increased amounts of CO_2 and other GHGs are the primary causes of the human-induced component of warming. The observed warming effect associated with the presence of GHGs in the atmosphere (from either natural or human sources) is often referred to as the greenhouse effect.[2]

GHGs are present in the atmosphere and naturally, are released by natural sources, or are formed from secondary reactions taking place in the atmosphere. The gases that are widely seen as the principal contributors to human-induced GCC are:[3]

- Carbon dioxide (CO_2)
- CH_4 (methane)
- Nitrous oxide (N_2O)
- Hydrofluorocarbons (HFCs)

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1 The troposphere is the zone of the atmosphere characterized by water vapor, weather, winds, and decreasing temperature with increasing altitude.

2 The temperature on Earth is regulated by a system commonly known as the "greenhouse effect." Just as the glass in a greenhouse allows in heat from sunlight and reduces the amount of heat that escapes, GHGs like CO_2, CH_4, and N_2O in the atmosphere keep the Earth at a relatively even temperature. Without the greenhouse effect, the Earth would be a frozen globe; thus, the *naturally occurring* greenhouse effect is necessary to keep our planet at a comfortable temperature.

3 The GHGs listed are consistent with the definition in Assembly Bill 32 (Government Code 38505), as discussed later in this section.

- Perfluorocarbons (PFCs)
- Sulfur hexafluoride (SF_6)

Over the last 200 years, human activities have caused substantial quantities of GHGs to be released into the atmosphere. These extra emissions are increasing GHG concentrations in the atmosphere and enhancing the natural greenhouse effect, which some scientists believe can cause global warming. While GHGs produced by human activities include naturally occurring GHGs such as CO_2, CH_4, and N_2O, some gases, like HFCs, PFCs, and SF_6, are completely new to the atmosphere. Certain other gases, such as water vapor, are short-lived in the atmosphere as compared to these GHGs that remain in the atmosphere for significant periods of time, contributing to climate change in the long term. Water vapor is generally excluded from the list of GHGs because it is short-lived in the atmosphere and its atmospheric concentrations are largely determined by natural processes, such as oceanic evaporation. For the purposes of this air quality and GHG impact analysis, the term "GHG" will refer collectively to the six gases identified in the bulleted list provided above.

These gases vary considerably in terms of Global Warming Potential (GWP), which is a concept developed to compare the ability of each GHG to trap heat in the atmosphere relative to another gas. GWP is based on several factors, including the relative effectiveness of a gas in absorbing infrared radiation and the length of time that the gas remains in the atmosphere ("atmospheric lifetime"). GWP of each gas is measured relative to CO_2, the most abundant GHG. The definition of GWP for a particular GHG is the ratio of heat trapped by one unit mass of the GHG to the ratio of heat trapped by one unit mass of CO_2 over a specified time period. GHG emissions are typically measured in terms of metric tons (MT)[1] of "CO_2 equivalents" (CO_2e). For example, N_2O is 265 times more potent at contributing to global warming than CO_2. Table C identifies the GWP for each type of GHG analyzed in this report.

Table C: Global Warming Potential of Greenhouse Gases

Gas	Atmospheric Lifetime (Years)	Global Warming Potential (100-Year Time Horizon)
Carbon Dioxide (CO_2)	~100	1
Methane (CH_4)	12	28
Nitrous Oxide (N_2O)	121	265

Source: *First Update to the Climate Change Scoping Plan: Building on the Framework Pursuant to AB 32, the California Global Warming Solutions Act* (ARB 2014b).
Notes:
AB 32 = Assembly Bill 32
ARB = California Air Resources Board

Carbon Dioxide. In the atmosphere, carbon generally exists in its oxidized form, as CO_2. Natural sources of CO_2 include the respiration (breathing) of humans, animals, and plants; volcanic outgassing; decomposition of organic matter; and evaporation from the oceans. Human-caused sources of CO_2 include the combustion of fossil fuels and wood, waste incineration, mineral production, and deforestation. Rates of CO_2 removal through carbon sinks may increase (e.g. due to steeper concentration gradients) in response to an increase in carbon source emissions and the resulting state of the carbon cycle will be different from before the increase. Natural changes to the

[1] A metric ton is equivalent to approximately 1.1 tons.

carbon cycle work slowly, especially compared to the rapid rate at which humans are adding CO_2 to the atmosphere. Natural removal processes, such as photosynthesis by land- and ocean-dwelling plant species, cannot keep pace with this extra input of human-made CO_2. Consequently, the gas is building up in the atmosphere. The concentration of CO_2 in the atmosphere has risen approximately 30 percent since the late 1800s (CalEPA 2010).

The transportation sector remains the largest source of GHG emissions in 2014 with 25 percent of California's GHG emission inventory (EPA 2016). When electricity-related emissions are distributed to economic end-use sectors, transportation activities accounted for 33.4 percent of U.S. CO_2 emissions from fossil fuel combustion in 2014. The largest sources of transportation CO_2 emissions in 2014 were passenger cars (42.4 percent), medium- and heavy-duty trucks (23.1 percent), light-duty trucks, which include sport utility vehicles, pickup trucks, and minivans (17.8 percent), commercial aircraft (6.6 percent), pipelines (2.7 percent), rail (2.6 percent), and ships and boats (1.6 percent).

Methane. CH_4 is produced when organic matter decomposes in environments lacking sufficient oxygen. Natural sources of CH_4 include fires, geologic processes, and bacteria that produce CH_4 in a variety of settings (most notably, wetlands) (EPA 2010). Anthropogenic sources include rice cultivation, livestock, landfills and waste treatment, biomass burning, and fossil fuel combustion (burning of coal, oil, and natural gas, etc.). As with CO_2, the major removal process of atmospheric CH_4—a chemical breakdown in the atmosphere—cannot keep pace with source emissions, and CH_4 concentrations in the atmosphere are increasing.

Nitrous Oxide. N_2O is produced naturally by a wide variety of biological sources, particularly microbial action in soils and water. Tropical soils and oceans account for the majority of natural source emissions. N_2O is also a product of the reaction that occurs between nitrogen and oxygen during fuel combustion. Both mobile and stationary combustion sources emit N_2O. The quantity of N_2O emitted varies according to the type of fuel, technology, and pollution control device used, as well as maintenance and operating practices. Agricultural soil management and fossil fuel combustion are the primary sources of human-generated N_2O emissions in California.

Hydrofluorocarbons, Perfluorocarbons, and Sulfur Hexafluoride. HFCs are primarily used as substitutes for O_3-depleting substances regulated under the Montreal Protocol.[1] PFCs and SF_6 are emitted from various industrial processes, including aluminum smelting, semiconductor manufacturing, electric power transmission and distribution, and magnesium casting. There is no aluminum or magnesium production in California; however, the rapid growth in the semiconductor industry, which is active in California, has led to greater use of PFCs. However, there are no known project-related emissions of these three GHGs; therefore, these substances are not discussed further in this analysis.

Emissions Sources and Inventories

An emissions inventory that identifies and quantifies the primary human-generated sources and sinks of GHGs is a well-recognized and useful tool for addressing climate change. This section summarizes the latest information on global, national, California, and local GHG emission inventories. However,

[1] The Montreal Protocol is an international treaty that was approved on January 1, 1989, and was designated to protect the ozone layer by phasing out the production of several groups of halogenated hydrocarbons believed to be responsible for O_3 depletion.

because GHGs persist for a long time in the atmosphere (see Table C), accumulate over time, and are generally well mixed, their impact on the atmosphere and climate cannot be tied to a specific point of emission.

Global Emissions. Worldwide emissions of GHGs in 2012 totaled 29 billion MT of CO_2e (UNFCCC 2015). Global estimates are based on country inventories developed as part of the programs of the United Nations Framework Convention on Climate Change (UNFCCC).

United States Emissions. In 2014, the United States emitted approximately 6.87 billion MT of CO_2e. Total U.S. emissions have increased by 7.4 percent from 1990 to 2014, and emissions increased from 2013 to 2014 by 1.0 percent. In 2014, relatively cool winter conditions led to an increase in fuels for the residential and commercial sectors for heating. Additionally, transportation emissions increased as a result of a small increase in vehicle miles traveled (VMT) and fuel use across on-road transportation modes. There also was an increase in industrial production across multiple sectors resulting in slight increases in industrial sector emissions. Lastly, since 1990, U.S. emissions have increased at an average annual rate of 0.3 percent (EPA 2016).

State of California Emissions. According to California ARB emission inventory estimates, California emitted approximately 441.5 million metric tons of CO_2e (MMT CO_2e) in 2014 (ARB 2015b). This is a decrease of 2.8 MMT CO_2e from 2013 and a 9.4 percent decrease since 2004 (ARB 2016b).

The ARB estimates that transportation was the source of approximately 36 percent of the State's GHG emissions in 2014, followed by electricity generation (both in-State and out-of-State) at 20 percent and industrial sources at 21 percent. The remaining sources of GHG emissions were residential and commercial activities at 9 percent, agriculture at 8 percent, high-GWP gases at 4 percent, and recycling and waste at 2 percent (ARB 2016b).

The ARB is responsible for developing the State GHG Emission Inventory. This inventory estimates the amount of GHGs emitted to and removed from the atmosphere by human activities within the State and supports the Assembly Bill (AB) 32 Climate Change Program. The ARB's current GHG emission inventory covers 1990–2013 and is based on fuel use, equipment activity, industrial processes, and other relevant data (e.g., housing, landfill activity, and agricultural lands).

The ARB staff has projected Statewide unregulated GHG emissions for 2020, which represent the emissions that would be expected to occur in the absence of any GHG reduction actions, at 509 MMT CO_2e. GHG emissions from the transportation and electricity sectors as a whole are expected to increase but remain at approximately 30 percent and 32 percent of total CO_2e emissions, respectively (ARB 2014). On April 29, 2015, Governor Edmund G. Brown, Jr. issued Executive Order (EO) B-30-15. The EO sets a new interim Statewide GHG emission reduction target to reduce GHG emissions to 40 percent below 1990 levels by 2030 in order to ensure California meets its target of reducing GHG 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 MMT CO_2e.

Air Pollution Constituents and Attainment Status

The ARB coordinates and oversees both State and federal air pollution control programs in California. The ARB oversees activities of local air quality management agencies and maintains air

quality monitoring stations throughout the State in conjunction with the EPA and local air districts. The ARB has divided the State into 15 air basins based on meteorological and topographical factors of air pollution. Data collected at these stations are used by the ARB and EPA to classify air basins as attainment, nonattainment, nonattainment-transitional, or unclassified, based on air quality data for the most recent 3 calendar years compared with the AAQS. Attainment areas may be further classified:

- **Attainment/Unclassified** ("unclassifiable" on some lists), areas which have never violated the air quality standard of interest or do not have enough monitoring data to establish attainment or nonattainment status;
- **Attainment-Maintenance** (national ambient air quality standards [NAAQS] only), areas which violated an NAAQS that is currently in use (was nonattainment) in or after 1990, but now attain the standard and are officially redesignated as attainment areas by the EPA with a maintenance State Implementation Plan (SIP); or
- **Attainment** (usually only for California ambient air quality standards [CAAQS], but sometimes for NAAQS), which areas have adequate monitoring data to show attainment, have never been nonattainment, or, for NAAQS, have completed the official maintenance period.

Nonattainment areas are imposed with additional restrictions as required by the EPA. The air quality data are also used to monitor progress in attaining air quality standards. Table D lists the attainment status for the criteria pollutants in the Basin.

Table D: Attainment Status of Criteria Pollutants in the South Coast Air Basin

Pollutant	State	Federal
O_3 1-hour	Nonattainment	Extreme Nonattainment
O_3 8-hour	Nonattainment	Extreme Nonattainment
PM_{10}	Nonattainment	Attainment/Maintenance
$PM_{2.5}$	Nonattainment	Serious Nonattainment
CO	Attainment	Attainment/Maintenance
NO_2	Attainment	Unclassified/Attainment (1-hr) Attainment/Maintenance (annual)
SO_2	Attainment[1]	Unclassified/Attainment
Lead	Attainment[1]	Unclassified/Attainment[2]
All Others	Attainment/Unclassified	Attainment/Unclassified

Source: South Coast Air Quality Management District. Website: www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/naaqs-caaqs-feb2016.pdf, accessed December 2016.

Notes:

[1] Information from California Air Resources Board. Website: www.arb.ca.gov/desig/adm/adm.htm

[2] Except in Los Angeles County.

CO = carbon monoxide
N/A = not applicable
NO_2 = nitrogen dioxide
O_3 = ozone
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
SO_2 = sulfur dioxide

Ozone. O_3 (smog) is formed by photochemical reactions between NO_X and reactive organic gases (ROGs) rather than being directly emitted. O_3 is a pungent, colorless gas typical of Southern California smog. Elevated O_3 concentrations result in reduced lung function, particularly during vigorous physical activity. This health problem is particularly acute in sensitive receptors such as the sick, the elderly, and young children. O_3 levels peak during summer and early fall. The entire Basin is designated as a nonattainment area for the State 1-hour and 8-hour O_3 standards. The EPA has officially designated the status for most of the Basin regarding the 8-hour O_3 standard as extreme nonattainment, which means the Basin has until 2024 to attain the federal 8-hour O_3 standard.

Carbon Monoxide. CO is formed by the incomplete combustion of fossil fuels, almost entirely from automobiles. It is a colorless, odorless gas that can cause dizziness, fatigue, and impairments to central nervous system functions. The entire Basin is in attainment for the State standards for CO. The Basin is designated as an attainment area under the State CO standards and as an attainment/maintenance area under the federal CO standards.

Nitrogen Oxides. NO_2, a reddish brown gas, and nitric oxide (NO), a colorless, odorless gas, are formed from fuel combustion under high temperature or pressure. These compounds are referred to as nitrogen oxides, or NO_X. NO_X is a primary component of the photochemical smog reaction. It also contributes to other pollution problems, including a high concentration of fine particulate matter ($PM_{2.5}$), poor visibility, and acid deposition (i.e., acid rain). NO_2 decreases lung function and may reduce resistance to infection. The entire Basin is designated as attainment for the State NO_2 standard and as an unclassified/attainment area under the federal 1-hour NO_2 standard.

Sulfur Dioxide. SO_2 is a colorless, irritating gas formed primarily from incomplete combustion of fuels containing sulfur. Industrial facilities also contribute to gaseous SO_2 levels. SO_2 irritates the respiratory tract, can injure lung tissue when combined with fine particulate matter ($PM_{2.5}$), and reduces visibility and the level of sunlight. The entire Basin is in attainment with both the federal and State SO_2 standards.

Lead. Lead is found in old paints and coatings, plumbing, and a variety of other materials. Once in the bloodstream, lead can cause damage to the brain, nervous system, and other body systems. Children are highly susceptible to the effects of lead. Lead dust is the most common source of lead poisoning and other health related effects of lead. Lead cannot be absorbed through the skin, so it may enter the bloodstream in one of two ways; either through ingestion or inhalation. Lead particles found in lead dust are small enough to make it past the filters in the nose and work their way down into the lungs. Lead dust can also very easily coat things such as toys, furniture, food, dishes, and many other surfaces found in the home. Once these surfaces are contaminated by lead dust, they pose a serious health risk to everyone inside the home, especially young children and pets. The portion of the Basin the project site is located in is in attainment with both the federal and State lead standards.

Particulate Matter. Particulate matter is the term used for a mixture of solid particles and liquid droplets found in the air. Coarse particles (PM_{10}) derive from a variety of sources, including windblown dust and grinding operations. Fuel combustion and resultant exhaust from power plants and diesel buses and trucks are primarily responsible for fine particle levels. Fine particles can also be formed in the atmosphere through chemical reactions. PM_{10} can accumulate in the respiratory system and aggravate health problems such as asthma. The EPA's scientific review concluded that $PM_{2.5}$, which penetrates deeply into the lungs, is more likely than PM_{10} to contribute to the health effects

listed in a number of recently published community epidemiological studies at concentrations that extend well below those allowed by the current PM_{10} standards. These health effects include premature death and increased hospital admissions and emergency room visits (primarily among the elderly and individuals with cardiopulmonary disease); increased respiratory symptoms and disease (in children and individuals with cardiopulmonary disease such as asthma); decreased lung function (particularly in children and individuals with asthma); and alterations in lung tissue and structure and in respiratory tract defense mechanisms. The Basin is designated nonattainment for the federal and State $PM_{2.5}$ standards and the State PM_{10} standard, and attainment/maintenance for the federal PM_{10} standard.

Volatile Organic Compounds. Volatile organic compounds (VOCs; also known as ROGs and reactive organic compounds [ROCs]) are formed from the combustion of fuels and the evaporation of organic solvents. VOCs are not defined as criteria pollutants, but are a prime component of the photochemical smog reaction. Consequently, VOCs accumulate in the atmosphere more quickly during the winter when sunlight is limited and photochemical reactions are slower. There are no attainment designations for VOCs.

Sulfates. Sulfates occur in combination with metal and/or hydrogen ions. In California, emissions of sulfur compounds occur primarily from the combustion of petroleum-derived fuels (e.g., gasoline and diesel fuel) that contain sulfur. This sulfur is oxidized to SO_2 during the combustion process and subsequently converted to sulfate compounds in the atmosphere. The conversion of SO_2 to sulfates takes place comparatively rapidly and completely in urban areas of California due to regional meteorological features. The entire Basin is in attainment for the State standard for sulfates.

Hydrogen Sulfide. H_2S is a colorless gas with the odor of rotten eggs. It is formed during bacterial decomposition of sulfur-containing organic substances. Also, it can be present in sewer gas and some natural gas and can be emitted as the result of geothermal energy exploitation. In 1984, an ARB committee concluded that the ambient standard for H_2S is adequate to protect public health and to significantly reduce odor annoyance. The entire Basin is unclassified for the State standard for H_2S.

Visibility-Reducing Particles. Visibility-reducing particles consist of suspended particulate matter, which is a complex mixture of tiny particles that consists of dry solid fragments, solid cores with liquid coatings, and small droplets of liquid. These particles vary greatly in shape, size, and chemical composition, and can be made up of many different materials such as metals, soot, soil, dust, and salt. The statewide standard is intended to limit the frequency and severity of visibility impairment due to regional haze. The entire Basin is unclassified for the State standard for visibility-reducing particles.

LOCAL AIR QUALITY

The SCAQMD, together with the ARB, maintains ambient air quality monitoring stations in the Basin. The air quality monitoring station closest to the site is the Riverside-Rubidoux Station located at 5888 Mission Boulevard approximately 5.75 miles northeast of project site, which monitors all of the air pollutants. The air quality trends from this station are used to represent the ambient air quality in the project area. The pollutants monitored are CO, O_3, PM_{10}, $PM_{2.5}$, NO_2, and SO_2.[1,1]

[1] United States Environmental Protection Agency (EPA). 2013–2015 Air Quality Data. Website: http://www3.epa.gov/airquality/airdata/, accessed October 2016.

The ambient air quality data in Table E show that NO_2 and CO levels are below the applicable State and federal standards. As detailed in Table E (Ambient Air Quality Monitored at the Riverside-Rubidoux Station), the State 1-hour O_3 standard was exceeded 13 to 31 times per year in the past 3 years.

Table E: Ambient Air Quality Monitored at the Riverside-Rubidoux Station

Pollutant	Standard	2013	2014	2015
Carbon Monoxide (CO)				
Maximum 1-hr concentration (ppm)		2.5	2.4	4.1
Number of days exceeded:	State: > 20 ppm	0	0	0
	Federal: > 35 ppm	0	0	0
Maximum 8-hr concentration (ppm)		2.0	1.9	1.5
Number of days exceeded:	State: ≥ 9.0 ppm	0	0	0
	Federal: ≥ 9 ppm	0	0	0
Ozone (O_3)				
Maximum 1-hr concentration (ppm)		0.123	0.141	0.132
Number of days exceeded:	State: > 0.09 ppm	13	29	31
Maximum 8-hr concentration (ppm)		0.103	0.104	0.105
Number of days exceeded:	State: > 0.07 ppm	38	69	59
	Federal: > 0.075 ppm	26	41	39
Coarse Particulates (PM_{10})				
Maximum 24-hr concentration ($\mu g/m^3$)		135	100	69
Number of days exceeded:	State: > 50 $\mu g/m^3$	86	119	87
	Federal: > 150 $\mu g/m^3$	0	0	0
Annual arithmetic average concentration ($\mu g/m^3$)		33.2	36.3	32.2
Exceeded for the year:	State: > 20 $\mu g/m^3$	Yes	Yes	Yes
Fine Particulates ($PM_{2.5}$)				
Maximum 24-hr concentration ($\mu g/m^3$)		60.3	48.9	54.7
Number of days exceeded:	Federal: > 35 $\mu g/m^3$	6	5	9
Annual arithmetic average concentration ($\mu g/m^3$)		12.4	ND	11.8
Exceeded for the year:	State: > 12 $\mu g/m^3$	Yes	ND	No
	Federal: > 15 $\mu g/m^3$	No	ND	No
Nitrogen Dioxide (NO_2)				
Maximum 1-hr concentration (ppm)		0.060	0.060	0.057
Number of days exceeded:	State: > 0.18 ppm	0	0	0
Annual arithmetic average concentration (ppm)		ND	0.015	0.014
Exceeded for the year:	State: > 0.030 ppm	ND	No	No
	Federal: > 0.053 ppm	ND	No	No

Source 1: United States Environmental Protection Agency (EPA). Air Quality Data. Website: https://www.epa.gov/outdoor-air-quality-data/monitor-values-report (accessed December 2016).
Source 2: California Air Resources Board (ARB). iADAM: Air Quality Data Statistics. Website: http://www.arb.ca.gov/adam (accessed December 2016).
Notes:
$\mu g/m^3$ = micrograms per cubic meter
hr = hour
ND = no data available
$PM_{2.5}$ = particulate matter less than 2.5 microns in size
PM_{10} = particulate matter less than 10 microns in size
ppm = parts per million

[1] California Air Resources Board (ARB). iADAM: Air Quality Data Statistics. Website: http://www.arb.ca.gov/adam/index.html, accessed October 2016.

The federal 8-hour O_3 standard was exceeded 26 to 41 days per year in the past 3 years, and the State 8-hour O_3 standard was exceeded 38 to 69 times per year in the past 3 years. The federal 24-hour PM_{10} standard was not exceeded in the past 3 years, but the State 24-hour PM_{10} standard was exceeded 86 to 119 days per year in the past 3 years. The State's annual PM_{10} standard was exceeded in each of the years from 2013 to 2015. The federal 24-hour $PM_{2.5}$ standard was exceeded 5 to 9 days per year in the past 3 years and the State's annual $PM_{2.5}$ standard was exceeded in 2013.

Data collected at permanent monitoring stations are used by the EPA to classify regions as "attainment" or "nonattainment," depending on whether the regions met the requirements stated in the primary NAAQS. Nonattainment areas are imposed with additional restrictions as required by the EPA. The EPA has designated the Southern California Association of Governments (SCAG) as the Metropolitan Planning Organization (MPO) responsible for ensuring compliance with the requirements of the CAA for the Basin.

In an effort to help federal agencies ensure the integrity of their environmental reviews and promote sound governmental decision making, the Council on Environmental Quality (CEQ) issued on January 14, 2011, final guidance on the "Appropriate Use of Mitigation and Monitoring and Clarifying the Appropriate Use of Mitigated Findings of No Significant Impact." This guidance was developed as part of CEQ's effort to modernize and reinvigorate federal agency implementation of the National Environmental Policy Act (NEPA). The EPA established new national air quality standards for ground-level O_3 and $PM_{2.5}$ in 1997. On May 14, 1999, the Court of Appeals for the District of Columbia Circuit issued a decision ruling that the CAA, as applied in setting the new public health standards for O_3 and $PM_{2.5}$, was unconstitutional as an improper delegation of legislative authority to the EPA. On February 27, 2001, the United States Supreme Court upheld the way the government sets air quality standards under the CAA. The court unanimously rejected industry arguments that the EPA must consider financial cost, as well as health benefits, in writing standards. The justices also rejected arguments that the EPA took too much lawmaking power from Congress when it set tougher standards for O_3 and soot in 1997. Nevertheless, the court threw out the EPA's policy for implementing new O_3 rules, saying that the agency ignored a section of the law that restricts its authority to enforce such rules.

In April 2003, the EPA was cleared by the White House Office of Management and Budget (OMB) to implement the 8-hour ground-level O_3 standard. The EPA issued the proposed rule implementing the 8-hour O_3 standard in April 2003. The EPA completed final 8-hour nonattainment status on April 15, 2004. The EPA revoked the 1-hour O_3 standard on June 15, 2005, and lowered the 8-hour O_3 standard from 0.08 ppm to 0.075 ppm on April 1, 2008.

The EPA issued the final $PM_{2.5}$ implementation rule in fall 2004. The EPA lowered the 24-hour $PM_{2.5}$ standard from 65 to 35 $\mu g/m^3$ and revoked the annual PM_{10} standard on December 17, 2006. The EPA issued final designations for the 2006 24-hour $PM_{2.5}$ standard on December 12, 2008.

The United States has historically had a voluntary approach to reducing GHG emissions. However, on April 2, 2007, the United States Supreme Court ruled that the EPA has the authority to regulate CO_2 emissions under the CAA. While there currently are no adopted federal regulations for the control or reduction of GHG emissions, the EPA commenced several actions in 2009 that are required to implement a regulatory approach to GCC.

On September 30, 2009, the EPA announced a proposal that focuses on large facilities emitting over 25,000 tons of GHG emissions per year. These facilities would be required to obtain permits that would demonstrate they are using the best practices and technologies to minimize GHG emissions.

On December 7, 2009, the EPA Administrator signed a final action under the CAA, finding that six GHGs (CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6) constitute a threat to public health and welfare, and that the combined emissions from motor vehicles cause and contribute to GCC. This EPA action does not impose any requirements on industry or other entities. However, the findings are a prerequisite to finalizing the GHG emission standards for light-duty vehicles mentioned below.

On July 18, 2016, the Department of Transportation's National Highway Traffic Safety Administration (NHTSA), EPA and ARB issued a Draft Technical Assessment Report (TAR) for light-duty vehicle CAFE (Corporate Average Fuel Economy) and GHG standards for MYs 2022-2025. This Draft TAR is the first step in the Agencies' mid-term evaluation process of the October 2012 final rule establishing CAFE and GHG standards for MYs 2017 and beyond. On August 16, 2016, the EPA and the NHTSA jointly finalized standards for medium- and heavy-duty vehicles that will improve fuel efficiency and cut carbon pollution, while bolstering energy security and spurring manufacturing innovation. The agencies estimate that the standards will save up to 2 billion barrels of oil and reduce CO_2 emissions by up to 1.1 billion metric tons over the lifetimes of MYs 2018-2029 vehicles, providing up to $230 billion in net social benefits.

State Regulations/Standards

California Air Pollution Control Officers Association. The California Air Pollution Control Officers Association (CAPCOA) is a non-profit association of the air pollution control officers from all 35 local air quality agencies throughout California. CAPCOA was formed in 1976 to promote clean air and to provide a forum for sharing of knowledge, experience, and information among the air quality regulatory agencies around the State. CAPCOA meets regularly with federal and state air quality officials to develop statewide rules and to assure consistent application of rules and regulations. CAPCOA works with specialized task forces (including regulated industry) by participating actively in the legislative process, and continuing to coordinate local efforts with those of the state and federal air agencies. The goal is to protect public health while maintaining economic vitality.

California Air Resource Board. In 1967, the California Legislature passed the Mulford-Carrell Act, which combined two Department of Health bureaus (i.e., the Bureau of Air Sanitation and the Motor Vehicle Pollution Control Board), to establish the ARB. Since its formation, the ARB has worked with the public, the business sector, and local governments to find solutions to California's air pollution problems.

California adopted the CCAA in 1988. The ARB administers CAAQS for the 10 air pollutants designated in the CCAA. These 10 State air pollutants are the six criteria pollutants designated by the federal CAA as well as visibility-reducing particulates, H_2S, sulfates, and vinyl chloride.

The ARB identified DPM as TACs in August 1998. Following the identification process, the ARB was required by law to determine whether there is a need for further control. In September 2000, the ARB adopted the Diesel Risk Reduction Plan, which recommends many control measures to reduce

the risks associated with DPM and to achieve goals of 75 percent DPM reduction by 2010 and 85 percent by 2020.

From the 2010 Climate Action Team Report – California Climate Action Milestones. In 1988, AB 4420 directed the California Energy Commission (CEC) to report on "how global warming trends may affect California's energy supply and demand, economy, environment, agriculture, and water supplies" and offer "recommendations for avoiding, reducing and addressing the impacts." This marked the first statutory direction to a California State agency to address climate change.

The California Climate Action Registry was created to encourage voluntary reporting and early reductions of GHG emissions with the adoption of Senate Bill (SB) 1771 in 2000. The CEC was directed to assist by developing metrics and identifying and qualifying third-party organizations to provide technical assistance and advice to GHG emission reporters. The next year, SB 527 amended SB 1771 to emphasize third-party verification.

SB 1711 also contained several additional requirements for the CEC, including updating the State's Greenhouse Gas Emissions Inventory from an existing 1998 report and continuing to update it every 5 years; acquiring, developing and distributing information on GCC to agencies and businesses; establishing a State interagency task force to ensure policy coordination; and establishing a climate change advisory committee to make recommendations on the most equitable and efficient ways to implement climate change requirements. In 2006, AB 1803 transferred preparation of the inventory from the CEC to the ARB. The ARB updates the inventory annually.

AB 1493, authored by Assembly Member Fran Pavley in 2002, directed the ARB to adopt regulations to achieve the maximum feasible and cost-effective reduction of GHG emissions from motor vehicles. The so-called "Pavley" regulations, or Clean Car regulations, were approved by the ARB in 2004. The ARB submitted a request to the EPA to implement the regulations in December 2005. After several years of requests to the federal government and accompanying litigation, this waiver request was granted on June 30, 2009. The ARB has since combined the control of smog-causing pollutants and GHG emissions to develop a single coordinated package of standards known as Low Emission Vehicles III. These regulations reduced GHG emissions from California passenger vehicles by approximately 22 percent in 2012 and approximately 30 percent in 2016, all while improving fuel efficiency and reducing motorists' costs. AB 1493 also directed the California Climate Action Registry to adopt protocols for reporting reductions in GHG emissions from mobile sources prior to the operative date of the regulations.

SB 812 added forest management practices to the California Climate Action Registry members' reportable emissions actions. It also directed the Registry to adopt forestry procedures and protocols to monitor, estimate, calculate, report, and certify carbon stores and CO_2 emissions that resulted from the conservation and conservation-based management of forests in California.

The California Renewable Portfolio Standard (RPS) Program, which requires electric utilities and other entities under the jurisdiction of the California Public Utilities Commission to meet 20 percent of its retail sales with renewable power by 2017, was established by SB 1078 in 2002. In 2006, the RPS Program was accelerated by SB 107 to 20 percent by 2010. The RPS Program was subsequently expanded by the renewable electricity standard approved by the ARB in September 2010, requiring

all utilities to meet a 33 percent target by 2020. The renewable electricity standard is projected to reduce GHG emissions from the electricity sector by at least 12 MMT CO_2e in 2020.

In December 2004, Governor Arnold Schwarzenegger signed Executive Order (EO) S-20-04, which set a goal of reducing energy use in State-owned buildings by 20 percent by 2015 (from a 2003 baseline) and encouraged cities, counties, schools, and the private sector to take all cost-effective measures to reduce building electricity use. This action built upon the State's strong history of energy efficiency efforts that have saved Californians and California businesses energy and money for decades. They are a cornerstone of GHG reduction efforts.

EO S-3-05 (June 2005) established GHG targets for the State, such as returning to year 2000 emission levels by 2010; 1990 levels by 2020; and 80 percent below 1990 levels by 2050. It directed the Secretary of CalEPA to coordinate efforts to meet the targets with the heads of other State agencies. This group became the Climate Action Team (CAT).

California's Million Solar Roofs plan was boosted by the passage of SB 1 in 2006. The plan is estimated to result in 3,000 megawatts of new electricity-generating capacity and avoidance of 2.1 MMT CO_2e emissions. The main components of the bill included expanding the program to more customers, requiring the State's municipal utilities to create their own solar rebate programs, and making solar panels a standard option on new homes.

The California Global Warming Solutions Act of 2006, best known by its bill number AB 32, created a first-in-the-country comprehensive program to achieve real, quantifiable, and cost-effective reductions in GHGs. The law set an economy-wide cap on California GHG emissions at 1990 levels by 2020. It directed the ARB to prepare, approve, and implement a Scoping Plan for achieving the maximum technologically feasible and cost-effective reductions in GHG emissions. EO S-20-06, signed in October 2006, directed the Secretary for Environmental Protection to establish a Market Advisory Committee of national and international experts. The committee made recommendations to the ARB on the design of a market-based program for GHG emissions reduction. The ARB adopted the Scoping Plan, describing a portfolio of measures to achieve the target, in December 2008.

The ARB approved the First Update to the Scoping Plan (Update) on May 22, 2014. The Update identifies the next steps for California's climate change strategy. It shows how California continues on its path to meet the near-term 2020 GHG limit, but also sets a path toward long-term, deep GHG emission reductions. The report establishes a broad framework for continued emission reductions beyond 2020, with a goal of 80 percent below 1990 levels by 2050. The Update identifies progress made to meet the near-term objectives of AB 32 and defines California's climate change priorities and activities Climate for the next several years. The Update does not set new targets for the State but rather describes a path that would achieve the long-term 2050 goal of EO S-3-05 for emissions to decline to 80 percent below 1990 levels by 2050. As previously stated Executive Order (EO) B-30-15 (April 29, 2015) requires ARB to update the Scoping Plan.

The Governors of California, Arizona, New Mexico, Oregon, and Washington entered into a Memorandum of Understanding in February 2007, establishing the Western Climate Initiative. The Governors agreed to set a regional goal for emissions reductions consistent with state-by-state goals; develop a design for a regional market-based, multi-sector mechanism to achieve the goal; and

participate in a multi-state GHG registry. The initiative has since grown to include Montana, Utah, and the Canadian provinces of British Columbia, Manitoba, Ontario, and Québec.

California is implementing the world's first Low Carbon Fuel Standard for transportation fuels, pursuant to both EO S-01-07 (signed January 2007) and AB 32. The standard requires a reduction of at least 10 percent in the carbon intensity of California's transportation fuels by 2020. This reduction is expected to reduce GHG emissions in 2020 by 17.6 MMT CO_2e. Also in 2007, AB 118 created the Alternative and Renewable Fuel and Vehicle Technology Program. The CEC and the ARB administer the program. This act provides funding for alternative fuel and vehicle technology research, development, and deployment in order to attain the State's climate change goals, achieve the State's petroleum reduction objectives and clean air and GHG emission reduction standards, develop public-private partnerships, and ensure a secure and reliable fuel supply.

In addition to vehicle emissions regulations and the Low Carbon Fuel Standard, the third effort for reducing GHG emissions from transportation is the reduction in the demand for personal vehicle travel (VMT). This measure was addressed in September 2008 through the Sustainable Communities and Climate Protection Act of 2008, or SB 375. The enactment of SB 375 initiated an important new regional land use planning process to mitigate GHG emissions by integrating and aligning planning for housing, land use, and transportation for California's 18 MPOs. The bill directed the ARB to set regional GHG emissions reduction targets for most areas of the State. It also contained important elements related to federally mandated Regional Transportation Plans (RTPs) and the alignment of State transportation and housing planning processes.

Also codified in 2008, SB 97 required the Governor's Office of Planning and Research (OPR) to develop GHG emissions criteria for use in determining project impacts under CEQA. These criteria were developed in 2009 and went into effect in 2010.

EO S-13-08 launched a major initiative for improving the State's adaptation to climate impacts from sea level rise, increased temperatures, shifting precipitation, and extreme weather events. It ordered a California Sea Level Rise Assessment Report to be requested from the National Academy of Sciences. It also ordered the development of a Climate Adaptation Strategy. The strategy, published in December 2009, assesses the State's vulnerability to climate change impacts and outlines possible solutions that can be implemented within and across State agencies to promote resiliency. The strategy focused on seven areas: public health, biodiversity and habitat, ocean and coastal resources, water management, agriculture, forestry, and transportation and energy infrastructure.

As described above, on April 29, 2015, Governor Edmund G. Brown, Jr. issued EO B-30-15 to establish a California GHG reduction target of 40 percent below 1990 levels by 2030. The Governor's EO aligns California's GHG reduction targets with those of leading international governments ahead of the United Nations Climate Change Conference in Paris set for late 2015. The EO also requires the State's climate adaptation plan to be updated every 3 years and for the State to continue its climate change research program, among other provisions. As with EO S-3-05, this EO is not legally enforceable against 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.

The initiatives, EOs, and statutes outlined above comprise the major milestones in California's efforts to address climate change through coordinated action on climate research, GHG mitigation, and

climate change adaptation. There are numerous other related efforts that have been undertaken by State agencies and departments to address specific questions and programmatic needs. The Climate Action Team coordinates these efforts and others, which comprise the State's climate program. The sections below describe these efforts.

Regional Air Quality Planning Framework

The 1976 Lewis Air Quality Management Act established the SCAQMD and other air districts throughout the State. The federal CAA Amendments of 1977 required that each state adopt an implementation plan outlining pollution control measures to attain the federal standards in nonattainment areas of the State.

The ARB is responsible for incorporating air quality management plans for local air basins into an SIP for EPA approval. Significant authority for air quality control within them has been given to local air districts that regulate stationary-source emissions and develop local nonattainment plans.

Regional Air Quality Management Plan

The SCAQMD and the SCAG are responsible for formulating and implementing the Air Quality Management Plan (AQMP) for the Basin. The main purpose of an AQMP is to bring the area into compliance with federal and State air quality standards. Every 3 years, the SCAQMD prepares a new AQMP, updating the previous plan and having a 20-year horizon. The SCAQMD adopted the 2012 AQMP in December 2012; the ARB approved it on January 23, 2013, and forwarded it to the EPA.

The 2012 AQMP incorporates the latest scientific and technological information and planning assumptions, including the 2012 RTP/Sustainable Communities Strategy (SCS) and updated emission inventory methodologies for various source categories. The 2012 AQMP included the new and changing federal requirements, implementation of new technology measures, and continued development of economically sound, flexible compliance approaches.

The 2016 RTP/SCS was adopted by SCAG in April 2016. SCAQMD released the Draft 2016 AQMP on June 30, 2016 for adoption in early 2017.

THRESHOLDS OF SIGNIFICANCE

A number of modeling tools are available to assess air quality impacts of projects. In addition, certain air districts, such as the SCAQMD, have created guidelines and requirements to conduct air quality analysis. The SCAQMD's current guidelines, the *CEQA Air Quality Handbook* (1993) with associated updates (SCAQMD, 2016), were adhered to in the assessment of air quality impacts for the proposed project. The current air quality model, CalEEMod Version 2016.3.1, was used to estimate project-related mobile- and stationary-source emissions in this air quality and GHG impact analysis.

This air quality and GHG impact analysis includes estimated emissions associated with short-term construction and long-term operation of the proposed project. Criteria pollutants with regional impacts would be emitted by project-related vehicular trips as well as by emissions associated with stationary sources used on site. Localized air quality impacts (i.e., higher CO concentrations [CO hot spots] near intersections or roadway segments in the project vicinity) would be small and less than significant due to the generally low ambient CO concentrations (maximum 2.5 ppm for the 1-hour period and 1.6 ppm for the 8-hour period) in the project area.

The net increase in pollutant emissions determines the significance and impact on regional air quality as a result of the proposed project. The results also allow the local government to determine whether the proposed project will deter the region from achieving the goal of reducing pollutants in accordance with the AQMP in order to comply with the NAAQS and CAAQS.

STATE THRESHOLDS OF SIGNIFICANCE

Based on Appendix G, PRC Sections 15000–15387 of the *State CEQA Guidelines,* a project would normally be considered to have a significant effect on air quality if the project would violate any AAQS, contribute substantially to an existing air quality violation, expose sensitive receptors to substantial pollutants concentrations, or conflict with adopted environmental plans and goals of the community in which it is located.

REGIONAL THRESHOLDS OF SIGNIFICANCE

In addition to the NAAQS and CAAQS, the SCAQMD has established daily emissions thresholds for construction and operation of a proposed project in the Basin. It should be noted that the emissions thresholds were established based on the attainment status of the air basin in regard to air quality standards for specific criteria pollutants. Because the concentration standards were set at a level that protects public health with an adequate margin of safety (EPA), these emissions thresholds are regarded as conservative and would overstate an individual project's contribution to health risks.

Regional Thresholds for Construction Emissions

The following CEQA significance thresholds for construction emissions have been established for the Basin:

- 75 pounds per day (lbs/day) of VOCs

- 100 lbs/day of NO_X
- 550 lbs/day of CO
- 150 lbs/day of PM_{10}
- 55 lbs/day of $PM_{2.5}$
- 150 lbs/day of SO_2

Projects in the Basin with construction-related emissions that exceed any of these emission thresholds are considered to be significant under the SCAQMD guidelines.

Regional Thresholds for Operational Emissions

The following CEQA significance thresholds for operational emissions have been established for the Basin:

- 55 lbs/day of VOCs
- 55 lbs/day of NO_X
- 550 lbs/day of CO
- 150 lbs/day of PM_{10}
- 55 lbs/day of $PM_{2.5}$
- 150 lbs/day of SO_2

Projects in the Basin with operational emissions that exceed any of these emission thresholds are considered to be significant under the SCAQMD guidelines.

The phase-out of leaded gasoline started in 1976. Since gasoline no longer contains lead, the project is not anticipated to result in air quality impacts related to lead; therefore, no further discussion is provided in this analysis.

Local Microscale Concentration Standards. The significance of localized project impacts under CEQA depends on whether ambient CO levels in the vicinity of the project are above or below State and federal CO standards. 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, project emissions are considered significant if they increase 1-hour CO concentrations by 1 ppm or more or 8-hour CO concentrations by 0.45 ppm or more. The following are applicable local emission concentration standards for CO:

- California State 1-hour CO standard of 20 ppm
- California State 8-hour CO standard of 9 ppm

Thresholds for Localized Impact Analysis

In the SCAQMD *Final Localized Significance Threshold Methodology* (published in June 2003 and revised in July 2008), it is recommended that all air quality analyses include an assessment of both

construction and operational impacts on the air quality of nearby sensitive receptors. LSTs represent the maximum emissions from a project site that are not expected to result in an exceedance of the NAAQS or CAAQS, as previously shown in Table A. LSTs are based on the ambient concentrations of that pollutant within the project Source Receptor Area (SRA) and the distance to the nearest sensitive receptor. For this project, the appropriate SRA for the localized impacts analysis is the Metropolitan Riverside County area (SRA 23).

In the case of CO and NO_2, since ambient levels are below the standards (see Table E), a project would be considered to have a significant impact if project emissions result in an exceedance of one or more of the NAAQS or CAAQS. Since the PM_{10} and $PM_{2.5}$ ambient levels already exceed a State or federal standard, then project emissions are considered significant if they increase ambient concentrations by a measurable amount. For these two, the significance criteria are the pollutant concentration thresholds presented in SCAQMD Rules 403 and 1301. The Rule 403 threshold of 10.4 $\mu g/m^3$ applies to construction emissions. The Rule 1301 threshold of 2.5 $\mu g/m^3$ applies to operational activities.

Based on the SCAQMD recommended methodology[1] and the construction equipment planned, no more than 4.5 acres[2] would be disturbed on any one day, thus the 2 and 5 acre thresholds have been interpolated to derive 4.5 acre LST thresholds for construction emissions. For operational emissions, the localized significance for a project greater than 5 acres can be determined by performing the screening-level analysis before using the dispersion modeling because the screening-level analysis is more conservative, and if no exceedance of the screening-level thresholds is identified, then the chance of operational LSTs exceeding concentration standards is small.

Sensitive receptors include residences, schools, hospitals, and similar uses that are sensitive to adverse air quality. There are existing residences immediately to the north and east of the project boundary, the closest at approximately 25 feet from property line. SCAQMD LST Methodology (SCAQMD 2008) specifies "Projects with boundaries located closer than 25 meters to the nearest receptor should use the LSTs for receptors located at 25 meters." Therefore, the following emissions thresholds apply during project construction and operation:

- **Construction Localized Significance Thresholds, 4.5 acres, 82 ft (25 m) distance**
  - 253 lbs/day of NO_X
  - 1,461 lbs/day of CO
  - 12 lbs/day of PM10
  - 7.3 lbs/day of $PM_{2.5}$
- **Operation Localized Significance Thresholds, 5 acres, 82 ft (25 m) distance**
  - 270 lbs/day of NO_X
  - 1,577 lbs/day of CO

[1] *Fact Sheet for Applying CalEEMod to Localized Significance Thresholds*. Website: www.aqmd.gov/docs/default-source/ceqa/handbook/localized-significance-thresholds/caleemod-guidance.pdf, accessed December 2016.

[2] Maximum disturbance of 4.5 acres would occur during the grading phase from the use of 2 tractors, 2 scrapers, 1 dozer, and 1 grader for 8 hours/day.

- 4 lbs/day of PM_{10}
- 2 lbs/day of $PM_{2.5}$

Thresholds for Global Climate Change

State CEQA Guidelines Section 15064(b) provides that the "determination of whether a project may have a significant effect on the environment calls for careful judgment on the part of the public agency involved, based to the extent possible on scientific and factual data," and further states that an "ironclad definition of significant effect is not always possible because the significance of an activity may vary with the setting."

The SCAQMD has not adopted recommended numeric CEQA significance thresholds for GHG emissions for lead agencies to use in assessing GHG impacts of residential and commercial development projects. In October 2008, SCAQMD presented to the Governing Board the *Draft Guidance Document – Interim CEQA GHG Significance Thresholds* (SCAQMD 2008). The guidance document was not adopted or approved by the Governing Board. This document, which builds on the previous guidance prepared by CAPCOA explored various approaches for establishing a significance threshold for GHG emissions. Among the concepts discussed, the document considered a "de minimis," or screening, threshold to "identify small projects that would not likely contribute to significant cumulative GHG impacts" (SCAQMD 2008). As further explained in this document, "Projects with GHG emissions less than the screening level are considered to be small projects, that is, they would not likely be considered cumulatively considerable" (SCAQMD 2008). The SCAQMD formed a GHG CEQA Significance Threshold Working Group to work with SCAQMD staff on developing GHG CEQA significance thresholds until statewide significance thresholds or guidelines are established.

The SCAQMD has continued to consider adoption of significance thresholds for residential and general development projects. The most recent proposal issued in September 2010 (SCAQMD 2010) uses the following tiered approach to evaluate potential GHG impacts from various uses:

Tier 1 Determine if CEQA categorical exemptions are applicable. If not, move to Tier 2.

Tier 2 Consider whether or not the proposed project is consistent with a locally adopted GHG reduction plan that has gone through public hearing and CEQA review, that has an approved inventory, includes monitoring, etc. If not, move to Tier 3.

Tier 3 Consider whether the proposed project generates GHG emissions in excess of screening thresholds for individual land uses. A 10,000 MT CO_2e per year threshold for industrial uses would be recommended for use by all lead agencies. Under Option 1, separate screening thresholds are proposed for residential projects (3,500 MT CO_2e per year), commercial projects (1,400 MT CO_2e per year), and mixed-use projects (3,000 MT CO_2e per year). Under Option 2, a single numerical screening threshold of 3,000 MT CO_2e per year would be used for all non-industrial projects. If the project generates emissions in excess of the applicable screening threshold, move to Tier 4.

Tier 4 Establishes a decision tree approach that includes compliance options for projects that have incorporated design features into the project and/or implement GHG mitigation measures.

- Efficiency Target (2020 Targets)
  - 4.8 MT CO_2e per service population (SP), (the number of jobs and number of residents provided by a project), for project level threshold (land use emissions only) and total residual emissions not to exceed 25,000 million tons per year (mty) CO_2e
  - 6.6 MT CO_2e per SP for plan level threshold (all sectors)
- Efficiency Target (2035 Targets)
  - 3.0 MT CO_2e per SP for project level threshold
  - 4.1 MT CO_2e per SP for plan level threshold

If a project fails to meet any of these emissions reduction targets and efficiency targets, the project would move to Tier 5.

Tier 5 Consider the implementation of CEQA mitigation (including the purchase of GHG offsets) to reduce the project efficiency target to Tier 4 levels.

The thresholds identified above have not been adopted by the SCAQMD or distributed for widespread public review and comment, and the working group tasked with developing the thresholds has not met since September 2010. The future schedule and likelihood of threshold adoption is uncertain.

For purposes of this analysis, the Tier 3 Option 1 approach for residential projects (3,500 MT CO_2e per year) is utilized in order to determine the significance of the proposed project's GHG emissions.

IMPACTS AND MITIGATION

Air pollutant emissions associated with the project would occur over the short term from construction activities, such as fugitive dust from demolition, site preparation, grading, building construction, architectural coating, paving, and emissions from equipment exhaust. There would be long-term regional emissions associated with project-related vehicular trips and due to energy consumption such as electricity usage by the proposed land uses.

CONSTRUCTION IMPACTS

Equipment Exhaust and Related Construction Activities

Construction activities produce combustion emissions from various sources, such as grading, site preparation, utility engines, and motor vehicles transporting the construction crew. Exhaust emissions from construction activities envisioned on site would vary daily as construction activity levels change. The use of construction equipment on site would result in localized exhaust emissions.

The details of the project construction have not yet been determined; therefore, the following includes preliminary construction information based on understanding of the project. The proposed project requires dirt moving. Development of the site will alter the existing on-site topography. During on-site grading, the site will be balanced and would not require either export or import of soil. No planned schedule is available at this time, however, for purposes of this analysis and to provide a conservative analysis, the schedule shown in Table F was assumed to be representative of the anticipated on-site activity. If construction occurs at a later time, the emissions would be similar or less than those presented in this study due to more fuel-efficient vehicles, etc.

Similarly, the details of what construction equipment would be used in the construction of the project have not been finalized as of the time of this air quality and GHG impact analysis. Table F lists a tentative construction schedule, and Table G lists a standard set of construction equipment capable of completing the anticipated project construction. This set was developed using the CalEEMod model and specifying the site area and planned land use.

Table F: Construction Schedule

Phase Name	No. of Days per Week	No. of Days
Demolition	5	20
Site Preparation	5	10
Grading	5	20
Building Construction	5	230
Architectural Coating	5	152
Paving	5	20

Table G: Diesel Construction Equipment Utilized by Construction Phase

Construction Phase	Off-Road Equipment Type	Off-Road Equipment Unit Amount	Hours Used per Day	Horsepower	Load Factor
Demolition	Concrete/Industrial Saws	1	8	81	0.73
	Excavators	3	8	158	0.38
	Rubber Tired Dozers	2	8	247	0.4
Site Preparation	Rubber Tired Dozers	3	8	247	0.4
	Tractors/Loaders/Backhoes	4	8	97	0.37
Grading	Excavators	1	8	158	0.38
	Rubber Tired Dozers	1	8	247	0.4
	Graders	1	8	187	0.41
	Tractors/Loaders/Backhoes	3	8	97	0.37
Building Construction	Cranes	1	7	231	0.29
	Forklifts	3	8	89	0.2
	Generator Sets	1	8	84	0.74
	Tractors/Loaders/Backhoes	3	7	97	0.37
	Welders	1	8	46	0.45
Architectural Coating	Air Compressors	1	6	78	0.48
Paving	Pavers	2	8	130	0.42
	Paving Equipment	2	8	132	0.36
	Rollers	2	8	80	0.38

Source: Compiled by LSA (December 2016).

The most recent version of the CalEEMod model (Version 2016.3.1) was used to calculate the construction emissions, as shown in Table H (based on the schedule and equipment listed above). The emissions rates shown are the combination of the on- and off-site emissions.

Table H: Short-Term Regional Construction Emissions

	Total Regional Pollutant Emissions (lbs/day)							
	VOC	NO_X	CO	SO_X	Fugitive PM_{10}	Exhaust PM_{10}	Fugitive $PM_{2.5}$	Exhaust $PM_{2.5}$
Year 2017	5.08	52.36	24.47	0.04	8.33	2.88	4.52	2.65
Year 2018	7.60	26.22	20.71	0.03	0.30	1.66	0.08	1.57
Maximum daily emissions	**7.60**	**52.36**	**24.47**	**0.04**	**8.33**	**2.88**	**4.52**	**2.65**
SCAQMD Pollutant Thresholds	**75**	**100**	**550**	**150**	**150**	**150**	**55**	**55**
Threshold exceeded?	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**

Source: Compiled by LSA (December 2016).
Notes: These estimates reflect control of fugitive dust required by SCAQMD Rule 403.
The values shown are the maximum summer or winter daily emissions results from CalEEMod.
CO = carbon monoxide
lbs/day = pounds per day
NO_X = nitrogen oxides
$PM_{2.5}$ = particulate matter less than 2.5 microns in size
PM_{10} = particulate matter less than 10 microns in size
SCAQMD = South Coast Air Quality Management District
SO_X = sulfur dioxide
VOC = volatile organic compounds

As shown in Table H, the emissions are all below the criteria pollutant significance thresholds. Since no exceedances of any criteria pollutants are expected, no significant impacts would occur for project construction. Standard measures were incorporated in the modeling and are discussed later in this report. Details of the emission factors and other assumptions are included in Appendix A.

Fugitive Dust

Fugitive dust emissions are generally associated with land clearing and exposure of soils to the air and wind, as well as cut-and-fill grading operations. Dust generated during construction varies substantially on a project-by-project basis depending on the level of activity, the specific operations, and weather conditions at the time of construction.

The proposed project will be required to comply with SCAQMD Rules 402 and 403 to control nuisance emissions and fugitive dust. The CalEEMod model does not provide for including these required measures in any way other than as mitigation. However, these measures are not mitigating a significant air quality impact but complying with the requirements. Thus, the PM_{10} and $PM_{2.5}$ emissions shown are from the CalEEMod output tables listed as "Mitigated Construction," even though the only measures that have been applied to the analysis are the required construction emissions control measures, or standard conditions.

Localized Impacts Analysis

The SCAQMD has issued guidance on applying CalEEMod modeling results to localized impacts analysis.[1] Sensitive receptors include residences, schools, hospitals, and similar uses that are sensitive to adverse air quality. The project site is surrounded primarily by residential development with the nearest residential use east of the project site having a garage located approximately 7 ½ feet from property line and the residence located approximately 25 feet from property line. As per SCAQMD LST guidance, for receptors less than 82 ft (25 m) away, LST screening thresholds at 82 ft (25 m) are used as the SCAQMD-recommended LST thresholds. Table I identifies that the emissions of the pollutants on the peak day of construction would result in concentrations of pollutants at these nearest residences that are all below the SCAQMD thresholds of significance.

Table I: Construction LST Impacts (lbs/day)

Emissions Sources	NO_X	CO	PM_{10}	$PM_{2.5}$
On-site Emissions	52	23	11	7.1
LSTs	**253**	**1,461**	**12**	**7.3**
Significant Emissions?	**No**	**No**	**No**	**No**

Source: Compiled by LSA (December 2016).
SRA: Metropolitan Riverside County, 4.5 acres, 25-meter distance
Notes:
CO = carbon monoxide
lbs/day = pounds per day
LST = local significance threshold
NO_X = nitrogen oxides
$PM_{2.5}$ = particulate matter less than 2.5 microns in size
PM_{10} = particulate matter less than 10 microns in size

[1] South Coast Air Quality Management District (SCAQMD). *Fact Sheet for Applying CalEEMod to Localized Significance Thresholds.* Website: http://www.aqmd.gov/docs/default-source/ceqa/handbook/localized-significance-thresholds/caleemod-guidance.pdf, accessed December 2016.

Odors

Heavy-duty equipment in the project area during construction would emit odors, primarily from the equipment exhaust. However, the construction activity would cease to occur after individual construction is completed. No other sources of objectionable odors have been identified for the proposed project, and no mitigation measures are required.

SCAQMD Rule 402 regarding nuisances states: "A person shall not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property." The proposed uses are not anticipated to emit any objectionable odors. Therefore, objectionable odors posing a health risk to potential on-site and existing off-site uses would not occur as a result of the proposed project.

Naturally Occurring Asbestos

Asbestos is the name given to a group of fibrous minerals that occur naturally in rock formations in the environment. Naturally occurring asbestos (NOA) is the term applied to a natural geological occurrence of various types of asbestos. NOA has been found to be present in the majority of counties in California. It is commonly found in ultramafic rock formations, including serpentine rock, and in the soils where these rock types are located. NOA may pose a health risk if asbestos-containing rocks are crushed or broken and asbestos fibers are released into the air, although these health risks are not yet fully understood.

The proposed project is located in the City of Riverside in Riverside County, which is among the counties found to have serpentine and ultramafic rock in their soils. However, no serpentine or ultramafic rock has been found in the project area in the past 25 years. By following standard nuisance and dust control measures, as required by SCAQMD Rules 402 and 403, any NOA that might be disturbed would not become airborne. Therefore, the potential risk for NOA exposure to nearby residents during project construction is small and less than significant.

Construction Emissions Conclusions

As established in Table H, daily regional construction emissions would not exceed the daily thresholds of any criteria pollutant emission thresholds established by the SCAQMD. Table I shows that during construction, there will be no localized significant impacts.

LONG-TERM REGIONAL AIR QUALITY IMPACTS

Long-Term Project Operational Emissions

Long-term air pollutant emission impacts are those associated with stationary sources and mobile sources involving any project-related changes. The proposed project would result in area-, energy-, and mobile-source emissions. Area sources include architectural coatings, consumer products, and landscaping. Energy sources include natural gas consumption for heating (the homes would only have non-wood burning gas fireplaces). Trip generation rates from the project's traffic study have been used to develop the mobile source emissions.

Long-term operational emissions associated with the proposed project are shown in Tables J and K (localized significance impacts). Table J shows that the peak daily emissions of all criteria pollutants as a result of the proposed project would not exceed the corresponding SCAQMD daily emission thresholds. Therefore, project-related long-term air quality impacts would be less than significant.

Table J: Opening Year Regional Operational Emissions

Source	Pollutant Emissions (lbs/day)					
	VOC	**NO_X**	**CO**	**SO_X**	**PM_{10}**	**$PM_{2.5}$**
Area Sources	2.58	0.95	4.86	<0.01	0.10	0.10
Energy Sources	0.060	0.51	0.22	<0.01	0.04	0.04
Mobile Sources	1.28	9.11	15.49	0.056	3.96	1.10
Total Project Emissions	**3.92**	**10.57**	**20.57**	**0.056**	**4.1**	**1.24**
SCAQMD Thresholds	**55**	**55**	**550**	**150**	**150**	**55**
Significant?	**No**	**No**	**No**	**No**	**No**	**No**

Source: Compiled by LSA (December 2016).
Notes:
The values shown are the maximum summer or winter daily emissions results from CalEEMod.
CO = carbon monoxide
lbs/day = pounds per day
NO_X = nitrogen oxides
$PM_{2.5}$ = particulate matter less than 2.5 microns in size
PM_{10} = particulate matter less than 10 microns in size
SCAQMD = South Coast Air Quality Management District
SO_X = sulfur oxides
VOC = volatile organic compounds

Localized Impacts Analysis

Table K shows the calculated emissions for the proposed operational activities compared with the appropriate SCAQMD localized impacts thresholds. The localized impacts analysis by design only includes on-site sources; however, the CalEEMod model outputs for operations do not separate on-site and off-site emissions. The emissions shown in Table I for area sources are assumed to all occur on site and for energy sources entirely off site. While some of the mobile-source emissions will occur from vehicles driving on site, most of the mobile-source emissions calculated by the CalEEMod model would occur while the vehicles are driving off site.

Table K: Long-Term Operational Localized Impact Analysis (lbs/day)

Emissions Sources	**NO_X**	**CO**	**PM_{10}**	**$PM_{2.5}$**
On-site emissions	1	6	0.29	0.15
LSTs	**270**	**1,577**	**4**	**2**
Significant Emissions?	**No**	**No**	**No**	**No**

Source: Compiled by LSA (December 2016).
Note: SRA – Metropolitan Riverside County, 5 acres, 82-foot distance, on-site traffic 5 percent of total.
CO = carbon monoxide
lbs/day = pounds per day
LST = localized significance thresholds
NO_X = nitrogen oxides
$PM_{2.5}$ = particulate matter less than 2.5 microns in size
PM_{10} = particulate matter less than 10 microns in size
SRA = Source Receptor Area

It is unlikely that the average on-site distance driven by vehicles will be more than 1,000 feet, which is approximately 2 percent of the total miles traveled. For a worst-case scenario assessment, the emissions shown in Table K include all on-site project-related area sources and 5 percent of the

project-related new mobile sources. Table K shows that the operational emission rates would not exceed the LSTs. Therefore, the proposed operational activity would not result in a locally significant air quality impact.

GHG Emissions

This section evaluates potential significant impacts related to GCC that could result from implementation of the proposed project. Because it is not possible to tie specific GHG emissions to actual changes in climate, this evaluation focuses on the project's emission of GHGs. Mitigation measures are identified as appropriate.

GHG Emissions Background. Emissions estimates for the proposed project are discussed below. GHG emissions estimates are provided herein for informational purposes only, as there is no established quantified GHG emissions threshold. Bearing in mind that CEQA does not require "perfection" but instead "adequacy, completeness, and a good faith effort at full disclosure," the analysis below is based on methodologies and information available to the City and the applicant at the time this analysis was prepared. Estimation of GHG emissions in the future does not account for all changes in technology that may reduce such emissions; therefore, the estimates are based on past performance and represent a scenario that is worse than that which is likely to be encountered (after energy-efficient technologies have been implemented). While information is presented below to assist the public and decision-makers in understanding the project's potential contribution to GCC impacts, the information available to the cities is not sufficiently detailed to allow a direct comparison between particular project characteristics and particular climate change impacts, or between any particular proposed mitigation measure and any reduction in climate change impacts.

Overall, the following activities associated with the proposed project could directly or indirectly contribute to the generation of GHG emissions:

- **Construction Activities:** During construction of the project, GHGs would be emitted through the operation of construction equipment and from worker and vendor vehicles, each of which typically uses fossil-based fuels to operate. The combustion of fossil-based fuels creates GHGs such as CO_2, CH_4, and N_2O. Furthermore, CH_4 is emitted during the fueling of heavy equipment.
- **Gas, Electricity, and Water Use:** Natural gas use results in the emission of two GHGs: CH_4 (the major component of natural gas) and CO_2 (from the combustion of natural gas). Electricity use can result in GHG production if the electricity is generated by combusting fossil fuel. California's water conveyance system is energy-intensive. Preliminary estimates indicate that the total energy used to pump and treat this water exceeds 6.5 percent of the total electricity used in the State per year (State of California 2008).
- **Solid Waste Disposal:** Solid waste generated by the project could contribute to GHG emissions in a variety of ways. Landfilling and other methods of disposal use energy for transporting and managing the waste, and they produce additional GHGs to varying degrees. Landfilling, the most common waste management practice, results in the release of CH_4 from the anaerobic decomposition of organic materials. CH_4 is 25 times more potent a GHG than CO_2. However, landfill CH_4 can also be a source of energy. In addition, many materials in landfills do not decompose fully, and the carbon that remains is sequestered in the landfill and not released into the atmosphere.

- **Motor Vehicle Use:** Transportation associated with the proposed project would result in GHG emissions from the combustion of fossil fuels in daily automobile and truck trips.

GHG emissions associated with the project would occur over the short term from construction activities and would consist primarily of emissions from equipment exhaust. There would also be long-term regional emissions associated with project-related new vehicular trips and stationary-source emissions, such as natural gas used for heating and electricity usage for lighting. Preliminary guidance from the OPR and recent letters from the Attorney General critical of CEQA documents that have taken different approaches indicate that lead agencies should calculate, or estimate, emissions from vehicular traffic, energy consumption, water conveyance and treatment, waste generation, and construction activities. The calculation presented below includes construction emissions in terms of CO_2; annual CO_2e GHG emissions from increased energy consumption, water usage, and solid waste disposal; and estimated GHG emissions from vehicular traffic that would result from implementation of the project.

Table L lists the annual GHG emissions for each of the planned construction phases in 2017 and 2018 and shows that the GHG emissions would be highest during the building construction phase, at approximately 266 MT. Total construction GHG emissions over the entire construction period are estimated to be 449 MT CO_2e.

Table L: Short-Term Regional Construction Emissions

Construction Phase		Total Regional Pollutant Emissions (MT/yr)			
		CO_2	CH_4	N_2O	CO_2e
2017	Demolition	41	0.01	0	41.3
	Site Preparation	19	<0.01	0	18.7
	Grading	29	<0.01	0	29.3
	Building Construction	48	0.01	0	48.3
2018	Building Construction	265	0.06	0	266.0
	Architectural Coating	22	<0.01	0	22.4
	Paving	22	<0.01	0	22.4
Total Construction Emissions		**446**	**0.10**	**0**	**449[1]**

Source: Compiled by LSA (December 2016).
Notes: [1]Rounded to the nearest whole number.
CH_4 = methane
CO_2 = carbon dioxide
CO_2e = carbon dioxide equivalent
MT/yr = metric tons per year
N_2O = nitrous oxide

Long-term operation of the proposed project would generate GHG emissions from area and mobile sources and indirect emissions from stationary sources associated with energy consumption. Mobile-source emissions of GHGs would include project-generated vehicle trips associated with on-site residences. Area-source emissions would be associated with activities such as landscaping and maintenance of proposed land uses, natural gas for heating, and other sources. Increases in stationary-source emissions would also occur at off-site utility providers as a result of demand for electricity, natural gas, and water by the proposed uses.

Operational and Construction GHG emissions as shown in Table M were calculated using CalEEMod Version 2016.3.1. The Table shows total GHG emissions from the project operational GHG emissions. Based on SCAQMD guidance, construction emissions were amortized over 30 years (a

typical project lifetime) and added to the total project operational emissions. Appendix A includes the worksheets for the GHG emissions.

Table M: Long-Term Operational Greenhouse Gas Emissions

Source	Pollutant Emissions (MT/yr)					
	Bio-CO_2	**NBio-CO_2**	**Total CO_2**	**CH_4**	**N_2O**	**CO_2e**
Construction emissions amortized over 30 years	0	15	15	<0.01	0	15
Operational Emissions						
Area Sources	0	14	14	<0.01	<0.01	14
Energy Sources	0	411	411	<0.01	<0.01	412
Mobile Sources	0	851	851	0.047	0	852
Waste Sources	13	0	13	0.76	0	32
Water Usage	1.1	42	43	0.12	<0.01	47
Total Project Emissions[1]	**14**	**1,334**	**1,348**	**0.92**	**<0.01**	**1,373**

Source: Compiled by LSA (December 2016).
Note: [1]Numbers in table may not appear to add up correctly due to rounding of numbers.
Bio-CO_2 = biologically generated CO_2
CH_4 = methane
CO_2 = carbon dioxide
CO_2e = carbon dioxide equivalent
MT/yr = metric tons per year
N_2O = nitrous oxide
NBio-CO_2 = non-biologically generated CO_2

As shown in Table M, the project will produce 1,373 MT CO_2e/yr, which is 0.0014 MMT CO_2e/yr. For comparison, the existing emissions from the entire SCAG region are estimated to be approximately 176.79 MMT CO_2e/yr, and the existing emissions for the entire State are estimated at approximately 496.95 MMT CO_2e/yr.

At present, there is a federal ban on chlorofluorocarbons (CFCs); therefore, it is assumed the project would not generate emissions of CFCs. The project may emit a small amount of HFCs from leakage and service of refrigeration and air-conditioning equipment and from disposal at the end of the life of the equipment. However, the details regarding refrigerants to be used at the project site are unknown at this time. PFCs and SF_6 are typically used in industrial applications, none of which would be used on the project site. Therefore, it is not anticipated that the project would contribute significant emissions of these additional GHGs.

Because climate change impacts are cumulative in nature, no typical single project can result in emissions of such a magnitude that it, in and of itself, would be significant on a project basis. The project's operational emissions of 1,373 MT CO_2e/yr is less than the SCAQMD-recommended interim threshold of 3,500 MT CO_2e/yr for residential uses. Therefore, the proposed project would not result in a significant impact on GHG emissions.

LONG-TERM MICROSCALE (CO HOT SPOT) ANALYSIS

Vehicular trips associated with the proposed project would contribute to congestion at intersections and along roadway segments in the project vicinity. Localized air quality impacts would occur when emissions from vehicular traffic increase as a result of the proposed project. The primary mobile-source pollutant of local concern is CO, which is a direct function of vehicle idling time and, thus, of traffic flow conditions. CO transport is extremely limited; under normal meteorological conditions, it

disperses rapidly with distance from the source. However, under certain extreme meteorological conditions, CO concentrations near a congested roadway or intersection may reach unhealthful levels, affecting local sensitive receptors (residents, schoolchildren, the elderly, and hospital patients, etc.). Typically, high CO concentrations are associated with roadways or intersections operating at unacceptable levels of service or with extremely high traffic volumes. In areas with high ambient background CO concentrations, modeling is recommended, to determine a project's effect on local CO levels.

An assessment of project-related impacts on localized ambient air quality requires that future ambient air quality levels be projected. Existing CO concentrations in the immediate project vicinity are not available. Ambient CO levels monitored in the Riverside area stations showed a highest recorded 1-hour concentration of 4.1 ppm (State standard is 20 ppm) and a highest 8-hour concentration of 2.0 ppm (State standard is 9 ppm) during the past 3 years (see Table E). The highest CO concentrations would normally occur during peak traffic hours; hence, CO impacts calculated under peak traffic conditions represent a worst-case analysis.

As described in the *Traffic Impact Analysis* prepared for the proposed project (LSA 2016), all study area intersections currently operate at satisfactory level of service (LOS) e.g., no intersections predicted to operate at LOS E or F. Intersections operating at higher LOS levels mean vehicles spend more time idling, thus causing higher CO emissions. With addition of the project in the existing setting with recommended improvements, all study area intersections would continue to operate at satisfactory LOS.

Therefore, the project can be implemented in an existing setting with no significant peak-hour intersection impacts. Given the relatively low level of CO concentrations in the project area, project-related vehicles are not expected to result in the CO concentrations exceeding the State or federal CO standards.

AIR QUALITY MANAGEMENT PLAN CONSISTENCY

A consistency determination plays an essential role in local agency project review by linking local planning and unique individual projects to the air quality plans. It fulfills the CEQA goal of fully informing local agency decision-makers of the environmental costs of the project under consideration at a stage early enough to ensure that air quality concerns are addressed. Only new or amended General Plan elements, Specific Plans, and significantly unique projects need to undergo a consistency review due to the air quality plan strategy being based on projections from local General Plans.

The AQMP is based on regional growth projections developed by the SCAG. It should be noted that the AQMP analyzed the site as a school with the former operation of the Hawthorne Elementary School. The proposed project is a residential development and is not defined as a regionally significant project under CEQA; therefore, it does not meet SCAG's Intergovernmental Review (IGR) criteria. In addition, based on the defaults trip rates and trip lengths in the Institute of Transportation Engineers Trip Generation Manual, Ninth Edition for the previous elementary school and the proposed project, the proposed project would produce a lower amount of vehicle miles traveled and thus lower operational emissions than the former elementary school. However, the project does require a General Plan Amendment (Planning Case P16-0112) from B/OP –

Business/Office Park to MDR – Medium Density Residential and Zone Change (Planning Case P16-0113) from PF - Public Facilities to R-1-7000 - Single-family residential.

Pursuant to the methodology provided in Chapter 12 of the 1993 SCAQMD *CEQA Air Quality Handbook,* consistency with the Basin 2012 AQMP is affirmed when a project: (1) does not increase the frequency or severity of an air quality standards violation or cause a new violation; and (2) is consistent with the growth assumptions in the AQMP. Consistency review is presented below:

1. The project would result in short-term construction and long-term pollutant emissions that are less than the CEQA significance emissions thresholds established by the SCAQMD, as demonstrated above; therefore, the project could not result in an increase in the frequency or severity of any air quality standards violation and will not cause a new air quality standard violation.
2. The *CEQA Air Quality Handbook* indicates that consistency with AQMP growth assumptions must be analyzed for new or amended General Plan elements, Specific Plans, and significant projects. Significant projects include airports, electrical generating facilities, petroleum and gas refineries, designation of oil drilling districts, water ports, solid waste disposal sites, and offshore drilling facilities; therefore, the proposed project is not defined as significant.

Therefore, based on the consistency analysis presented above, the proposed project is consistent with the current regional AQMP.

STANDARD CONDITIONS

Construction Operations

The project is required to comply with regional rules that assist in reducing short-term air pollutant emissions. SCAQMD Rule 403 requires that fugitive dust be controlled with best-available control measures so that the presence of such dust does not remain visible in the atmosphere beyond the property line of the emission source. In addition, SCAQMD Rule 402 requires implementation of dust suppression techniques to prevent fugitive dust from creating a nuisance off site.

Operations

The proposed project is required to comply with Title 24 of the California Code of Regulations (CCR) established by the CEC regarding energy conservation and green building standards.

These measures will result in reduced emissions during the construction and operation phases of the proposed project.

PROJECT FEATURES

Global Climate Change Impacts

Project Feature GCC-1 To ensure that the proposed project complies with and would not conflict with or impede the implementation of reduction goals identified in Assembly Bill 32, the Governor's Executive Order S-3-05, and other strategies to help reduce greenhouse gases (GHGs) to the level proposed by the Governor, the project will implement a variety of measures that

will reduce its GHG emissions. The following measures shall be incorporated into the design and construction of the project (including specific building projects):

Construction and Building Materials

- Divert at least 50 percent of the grubbed construction materials (including, but not limited to, soil, vegetation, concrete, lumber, metal, and cardboard) to a material recycling facility within 20 miles from the project site.

Water Conservation and Efficiency Measures

- Devise a comprehensive water conservation strategy appropriate for the project and its location. The strategy may include the following, plus other innovative measures that may be appropriate:
  - Create water-efficient landscapes within the development.
  - Install water-efficient irrigation systems and devices, such as soil moisture-based irrigation controls.
  - Restrict watering methods (e.g., prohibit systems that apply water to nonvegetated surfaces) and control runoff.

In addition, the project would be subject to all applicable regulatory requirements, which would also reduce the GHG emissions of the project. With implementation of Project Feature GCC-1 and application of regulatory requirements, the project would not conflict with or impede implementation of reduction goals identified in AB 32, the Governor's EO S-3-05, and other strategies to help reduce GHGs to the level proposed by the Governor. Therefore, the project's contribution to cumulative GHG emissions would be less than significant.

CUMULATIVE IMPACTS

The project would temporarily contribute criteria pollutants to the area during its construction. A number of individual projects in the area may be under construction simultaneously with the proposed project. Depending on construction schedules and actual implementation of other projects in the area, generation of fugitive dust and pollutant emissions during construction could result in substantial short-term increases in air pollutants. However, each project would be required to comply with the SCAQMD's standard construction measures. The proposed project's short-term construction emissions would not exceed the significance thresholds. Therefore, it will not have a significant short-term cumulative impact.

The project's long-term operational emissions would not exceed the SCAQMD's criteria pollutant thresholds. As climate change impacts are global in nature, no typical single project can result in emissions of such a magnitude that it, in and of itself, would be significant on project basis. Because the proposed project will not exceed the SCAQMD-recommended interim thresholds for residential uses, the proposed project would not result in a significant long-term cumulative impact.

IMPACTS TO THE PROPOSED PROJECT FROM GLOBAL CLIMATE CHANGE

Local temperatures could increase in time as a result of GCC with or without the proposed project. This increase in temperature could lead to other climate effects, including, but not limited to, increased flooding due to increased precipitation and runoff. At present, the extent of climate change impacts is uncertain, and more extensive monitoring of runoff is necessary for greater understanding of changes in hydrologic patterns. Studies indicate that increased temperatures could result in a greater portion of peak stream flows occurring earlier in the spring, with decreases in late spring and early summer. These changes could have implications for water supply, flood management, and ecosystem health. In addition, there is a potential for sea level rising due to global warming. However, based on the location of the project site and the nature of the project use, the proposed project is not expected to be significantly affected by GCC.

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APPENDIX A

TRAFFIC DATA & CALEEMOD MODEL PRINTOUTS

Trip Generation Comparison Table

Project No.	Land Use	Location	Units	Rate	A.M. Peak Hour In	A.M. Peak Hour Out	A.M. Peak Hour Total	P.M. Peak Hour In	P.M. Peak Hour Out	P.M. Peak Hour Total	Daily
1 .	Single-Family Detached Housing		54 DU	Trips/Unit[1]	0.19	0.56	0.75	0.63	0.37	1.00	9.52
	Residential Development (Proposed)			Trip Generation	**10**	**30**	**40**	**34**	**20**	**54**	**514**
2 .	Elementary School (Previous Land Use)		610 Students	Trips/Unit[2]	0.25	0.20	0.45	0.07	0.08	0.15	1.29
				Trip Generation	**151**	**124**	**275**	**45**	**47**	**92**	**787**
			Net New Trips		**-141**	**-94**	**-235**	**-11**	**-27**	**-38**	**-273**

DU = Dwelling Units

[1] Rates based on Land Use 210 "Single-Family Detached Housing" from ITE *Trip Generation,* 9th Edition.

[2] Rates based on Land Use 520 "Elementary School" from ITE *Trip Generation,* 9th Edition.

Hawthorn Heights

Riverside-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	54.00	Dwelling Unit	6.85	108,466.00	154

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2019
Utility Company	Riverside Public Utilities				
CO2 Intensity (lb/MWhr)	1325.65	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Site acreage and building sf from project plans.

Construction Phase - Assumed architectual coatings applied to each residence throughout the building construction phase.

Demolition - There are 5 main existing buildings totaling 23,295 square feet

Vehicle Trips -

Woodstoves - No residences will have a wood-burning fireplace, assume all would have gas fireplaces.

Sequestration - Estimated the number of new trees from the site plan.

Construction Off-road Equipment Mitigation - Dust control measures as required by SCAQMD Rule 403.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	40	15

tblConstructionPhase	NumDays	20.00	152.00
tblConstructionPhase	PhaseEndDate	11/23/2018	9/28/2018
tblConstructionPhase	PhaseStartDate	10/27/2018	3/1/2018
tblFireplaces	FireplaceWoodMass	1,019.20	0.00
tblFireplaces	NumberGas	45.90	54.00
tblFireplaces	NumberNoFireplace	5.40	0.00
tblFireplaces	NumberWood	2.70	0.00
tblLandUse	BuildingSpaceSquareFeet	97,200.00	108,466.00
tblLandUse	LandUseSquareFeet	97,200.00	108,466.00
tblLandUse	LotAcreage	17.53	6.85
tblProjectCharacteristics	OperationalYear	2018	2019
tblSequestration	NumberOfNewTrees	0.00	20.00
tblWoodstoves	NumberCatalytic	2.70	0.00
tblWoodstoves	NumberNoncatalytic	2.70	0.00
tblWoodstoves	WoodstoveDayYear	25.00	0.00
tblWoodstoves	WoodstoveWoodMass	999.60	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					
2017	5.0811	52.3543	24.4658	0.0448	18.2675	2.8799	21.1473	9.9840	2.6495	12.6335	0.0000	4,544.7943	4,544.7943	1.2007	0.0000	4,572.4963
2018	7.6038	26.2128	20.7132	0.0342	0.2955	1.6581	1.9537	0.0792	1.5678	1.6470	0.0000	3,339.7151	3,339.7151	0.7195	0.0000	3,356.9880
Maximum	**7.6038**	**52.3543**	**24.4658**	**0.0448**	**18.2675**	**2.8799**	**21.1473**	**9.9840**	**2.6495**	**12.6335**	**0.0000**	**4,544.7943**	**4,544.7943**	**1.2007**	**0.0000**	**4,572.4963**

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					
2017	5.0811	52.3543	24.4658	0.0448	8.3310	2.8799	11.2109	4.5222	2.6495	7.1716	0.0000	4,544.7943	4,544.7943	1.2007	0.0000	4,572.4963
2018	7.6038	26.2128	20.7132	0.0342	0.2955	1.6581	1.9537	0.0792	1.5678	1.6470	0.0000	3,339.7151	3,339.7151	0.7195	0.0000	3,356.9880
Maximum	**7.6038**	**52.3543**	**24.4658**	**0.0448**	**8.3310**	**2.8799**	**11.2109**	**4.5222**	**2.6495**	**7.1716**	**0.0000**	**4,544.7943**	**4,544.7943**	**1.2007**	**0.0000**	**4,572.4963**

	ROG	**NOx**	**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**	**53.53**	**0.00**	**43.01**	**54.28**	**0.00**	**38.25**	**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	2.5755	0.9476	4.8583	5.9500e-003		0.0970	0.0970		0.0970	0.0970	0.0000	1,151.5512	1,151.5512	0.0298	0.0210	1,158.5435
Energy	0.0592	0.5062	0.2154	3.2300e-003		0.0409	0.0409		0.0409	0.0409		646.1968	646.1968	0.0124	0.0119	650.0368
Mobile	1.2834	9.0536	15.4896	0.0563	3.9006	0.0586	3.9592	1.0439	0.0554	1.0993		5,733.3829	5,733.3829	0.2968		5,740.8026
Total	**3.9180**	**10.5074**	**20.5633**	**0.0655**	**3.9006**	**0.1965**	**4.0971**	**1.0439**	**0.1933**	**1.2372**	**0.0000**	**7,531.1309**	**7,531.1309**	**0.3390**	**0.0328**	**7,549.3830**

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	2.5755	0.9476	4.8583	5.9500e-003		0.0970	0.0970		0.0970	0.0970	0.0000	1,151.5512	1,151.5512	0.0298	0.0210	1,158.5435
Energy	0.0592	0.5062	0.2154	3.2300e-003		0.0409	0.0409		0.0409	0.0409		646.1968	646.1968	0.0124	0.0119	650.0368
Mobile	1.2834	9.0536	15.4896	0.0563	3.9006	0.0586	3.9592	1.0439	0.0554	1.0993		5,733.3829	5,733.3829	0.2968		5,740.8026
Total	**3.9180**	**10.5074**	**20.5633**	**0.0655**	**3.9006**	**0.1965**	**4.0971**	**1.0439**	**0.1933**	**1.2372**	**0.0000**	**7,531.1309**	**7,531.1309**	**0.3390**	**0.0328**	**7,549.3830**

	ROG	**NOx**	**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	Demolition	Demolition	9/4/2017	9/29/2017	5	20	
2	Site Preparation	Site Preparation	9/30/2017	10/13/2017	5	10	
3	Grading	Grading	10/14/2017	11/10/2017	5	20	
4	Building Construction	Building Construction	11/11/2017	9/28/2018	5	230	
5	Paving	Paving	9/29/2018	10/26/2018	5	20	
6	Architectural Coating	Architectural Coating	3/1/2018	9/28/2018	5	152	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 10

Acres of Paving: 0

Residential Indoor: 219,644; Residential Outdoor: 73,215; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Demolition	Excavators	3	8.00	158	0.38
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Grading	Excavators	1	8.00	158	0.38
Building Construction	Cranes	1	7.00	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
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Grading	Graders	1	8.00	187	0.41
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Paving	Paving Equipment	2	8.00	132	0.36
Site Preparation	Tractors/Loaders/Backhoes	4	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

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
Architectural Coating	1	4.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	19.00	6.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Demolition	6	15.00	0.00	106.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	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

Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Demolition - 2017

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					1.1536	0.0000	1.1536	0.1747	0.0000	0.1747			0.0000			0.0000
Off-Road	4.1031	42.7475	23.0122	0.0388		2.1935	2.1935		2.0425	2.0425		3,924.2833	3,924.2833	1.0730		3,951.1070
Total	**4.1031**	**42.7475**	**23.0122**	**0.0388**	**1.1536**	**2.1935**	**3.3471**	**0.1747**	**2.0425**	**2.2172**		**3,924.2833**	**3,924.2833**	**1.0730**		**3,951.1070**

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	0.0367	1.5744	0.1874	4.1500e-003	0.0927	8.4500e-003	0.1012	0.0254	8.0800e-003	0.0335		439.3901	439.3901	0.0291		440.1164
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	0.1003	0.0657	0.8420	1.8200e-003	0.1677	1.0700e-003	0.1687	0.0445	9.9000e-004	0.0455		181.1209	181.1209	6.0800e-003		181.2729

Total	**0.1370**	**1.6401**	**1.0294**	**5.9700e-003**	**0.2604**	**9.5200e-003**	**0.2699**	**0.0699**	**9.0700e-003**	**0.0790**		**620.5110**	**620.5110**	**0.0351**		**621.3893**

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					0.5191	0.0000	0.5191	0.0786	0.0000	0.0786			0.0000			0.0000
Off-Road	4.1031	42.7475	23.0122	0.0388		2.1935	2.1935		2.0425	2.0425	0.0000	3,924.2833	3,924.2833	1.0730		3,951.1070
Total	**4.1031**	**42.7475**	**23.0122**	**0.0388**	**0.5191**	**2.1935**	**2.7126**	**0.0786**	**2.0425**	**2.1211**	**0.0000**	**3,924.2833**	**3,924.2833**	**1.0730**		**3,951.1070**

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	0.0367	1.5744	0.1874	4.1500e-003	0.0927	8.4500e-003	0.1012	0.0254	8.0800e-003	0.0335		439.3901	439.3901	0.0291		440.1164
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	0.1003	0.0657	0.8420	1.8200e-003	0.1677	1.0700e-003	0.1687	0.0445	9.9000e-004	0.0455		181.1209	181.1209	6.0800e-003		181.2729
Total	**0.1370**	**1.6401**	**1.0294**	**5.9700e-003**	**0.2604**	**9.5200e-003**	**0.2699**	**0.0699**	**9.0700e-003**	**0.0790**		**620.5110**	**620.5110**	**0.0351**		**621.3893**

3.3 Site Preparation - 2017

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	4.9608	52.2754	23.4554	0.0380		2.8786	2.8786		2.6483	2.6483		3,894.9500	3,894.9500	1.1934		3,924.7852
Total	**4.9608**	**52.2754**	**23.4554**	**0.0380**	**18.0663**	**2.8786**	**20.9448**	**9.9307**	**2.6483**	**12.5790**		**3,894.9500**	**3,894.9500**	**1.1934**		**3,924.7852**

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	0.1204	0.0789	1.0104	2.1900e-003	0.2012	1.2900e-003	0.2025	0.0534	1.1900e-003	0.0546		217.3450	217.3450	7.3000e-003		217.5275
Total	**0.1204**	**0.0789**	**1.0104**	**2.1900e-003**	**0.2012**	**1.2900e-003**	**0.2025**	**0.0534**	**1.1900e-003**	**0.0546**		**217.3450**	**217.3450**	**7.3000e-003**		**217.5275**

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					8.1298	0.0000	8.1298	4.4688	0.0000	4.4688			0.0000			0.0000
Off-Road	4.9608	52.2754	23.4554	0.0380		2.8786	2.8786		2.6483	2.6483	0.0000	3,894.9500	3,894.9500	1.1934		3,924.7852
Total	**4.9608**	**52.2754**	**23.4554**	**0.0380**	**8.1298**	**2.8786**	**11.0084**	**4.4688**	**2.6483**	**7.1171**	**0.0000**	**3,894.9500**	**3,894.9500**	**1.1934**		**3,924.7852**

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	0.1204	0.0789	1.0104	2.1900e-003	0.2012	1.2900e-003	0.2025	0.0534	1.1900e-003	0.0546		217.3450	217.3450	7.3000e-003		217.5275
Total	**0.1204**	**0.0789**	**1.0104**	**2.1900e-003**	**0.2012**	**1.2900e-003**	**0.2025**	**0.0534**	**1.1900e-003**	**0.0546**		**217.3450**	**217.3450**	**7.3000e-003**		**217.5275**

3.4 Grading - 2017

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					6.5523	0.0000	6.5523	3.3675	0.0000	3.3675			0.0000			0.0000
Off-Road	3.0705	33.8868	17.1042	0.0297		1.7774	1.7774		1.6352	1.6352		3,037.9107	3,037.9107	0.9308		3,061.1809
Total	**3.0705**	**33.8868**	**17.1042**	**0.0297**	**6.5523**	**1.7774**	**8.3298**	**3.3675**	**1.6352**	**5.0027**		**3,037.9107**	**3,037.9107**	**0.9308**		**3,061.1809**

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	0.1003	0.0657	0.8420	1.8200e-003	0.1677	1.0700e-003	0.1687	0.0445	9.9000e-004	0.0455		181.1209	181.1209	6.0800e-003		181.2729
Total	**0.1003**	**0.0657**	**0.8420**	**1.8200e-003**	**0.1677**	**1.0700e-003**	**0.1687**	**0.0445**	**9.9000e-004**	**0.0455**		**181.1209**	**181.1209**	**6.0800e-003**		**181.2729**

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					2.9486	0.0000	2.9486	1.5154	0.0000	1.5154			0.0000			0.0000
Off-Road	3.0705	33.8868	17.1042	0.0297		1.7774	1.7774		1.6352	1.6352	0.0000	3,037.9107	3,037.9107	0.9308		3,061.1809
Total	**3.0705**	**33.8868**	**17.1042**	**0.0297**	**2.9486**	**1.7774**	**4.7260**	**1.5154**	**1.6352**	**3.1506**	**0.0000**	**3,037.9107**	**3,037.9107**	**0.9308**		**3,061.1809**

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	0.1003	0.0657	0.8420	1.8200e-003	0.1677	1.0700e-003	0.1687	0.0445	9.9000e-004	0.0455		181.1209	181.1209	6.0800e-003		181.2729
Total	**0.1003**	**0.0657**	**0.8420**	**1.8200e-003**	**0.1677**	**1.0700e-003**	**0.1687**	**0.0445**	**9.9000e-004**	**0.0455**		**181.1209**	**181.1209**	**6.0800e-003**		**181.2729**

3.5 Building Construction - 2017

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	3.1149	26.5546	18.1825	0.0269		1.7879	1.7879		1.6791	1.6791		2,650.9797	2,650.9797	0.6531		2,667.3078
Total	**3.1149**	**26.5546**	**18.1825**	**0.0269**		**1.7879**	**1.7879**		**1.6791**	**1.6791**		**2,650.9797**	**2,650.9797**	**0.6531**		**2,667.3078**

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	0.0253	0.7807	0.1592	1.5900e-003	0.0384	7.6200e-003	0.0461	0.0111	7.2900e-003	0.0184		167.7388	167.7388	0.0148		168.1085
Worker	0.1270	0.0833	1.0665	2.3100e-003	0.2124	1.3600e-003	0.2137	0.0563	1.2600e-003	0.0576		229.4198	229.4198	7.7000e-003		229.6123

Total	**0.1523**	**0.8640**	**1.2257**	**3.9000e-003**	**0.2508**	**8.9800e-003**	**0.2598**	**0.0674**	**8.5500e-003**	**0.0759**		**397.1586**	**397.1586**	**0.0225**		**397.7209**

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	3.1149	26.5546	18.1825	0.0269		1.7879	1.7879		1.6791	1.6791	0.0000	2,650.9797	2,650.9797	0.6531		2,667.3078
Total	**3.1149**	**26.5546**	**18.1825**	**0.0269**		**1.7879**	**1.7879**		**1.6791**	**1.6791**	**0.0000**	**2,650.9797**	**2,650.9797**	**0.6531**		**2,667.3078**

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	0.0253	0.7807	0.1592	1.5900e-003	0.0384	7.6200e-003	0.0461	0.0111	7.2900e-003	0.0184		167.7388	167.7388	0.0148		168.1085
Worker	0.1270	0.0833	1.0665	2.3100e-003	0.2124	1.3600e-003	0.2137	0.0563	1.2600e-003	0.0576		229.4198	229.4198	7.7000e-003		229.6123
Total	**0.1523**	**0.8640**	**1.2257**	**3.9000e-003**	**0.2508**	**8.9800e-003**	**0.2598**	**0.0674**	**8.5500e-003**	**0.0759**		**397.1586**	**397.1586**	**0.0225**		**397.7209**

3.5 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	2.6795	23.3900	17.5804	0.0269		1.4999	1.4999		1.4099	1.4099		2,620.9351	2,620.9351	0.6421		2,636.9883
Total	**2.6795**	**23.3900**	**17.5804**	**0.0269**		**1.4999**	**1.4999**		**1.4099**	**1.4099**		**2,620.9351**	**2,620.9351**	**0.6421**		**2,636.9883**

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	0.0221	0.7290	0.1410	1.5900e-003	0.0384	6.1100e-003	0.0445	0.0111	5.8500e-003	0.0169		167.4790	167.4790	0.0138		167.8248
Worker	0.1144	0.0727	0.9397	2.2400e-003	0.2124	1.3300e-003	0.2137	0.0563	1.2200e-003	0.0576		222.9216	222.9216	6.7900e-003		223.0912
Total	**0.1365**	**0.8017**	**1.0807**	**3.8300e-003**	**0.2508**	**7.4400e-003**	**0.2582**	**0.0674**	**7.0700e-003**	**0.0745**		**390.4006**	**390.4006**	**0.0206**		**390.9161**

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	2.6795	23.3900	17.5804	0.0269		1.4999	1.4999		1.4099	1.4099	0.0000	2,620.9351	2,620.9351	0.6421		2,636.9883
Total	**2.6795**	**23.3900**	**17.5804**	**0.0269**		**1.4999**	**1.4999**		**1.4099**	**1.4099**	**0.0000**	**2,620.9351**	**2,620.9351**	**0.6421**		**2,636.9883**

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	0.0221	0.7290	0.1410	1.5900e-003	0.0384	6.1100e-003	0.0445	0.0111	5.8500e-003	0.0169		167.4790	167.4790	0.0138		167.8248
Worker	0.1144	0.0727	0.9397	2.2400e-003	0.2124	1.3300e-003	0.2137	0.0563	1.2200e-003	0.0576		222.9216	222.9216	6.7900e-003		223.0912
Total	**0.1365**	**0.8017**	**1.0807**	**3.8300e-003**	**0.2508**	**7.4400e-003**	**0.2582**	**0.0674**	**7.0700e-003**	**0.0745**		**390.4006**	**390.4006**	**0.0206**		**390.9161**

3.6 Paving - 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	1.6437	17.5209	14.7964	0.0228		0.9561	0.9561		0.8797	0.8797		2,294.0887	2,294.0887	0.7142		2,311.9432
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.6437**	**17.5209**	**14.7964**	**0.0228**		**0.9561**	**0.9561**		**0.8797**	**0.8797**		**2,294.0887**	**2,294.0887**	**0.7142**		**2,311.9432**

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	0.0903	0.0574	0.7419	1.7700e-003	0.1677	1.0500e-003	0.1687	0.0445	9.7000e-004	0.0454		175.9907	175.9907	5.3600e-003		176.1247
Total	**0.0903**	**0.0574**	**0.7419**	**1.7700e-003**	**0.1677**	**1.0500e-003**	**0.1687**	**0.0445**	**9.7000e-004**	**0.0454**		**175.9907**	**175.9907**	**5.3600e-003**		**176.1247**

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	1.6437	17.5209	14.7964	0.0228		0.9561	0.9561		0.8797	0.8797	0.0000	2,294.0887	2,294.0887	0.7142		2,311.9432
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.6437**	**17.5209**	**14.7964**	**0.0228**		**0.9561**	**0.9561**		**0.8797**	**0.8797**	**0.0000**	**2,294.0887**	**2,294.0887**	**0.7142**		**2,311.9432**

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	0.0903	0.0574	0.7419	1.7700e-003	0.1677	1.0500e-003	0.1687	0.0445	9.7000e-004	0.0454		175.9907	175.9907	5.3600e-003		176.1247
Total	**0.0903**	**0.0574**	**0.7419**	**1.7700e-003**	**0.1677**	**1.0500e-003**	**0.1687**	**0.0445**	**9.7000e-004**	**0.0454**		**175.9907**	**175.9907**	**5.3600e-003**		**176.1247**

3.7 Architectural Coating - 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					
Archit. Coating	4.4651					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2986	2.0058	1.8542	2.9700e-003		0.1506	0.1506		0.1506	0.1506		281.4485	281.4485	0.0267		282.1171
Total	**4.7638**	**2.0058**	**1.8542**	**2.9700e-003**		**0.1506**	**0.1506**		**0.1506**	**0.1506**		**281.4485**	**281.4485**	**0.0267**		**282.1171**

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	0.0241	0.0153	0.1978	4.7000e-004	0.0447	2.8000e-004	0.0450	0.0119	2.6000e-004	0.0121		46.9309	46.9309	1.4300e-003		46.9666

Total	**0.0241**	**0.0153**	**0.1978**	**4.7000e-004**	**0.0447**	**2.8000e-004**	**0.0450**	**0.0119**	**2.6000e-004**	**0.0121**		**46.9309**	**46.9309**	**1.4300e-003**		**46.9666**

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	4.4651					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2986	2.0058	1.8542	2.9700e-003		0.1506	0.1506		0.1506	0.1506	0.0000	281.4485	281.4485	0.0267		282.1171
Total	**4.7638**	**2.0058**	**1.8542**	**2.9700e-003**		**0.1506**	**0.1506**		**0.1506**	**0.1506**	**0.0000**	**281.4485**	**281.4485**	**0.0267**		**282.1171**

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	0.0241	0.0153	0.1978	4.7000e-004	0.0447	2.8000e-004	0.0450	0.0119	2.6000e-004	0.0121		46.9309	46.9309	1.4300e-003		46.9666
Total	**0.0241**	**0.0153**	**0.1978**	**4.7000e-004**	**0.0447**	**2.8000e-004**	**0.0450**	**0.0119**	**2.6000e-004**	**0.0121**		**46.9309**	**46.9309**	**1.4300e-003**		**46.9666**

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	1.2834	9.0536	15.4896	0.0563	3.9006	0.0586	3.9592	1.0439	0.0554	1.0993		5,733.3829	5,733.3829	0.2968		5,740.8026
Unmitigated	1.2834	9.0536	15.4896	0.0563	3.9006	0.0586	3.9592	1.0439	0.0554	1.0993		5,733.3829	5,733.3829	0.2968		5,740.8026

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Single Family Housing	514.08	535.14	465.48	1,743,245	1,743,245
Total	514.08	535.14	465.48	1,743,245	1,743,245

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
Single Family Housing	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Single Family Housing	0.533383	0.039495	0.183627	0.126156	0.018688	0.005561	0.017029	0.066607	0.001345	0.001247	0.004677	0.000974	0.001211

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	0.0592	0.5062	0.2154	3.2300e-003		0.0409	0.0409		0.0409	0.0409		646.1968	646.1968	0.0124	0.0119	650.0368
NaturalGas Unmitigated	0.0592	0.5062	0.2154	3.2300e-003		0.0409	0.0409		0.0409	0.0409		646.1968	646.1968	0.0124	0.0119	650.0368

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					
Single Family Housing	5492.67	0.0592	0.5062	0.2154	3.2300e-003		0.0409	0.0409		0.0409	0.0409		646.1968	646.1968	0.0124	0.0119	650.0368
Total		**0.0592**	**0.5062**	**0.2154**	**3.2300e-003**		**0.0409**	**0.0409**		**0.0409**	**0.0409**		**646.1968**	**646.1968**	**0.0124**	**0.0119**	**650.0368**

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					
Single Family Housing	5.49267	0.0592	0.5062	0.2154	3.2300e-003		0.0409	0.0409		0.0409	0.0409		646.1968	646.1968	0.0124	0.0119	650.0368
Total		**0.0592**	**0.5062**	**0.2154**	**3.2300e-003**		**0.0409**	**0.0409**		**0.0409**	**0.0409**		**646.1968**	**646.1968**	**0.0124**	**0.0119**	**650.0368**

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	2.5755	0.9476	4.8583	5.9500e-003		0.0970	0.0970		0.0970	0.0970	0.0000	1,151.5512	1,151.5512	0.0298	0.0210	1,158.5435
Unmitigated	2.5755	0.9476	4.8583	5.9500e-003		0.0970	0.0970		0.0970	0.0970	0.0000	1,151.5512	1,151.5512	0.0298	0.0210	1,158.5435

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	0.1860					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000

Consumer Products	2.1476					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.1048	0.8958	0.3812	5.7200e-003		0.0724	0.0724		0.0724	0.0724	0.0000	1,143.5294	1,143.5294	0.0219	0.0210	1,150.3248
Landscaping	0.1371	0.0519	4.4771	2.4000e-004		0.0245	0.0245		0.0245	0.0245		8.0218	8.0218	7.8700e-003		8.2187
Total	**2.5755**	**0.9476**	**4.8583**	**5.9600e-003**		**0.0970**	**0.0970**		**0.0970**	**0.0970**	**0.0000**	**1,151.5512**	**1,151.5512**	**0.0298**	**0.0210**	**1,158.5435**

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	0.1860					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	2.1476					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.1048	0.8958	0.3812	5.7200e-003		0.0724	0.0724		0.0724	0.0724	0.0000	1,143.5294	1,143.5294	0.0219	0.0210	1,150.3248
Landscaping	0.1371	0.0519	4.4771	2.4000e-004		0.0245	0.0245		0.0245	0.0245		8.0218	8.0218	7.8700e-003		8.2187
Total	**2.5755**	**0.9476**	**4.8583**	**5.9600e-003**		**0.0970**	**0.0970**		**0.0970**	**0.0970**	**0.0000**	**1,151.5512**	**1,151.5512**	**0.0298**	**0.0210**	**1,158.5435**

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

Hawthorn Heights

Riverside-South Coast County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	54.00	Dwelling Unit	6.85	108,466.00	154

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2019
Utility Company	Riverside Public Utilities				
CO2 Intensity (lb/MWhr)	1325.65	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Site acreage and building sf from project plans.

Construction Phase - Assumed architectual coatings applied to each residence throughout the building construction phase.

Demolition - There are 5 main existing buildings totaling 23,295 square feet

Vehicle Trips -

Woodstoves - No residences will have a wood-burning fireplace, assume all would have gas fireplaces.

Sequestration - Estimated the number of new trees from the site plan.

Construction Off-road Equipment Mitigation - Dust control measures as required by SCAQMD Rule 403.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	40	15

tblConstructionPhase	NumDays	20.00	152.00
tblConstructionPhase	PhaseEndDate	11/23/2018	9/28/2018
tblConstructionPhase	PhaseStartDate	10/27/2018	3/1/2018
tblFireplaces	FireplaceWoodMass	1,019.20	0.00
tblFireplaces	NumberGas	45.90	54.00
tblFireplaces	NumberNoFireplace	5.40	0.00
tblFireplaces	NumberWood	2.70	0.00
tblLandUse	BuildingSpaceSquareFeet	97,200.00	108,466.00
tblLandUse	LandUseSquareFeet	97,200.00	108,466.00
tblLandUse	LotAcreage	17.53	6.85
tblProjectCharacteristics	OperationalYear	2018	2019
tblSequestration	NumberOfNewTrees	0.00	20.00
tblWoodstoves	NumberCatalytic	2.70	0.00
tblWoodstoves	NumberNoncatalytic	2.70	0.00
tblWoodstoves	WoodstoveDayYear	25.00	0.00
tblWoodstoves	WoodstoveWoodMass	999.60	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					
2017	5.0782	52.3573	24.2793	0.0445	18.2675	2.8799	21.1473	9.9840	2.6495	12.6335	0.0000	4,515.6898	4,515.6898	1.1998	0.0000	4,543.4391
2018	7.6015	26.2154	20.5219	0.0338	0.2955	1.6582	1.9537	0.0792	1.5679	1.6471	0.0000	3,305.7494	3,305.7494	0.7189	0.0000	3,323.0337
Maximum	**7.6015**	**52.3573**	**24.2793**	**0.0445**	**18.2675**	**2.8799**	**21.1473**	**9.9840**	**2.6495**	**12.6335**	**0.0000**	**4,515.6898**	**4,515.6898**	**1.1998**	**0.0000**	**4,543.4391**

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					
2017	5.0782	52.3573	24.2793	0.0445	8.3310	2.8799	11.2109	4.5222	2.6495	7.1716	0.0000	4,515.6898	4,515.6898	1.1998	0.0000	4,543.4391
2018	7.6015	26.2154	20.5219	0.0338	0.2955	1.6582	1.9537	0.0792	1.5679	1.6471	0.0000	3,305.7494	3,305.7494	0.7189	0.0000	3,323.0336
Maximum	**7.6015**	**52.3573**	**24.2793**	**0.0445**	**8.3310**	**2.8799**	**11.2109**	**4.5222**	**2.6495**	**7.1716**	**0.0000**	**4,515.6898**	**4,515.6898**	**1.1998**	**0.0000**	**4,543.4391**

	ROG	**NOx**	**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**	**53.53**	**0.00**	**43.01**	**54.28**	**0.00**	**38.25**	**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	2.5755	0.9476	4.8583	5.9500e-003		0.0970	0.0970		0.0970	0.0970	0.0000	1,151.5512	1,151.5512	0.0298	0.0210	1,158.5435
Energy	0.0592	0.5062	0.2154	3.2300e-003		0.0409	0.0409		0.0409	0.0409		646.1968	646.1968	0.0124	0.0119	650.0368
Mobile	1.0948	9.1086	13.4081	0.0519	3.9006	0.0592	3.9599	1.0439	0.0560	1.0999		5,290.2581	5,290.2581	0.3038		5,297.8522
Total	**3.7295**	**10.5624**	**18.4818**	**0.0611**	**3.9006**	**0.1971**	**4.0978**	**1.0439**	**0.1939**	**1.2378**	**0.0000**	**7,088.0061**	**7,088.0061**	**0.3459**	**0.0328**	**7,106.4325**

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	2.5755	0.9476	4.8583	5.9500e-003		0.0970	0.0970		0.0970	0.0970	0.0000	1,151.5512	1,151.5512	0.0298	0.0210	1,158.5435
Energy	0.0592	0.5062	0.2154	3.2300e-003		0.0409	0.0409		0.0409	0.0409		646.1968	646.1968	0.0124	0.0119	650.0368
Mobile	1.0948	9.1086	13.4081	0.0519	3.9006	0.0592	3.9599	1.0439	0.0560	1.0999		5,290.2581	5,290.2581	0.3038		5,297.8522
Total	**3.7295**	**10.5624**	**18.4818**	**0.0611**	**3.9006**	**0.1971**	**4.0978**	**1.0439**	**0.1939**	**1.2378**	**0.0000**	**7,088.0061**	**7,088.0061**	**0.3459**	**0.0328**	**7,106.4325**

	ROG	**NOx**	**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	Demolition	Demolition	9/4/2017	9/29/2017	5	20	
2	Site Preparation	Site Preparation	9/30/2017	10/13/2017	5	10	
3	Grading	Grading	10/14/2017	11/10/2017	5	20	
4	Building Construction	Building Construction	11/11/2017	9/28/2018	5	230	
5	Paving	Paving	9/29/2018	10/26/2018	5	20	
6	Architectural Coating	Architectural Coating	3/1/2018	9/28/2018	5	152	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 10

Acres of Paving: 0

Residential Indoor: 219,644; Residential Outdoor: 73,215; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Demolition	Excavators	3	8.00	158	0.38
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Grading	Excavators	1	8.00	158	0.38
Building Construction	Cranes	1	7.00	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
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Grading	Graders	1	8.00	187	0.41
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Paving	Paving Equipment	2	8.00	132	0.36
Site Preparation	Tractors/Loaders/Backhoes	4	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

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
Architectural Coating	1	4.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	19.00	6.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Demolition	6	15.00	0.00	106.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	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

Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Demolition - 2017

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					1.1536	0.0000	1.1536	0.1747	0.0000	0.1747			0.0000			0.0000
Off-Road	4.1031	42.7475	23.0122	0.0388		2.1935	2.1935		2.0425	2.0425		3,924.2833	3,924.2833	1.0730		3,951.1070
Total	**4.1031**	**42.7475**	**23.0122**	**0.0388**	**1.1536**	**2.1935**	**3.3471**	**0.1747**	**2.0425**	**2.2172**		**3,924.2833**	**3,924.2833**	**1.0730**		**3,951.1070**

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	0.0384	1.5953	0.2188	4.0500e-003	0.0927	8.5700e-003	0.1013	0.0254	8.2000e-003	0.0336		428.8603	428.8603	0.0317		429.6529
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	0.0978	0.0682	0.6866	1.6300e-003	0.1677	1.0700e-003	0.1687	0.0445	9.9000e-004	0.0455		162.5462	162.5462	5.3200e-003		162.6792

Total	**0.1363**	**1.6635**	**0.9054**	**5.6800e-003**	**0.2604**	**9.6400e-003**	**0.2701**	**0.0699**	**9.1900e-003**	**0.0791**		**591.4064**	**591.4064**	**0.0370**		**592.3321**

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					0.5191	0.0000	0.5191	0.0786	0.0000	0.0786			0.0000			0.0000
Off-Road	4.1031	42.7475	23.0122	0.0388		2.1935	2.1935		2.0425	2.0425	0.0000	3,924.2833	3,924.2833	1.0730		3,951.1070
Total	**4.1031**	**42.7475**	**23.0122**	**0.0388**	**0.5191**	**2.1935**	**2.7126**	**0.0786**	**2.0425**	**2.1211**	**0.0000**	**3,924.2833**	**3,924.2833**	**1.0730**		**3,951.1070**

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	0.0384	1.5953	0.2188	4.0500e-003	0.0927	8.5700e-003	0.1013	0.0254	8.2000e-003	0.0336		428.8603	428.8603	0.0317		429.6529
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	0.0978	0.0682	0.6866	1.6300e-003	0.1677	1.0700e-003	0.1687	0.0445	9.9000e-004	0.0455		162.5462	162.5462	5.3200e-003		162.6792
Total	**0.1363**	**1.6635**	**0.9054**	**5.6800e-003**	**0.2604**	**9.6400e-003**	**0.2701**	**0.0699**	**9.1900e-003**	**0.0791**		**591.4064**	**591.4064**	**0.0370**		**592.3321**

3.3 Site Preparation - 2017

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	4.9608	52.2754	23.4554	0.0380		2.8786	2.8786		2.6483	2.6483		3,894.9500	3,894.9500	1.1934		3,924.7852
Total	**4.9608**	**52.2754**	**23.4554**	**0.0380**	**18.0663**	**2.8786**	**20.9448**	**9.9307**	**2.6483**	**12.5790**		**3,894.9500**	**3,894.9500**	**1.1934**		**3,924.7852**

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	0.1174	0.0819	0.8240	1.9600e-003	0.2012	1.2900e-003	0.2025	0.0534	1.1900e-003	0.0546		195.0554	195.0554	6.3900e-003		195.2150
Total	**0.1174**	**0.0819**	**0.8240**	**1.9600e-003**	**0.2012**	**1.2900e-003**	**0.2025**	**0.0534**	**1.1900e-003**	**0.0546**		**195.0554**	**195.0554**	**6.3900e-003**		**195.2150**

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					8.1298	0.0000	8.1298	4.4688	0.0000	4.4688			0.0000			0.0000
Off-Road	4.9608	52.2754	23.4554	0.0380		2.8786	2.8786		2.6483	2.6483	0.0000	3,894.9500	3,894.9500	1.1934		3,924.7852
Total	**4.9608**	**52.2754**	**23.4554**	**0.0380**	**8.1298**	**2.8786**	**11.0084**	**4.4688**	**2.6483**	**7.1171**	**0.0000**	**3,894.9500**	**3,894.9500**	**1.1934**		**3,924.7852**

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	0.1174	0.0819	0.8240	1.9600e-003	0.2012	1.2900e-003	0.2025	0.0534	1.1900e-003	0.0546		195.0554	195.0554	6.3900e-003		195.2150
Total	**0.1174**	**0.0819**	**0.8240**	**1.9600e-003**	**0.2012**	**1.2900e-003**	**0.2025**	**0.0534**	**1.1900e-003**	**0.0546**		**195.0554**	**195.0554**	**6.3900e-003**		**195.2150**

3.4 Grading - 2017

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					6.5523	0.0000	6.5523	3.3675	0.0000	3.3675			0.0000			0.0000
Off-Road	3.0705	33.8868	17.1042	0.0297		1.7774	1.7774		1.6352	1.6352		3,037.9107	3,037.9107	0.9308		3,061.1809
Total	**3.0705**	**33.8868**	**17.1042**	**0.0297**	**6.5523**	**1.7774**	**8.3298**	**3.3675**	**1.6352**	**5.0027**		**3,037.9107**	**3,037.9107**	**0.9308**		**3,061.1809**

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	0.0978	0.0682	0.6866	1.6300e-003	0.1677	1.0700e-003	0.1687	0.0445	9.9000e-004	0.0455		162.5462	162.5462	5.3200e-003		162.6792
Total	**0.0978**	**0.0682**	**0.6866**	**1.6300e-003**	**0.1677**	**1.0700e-003**	**0.1687**	**0.0445**	**9.9000e-004**	**0.0455**		**162.5462**	**162.5462**	**5.3200e-003**		**162.6792**

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					2.9486	0.0000	2.9486	1.5154	0.0000	1.5154			0.0000			0.0000
Off-Road	3.0705	33.8868	17.1042	0.0297		1.7774	1.7774		1.6352	1.6352	0.0000	3,037.9107	3,037.9107	0.9308		3,061.1809
Total	**3.0705**	**33.8868**	**17.1042**	**0.0297**	**2.9486**	**1.7774**	**4.7260**	**1.5154**	**1.6352**	**3.1506**	**0.0000**	**3,037.9107**	**3,037.9107**	**0.9308**		**3,061.1809**

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	0.0978	0.0682	0.6866	1.6300e-003	0.1677	1.0700e-003	0.1687	0.0445	9.9000e-004	0.0455		162.5462	162.5462	5.3200e-003		162.6792
Total	**0.0978**	**0.0682**	**0.6866**	**1.6300e-003**	**0.1677**	**1.0700e-003**	**0.1687**	**0.0445**	**9.9000e-004**	**0.0455**		**162.5462**	**162.5462**	**5.3200e-003**		**162.6792**

3.5 Building Construction - 2017

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	3.1149	26.5546	18.1825	0.0269		1.7879	1.7879		1.6791	1.6791		2,650.9797	2,650.9797	0.6531		2,667.3078
Total	**3.1149**	**26.5546**	**18.1825**	**0.0269**		**1.7879**	**1.7879**		**1.6791**	**1.6791**		**2,650.9797**	**2,650.9797**	**0.6531**		**2,667.3078**

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	0.0264	0.7816	0.1816	1.5400e-003	0.0384	7.7100e-003	0.0461	0.0111	7.3800e-003	0.0184		161.6313	161.6313	0.0163		162.0393
Worker	0.1239	0.0864	0.8697	2.0700e-003	0.2124	1.3600e-003	0.2137	0.0563	1.2600e-003	0.0576		205.8918	205.8918	6.7400e-003		206.0603

Total	**0.1503**	**0.8681**	**1.0513**	**3.6100e-003**	**0.2508**	**9.0700e-003**	**0.2599**	**0.0674**	**8.6400e-003**	**0.0760**		**367.5231**	**367.5231**	**0.0231**		**368.0996**

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	3.1149	26.5546	18.1825	0.0269		1.7879	1.7879		1.6791	1.6791	0.0000	2,650.9797	2,650.9797	0.6531		2,667.3078
Total	**3.1149**	**26.5546**	**18.1825**	**0.0269**		**1.7879**	**1.7879**		**1.6791**	**1.6791**	**0.0000**	**2,650.9797**	**2,650.9797**	**0.6531**		**2,667.3078**

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	0.0264	0.7816	0.1816	1.5400e-003	0.0384	7.7100e-003	0.0461	0.0111	7.3800e-003	0.0184		161.6313	161.6313	0.0163		162.0393
Worker	0.1239	0.0864	0.8697	2.0700e-003	0.2124	1.3600e-003	0.2137	0.0563	1.2600e-003	0.0576		205.8918	205.8918	6.7400e-003		206.0603
Total	**0.1503**	**0.8681**	**1.0513**	**3.6100e-003**	**0.2508**	**9.0700e-003**	**0.2599**	**0.0674**	**8.6400e-003**	**0.0760**		**367.5231**	**367.5231**	**0.0231**		**368.0996**

3.5 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	2.6795	23.3900	17.5804	0.0269		1.4999	1.4999		1.4099	1.4099		2,620.9351	2,620.9351	0.6421		2,636.9883
Total	**2.6795**	**23.3900**	**17.5804**	**0.0269**		**1.4999**	**1.4999**		**1.4099**	**1.4099**		**2,620.9351**	**2,620.9351**	**0.6421**		**2,636.9883**

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	0.0232	0.7284	0.1627	1.5300e-003	0.0384	6.1900e-003	0.0446	0.0111	5.9200e-003	0.0170		161.2405	161.2405	0.0153		161.6240
Worker	0.1116	0.0754	0.7638	2.0100e-003	0.2124	1.3300e-003	0.2137	0.0563	1.2200e-003	0.0576		200.0165	200.0165	5.9200e-003		200.1644
Total	**0.1348**	**0.8038**	**0.9265**	**3.5400e-003**	**0.2508**	**7.5200e-003**	**0.2583**	**0.0674**	**7.1400e-003**	**0.0745**		**361.2570**	**361.2570**	**0.0213**		**361.7884**

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	2.6795	23.3900	17.5804	0.0269		1.4999	1.4999		1.4099	1.4099	0.0000	2,620.9351	2,620.9351	0.6421		2,636.9883
Total	**2.6795**	**23.3900**	**17.5804**	**0.0269**		**1.4999**	**1.4999**		**1.4099**	**1.4099**	**0.0000**	**2,620.9351**	**2,620.9351**	**0.6421**		**2,636.9883**

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	0.0232	0.7284	0.1627	1.5300e-003	0.0384	6.1900e-003	0.0446	0.0111	5.9200e-003	0.0170		161.2405	161.2405	0.0153		161.6240
Worker	0.1116	0.0754	0.7638	2.0100e-003	0.2124	1.3300e-003	0.2137	0.0563	1.2200e-003	0.0576		200.0165	200.0165	5.9200e-003		200.1644
Total	**0.1348**	**0.8038**	**0.9265**	**3.5400e-003**	**0.2508**	**7.5200e-003**	**0.2583**	**0.0674**	**7.1400e-003**	**0.0745**		**361.2570**	**361.2570**	**0.0213**		**361.7884**

3.6 Paving - 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	1.6437	17.5209	14.7964	0.0228		0.9561	0.9561		0.8797	0.8797		2,294.0887	2,294.0887	0.7142		2,311.9432
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.6437**	**17.5209**	**14.7964**	**0.0228**		**0.9561**	**0.9561**		**0.8797**	**0.8797**		**2,294.0887**	**2,294.0887**	**0.7142**		**2,311.9432**

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	0.0881	0.0595	0.6030	1.5900e-003	0.1677	1.0500e-003	0.1687	0.0445	9.7000e-004	0.0454		157.9077	157.9077	4.6700e-003		158.0245
Total	**0.0881**	**0.0595**	**0.6030**	**1.5900e-003**	**0.1677**	**1.0500e-003**	**0.1687**	**0.0445**	**9.7000e-004**	**0.0454**		**157.9077**	**157.9077**	**4.6700e-003**		**158.0245**

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	1.6437	17.5209	14.7964	0.0228		0.9561	0.9561		0.8797	0.8797	0.0000	2,294.0887	2,294.0887	0.7142		2,311.9432
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.6437**	**17.5209**	**14.7964**	**0.0228**		**0.9561**	**0.9561**		**0.8797**	**0.8797**	**0.0000**	**2,294.0887**	**2,294.0887**	**0.7142**		**2,311.9432**

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	0.0881	0.0595	0.6030	1.5900e-003	0.1677	1.0500e-003	0.1687	0.0445	9.7000e-004	0.0454		157.9077	157.9077	4.6700e-003		158.0245
Total	**0.0881**	**0.0595**	**0.6030**	**1.5900e-003**	**0.1677**	**1.0500e-003**	**0.1687**	**0.0445**	**9.7000e-004**	**0.0454**		**157.9077**	**157.9077**	**4.6700e-003**		**158.0245**

3.7 Architectural Coating - 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					
Archit. Coating	4.4651					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2986	2.0058	1.8542	2.9700e-003		0.1506	0.1506		0.1506	0.1506		281.4485	281.4485	0.0267		282.1171
Total	**4.7638**	**2.0058**	**1.8542**	**2.9700e-003**		**0.1506**	**0.1506**		**0.1506**	**0.1506**		**281.4485**	**281.4485**	**0.0267**		**282.1171**

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	0.0235	0.0159	0.1608	4.2000e-004	0.0447	2.8000e-004	0.0450	0.0119	2.6000e-004	0.0121		42.1087	42.1087	1.2500e-003		42.1399

Total	**0.0235**	**0.0159**	**0.1608**	**4.2000e-004**	**0.0447**	**2.8000e-004**	**0.0450**	**0.0119**	**2.6000e-004**	**0.0121**		**42.1087**	**42.1087**	**1.2500e-003**		**42.1399**

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	4.4651					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2986	2.0058	1.8542	2.9700e-003		0.1506	0.1506		0.1506	0.1506	0.0000	281.4485	281.4485	0.0267		282.1171
Total	**4.7638**	**2.0058**	**1.8542**	**2.9700e-003**		**0.1506**	**0.1506**		**0.1506**	**0.1506**	**0.0000**	**281.4485**	**281.4485**	**0.0267**		**282.1171**

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	0.0235	0.0159	0.1608	4.2000e-004	0.0447	2.8000e-004	0.0450	0.0119	2.6000e-004	0.0121		42.1087	42.1087	1.2500e-003		42.1399
Total	**0.0235**	**0.0159**	**0.1608**	**4.2000e-004**	**0.0447**	**2.8000e-004**	**0.0450**	**0.0119**	**2.6000e-004**	**0.0121**		**42.1087**	**42.1087**	**1.2500e-003**		**42.1399**

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	1.0948	9.1086	13.4081	0.0519	3.9006	0.0592	3.9599	1.0439	0.0560	1.0999		5,290.2581	5,290.2581	0.3038		5,297.8522
Unmitigated	1.0948	9.1086	13.4081	0.0519	3.9006	0.0592	3.9599	1.0439	0.0560	1.0999		5,290.2581	5,290.2581	0.3038		5,297.8522

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Single Family Housing	514.08	535.14	465.48	1,743,245	1,743,245
Total	514.08	535.14	465.48	1,743,245	1,743,245

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
Single Family Housing	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Single Family Housing	0.533383	0.039495	0.183627	0.126156	0.018688	0.005561	0.017029	0.066607	0.001345	0.001247	0.004677	0.000974	0.001211

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	0.0592	0.5062	0.2154	3.2300e-003		0.0409	0.0409		0.0409	0.0409		646.1968	646.1968	0.0124	0.0119	650.0368
NaturalGas Unmitigated	0.0592	0.5062	0.2154	3.2300e-003		0.0409	0.0409		0.0409	0.0409		646.1968	646.1968	0.0124	0.0119	650.0368

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					
Single Family Housing	5492.67	0.0592	0.5062	0.2154	3.2300e-003		0.0409	0.0409		0.0409	0.0409		646.1968	646.1968	0.0124	0.0119	650.0368
Total		**0.0592**	**0.5062**	**0.2154**	**3.2300e-003**		**0.0409**	**0.0409**		**0.0409**	**0.0409**		**646.1968**	**646.1968**	**0.0124**	**0.0119**	**650.0368**

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					
Single Family Housing	5.49267	0.0592	0.5062	0.2154	3.2300e-003		0.0409	0.0409		0.0409	0.0409		646.1968	646.1968	0.0124	0.0119	650.0368
Total		**0.0592**	**0.5062**	**0.2154**	**3.2300e-003**		**0.0409**	**0.0409**		**0.0409**	**0.0409**		**646.1968**	**646.1968**	**0.0124**	**0.0119**	**650.0368**

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	2.5755	0.9476	4.8583	5.9500e-003		0.0970	0.0970		0.0970	0.0970	0.0000	1,151.5512	1,151.5512	0.0298	0.0210	1,158.5435
Unmitigated	2.5755	0.9476	4.8583	5.9500e-003		0.0970	0.0970		0.0970	0.0970	0.0000	1,151.5512	1,151.5512	0.0298	0.0210	1,158.5435

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	0.1860					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000

Consumer Products	2.1476					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.1048	0.8958	0.3812	5.7200e-003		0.0724	0.0724		0.0724	0.0724	0.0000	1,143.5294	1,143.5294	0.0219	0.0210	1,150.3248
Landscaping	0.1371	0.0519	4.4771	2.4000e-004		0.0245	0.0245		0.0245	0.0245		8.0218	8.0218	7.8700e-003		8.2187
Total	**2.5755**	**0.9476**	**4.8583**	**5.9600e-003**		**0.0970**	**0.0970**		**0.0970**	**0.0970**	**0.0000**	**1,151.5512**	**1,151.5512**	**0.0298**	**0.0210**	**1,158.5435**

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	0.1860					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	2.1476					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.1048	0.8958	0.3812	5.7200e-003		0.0724	0.0724		0.0724	0.0724	0.0000	1,143.5294	1,143.5294	0.0219	0.0210	1,150.3248
Landscaping	0.1371	0.0519	4.4771	2.4000e-004		0.0245	0.0245		0.0245	0.0245		8.0218	8.0218	7.8700e-003		8.2187
Total	**2.5755**	**0.9476**	**4.8583**	**5.9600e-003**		**0.0970**	**0.0970**		**0.0970**	**0.0970**	**0.0000**	**1,151.5512**	**1,151.5512**	**0.0298**	**0.0210**	**1,158.5435**

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

Hawthorn Heights

Riverside-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	54.00	Dwelling Unit	6.85	108,466.00	154

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2019
Utility Company	Riverside Public Utilities				
CO2 Intensity (lb/MWhr)	1325.65	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Site acreage and building sf from project plans.

Construction Phase - Assumed architectual coatings applied to each residence throughout the building construction phase.

Demolition - There are 5 main existing buildings totaling 23,295 square feet

Vehicle Trips -

Woodstoves - No residences will have a wood-burning fireplace, assume all would have gas fireplaces.

Sequestration - Estimated the number of new trees from the site plan.

Construction Off-road Equipment Mitigation - Dust control measures as required by SCAQMD Rule 403.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	40	15

tblConstructionPhase	NumDays	20.00	152.00
tblConstructionPhase	PhaseEndDate	11/23/2018	9/28/2018
tblConstructionPhase	PhaseStartDate	10/27/2018	3/1/2018
tblFireplaces	FireplaceWoodMass	1,019.20	0.00
tblFireplaces	NumberGas	45.90	54.00
tblFireplaces	NumberNoFireplace	5.40	0.00
tblFireplaces	NumberWood	2.70	0.00
tblLandUse	BuildingSpaceSquareFeet	97,200.00	108,466.00
tblLandUse	LandUseSquareFeet	97,200.00	108,466.00
tblLandUse	LotAcreage	17.53	6.85
tblProjectCharacteristics	OperationalYear	2018	2019
tblSequestration	NumberOfNewTrees	0.00	20.00
tblWoodstoves	NumberCatalytic	2.70	0.00
tblWoodstoves	NumberNoncatalytic	2.70	0.00
tblWoodstoves	WoodstoveDayYear	25.00	0.00
tblWoodstoves	WoodstoveWoodMass	999.60	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					
2017	0.1562	1.5259	0.8764	1.5000e-003	0.1769	0.0857	0.2626	0.0876	0.0797	0.1673	0.0000	136.7662	136.7662	0.0347	0.0000	137.6342
2018	0.6545	2.6898	2.1154	3.4800e-003	0.0291	0.1680	0.1971	7.8000e-003	0.1584	0.1662	0.0000	309.2143	309.2143	0.0671	0.0000	310.8911
Maximum	**0.6545**	**2.6898**	**2.1154**	**3.4800e-003**	**0.1769**	**0.1680**	**0.2626**	**0.0876**	**0.1584**	**0.1673**	**0.0000**	**309.2143**	**309.2143**	**0.0671**	**0.0000**	**310.8911**

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					
2017	0.1562	1.5259	0.8764	1.5000e-003	0.0848	0.0857	0.1705	0.0408	0.0797	0.1205	0.0000	136.7660	136.7660	0.0347	0.0000	137.6340
2018	0.6545	2.6898	2.1154	3.4800e-003	0.0291	0.1680	0.1971	7.8000e-003	0.1584	0.1662	0.0000	309.2140	309.2140	0.0671	0.0000	310.8908
Maximum	**0.6545**	**2.6898**	**2.1154**	**3.4800e-003**	**0.0848**	**0.1680**	**0.1971**	**0.0408**	**0.1584**	**0.1662**	**0.0000**	**309.2140**	**309.2140**	**0.0671**	**0.0000**	**310.8908**

	ROG	**NOx**	**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**	**44.70**	**0.00**	**20.03**	**49.04**	**0.00**	**14.03**	**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	**9-4-2017**	**12-3-2017**	1.3620	1.3620
2	**12-4-2017**	**3-3-2018**	0.9122	0.9122
3	**3-4-2018**	**6-3-2018**	1.1111	1.1111
4	**6-4-2018**	**9-3-2018**	1.1111	1.1111
5	**9-4-2018**	**9-30-2018**	0.3157	0.3157
		Highest	1.3620	1.3620

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	0.4443	0.0177	0.5644	1.0000e-004		3.9700e-003	3.9700e-003		3.9700e-003	3.9700e-003	0.0000	13.8771	13.8771	1.1400e-003	2.4000e-004	13.9765
Energy	0.0108	0.0924	0.0393	5.9000e-004		7.4700e-003	7.4700e-003		7.4700e-003	7.4700e-003	0.0000	411.1365	411.1365	8.7000e-003	3.3400e-003	412.3489
Mobile	0.1901	1.6076	2.3983	9.2100e-003	0.6657	0.0102	0.6759	0.1784	9.6400e-003	0.1880	0.0000	851.3289	851.3289	0.0466	0.0000	852.4938
Waste						0.0000	0.0000		0.0000	0.0000	12.8169	0.0000	12.8169	0.7575	0.0000	31.7532
Water						0.0000	0.0000		0.0000	0.0000	1.1162	42.3648	43.4810	0.1156	2.9000e-003	47.2341
Total	**0.6452**	**1.7176**	**3.0020**	**9.9000e-003**	**0.6657**	**0.0216**	**0.6874**	**0.1784**	**0.0211**	**0.1995**	**13.9331**	**1,318.7073**	**1,332.6404**	**0.9295**	**6.4800e-003**	**1,357.8064**

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	0.4443	0.0177	0.5644	1.0000e-004		3.9700e-003	3.9700e-003		3.9700e-003	3.9700e-003	0.0000	13.8771	13.8771	1.1400e-003	2.4000e-004	13.9765
Energy	0.0108	0.0924	0.0393	5.9000e-004		7.4700e-003	7.4700e-003		7.4700e-003	7.4700e-003	0.0000	411.1365	411.1365	8.7000e-003	3.3400e-003	412.3489
Mobile	0.1901	1.6076	2.3983	9.2100e-003	0.6657	0.0102	0.6759	0.1784	9.6400e-003	0.1880	0.0000	851.3289	851.3289	0.0466	0.0000	852.4938
Waste						0.0000	0.0000		0.0000	0.0000	12.8169	0.0000	12.8169	0.7575	0.0000	31.7532
Water						0.0000	0.0000		0.0000	0.0000	1.1162	42.3648	43.4810	0.1156	2.9000e-003	47.2341
Total	**0.6452**	**1.7176**	**3.0020**	**9.9000e-003**	**0.6657**	**0.0216**	**0.6874**	**0.1784**	**0.0211**	**0.1995**	**13.9331**	**1,318.7073**	**1,332.6404**	**0.9295**	**6.4800e-003**	**1,357.8064**

	ROG	**NOx**	**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**

2.3 Vegetation

Vegetation

	CO2e
Category	MT
New Trees	14.1600
Total	**14.1600**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	9/4/2017	9/29/2017	5	20	
2	Site Preparation	Site Preparation	9/30/2017	10/13/2017	5	10	
3	Grading	Grading	10/14/2017	11/10/2017	5	20	
4	Building Construction	Building Construction	11/11/2017	9/28/2018	5	230	
5	Paving	Paving	9/29/2018	10/26/2018	5	20	
6	Architectural Coating	Architectural Coating	3/1/2018	9/28/2018	5	152	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 10

Acres of Paving: 0

Residential Indoor: 219,644; Residential Outdoor: 73,215; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area:

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Demolition	Excavators	3	8.00	158	0.38

Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Grading	Excavators	1	8.00	158	0.38
Building Construction	Cranes	1	7.00	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
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Grading	Graders	1	8.00	187	0.41
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Paving	Paving Equipment	2	8.00	132	0.36
Site Preparation	Tractors/Loaders/Backhoes	4	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

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
Architectural Coating	1	4.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	19.00	6.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Demolition	6	15.00	0.00	106.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	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
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Demolition - 2017

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					0.0115	0.0000	0.0115	1.7500e-003	0.0000	1.7500e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0410	0.4275	0.2301	3.9000e-004		0.0219	0.0219		0.0204	0.0204	0.0000	35.6005	35.6005	9.7300e-003	0.0000	35.8438
Total	**0.0410**	**0.4275**	**0.2301**	**3.9000e-004**	**0.0115**	**0.0219**	**0.0335**	**1.7500e-003**	**0.0204**	**0.0222**	**0.0000**	**35.6005**	**35.6005**	**9.7300e-003**	**0.0000**	**35.8438**

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	3.7000e-004	0.0162	2.0100e-003	4.0000e-005	9.1000e-004	8.0000e-005	1.0000e-003	2.5000e-004	8.0000e-005	3.3000e-004	0.0000	3.9460	3.9460	2.7000e-004	0.0000	3.9528
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	9.1000e-004	7.1000e-004	7.2300e-003	2.0000e-005	1.6500e-003	1.0000e-005	1.6600e-003	4.4000e-004	1.0000e-005	4.5000e-004	0.0000	1.5124	1.5124	5.0000e-005	0.0000	1.5136
Total	**1.2800e-003**	**0.0169**	**9.2400e-003**	**6.0000e-005**	**2.5600e-003**	**9.0000e-005**	**2.6600e-003**	**6.9000e-004**	**9.0000e-005**	**7.8000e-004**	**0.0000**	**5.4583**	**5.4583**	**3.2000e-004**	**0.0000**	**5.4664**

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					5.1900e-003	0.0000	5.1900e-003	7.9000e-004	0.0000	7.9000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0410	0.4275	0.2301	3.9000e-004		0.0219	0.0219		0.0204	0.0204	0.0000	35.6005	35.6005	9.7300e-003	0.0000	35.8438
Total	**0.0410**	**0.4275**	**0.2301**	**3.9000e-004**	**5.1900e-003**	**0.0219**	**0.0271**	**7.9000e-004**	**0.0204**	**0.0212**	**0.0000**	**35.6005**	**35.6005**	**9.7300e-003**	**0.0000**	**35.8438**

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	3.7000e-004	0.0162	2.0100e-003	4.0000e-005	9.1000e-004	8.0000e-005	1.0000e-003	2.5000e-004	8.0000e-005	3.3000e-004	0.0000	3.9460	3.9460	2.7000e-004	0.0000	3.9528
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	9.1000e-004	7.1000e-004	7.2300e-003	2.0000e-005	1.6500e-003	1.0000e-005	1.6600e-003	4.4000e-004	1.0000e-005	4.5000e-004	0.0000	1.5124	1.5124	5.0000e-005	0.0000	1.5136
Total	**1.2800e-003**	**0.0169**	**9.2400e-003**	**6.0000e-005**	**2.5600e-003**	**9.0000e-005**	**2.6600e-003**	**6.9000e-004**	**9.0000e-005**	**7.8000e-004**	**0.0000**	**5.4583**	**5.4583**	**3.2000e-004**	**0.0000**	**5.4664**

3.3 Site Preparation - 2017

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	0.0248	0.2614	0.1173	1.9000e-004		0.0144	0.0144		0.0132	0.0132	0.0000	17.6672	17.6672	5.4100e-003	0.0000	17.8025
Total	**0.0248**	**0.2614**	**0.1173**	**1.9000e-004**	**0.0903**	**0.0144**	**0.1047**	**0.0497**	**0.0132**	**0.0629**	**0.0000**	**17.6672**	**17.6672**	**5.4100e-003**	**0.0000**	**17.8025**

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	5.4000e-004	4.2000e-004	4.3400e-003	1.0000e-005	9.9000e-004	1.0000e-005	1.0000e-003	2.6000e-004	1.0000e-005	2.7000e-004	0.0000	0.9074	0.9074	3.0000e-005	0.0000	0.9082
Total	**5.4000e-004**	**4.2000e-004**	**4.3400e-003**	**1.0000e-005**	**9.9000e-004**	**1.0000e-005**	**1.0000e-003**	**2.6000e-004**	**1.0000e-005**	**2.7000e-004**	**0.0000**	**0.9074**	**0.9074**	**3.0000e-005**	**0.0000**	**0.9082**

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					0.0407	0.0000	0.0407	0.0223	0.0000	0.0223	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0248	0.2614	0.1173	1.9000e-004		0.0144	0.0144		0.0132	0.0132	0.0000	17.6672	17.6672	5.4100e-003	0.0000	17.8025
Total	**0.0248**	**0.2614**	**0.1173**	**1.9000e-004**	**0.0407**	**0.0144**	**0.0550**	**0.0223**	**0.0132**	**0.0356**	**0.0000**	**17.6672**	**17.6672**	**5.4100e-003**	**0.0000**	**17.8025**

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	5.4000e-004	4.2000e-004	4.3400e-003	1.0000e-005	9.9000e-004	1.0000e-005	1.0000e-003	2.6000e-004	1.0000e-005	2.7000e-004	0.0000	0.9074	0.9074	3.0000e-005	0.0000	0.9082
Total	**5.4000e-004**	**4.2000e-004**	**4.3400e-003**	**1.0000e-005**	**9.9000e-004**	**1.0000e-005**	**1.0000e-003**	**2.6000e-004**	**1.0000e-005**	**2.7000e-004**	**0.0000**	**0.9074**	**0.9074**	**3.0000e-005**	**0.0000**	**0.9082**

3.4 Grading - 2017

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					0.0655	0.0000	0.0655	0.0337	0.0000	0.0337	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0307	0.3389	0.1710	3.0000e-004		0.0178	0.0178		0.0164	0.0164	0.0000	27.5595	27.5595	8.4400e-003	0.0000	27.7706
Total	**0.0307**	**0.3389**	**0.1710**	**3.0000e-004**	**0.0655**	**0.0178**	**0.0833**	**0.0337**	**0.0164**	**0.0500**	**0.0000**	**27.5595**	**27.5595**	**8.4400e-003**	**0.0000**	**27.7706**

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	9.1000e-004	7.1000e-004	7.2300e-003	2.0000e-005	1.6500e-003	1.0000e-005	1.6600e-003	4.4000e-004	1.0000e-005	4.5000e-004	0.0000	1.5124	1.5124	5.0000e-005	0.0000	1.5136
Total	**9.1000e-004**	**7.1000e-004**	**7.2300e-003**	**2.0000e-005**	**1.6500e-003**	**1.0000e-005**	**1.6600e-003**	**4.4000e-004**	**1.0000e-005**	**4.5000e-004**	**0.0000**	**1.5124**	**1.5124**	**5.0000e-005**	**0.0000**	**1.5136**

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					0.0295	0.0000	0.0295	0.0152	0.0000	0.0152	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0307	0.3389	0.1710	3.0000e-004		0.0178	0.0178		0.0164	0.0164	0.0000	27.5594	27.5594	8.4400e-003	0.0000	27.7705
Total	**0.0307**	**0.3389**	**0.1710**	**3.0000e-004**	**0.0295**	**0.0178**	**0.0473**	**0.0152**	**0.0164**	**0.0315**	**0.0000**	**27.5594**	**27.5594**	**8.4400e-003**	**0.0000**	**27.7705**

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	9.1000e-004	7.1000e-004	7.2300e-003	2.0000e-005	1.6500e-003	1.0000e-005	1.6600e-003	4.4000e-004	1.0000e-005	4.5000e-004	0.0000	1.5124	1.5124	5.0000e-005	0.0000	1.5136

Total	**9.1000e-004**	**7.1000e-004**	**7.2300e-003**	**2.0000e-005**	**1.6500e-003**	**1.0000e-005**	**1.6600e-003**	**4.4000e-004**	**1.0000e-005**	**4.5000e-004**	**0.0000**	**1.5124**	**1.5124**	**5.0000e-005**	**0.0000**	**1.5136**

3.5 Building Construction - 2017

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	0.0545	0.4647	0.3182	4.7000e-004		0.0313	0.0313		0.0294	0.0294	0.0000	42.0863	42.0863	0.0104	0.0000	42.3455
Total	**0.0545**	**0.4647**	**0.3182**	**4.7000e-004**		**0.0313**	**0.0313**		**0.0294**	**0.0294**	**0.0000**	**42.0863**	**42.0863**	**0.0104**	**0.0000**	**42.3455**

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	4.5000e-004	0.0139	2.9700e-003	3.0000e-005	6.6000e-004	1.3000e-004	8.0000e-004	1.9000e-004	1.3000e-004	3.2000e-004	0.0000	2.6223	2.6223	2.5000e-004	0.0000	2.6284
Worker	2.0100e-003	1.5600e-003	0.0160	4.0000e-005	3.6500e-003	2.0000e-005	3.6800e-003	9.7000e-004	2.0000e-005	9.9000e-004	0.0000	3.3524	3.3524	1.1000e-004	0.0000	3.3552
Total	**2.4600e-003**	**0.0155**	**0.0190**	**7.0000e-005**	**4.3100e-003**	**1.5000e-004**	**4.4800e-003**	**1.1600e-003**	**1.5000e-004**	**1.3100e-003**	**0.0000**	**5.9747**	**5.9747**	**3.6000e-004**	**0.0000**	**5.9836**

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	0.0545	0.4647	0.3182	4.7000e-004		0.0313	0.0313		0.0294	0.0294	0.0000	42.0862	42.0862	0.0104	0.0000	42.3454
Total	**0.0545**	**0.4647**	**0.3182**	**4.7000e-004**		**0.0313**	**0.0313**		**0.0294**	**0.0294**	**0.0000**	**42.0862**	**42.0862**	**0.0104**	**0.0000**	**42.3454**

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	4.5000e-004	0.0139	2.9700e-003	3.0000e-005	6.6000e-004	1.3000e-004	8.0000e-004	1.9000e-004	1.3000e-004	3.2000e-004	0.0000	2.6223	2.6223	2.5000e-004	0.0000	2.6284
Worker	2.0100e-003	1.5600e-003	0.0160	4.0000e-005	3.6500e-003	2.0000e-005	3.6800e-003	9.7000e-004	2.0000e-005	9.9000e-004	0.0000	3.3524	3.3524	1.1000e-004	0.0000	3.3552
Total	**2.4600e-003**	**0.0155**	**0.0190**	**7.0000e-005**	**4.3100e-003**	**1.5000e-004**	**4.4800e-003**	**1.1600e-003**	**1.5000e-004**	**1.3100e-003**	**0.0000**	**5.9747**	**5.9747**	**3.6000e-004**	**0.0000**	**5.9836**

3.5 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	0.2613	2.2805	1.7141	2.6200e-003		0.1462	0.1462		0.1375	0.1375	0.0000	231.8231	231.8231	0.0568	0.0000	233.2430
Total	**0.2613**	**2.2805**	**1.7141**	**2.6200e-003**		**0.1462**	**0.1462**		**0.1375**	**0.1375**	**0.0000**	**231.8231**	**231.8231**	**0.0568**	**0.0000**	**233.2430**

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	2.1900e-003	0.0722	0.0148	1.5000e-004	3.7000e-003	6.0000e-004	4.2900e-003	1.0700e-003	5.7000e-004	1.6400e-003	0.0000	14.5819	14.5819	1.2800e-003	0.0000	14.6139
Worker	0.0101	7.6000e-003	0.0784	2.0000e-004	0.0204	1.3000e-004	0.0205	5.4100e-003	1.2000e-004	5.5300e-003	0.0000	18.1459	18.1459	5.4000e-004	0.0000	18.1594
Total	**0.0123**	**0.0798**	**0.0932**	**3.5000e-004**	**0.0241**	**7.3000e-004**	**0.0248**	**6.4800e-003**	**6.9000e-004**	**7.1700e-003**	**0.0000**	**32.7277**	**32.7277**	**1.8200e-003**	**0.0000**	**32.7733**

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	0.2613	2.2805	1.7141	2.6200e-003		0.1462	0.1462		0.1375	0.1375	0.0000	231.8228	231.8228	0.0568	0.0000	233.2427
Total	**0.2613**	**2.2805**	**1.7141**	**2.6200e-003**		**0.1462**	**0.1462**		**0.1375**	**0.1375**	**0.0000**	**231.8228**	**231.8228**	**0.0568**	**0.0000**	**233.2427**

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	2.1900e-003	0.0722	0.0148	1.5000e-004	3.7000e-003	6.0000e-004	4.2900e-003	1.0700e-003	5.7000e-004	1.6400e-003	0.0000	14.5819	14.5819	1.2800e-003	0.0000	14.6139
Worker	0.0101	7.6000e-003	0.0784	2.0000e-004	0.0204	1.3000e-004	0.0205	5.4100e-003	1.2000e-004	5.5300e-003	0.0000	18.1459	18.1459	5.4000e-004	0.0000	18.1594
Total	**0.0123**	**0.0798**	**0.0932**	**3.5000e-004**	**0.0241**	**7.3000e-004**	**0.0248**	**6.4800e-003**	**6.9000e-004**	**7.1700e-003**	**0.0000**	**32.7277**	**32.7277**	**1.8200e-003**	**0.0000**	**32.7733**

3.6 Paving - 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	0.0164	0.1752	0.1480	2.3000e-004		9.5600e-003	9.5600e-003		8.8000e-003	8.8000e-003	0.0000	20.8116	20.8116	6.4800e-003	0.0000	20.9736
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0164**	**0.1752**	**0.1480**	**2.3000e-004**		**9.5600e-003**	**9.5600e-003**		**8.8000e-003**	**8.8000e-003**	**0.0000**	**20.8116**	**20.8116**	**6.4800e-003**	**0.0000**	**20.9736**

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	8.1000e-004	6.2000e-004	6.3500e-003	2.0000e-005	1.6500e-003	1.0000e-005	1.6600e-003	4.4000e-004	1.0000e-005	4.5000e-004	0.0000	1.4693	1.4693	4.0000e-005	0.0000	1.4704
Total	**8.1000e-004**	**6.2000e-004**	**6.3500e-003**	**2.0000e-005**	**1.6500e-003**	**1.0000e-005**	**1.6600e-003**	**4.4000e-004**	**1.0000e-005**	**4.5000e-004**	**0.0000**	**1.4693**	**1.4693**	**4.0000e-005**	**0.0000**	**1.4704**

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	0.0164	0.1752	0.1480	2.3000e-004		9.5600e-003	9.5600e-003		8.8000e-003	8.8000e-003	0.0000	20.8116	20.8116	6.4800e-003	0.0000	20.9736
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0164**	**0.1752**	**0.1480**	**2.3000e-004**		**9.5600e-003**	**9.5600e-003**		**8.8000e-003**	**8.8000e-003**	**0.0000**	**20.8116**	**20.8116**	**6.4800e-003**	**0.0000**	**20.9736**

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	8.1000e-004	6.2000e-004	6.3500e-003	2.0000e-005	1.6500e-003	1.0000e-005	1.6600e-003	4.4000e-004	1.0000e-005	4.5000e-004	0.0000	1.4693	1.4693	4.0000e-005	0.0000	1.4704

Total	**8.1000e-004**	**6.2000e-004**	**6.3500e-003**	**2.0000e-005**	**1.6500e-003**	**1.0000e-005**	**1.6600e-003**	**4.4000e-004**	**1.0000e-005**	**4.5000e-004**	**0.0000**	**1.4693**	**1.4693**	**4.0000e-005**	**0.0000**	**1.4704**

3.7 Architectural Coating - 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					
Archit. Coating	0.3394					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0227	0.1524	0.1409	2.3000e-004		0.0114	0.0114		0.0114	0.0114	0.0000	19.4048	19.4048	1.8400e-003	0.0000	19.4509
Total	**0.3621**	**0.1524**	**0.1409**	**2.3000e-004**		**0.0114**	**0.0114**		**0.0114**	**0.0114**	**0.0000**	**19.4048**	**19.4048**	**1.8400e-003**	**0.0000**	**19.4509**

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	1.6500e-003	1.2500e-003	0.0129	3.0000e-005	3.3400e-003	2.0000e-005	3.3600e-003	8.9000e-004	2.0000e-005	9.1000e-004	0.0000	2.9778	2.9778	9.0000e-005	0.0000	2.9800
Total	**1.6500e-003**	**1.2500e-003**	**0.0129**	**3.0000e-005**	**3.3400e-003**	**2.0000e-005**	**3.3600e-003**	**8.9000e-004**	**2.0000e-005**	**9.1000e-004**	**0.0000**	**2.9778**	**2.9778**	**9.0000e-005**	**0.0000**	**2.9800**

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	0.3394					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0227	0.1524	0.1409	2.3000e-004		0.0114	0.0114		0.0114	0.0114	0.0000	19.4047	19.4047	1.8400e-003	0.0000	19.4508
Total	**0.3621**	**0.1524**	**0.1409**	**2.3000e-004**		**0.0114**	**0.0114**		**0.0114**	**0.0114**	**0.0000**	**19.4047**	**19.4047**	**1.8400e-003**	**0.0000**	**19.4508**

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	1.6500e-003	1.2500e-003	0.0129	3.0000e-005	3.3400e-003	2.0000e-005	3.3600e-003	8.9000e-004	2.0000e-005	9.1000e-004	0.0000	2.9778	2.9778	9.0000e-005	0.0000	2.9800
Total	**1.6500e-003**	**1.2500e-003**	**0.0129**	**3.0000e-005**	**3.3400e-003**	**2.0000e-005**	**3.3600e-003**	**8.9000e-004**	**2.0000e-005**	**9.1000e-004**	**0.0000**	**2.9778**	**2.9778**	**9.0000e-005**	**0.0000**	**2.9800**

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	0.1901	1.6076	2.3983	9.2100e-003	0.6657	0.0102	0.6759	0.1784	9.6400e-003	0.1880	0.0000	851.3289	851.3289	0.0466	0.0000	852.4938
Unmitigated	0.1901	1.6076	2.3983	9.2100e-003	0.6657	0.0102	0.6759	0.1784	9.6400e-003	0.1880	0.0000	851.3289	851.3289	0.0466	0.0000	852.4938

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Single Family Housing	514.08	535.14	465.48	1,743,245	1,743,245
Total	514.08	535.14	465.48	1,743,245	1,743,245

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
Single Family Housing	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Single Family Housing	0.533383	0.039495	0.183627	0.126156	0.018688	0.005561	0.017029	0.066607	0.001345	0.001247	0.004677	0.000974	0.001211

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	304.1514	304.1514	6.6500e-003	1.3800e-003	304.7280
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	304.1514	304.1514	6.6500e-003	1.3800e-003	304.7280
NaturalGas Mitigated	0.0108	0.0924	0.0393	5.9000e-004		7.4700e-003	7.4700e-003		7.4700e-003	7.4700e-003	0.0000	106.9851	106.9851	2.0500e-003	1.9600e-003	107.6209
NaturalGas Unmitigated	0.0108	0.0924	0.0393	5.9000e-004		7.4700e-003	7.4700e-003		7.4700e-003	7.4700e-003	0.0000	106.9851	106.9851	2.0500e-003	1.9600e-003	107.6209

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					
Single Family Housing	2.00483e+006	0.0108	0.0924	0.0393	5.9000e-004		7.4700e-003	7.4700e-003		7.4700e-003	7.4700e-003	0.0000	106.9851	106.9851	2.0500e-003	1.9600e-003	107.6209
Total		**0.0108**	**0.0924**	**0.0393**	**5.9000e-004**		**7.4700e-003**	**7.4700e-003**		**7.4700e-003**	**7.4700e-003**	**0.0000**	**106.9851**	**106.9851**	**2.0500e-003**	**1.9600e-003**	**107.6209**

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					
Single Family Housing	2.00483e+006	0.0108	0.0924	0.0393	5.9000e-004		7.4700e-003	7.4700e-003		7.4700e-003	7.4700e-003	0.0000	106.9851	106.9851	2.0500e-003	1.9600e-003	107.6209
Total		**0.0108**	**0.0924**	**0.0393**	**5.9000e-004**		**7.4700e-003**	**7.4700e-003**		**7.4700e-003**	**7.4700e-003**	**0.0000**	**106.9851**	**106.9851**	**2.0500e-003**	**1.9600e-003**	**107.6209**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Single Family Housing	505819	304.1514	6.6500e-003	1.3800e-003	304.7280
Total		**304.1514**	**6.6500e-003**	**1.3800e-003**	**304.7280**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Single Family Housing	505819	304.1514	6.6500e-003	1.3800e-003	304.7280
Total		**304.1514**	**6.6500e-003**	**1.3800e-003**	**304.7280**

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	0.4443	0.0177	0.5644	1.0000e-004		3.9700e-003	3.9700e-003		3.9700e-003	3.9700e-003	0.0000	13.8771	13.8771	1.1400e-003	2.4000e-004	13.9765
Unmitigated	0.4443	0.0177	0.5644	1.0000e-004		3.9700e-003	3.9700e-003		3.9700e-003	3.9700e-003	0.0000	13.8771	13.8771	1.1400e-003	2.4000e-004	13.9765

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	0.0339					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.3919					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	1.3100e-003	0.0112	4.7600e-003	7.0000e-005		9.1000e-004	9.1000e-004		9.1000e-004	9.1000e-004	0.0000	12.9674	12.9674	2.5000e-004	2.4000e-004	13.0445
Landscaping	0.0171	6.4800e-003	0.5596	3.0000e-005		3.0700e-003	3.0700e-003		3.0700e-003	3.0700e-003	0.0000	0.9097	0.9097	8.9000e-004	0.0000	0.9320
Total	**0.4443**	**0.0177**	**0.5644**	**1.0000e-004**		**3.9800e-003**	**3.9800e-003**		**3.9800e-003**	**3.9800e-003**	**0.0000**	**13.8771**	**13.8771**	**1.1400e-003**	**2.4000e-004**	**13.9764**

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	0.0339					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.3919					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	1.3100e-003	0.0112	4.7600e-003	7.0000e-005		9.1000e-004	9.1000e-004		9.1000e-004	9.1000e-004	0.0000	12.9674	12.9674	2.5000e-004	2.4000e-004	13.0445
Landscaping	0.0171	6.4800e-003	0.5596	3.0000e-005		3.0700e-003	3.0700e-003		3.0700e-003	3.0700e-003	0.0000	0.9097	0.9097	8.9000e-004	0.0000	0.9320
Total	**0.4443**	**0.0177**	**0.5644**	**1.0000e-004**		**3.9800e-003**	**3.9800e-003**		**3.9800e-003**	**3.9800e-003**	**0.0000**	**13.8771**	**13.8771**	**1.1400e-003**	**2.4000e-004**	**13.9764**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	43.4810	0.1156	2.9000e-003	47.2341
Unmitigated	43.4810	0.1156	2.9000e-003	47.2341

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Single Family Housing	3.51832 / 2.21807	43.4810	0.1156	2.9000e-003	47.2341
Total		**43.4810**	**0.1156**	**2.9000e-003**	**47.2341**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Single Family Housing	3.51832 / 2.21807	43.4810	0.1156	2.9000e-003	47.2341
Total		**43.4810**	**0.1156**	**2.9000e-003**	**47.2341**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	12.8169	0.7575	0.0000	31.7532
Unmitigated	12.8169	0.7575	0.0000	31.7532

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Single Family Housing	63.14	12.8169	0.7575	0.0000	31.7532
Total		**12.8169**	**0.7575**	**0.0000**	**31.7532**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Single Family Housing	63.14	12.8169	0.7575	0.0000	31.7532
Total		**12.8169**	**0.7575**	**0.0000**	**31.7532**

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

	Total CO2	CH4	N2O	CO2e
Category	MT			
Unmitigated	14.1600	0.0000	0.0000	14.1600

11.2 Net New Trees

Species Class

	Number of Trees	Total CO2	CH4	N2O	CO2e
		MT			
Miscellaneous	20	14.1600	0.0000	0.0000	14.1600
Total		**14.1600**	**0.0000**	**0.0000**	**14.1600**

Appendix B:
Health Risk Assessment

HEALTH RISK ASSESSMENT

HAWTHORNE RESIDENTIAL DEVELOPMENT PROJECT

CITY OF RIVERSIDE, COUNTY OF RIVERSIDE, CALIFORNIA

LSA

August 2017

HEALTH RISK ASSESSMENT

HAWTHORNE RESIDENTIAL DEVELOPMENT PROJECT

CITY OF RIVERSIDE, COUNTY OF RIVERSIDE, CALIFORNIA

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August 2017

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LIST OF ACRONYMS AND ABBREVIATIONS

AAQS	ambient air quality standards
AERMOD	American Meteorological Society/Environmental Protection Agency Regulatory Model
AB	Assembly Bill
ARB	California Air Resources Board
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
Basin	South Coast Air Basin
BNSF	Burlington Northern and Santa Fe
CalEPA	California Environmental Protection Agency
CAPCOA	California Air Pollution Control Officers Association
CEQA	California Environmental Quality Act
CO	carbon monoxide
DPM	diesel particulate matter
EPA	United States Environmental Protection Agency
FIND	SCAQMD Facility Information Detail
ft	Feet
HARP 2	Hotspots Analysis and Reporting Program Version 2
HI	hazard index
HRA	health risk assessment
LSA	LSA Associates, Inc.
MERV	minimum efficiency reporting value
MICR	maximum individual cancer risk
mph	miles per hour
NOx	Nitrogen oxides
OEHHA	Office of Environmental Health and Hazards Assessment
PM10	particulate matter less than 10 microns in diameter
PSE	particle size efficiency
SB	Senate Bill
SCAQMD	South Coast Air Quality Management District
SR-91	State Route 91
T-BACT	toxics best available control technology
TAC	toxic air contaminant

Symbols

°F	degree(s) Fahrenheit

1.0 INTRODUCTION

1.1 INTRODUCTION

LSA was retained to prepare a health risk assessment (HRA) for the proposed residential development project located at 9170 Indiana Avenue, in the City of Riverside, County of Riverside, California.

An HRA is a process used to estimate the increased risk of health problems in people who are exposed to toxic air contaminants (TAC). An HRA combines results of studies on the health effects of various animal and human exposures to TAC with results of studies that estimate the level of people's exposures at different distances from the sources of the pollutants. The purpose of the HRA is to determine the increased cancer risk and noncancer health risks from exposure to TAC from all sources nearby the proposed project.

In 2005, the California Air Resources Board (ARB) developed an Air Quality and Land Use Handbook to help readers understand the potential cancer risks from some common sources of toxic emissions, such as:

- Freeways and high traffic volume roads
- Goods distribution centers
- Rail yards
- Ports
- Refineries
- Chrome platers
- Dry cleaners using perchloroethylene
- Gasoline dispensing facilities

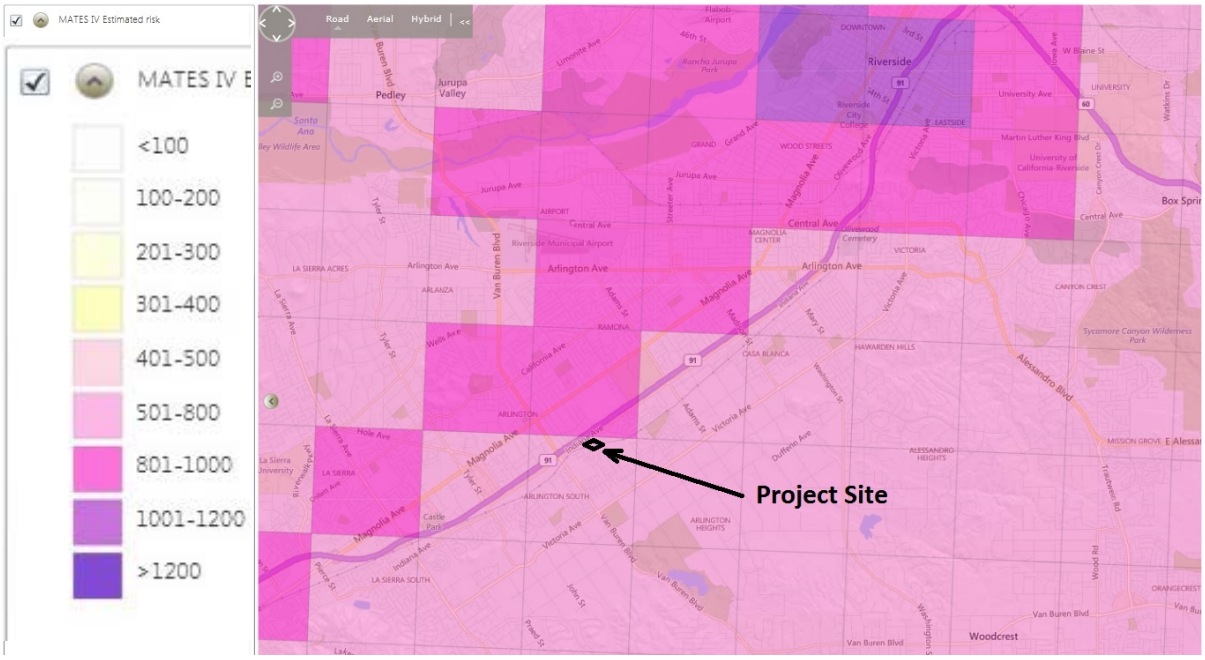
The ARB Handbook identified the potential cancer risks at various distances from these sources and recommended buffer distances between those sources and receptors. The ARB promulgated an advisory recommendation to avoid setting sensitive land uses within 500 feet of a freeway, urban roads with 100,000 vehicles per day, or rural roads with 50,000 vehicles per day. The ARB indicates that due to traffic-generated pollutants, there is an estimated increased cancer risk incidence of 300 to 1,700 in a million if within 500 feet of a freeway. At some point after 500 feet however, the increased cancer risk incidence due to the effects of freeway/roadway corridor pollutants become indistinguishable from the ambient air quality condition. In this regard, the effects of freeway/roadway-source pollutants that may impact the Project site are analyzed because the site is located within 500 feet of freeway/roadway-sources.

The South Coast Air Quality Management District (SCAQMD) has conducted four Multiple Air Toxics Exposure Studies, (the most recent being MATES IV)[1]. These are monitoring and evaluation

[1] http://www.aqmd.gov/home/library/air-quality-data-studies/health-studies/mates-iv, accessed March 1, 2017.

studies conducted in the South Coast Air Basin (Basin). The MATES studies do not provide land use development recommendations. The MATES IV Study includes a network of 10 fixed sites used to monitor toxic air contaminants once every six days for one year. The fixed monitoring station nearest to the project site was located at 5888 Mission Boulevard in the City of Jurupa Valley, approximately 5.9 miles northwest of the site. In addition to the 10 fixed sites, mobile monitoring platforms were deployed that focused on local scale studies at locations for short time periods. For the modeling analysis conducted for the MATES IV study, emissions over the Basin were estimated and allocated to 2 kilometer by 2 kilometer (1.2 mile x 1.2 mile) geographic grids. A regional dispersion model was used to estimate the annual average concentrations in each grid cell.

The MATES IV Study data for the Project vicinity comprehensively reflects increased TAC-source cancer risks affecting the City and Project site, including increased cancer risks due to freeway, roadway, and rail line pollutant sources. Based on the SCAQMD's MATES IV Carcinogenic Risk Interactive Map[1] (and reproduced below), the northern corner of the site is located within a grid cell with an estimated carcinogenic risk of 801 - 1,000 per million. The balance of the site has an estimated carcinogenic risk of 501 to 800 per million. While these are very high risk levels, the average risk level is now about 65 percent lower than the estimated risk shown in the MATES III report for the 2004-2006 time period, reflecting the success of various control strategies to reduce exposure to air toxics in the region.



In addition, the California Code of Regulations, Title 14, Section 15126.2(a) recommends that significant environmental effects of a project be assessed when a project brings development and

[1] http://www3.aqmd.gov/webappl/OI.Web/OI.aspx?jurisdictionID=AQMD.gov&shareID=73f55d6b-82cc-4c41-b779-4c48c9a8b15b, site accessed March 1, 2017.

people into an affected area (1). For the proposed project, adjoining freeway emissions and an existing railroad line are a potential concern and relevant thresholds and standards exist to determine the impact of vehicular and locomotive emissions on an exposed population. As such, a health risk assessment was prepared to assess the impact of these emissions on individuals residing at the proposed project site.

In accordance with the Air Quality Element within the City of Riverside's General Plan 2025, Policy AQ-1.3 specifically states that City should separate, create buffers, and/or protect sensitive receptors from significant sources of pollution to the greatest extent possible.

The Project proposes single-family residential land uses that would be located approximately 200 feet southeast of the 10-lane Route 91 freeway. Additionally, the Project is approximately 50 feet to the north of an existing double-tracked rail line utilized by Burlington Northern and Santa Fe (BNSF) Railway trains, Amtrak passenger rail, and the Riverside Transit Agency Metrolink passenger rail.

The 2005 ARB guidance noted previously, information made available through the MATES-IV Study, City's Policy AQ-1.3, and configuration and design of the Project would suggest that further assessment of the existing freeway-source and railroad-source pollutant impacts are warranted. Notwithstanding, these off-site freeway-source and railroad-source Air Toxic Health Risk Assessment has been prepared for the Project and is intended to:

- Disaggregate potential freeway-source and railroad-source air pollutant health effects from other background conditions identified in the MATES IV Study;
- Comply with the City's Air Quality Element of the General Plan 2025; and
- Identify means to reduce the specific effects of freeway-source and railroad-source pollutants at the Project site.

In 2009, the California Air Pollution Control Officers Association (CAPCOA) published guidance (CAPCOA 2009) on assessing the health risk impacts from and to proposed land use projects, focusing on the acute, chronic, and cancer impacts of sources affected by California Environmental Quality Act (CEQA) and recommending procedures to identify when a project should undergo further risk evaluation, how to conduct the HRA, how to engage the public, what to do with the results from the HRA, and what mitigation measures may be appropriate for various land use projects. In 2015, six years after the CAPCOA guidance document was released in 2009, an important CEQA case (California Building Industry Association v. Bay Area Air Quality Management District (2015) 62 Cal.4th 369) established that CEQA does not require the analysis of the existing air environment on a project; thus this HRA is *not* properly part of the CEQA analysis of existing impacts on the Hawthorne project.

Finally, the South Coast Air Quality Management District (SCAQMD) has its own Risk Assessment guidelines and required assumptions (SCAQMD 2015). These guidelines incorporate the new Office of Environmental Health and Hazards Assessment (OEHHA) guidance and the options to be used when using the ARB's Hotspots Analysis and Reporting Program Version 2 (HARP 2) program for risk assessment calculations. While this guidance only covers projects producing emissions that potentially affect nearby sensitive receptors, this HRA applies the SCAQMD guidelines to determine the health risk levels to future residents of the proposed project from external sources.

This HRA follows the ARB Handbook, CAPCOA, and SCAQMD guidance and recommendations and examines the short-term and long-term potential health effects from emissions of TAC in the area surrounding the proposed project, primarily exhaust of traffic on the surrounding roadways and any TAC emissions from businesses operating within 0.25 mile of the proposed project.

1.2 PROJECT DESCRIPTION

The project site is a former elementary school located south of Indiana Avenue and north of the existing railroad tracks, between Gibson Street and Jackson Street in the City of Riverside in the County of Riverside. Figure 1 shows the project location. The project consists of the construction of 54 single-family dwelling units. Figure 2 illustrates the site plan.

1.3 EXISTING LAND USES ON THE PROJECT SITE AND IN THE PROJECT VICINITY

The project site is surrounded primarily by residential development with the nearest residential use east of the project site having a garage located approximately 7 ½ feet from property line and the residence located approximately 25 feet from property line. The areas adjacent to the project site include the following uses:

- **North:** Residential uses on the north side of Indiana Avenue
- **East:** Vacant land and single-family residential development
- **South:** BNSF Railway right-of-way with substation, vacant land and single-family residential development further south
- **West:** Vacant land, with Gibson Street and a single-family residential development further west

1.4 EMISSIONS SOURCES

To be thorough, all stationary sources within 0.25 mile of the project should be included in an HRA. A survey of the SCAQMD Facility Information Detail (FIND) database shows that there are no permitted facilities within this range. For this HRA, exhaust emissions from all gasoline- and diesel-powered traffic on Indiana Avenue and State Route 91 (SR-91) and from trains passing on the nearby tracks were included in the analysis.

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FIGURE 1

N

0 1000 2000
FEET

Hawthorne Residential Development

Regional and Project Location

SOURCE: Bing Aerial, 2016: Streetmap, 2013/Riverside County, 2015.

I:\SWK1603\Reports\Traffic\fig1_RegLoc.mxd (9/23/2016)

LSA

FIGURE 2

N

0 70 140
FEET

Hawthorne Residential Development Project

Site Plan

SOURCE: SDH and Associates, Inc. February, 2016.

I:\SWK1502\G\Site Plan.cdr (8/8/2017)

2.0 SETTING

2.1 REGIONAL AIR QUALITY

The project site is located in the City of Riverside, is within the South Coast Air Basin (Basin) and is under the jurisdiction of the SCAQMD.

2.1.1 Climate/Meteorology

Air quality in the planning area is not only affected by various emission sources (mobile, industry, etc.), but also by atmospheric conditions such as wind speed, wind direction, temperature, rainfall, etc. The combination of topography, low mixing height, abundant sunshine, and emissions from the second-largest urban area in the United States gives the Basin some of the worst air pollution problems in the nation.

The annual average temperature varies little throughout the Basin, ranging from the low-to-middle 60s, measured in degrees Fahrenheit (°F). With a more pronounced oceanic influence, coastal areas show less variability in annual minimum and maximum temperatures than inland areas. The climatological station closest to the site with complete weather data is the Riverside Fire Department Station 3, which provides sufficient data for average temperatures in the project area. Riverside Fire Department Station 3[1] shows the monthly average maximum temperature recorded ranged from 66.8°F in January to 94.4°F in August, with an annual average maximum of 79.5°F. The monthly average minimum temperature recorded at this station ranged from 39.1°F in January to 59.6°F in August, with an annual average minimum of 48.6°F. January is typically the coldest month, and July and August are typically the warmest months in this area of the Basin.

The majority of annual rainfall in the Basin occurs between November and April. Summer rainfall is minimal and is generally limited to scattered thundershowers in coastal regions and slightly heavier showers in the eastern portion of the Basin and along the coastal side of the mountains. Riverside Fire Department Station 3's monitored precipitation shows average monthly rainfall varied from 2.20 inches in February to 0.44 inch or less from May to October, with an annual total of 10.21 inches. Patterns in monthly and yearly rainfall totals are unpredictable due to fluctuations in the weather.

The Basin experiences a persistent temperature inversion (increasing temperature with increasing altitude) as a result of the Pacific high. This inversion limits the vertical dispersion of air contaminants, holding them relatively near the ground. As the sun warms the ground and the lower air layer, the temperature of the lower air layer approaches the temperature of the base of the inversion (upper) layer until the inversion layer finally breaks, allowing vertical mixing with the lower layer. This phenomenon is observed in midafternoon to late afternoon on hot summer days, when the smog appears to clear up suddenly. Winter inversions frequently break by midmorning.

[1] Western Regional Climate Center. Website: www.wrcc.dri.edu (accessed December 2016).

Winds in the vicinity of the project area blow predominantly from the south-southwest, with relatively low velocities. Wind speeds in the project area average about 5 miles per hour (mph). Summer wind speeds average slightly higher than winter wind speeds. Low average wind speeds, together with a persistent temperature inversion, limit the vertical dispersion of air pollutants throughout the Basin. Strong, dry, north or northeasterly winds, known as Santa Ana winds, occur during the fall and winter months, dispersing air contaminants. The Santa Ana conditions tend to last for several days at a time.

The combination of stagnant wind conditions and low inversions produces the greatest pollutant concentrations. On days of no inversion or high wind speeds, ambient air pollutant concentrations are the lowest. During periods of low inversions and low wind speeds, air pollutants generated in urbanized areas are transported predominantly on shore into Riverside and San Bernardino Counties. In the winter, the greatest pollution problems are carbon monoxide (CO) and nitrogen oxides (NO_X) because of extremely low inversions and air stagnation during the night and early morning hours. In the summer, the longer daylight hours and the brighter sunshine combine to cause a reaction between hydrocarbons and NO_X to form photochemical smog.

2.1.2 Toxic Air Contaminants

The public's exposure to TACs is a significant environmental health issue in the State of California (State). In 1983, the California Legislature enacted a program to identify the health effects of TACs and to reduce exposure to these contaminants to protect the public health. The Health and Safety Code defines a TAC as “an air pollutant which may cause or contribute to an increase in mortality or in serious illness, or which may pose a present or potential hazard to human health.” A substance that is listed as a hazardous air pollutant pursuant to subsection (b) of Section 112 of the federal Clean Air Act (42 United States Code [USC] Sec. 7412[b]) is a TAC. Under State law, the California Environmental Protection Agency (CalEPA), acting through the ARB, is authorized to identify a substance as a TAC if it determines the substance is an air pollutant which may cause or contribute to an increase in mortality or an increase in serious illness, or which may pose a present or potential hazard to human health.

California regulates TACs primarily through Assembly Bill (AB) 1807 (Tanner Air Toxics Act), AB 2588 (Air Toxics “Hot Spot” Information and Assessment Act of 1987), and Senate Bill (SB) 25, the Children’s Environmental Health Protection Act. The Tanner Air Toxics Act sets forth a formal procedure for ARB to designate substances as TACs. To date, the ARB has designated nearly 200 compounds as TACs. The majority of the estimated health risks from TACs can be attributed to a relatively few compounds, the most important being particulate matter from diesel-fueled engines diesel particulate matter (DPM).

3.0 THRESHOLDS

3.1 HEALTH RISK ASSESSMENT THRESHOLDS OF SIGNIFICANCE

Both the State and the federal government have established health-based ambient air quality standards (AAQS) for seven air pollutants. For other air pollutants without defined significance standards, the definition of substantial pollutant concentrations varies. For TACs, "substantial" is taken to mean the health risk to any individual exceeds a threshold considered to be a prudent risk management level.

The following limits for maximum individual cancer risk (MICR), and noncancer acute and chronic hazard index (HI) from concentrations of TACs published by the SCAQMD[1] have been published for projects generating emissions of TACs. However, due to a lack of corresponding limits for projects that are not generating emissions of TACs, but rather introducing individuals to an environment that contains TAC emissions, the following limits are considered appropriate for use in determining the health risk for individuals in the Basin:

- **MICR:** MICR is the estimated probability of an individual contracting cancer as a result of exposure to TACs over a period of 30 years for adult residents and 9 years for children. The MICR calculations include multipathway consideration, when applicable.

  The cancer risk would be considered significant if the increase in total cancer risk due to total TAC emissions affecting the project would exceed 10 in 1 million (1.0×10^{-5}) for any individual.
- **Chronic HI:** Chronic HI is the ratio of the estimated long-term level of exposure to a TAC for an individual to its chronic reference exposure level. The chronic HI calculations include multipathway consideration, when applicable.

  The chronic risk would be considered significant if the cumulative increase in total chronic HI for any target organ system due to total TAC emissions affecting the project would exceed 1.0 for any individual.
- **Acute HI:** Acute HI is the ratio of the estimated maximum 1-hour concentration of a TAC for an individual to its acute reference exposure level. The acute HI calculations include multipathway consideration, when applicable.

  The acute risk would be considered significant if the cumulative increase in total acute HI for any target organ system due to total TAC emissions affecting the project would exceed 1.0 for any individual.

[1] SCAQMD Air Quality Significance Thresholds, www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf (accessed December 2016).

4.0 IMPACTS

4.1 HEALTH RISK ASSESSMENT

For the purposes of an HRA, short-term (1-hour) concentrations are of concern for analyzing acute health risk levels, and long-term (multiyear) concentrations are of concern for analyzing chronic and carcinogenic health risk levels. A multipathway HRA has been conducted, analyzing the inhalation, dermal soil, mother's milk, and homegrown produce pathways. This technique was chosen as prescribed in the SCAQMD's June 2015, *Supplemental Guidelines for Preparing Risk Assessments for the Air Toxics "Hot Spots" Information and Assessment Act*.

4.1.1 Construction Health Risk Impacts

Construction of the proposed project would include the use of diesel-powered equipment that release DPM, a toxic air contaminant with known carcinogenic and chronic health effects (Office of Environmental Health Hazard Assessment and American Lung Association of California 2002). For construction analyses, the emissions of DPM will be included in the exhaust PM_{10} emissions. Table H in the project's *Air Quality and Greenhouse Gas Impact Analysis* (LSA 2017) shows that the exhaust PM_{10} emissions from construction would be no more than 2.88 lbs/day. However, these are peak day emissions and average daily emissions over the entire construction process would be much lower. Carcinogenic and chronic health risk levels are determined by considering a 30-year exposure period, however construction is only expected to last approximately one year. This low average DPM emissions rate, combined with a short period of construction would result in construction health risk levels well below thresholds of significance.

4.1.2 Operational Health Risk Impacts

The first step of the HRA is to characterize the emissions of TACs within range of the project site. To be thorough and as directed by the SCAQMD, all stationary sources of TACs within a 0.25 mile of the project would be included in this HRA. However, a survey of the SCAQMD FIND database shows that there are no permitted facilities with emissions of TACs within this range.

Vehicle traffic on Indiana Avenue and SR-91 is a TAC source within range of the project site. The total daily traffic for Indiana Avenue is sourced from the project Traffic Study (LSA 2016) and for SR-91 is sourced from Caltrans for 2014 (the most recent year available). As described above, the most important TAC to consider in an HRA is DPM. Thus, it is important to break down the total traffic data for these roadways into gasoline and diesel-powered categories. While the Caltrans data include the percentage of trucks by number of axles, no similar data are available for Indiana Avenue. Also, no data are available to determine the percentages of trucks that are diesel-powered for either road. For this HRA, it was assumed that the percentage of diesel-powered vehicles are consistent with the EMFAC2014[1] data for the region. It was further assumed that all the trucks were the type that resulted in the greatest exhaust emissions and highest health risk levels.

[1] The ARB maintains the Emission Factors (EMFAC) model, which is approved by EPA for developing on-road motor vehicle emission inventories and conformity analyses in California. EMFAC models on-road

Finally, trains passing on the tracks to the south of the project site are sources of TACs within range of the project site. Emissions data from the United States Environmental Protection Agency (EPA)[1] were used to characterize these train emissions. Based on communications received from Metrolink (included in Appendix A), 25 Metrolink, 2 Amtrak, and 74 BNSF Railway freight trains pass the project site daily. Metrolink began transitioning to Tier 4 locomotives in 2013, so for this HRA, locomotives are assumed to be a mixture of Tiers 1 through 4. Tier 4 locomotives reduce particulate matter and nitrogen oxide emissions by up to 85 percent compared to the lower tiers. It was assumed Amtrak locomotives are the same as Metrolink. BNSF Railway freight trains typically have multiple 4400 HP locomotives per train. For this HRA, an average of two locomotives per BNSF Railway freight train was assumed. Further, for the purpose of this HRA, while BNSF has already upgraded their locomotives to perform at Tier 2 levels, it was assumed that over the 30-year period of this HRA, BNSF would continue to upgrade their locomotive performance levels. For this HRA, it was assumed that using 75 percent of the locomotives as Tier 2 and 25 percent as Tier 4 was representative.

The OEHHA has determined that long-term exposure to DPM poses the highest cancer risk of any TAC it has evaluated. Exposure to diesel exhaust can also have other health effects. Diesel exhaust can irritate the eyes, nose, throat, and lungs, and it can cause coughs, headaches, lightheadedness, and nausea. In studies with human volunteers, diesel exhaust particles made people with allergies more susceptible to the materials to which they are allergic, such as dust and pollen. Exposure to diesel exhaust also causes inflammation in the lungs, which may aggravate chronic respiratory symptoms and increase the frequency or intensity of asthma attacks. For risk assessment procedures, the OEHHA specifies the surrogate for whole diesel exhaust is DPM.

Fortunately, improvements to diesel fuel and diesel engines have already reduced emissions of some of the contaminants. These improvements have already resulted in a 75 percent reduction in particle emissions from diesel-powered trucks and other equipment (compared to 2000 levels), and by 2020, when fully implemented, they will result in an 85 percent reduction.[2] These improvements are anticipated to continue into the foreseeable future. However, to be conservative, other than what is built into the EMFAC2014 model, none of these anticipated improvements are included in this HRA. See Appendix A for the details of this emissions factor derivation. Appendix A shows the development of the exhaust emission rates for the vehicles driving on the roadways and the permitted facility emissions.

4.2 EXPOSURE QUANTIFICATION

In order to assess the impact of TAC emissions on individuals who will live in the proposed residences, air dispersion modeling utilizing the American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) was performed. The model is approved by the

mobile source emissions under multiple temporal and spatial scales; it produces composite emission factors for specific California geographic areas.

1 United States Locomotive Emissions Standards, www.dieselnet.com/standards/us/loco.php (accessed December 2016).

2 Cal EPA OEHHA and American Lung Association of California, 2002. *Health Effects of Diesel Exhaust*. April.

EPA when estimating the air quality impacts associated with point and fugitive sources in simple and complex terrain. The model was used to calculate the annual average and short duration (i.e., 1 hour) pollutant concentrations associated with each emitting source. Inputs for each emitting source were based on the characterizations referenced in Section 4.1. Details of these inputs are shown in Appendix A. Figure 3 shows the locations of all emissions sources and receptors.

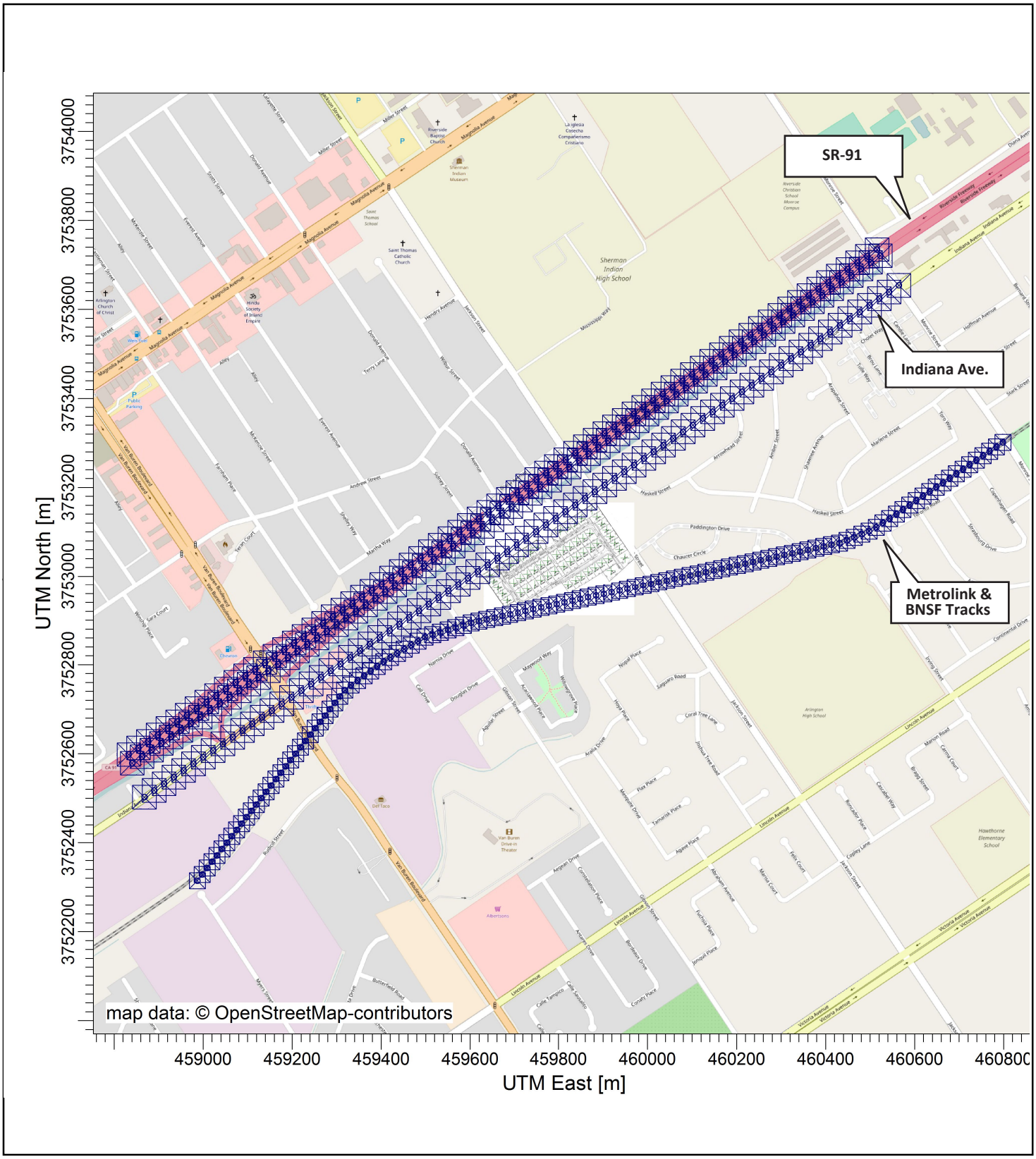
For this HRA, a series of volume sources were used to represent road and train mobile source activity. Vertical (sigma z) dispersion parameters were developed by approximating mixing zone residence time and quantifying the initial vertical term as described in the EPA guidance. Horizontal (sigma y) dispersion parameters were generated by dividing the source separation distance by a standard deviation of 2.15, again as described in the EPA guidance.

The model requires additional input parameters including local meteorology. Due to the model's sensitivity to individual parameters such as wind speed, temperature and direction, the EPA recommends meteorological data used as input in dispersion models be selected on the basis of relative spatial and temporal conditions that exist in the area of concern. As such, 5 years of meteorological data from the SCAQMD Riverside monitoring station was used to represent local weather conditions and prevailing winds.

The modeling analysis also considered the spatial distribution of each source in relation to the proposed residential homes on the project site. Receptors were placed in the approximate location of the house on every residence site to characterize the health risk levels throughout the proposed project site.

The ARB's HARP 2 model is a tool that assists with the programmatic requirements of the Air Toxics "Hot Spots" Program (AB 2588). HARP 2 was used to translate the TAC concentrations from AERMOD into long-term carcinogenic and chronic and short-term acute health risk levels following the guidance in the SCAQMD Risk Assessment Guidelines.

Appendix A contains the HRA emissions worksheets, a list of the receptors that represent locations on the proposed project site, and select pages from the AERMOD output. Appendix B includes the HARP 2 report files for this HRA.



LSA

LEGEND

- Volume Sources Along Roads and Railroad Tracks
- Receptors on Project Site

FIGURE 3

N

0 70 140
FEET

Hawthorne Residential Development

AERMOD Modeling Setup

SOURCE: SDH and Associates, Inc. February, 2016.

I:\SWK1603\Reports\Traffic\fig2_ConceptSP.mxd (9/23/2016)

4.2.1 Acute Project-Related Emission Impacts

Exposure to diesel exhaust can result in immediate health effects. Diesel exhaust can irritate the eyes, nose, throat, and lungs, and it can cause coughs, headaches, lightheadedness, and nausea. In studies with human volunteers, diesel exhaust particles made people with allergies more susceptible to the materials to which they are allergic, such as dust and pollen. Exposure to diesel exhaust also causes inflammation in the lungs, which may aggravate chronic respiratory symptoms and increase the frequency or intensity of asthma attacks. However, according to the rulemaking on *Identifying Particulate Emissions from Diesel-Fueled Engines as a Toxic Air Contaminant* (ARB 1998) and the current *Consolidated Table of OEHHA / ARB Approved Risk Assessment Health Values*, the available data from studies of humans exposed to diesel exhaust are not sufficient for deriving an acute noncancer health risk guidance value. Emissions from gasoline-powered vehicles do contain TACs with short-term acute health effects. The acute inhalation health risks from all sources to the future residents of the proposed project are shown in Table A. The Acute Hazard Index for both the children and adults would be 0.014, less than the threshold of 1.0.

4.2.2 Carcinogenic and Chronic Project-Related Emission Impacts

The carcinogenic and chronic inhalation health risks at the proposed project are also shown in Table A. For a child living at the proposed project for 9 years, he or she would be exposed to an unmitigated inhalation cancer risk of no more than 813 in 1 million. Any adult at the proposed project for 30 years would be exposed to an unmitigated inhalation cancer risk of no more than 1,170 in 1 million. The Chronic Hazard Index for both the children and adults would be 0.26.

Table A: Health Risk Levels for the Residents of the Proposed Project

Location	Maximum Cancer Risk (risk per million)[1,2]	Maximum Noncancer Chronic Risk (Hazard Index)	Maximum Noncancer Acute Risk (Hazard Index)
Children (9-year exposure)	813	0.26	0.014
Adults (30-year exposure) (MICR)	1,170		

Source: LSA Associates, Inc., July 2017.
Note:
[1] The Maximum Cancer Risk and Maximum Noncancer Risks noted in the table represents the ambient/baseline, as the proposed project does not add any emissions of Toxic Air Contaminant (TAC). Thus, there is no marginal/incremental increase of TAC with implementation of the proposed project.
[2] Based on the South Coast Air Quality Management District's MATES IV Study, the project site is located within a grid cell with an estimated carcinogenic risk of 501 to 1,000 per million. The California Environmental Quality Act (CEQA) case (California Building Industry Association v. Bay Area Air Quality Management District (2015) 62 Cal.4th 369) established that CEQA does not require the analysis of the existing air environment on a project. As noted above, the proposed project does not add any emissions of TAC.
MICR = maximum individual cancer risk

It should be noted that though the results of this HRA are much higher than the SCAQMD threshold for carcinogenic health risk of 10 in a million, the health risk level is attributed to the existing sources such as frequent nearby Metrolink and BNSF freight trains and heavy traffic on the nearby SR-91

freeway. As described above, the project area has been measured to have a carcinogenic risk level of 501 to 800 per million and 801 to 1,000 per million in the MATES IV study.[1]

Although the proposed project will not add any emissions of TAC, a feasible measure that could be implemented to reduce these health risks would be to install air filtration systems in the residences to provide protection while indoors. The health risk levels shown in Table A assume no protection from being indoors, as typical homes provide little filtration of TACs. Air filtration systems are available with efficiencies equal to or exceeding a Minimum Efficiency Reporting Value (MERV) 16 as defined by the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) Standard 52.2. The average particle size efficiency (PSE) removal based on ASHRAE Standard 52.2 for MERV 16 is approximately 95% for 0.3 to 1.0 $\mu g/m^3$ (DPM) and 95% for 1.0 to 10 $\mu g/m^3$ (PM_{10} and $PM_{2.5}$). The project shall install such systems on the residences to reduce the exposure to the ambient TACs. Table B shows the reduced health risk levels that would result. With MERV 16 filtration, the exposure to TACs for these residents would be substantially lower than the ambient/baseline TAC concentration levels

Table B: Health Risk Levels for the Residents of the Proposed Project with MERV 16 Air Filtration Systems

Location	Maximum Cancer Risk (risk per million)[1,2]	Maximum Noncancer Chronic Risk (Hazard Index)	Maximum Noncancer Acute Risk (Hazard Index)
Children (9-year exposure)	41	0.013	0.0007
Adults (30-year exposure) (MICR)	58		

Source: LSA Associates, Inc., July 2017.
Note:
[1] Based on the South Coast Air Quality Management District's MATES IV Study, the project site is located within a grid cell with an estimated carcinogenic risk of 501 to 1,000 per million. The California Environmental Quality Act (CEQA) case (California Building Industry Association v. Bay Area Air Quality Management District (2015) 62 Cal.4th 369) established that CEQA does not require the analysis of the existing air environment on a project. The proposed project does not add any emissions of TAC.
[2] The Maximum Cancer Risk and Noncancer risks with MERV 16 Air Filtration Systems are substantially lower than the ambient/baseline Maximum Cancer Risk and Noncancer risks shown in Table A.
MICR = maximum individual cancer risk

The use of MERV filtration systems to reduce DPM and particulates has been successfully implemented by several lead agencies, including, but not limited to: City of Los Angeles, City of Claremont, City of Irvine, City of Glendale, City of Berkley, City of Oakland, and the Los Angeles Unified School District (LAUSD).

As described in Section 3.1 of this report, the SCAQMD only provides a health risk threshold applicable to projects that are generating emissions that would affect nearby sensitive receptors. The basis for these thresholds is that if a project increases the health risk level by less than the thresholds

[1] South Coast Air Quality Management District (SCAQMD), 2015, *MATES IVMultiple Air Toxics Exposure Study*. http://www.aqmd.gov/home/library/air-quality-data-studies/health-studies/mates-iv (accessed December 2016).

over the existing conditions the impact would be less than significant. The SCAQMD has no threshold for a project like the proposed project that doesn't generate TAC emissions, but introduce individuals into an environment that contains TAC concentrations. As discussed previously in CBIA v. BAAQMD, the California Supreme Court[1] held that CEQA generally does not require analysis or mitigation of the impact of existing environmental conditions on a project, including a project's future users or residents. However, as with other laws and regulations enforced by other agencies that protect public health and safety, the City as the lead agency has authority other than CEQA to require measures to protect public health and safety. Therefore, this document includes *for informational purposes* an evaluation of the environment's impacts on the Project consistent with the current version of the CEQA Checklist provided in Appendix G of the CEQA Guidelines. The evaluation includes an assessment of the Project's potential to expose future sensitive receptors that would be located on the Project site to substantial pollutant concentrations by individual exposure to the existing sources of toxic air contaminants in the Project vicinity. This analysis of the impacts of the environment on the Project is provided for informational purposes only (FindLaw, 2017). As described in Section 1.1 of this report, the SCAQMD has documented that the existing levels of TAC in the project area result in cancer risk levels from 501 to 1,000 per million. In other words, all individuals living in the area of the proposed project are being exposed to these cancer risk levels.

Given that the proposed project will not add any emissions of TAC and will be installing air filtration systems, the individuals living in these homes would be substantially protected from the ambient TAC concentration levels such that the health risk levels would be reduced from those shown in Table A to the much lower levels shown in Table B. As such, the proposed project will not result in a significant health risk.

Finally, in order to fully inform the residents of the proposed project, prior to the issuance of building permits, the applicant shall provide to the City for review and approval, a copy of a Toxic Air Contaminant Disclosure that will be presented to prospective buyers of real estate within the project site. The Toxic Air Contaminant Disclosure shall convey information to prospective buyers about potential TAC exposure at the project site. As approved by the City, the Toxic Air Contaminant Disclosure shall contain the language dictated by State law in conjunction with real estate transfer.

[1] California Supreme Court, 2015, op. cit.

5.0 REFERENCES

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APPENDIX A

EMISSIONS WORKSHEETS

Roadway Vehicle Exhaust Worksheet

Hawthorne Residential Development Project

Indiana		AADT by Vehicle Category[1]			
Total		**LDV**	**2-Axle[2]**	**3-Axle[3]**	**4+-Axle[4]**
AADT		11,874	158	142	16
12,190		% of Vehicles That Are Diesel-Powered[5]			
		2.3%	89.3%	89.3%	98.6%
Average		**Diesel Exhaust PM10 & PM2.5 Emissions at 45 mph (g/mi)6**			
Speed	PM_{10}	2.104E-03	4.80E-04	2.20E-04	1.93E-04
45 mph	$PM_{2.5}$	1.950E-03	4.59E-04	2.11E-04	1.85E-04
		% of Vehicles That Are Gasoline-Powered[5]			
		98%	10.7%	10.7%	1.4%
Total distance		**Gasoline Exhaust ROG Emissions at 45 mph (g/mi)6**			
covered by Indiana	ROG	1.86E-02	6.12E-04	6.12E-04	6.01E-04
sources		**PM_{10}, $PM_{2.5}$ & ROG Exhaust Emissions (g/s)**			
2,051 meters	PM_{10}	8.46E-06	9.98E-07	4.12E-07	4.50E-08
	$PM_{2.5}$	7.84E-06	9.55E-07	3.94E-07	4.30E-08
	ROG	3.19E-03	1.53E-07	1.37E-07	2.04E-09

Number of Sources	Emission Rates per source g/s	lb/hr	lb/yr
78	1.3E-07	1.0E-06	0.0088
78	1.2E-07	9.4E-07	0.0082
78	4.1E-05	3.2E-04	2.8452

Speciated Emissions Rates

		lb/hr	lb/yr
diesel part.	--	1.01E-06	8.84E-03
PM2.5	--	9.39E-07	8.23E-03
1,3-butadiene	0.0055	1.79E-06	1.56E-02
benzene	0.02636	8.56E-06	7.50E-02
ethylbenzene	0.01072	3.48E-06	3.05E-02
MEK	0.00019	6.17E-08	5.41E-04
naphthalene	0.00048	1.56E-07	1.37E-03
propylene	0.03128	1.02E-05	8.90E-02
styrene	0.00126	4.09E-07	3.58E-03
toluene	0.0588	1.91E-05	1.67E-01
m & p-xylene	0.0364	1.18E-05	1.04E-01

[1] AADT from project traffic study

[2] 2 axle trucks are assumed to be T6-Instate small (Medium-Heavy Duty Diesel Truck <= 26,000 lbs.

[3] 3 axle trucks are assumed to be T6-Instate heavy (Medium-Heavy Duty Diesel Truck > 26,000 lbs.

[4] 4+ axle trucks are assumed to be Heavy-Heavy Duty Diesel Truck (the emissions factor used is the highest of T7-Tractor, T7-OOS, and T7-POLA) trucks

[5] Source: EMFAC2014 fleet percentages.

[6] Source: EMFAC2014 emission factors for 2020 (model year aggregate).

AADT Total	Total Trucks	Total Truck %	2 Axle Volume	2 Axle Percent	3 Axle Volume	3 Axle Percent	4 Axle Volume	4 Axle Percent	5 Axle Volume	5 Axle Percent	Year
12,190	315	2.58%	158	50%	95	30%	47	15%	16	5%	2010-2012

Total AADT from the October 2016 Traffic Impact Analysis: Hawthorne Residential Project, Figure 4, translated from peak PM hour to ADT by multiplying by 1

Fleet percentages based on standard Orange County roadway fleet percentages.

Roadway Vehicle Exhaust Worksheet

Hawthorne Residential Development Project

SR-91		AADT by Vehicle Category[1]			
Total		**LDV**	**2-Axle[2]**	**3-Axle[3]**	**4+-Axle[4]**
AADT		164,349	5,969	519	2,163
173,000		% of Vehicles That Are Diesel-Powered[5]			
		2.3%	89.3%	89.3%	98.6%
Average		**Diesel Exhaust PM10 & PM2.5 Emissions at 65 mph (g/mi)6**			
Speed	PM_{10}	1.583E-03	2.45E-04	1.13E-04	1.51E-04
65 mph	$PM_{2.5}$	1.480E-03	2.35E-04	1.08E-04	1.45E-04
		% of Vehicles That Are Gasoline-Powered[5]			
		98%	10.7%	10.7%	1.4%
Total distance		**Gasoline Exhaust ROG Emissions at 65 mph (g/mi)6**			
covered by SR-91	ROG	1.45E-02	3.23E-04	3.23E-04	3.15E-04
sources		**PM_{10}, $PM_{2.5}$ & ROG Exhaust Emissions (g/s)**			
	PM_{10}	1.75E-04	3.82E-05	1.53E-06	9.42E-06
4,064 meters	$PM_{2.5}$	1.63E-04	3.65E-05	1.46E-06	9.01E-06
	ROG	6.80E-02	6.02E-06	5.23E-07	2.87E-07

Number of Sources	Emission Rates per source		
	g/s	**lb/hr**	**lb/yr**
156	1.4E-06	1.1E-05	0.0998
156	1.3E-06	1.1E-05	0.0938
156	4.4E-04	3.5E-03	30.3368

Speciated Emissions Rates

		lb/hr	lb/yr
diesel part.	--	1.14E-05	9.98E-02
PM2.5	--	1.07E-05	9.38E-02
1,3-butadiene	0.0055	1.90E-05	1.67E-01
benzene	0.02636	9.12E-05	8.00E-01
ethylbenzene	0.01072	3.71E-05	3.25E-01
MEK	0.00019	6.58E-07	5.76E-03
naphthalene	0.00048	1.66E-06	1.46E-02
propylene	0.03128	1.08E-04	9.49E-01
styrene	0.00126	4.36E-06	3.82E-02
toluene	0.0588	2.03E-04	1.78E+00
m & p-xylene	0.0364	1.26E-04	1.10E+00

[1] AADT from project traffic study

[2] 2 axle trucks are assumed to be T6-Instate small (Medium-Heavy Duty Diesel Truck <= 26,000 lbs.

[3] 3 axle trucks are assumed to be T6-Instate heavy (Medium-Heavy Duty Diesel Truck > 26,000 lbs.

[4] 4+ axle trucks are assumed to be Heavy-Heavy Duty Diesel Truck (the emissions factor used is the highest of T7-Tractor, T7-OOS, and T7-POLA) trucks

[5] Source: EMFAC2014 fleet percentages.

[6] Source: EMFAC2014 emission factors for 2020 (model year aggregate).

Route	Dist	County	Post Mile	Leg	Description	AADT Total	Total Trucks	Total Truck %	2 Axle Volume	3 Axle Volume	4 Axle Volume	5 Axle Volume	2 Axle Percent	3 Axle Percent	4 Axle Percent	5 Axle Percent	EAL 2-Way (1,000)	
091	08	RIV	14.079	A	RIVERSIDE, VAN BUREN RD	173,000	8,651	5.00	5,969	519	346	1,817	69.00	6.00	4.00	21.00	934	81V

Total AADT from Caltrans website: http://www.dot.ca.gov/trafficops/census/, accessed 12/12/2016

METROLINK®

Southern California Regional Rail Authority

January 10, 2017

Ms. Stephanie Tang
Senior Planner
City of Riverside – Planning Division
Community Development Department
3900 Main Street, 3rd Floor
Riverside, CA 92522

RE: **Planning Cases P16-0112 (GPA), P16-0113 (ZC), P16-0114 (TTM), P16-0111 (PRD)**

Dear Ms. Tang:

The Southern California Regional Rail Authority (SCRRA) has received a copy of the proposal to subdivide a 6.85-acre property into a 54-lot planned residential subdivision in the City of Riverside. The property is located at 9160 through 9258 Indiana Avenue. Thank you for the opportunity to comment on key issues relative to SCRRA and operations of the railroad adjacent to the project site. As background information, SCRRA is a five-county Joint Powers Authority (JPA) that operates the regional commuter rail system known as Metrolink. The JPA consists of the Los Angeles County Metropolitan Transportation Authority (METRO), San Bernardino Associated Governments (SANBAG), Orange County Transportation Authority (OCTA), Riverside County Transportation Commission (RCTC) and Ventura County Transportation Commission (VCTC).

The railroad right of way adjacent to the proposed project is owned, operated and maintained by the BNSF Railway Company. The proposed project is also located between the existing at-grade crossings of Gibson Street and Jackson Street, south of Indiana Avenue. These two at-grade crossings fall within the City of Riverside's seven (7) mile Quiet Zone that went into effect of November 17, 2016.

Below is a list of general comments that are of concern for all proposed projects near or adjacent to the railroad right of way:

1. The proposed residential subdivision is located approximately 2.25 miles from the Metrolink La Sierra Station. We would encourage promoting Metrolink as a commuting option for the future residents of this development.
2. Currently there are about 25 Metrolink and 2 Amtrak passenger trains and 74 BNSF freight trains that operate on the rail line immediately adjacent to the proposed development. Trains operate 7 days per week and 24 hours per day.
3. Safety is of utmost importance to the railroads. As the development is being built alongside an active rail line in an existing FRA approved Quiet Zone where the locomotive engineers are not required to sound the train horns unless in emergencies when tracks are obstructed, we would encourage the developer to work with the BNSF Railway Company to ensure that pedestrian access is improved and the at-grade crossings of Gibson Street and Jackson Street are upgraded to the safest grade crossing safety standards. We would also request that a proper noise/barrier wall be built to

segregate the development from the railroad right of way. It appears that a playground/walkway may be built along the railroad and must be protected with a wall or adequate fence to preclude trespassing into the active rail line by children and others living in this future residential development.

4. For future mailings to SCRRA/Metrolink on planning documents please send to the following:

Southern California Regional Rail Authority (Metrolink)
Planning Department
One Gateway Plaza, 12th floor
Los Angeles, CA 90012

Thank you again for cooperating with SCRRA to help ensure the development of a successful project. If you have any questions regarding these comments please contact me at 213-452-0456 or via e-mail at mathieur@scrra.net.

Sincerely,

Ron Mathieu
Sr. Public Projects Specialist

Cc: John Shurson, BNSF
Michael Roberson, CPUC
Sheldon Peterson, RCTC
Roderick Diaz, SCRRA

Roadway Vehicle Exhaust Worksheet

	Train Emission Factors PM_{10} Moving (g/bhp-hr)
Tier 1	0.22
Tier 2	0.22
Tier 3	0.1
Tier 4	0.03

		Percent of Locomotives that are				Average Locomotive PM_{10} Emissions Rate					Average PM10 Emissions Rate per Source	
	Locomotive HP	Tier 1	Tier 2	Tier 3	Tier 4	(lb/hr)	Locomotives per train	trains per day	average speed (mph)	days per week	(lb/hr)	(lb/yr)
Metrolink Passenger	1800		25%		75%	0.31	1	27	50	6	0.000078	0.58
BNSF freight	4400	0%	75%	0%	25%	1.67	2	74	50	6	0.0023	17.3
										Total	0.0024	17.9
	Source spacing	18.05	meters									

EMFAC2014 Emission Rates
Region Type: County
Region: Orange (SC)
Calendar Year: 2025
Season: Annual
Vehicle Classification: EMFAC2011 Categories

Region	CalYr	Season	Veh_Class	Fuel	Speed (miles/hr)	VMT (miles/day)	ROG (gms/mile)	PM10 (gms/mile)	PM2.5 (gms/mile)	
South Coast	2025	Annual	Aggreg Light Vel	GAS	5	253,848	0.006564442	0.001371381	0.001261809	These EFs are derived by factoring EFs for LDA, LDT1, LDT2, LHD1, LHD2, MDV, MH, Motorcoach, and SBUS by VMT for each to get a weighted aggregate set of EFs.
South Coast	2025	Annual	Aggreg Light Vel	GAS	10	540,901	0.00893072	0.001843778	0.00169672	
South Coast	2025	Annual	Aggreg Light Vel	GAS	15	1,152,907	0.012624958	0.002622393	0.002413574	
South Coast	2025	Annual	Aggreg Light Vel	GAS	20	3,061,209	0.02345415	0.004929819	0.004537791	
South Coast	2025	Annual	Aggreg Light Vel	GAS	25	8,858,292	0.050364508	0.010607449	0.009765029	
South Coast	2025	Annual	Aggreg Light Vel	GAS	30	13,292,207	0.059162443	0.012452737	0.011465104	
South Coast	2025	Annual	Aggreg Light Vel	GAS	35	10,558,006	0.038672805	0.008146304	0.007501034	
South Coast	2025	Annual	Aggreg Light Vel	GAS	40	7,982,902	0.025217142	0.005335612	0.00491344	
South Coast	2025	Annual	Aggreg Light Vel	GAS	45	6,450,360	0.018641567	0.00392479	0.003614519	
South Coast	2025	Annual	Aggreg Light Vel	GAS	50	5,644,870	0.015725431	0.003309969	0.003048366	
South Coast	2025	Annual	Aggreg Light Vel	GAS	55	4,832,715	0.013635657	0.002882507	0.002654701	
South Coast	2025	Annual	Aggreg Light Vel	GAS	60	6,880,717	0.020387127	0.004407361	0.004059548	
South Coast	2025	Annual	Aggreg Light Vel	GAS	65	4,301,959	0.014491697	0.003131955	0.002884173	
South Coast	2025	Annual	Aggreg Light Vel	GAS	70	5,682	2.07745E-05	4.55596E-06	4.1949E-06	
South Coast	2025	Annual	Aggreg Light Vel	DSL	5	5,545	0.003951339	0.000747411	0.000688801	These EFs are derived by factoring EFs for LDA, LDT1, LDT2, LHD1, LHD2, MDV, MH, Motorcoach, and SBUS by VMT for each to get a weighted aggregate set of EFs.
South Coast	2025	Annual	Aggreg Light Vel	DSL	10	12,761	0.005278793	0.000954814	0.000880862	
South Coast	2025	Annual	Aggreg Light Vel	DSL	15	27,203	0.007221614	0.001370945	0.001265385	
South Coast	2025	Annual	Aggreg Light Vel	DSL	20	62,857	0.014068666	0.00289208	0.002667706	
South Coast	2025	Annual	Aggreg Light Vel	DSL	25	164,832	0.03232243	0.006773594	0.006245907	
South Coast	2025	Annual	Aggreg Light Vel	DSL	30	248,179	0.037887238	0.007966178	0.007347827	
South Coast	2025	Annual	Aggreg Light Vel	DSL	35	217,411	0.023093703	0.004867212	0.004494529	
South Coast	2025	Annual	Aggreg Light Vel	DSL	40	183,778	0.014140853	0.002996667	0.002772013	
South Coast	2025	Annual	Aggreg Light Vel	DSL	45	165,212	0.009977977	0.002104222	0.001950204	
South Coast	2025	Annual	Aggreg Light Vel	DSL	50	150,048	0.008298082	0.001755034	0.001627863	
South Coast	2025	Annual	Aggreg Light Vel	DSL	55	150,511	0.006843621	0.001469073	0.001367243	
South Coast	2025	Annual	Aggreg Light Vel	DSL	60	364,303	0.011313536	0.002595939	0.002448362	
South Coast	2025	Annual	Aggreg Light Vel	DSL	65	162,239	0.007106304	0.001583272	0.001480295	
South Coast	2025	Annual	Aggreg Light Vel	DSL	70	101	0.004482175	0.000518982	0.000495784	
South Coast	2025	Annual	T6 instate heavy	DSL	5	1362.165969	0.000396951	9.83872E-06	9.4131E-06	
South Coast	2025	Annual	T6 instate heavy	DSL	10	2982.289922	0.000703858	1.93767E-05	1.85385E-05	
South Coast	2025	Annual	T6 instate heavy	DSL	15	7099.946843	0.00118014	3.96399E-05	3.79251E-05	
South Coast	2025	Annual	T6 instate heavy	DSL	20	13533.92272	0.001627398	6.74125E-05	6.44962E-05	
South Coast	2025	Annual	T6 instate heavy	DSL	25	34051.07459	0.00300063	0.000154294	0.00014762	
South Coast	2025	Annual	T6 instate heavy	DSL	30	57561.6448	0.003738005	0.000240156	0.000229767	
South Coast	2025	Annual	T6 instate heavy	DSL	35	55237.13315	0.0026434	0.000213945	0.00020469	
South Coast	2025	Annual	T6 instate heavy	DSL	40	52026.84204	0.001834781	0.000188188	0.000180047	
South Coast	2025	Annual	T6 instate heavy	DSL	45	64928.7573	0.001687404	0.000220313	0.000210782	
South Coast	2025	Annual	T6 instate heavy	DSL	50	62268.78596	0.001192552	0.000198893	0.000190289	
South Coast	2025	Annual	T6 instate heavy	DSL	55	52911.1945	0.000746758	0.000159527	0.000152626	
South Coast	2025	Annual	T6 instate heavy	DSL	60	83672.71453	0.001013745	0.000245308	0.000234696	
South Coast	2025	Annual	T6 instate heavy	DSL	65	38399.33081	0.000465231	0.000112577	0.000107707	
South Coast	2025	Annual	T6 instate heavy	DSL	70	9.74258313	1.18037E-07	2.85629E-08	2.73272E-08	
South Coast	2025	Annual	T6 instate small	DSL	5	3403.437999	0.000885661	2.14209E-05	2.04943E-05	
South Coast	2025	Annual	T6 instate small	DSL	10	7451.39658	0.00157042	4.21871E-05	4.03621E-05	
South Coast	2025	Annual	T6 instate small	DSL	15	17739.56289	0.002633083	8.63042E-05	8.25707E-05	
South Coast	2025	Annual	T6 instate small	DSL	20	33815.1649	0.003630985	0.000146771	0.000140421	
South Coast	2025	Annual	T6 instate small	DSL	25	85078.26786	0.006694887	0.000335931	0.000321398	
South Coast	2025	Annual	T6 instate small	DSL	30	143820.5723	0.00834009	0.00052287	0.00050025	
South Coast	2025	Annual	T6 instate small	DSL	35	138012.6667	0.005897851	0.000465802	0.000445652	
South Coast	2025	Annual	T6 instate small	DSL	40	129991.5981	0.004093692	0.000409723	0.000391999	
South Coast	2025	Annual	T6 instate small	DSL	45	162227.6616	0.00376487	0.000479666	0.000458916	
South Coast	2025	Annual	T6 instate small	DSL	50	155581.5937	0.002660776	0.000433031	0.000414298	
South Coast	2025	Annual	T6 instate small	DSL	55	132201.1958	0.001666137	0.000347324	0.000332299	
South Coast	2025	Annual	T6 instate small	DSL	60	209060.3514	0.002261827	0.000534085	0.000510981	
South Coast	2025	Annual	T6 instate small	DSL	65	95942.59774	0.001038004	0.000245104	0.000234501	
South Coast	2025	Annual	T6 instate small	DSL	70	24.34231833	2.6336E-07	6.21872E-08	5.9497E-08	
South Coast	2025	Annual	T6TS	GAS	5	631.7695776	0.000146747	4.496E-06	4.1339E-06	
South Coast	2025	Annual	T6TS	GAS	10	1425.608078	0.000209497	6.38894E-06	5.87439E-06	
South Coast	2025	Annual	T6TS	GAS	15	3172.33269	0.000310656	9.44512E-06	8.68444E-06	
South Coast	2025	Annual	T6TS	GAS	20	5915.162958	0.000407065	1.23433E-05	1.13492E-05	
South Coast	2025	Annual	T6TS	GAS	25	14864.01239	0.000758456	2.2933E-05	2.10861E-05	
South Coast	2025	Annual	T6TS	GAS	30	23478.75543	0.000937571	2.82541E-05	2.59786E-05	
South Coast	2025	Annual	T6TS	GAS	35	21051.90274	0.000693564	2.08446E-05	1.91658E-05	
South Coast	2025	Annual	T6TS	GAS	40	19658.14572	0.000563304	1.68945E-05	1.55339E-05	
South Coast	2025	Annual	T6TS	GAS	45	23207.68482	0.000612226	1.82615E-05	1.67908E-05	
South Coast	2025	Annual	T6TS	GAS	50	21836.32484	0.000557908	1.65951E-05	1.52586E-05	
South Coast	2025	Annual	T6TS	GAS	55	17805.34708	0.00046313	1.3786E-05	1.26757E-05	
South Coast	2025	Annual	T6TS	GAS	60	21371.49015	0.000591025	1.77824E-05	1.63503E-05	
South Coast	2025	Annual	T6TS	GAS	65	10240.61114	0.000322506	9.65904E-06	8.88113E-06	
South Coast	2025	Annual	T6TS	GAS	70	2.069093895	7.00144E-08	2.11986E-09	1.94913E-09	

South Coast	2025	Annual	T7 NNOOS	DSL	5	539.7075399	0.000300519	5.62014E-06	5.37702E-06
South Coast	2025	Annual	T7 NNOOS	DSL	10	1085.056991	0.000489322	1.0164E-05	9.72428E-06
South Coast	2025	Annual	T7 NNOOS	DSL	15	2662.946265	0.000845762	2.14348E-05	2.05076E-05
South Coast	2025	Annual	T7 NNOOS	DSL	20	5342.406746	0.001227479	3.83649E-05	3.67052E-05
South Coast	2025	Annual	T7 NNOOS	DSL	25	13569.49769	0.002284822	8.86469E-05	8.48121E-05
South Coast	2025	Annual	T7 NNOOS	DSL	30	22877.64931	0.002838737	0.000137611	0.000131658
South Coast	2025	Annual	T7 NNOOS	DSL	35	22643.98166	0.002070578	0.000126446	0.000120976
South Coast	2025	Annual	T7 NNOOS	DSL	40	21854.61985	0.001472676	0.000113969	0.000109039
South Coast	2025	Annual	T7 NNOOS	DSL	45	23770.82376	0.001180411	0.000116286	0.000111255
South Coast	2025	Annual	T7 NNOOS	DSL	50	22109.98265	0.000809101	0.000101816	9.74119E-05
South Coast	2025	Annual	T7 NNOOS	DSL	55	21539.7496	0.000580871	9.36286E-05	8.95783E-05
South Coast	2025	Annual	T7 NNOOS	DSL	60	51553.89886	0.001193475	0.000217906	0.00020848
South Coast	2025	Annual	T7 NNOOS	DSL	65	21510.14349	0.000497961	9.09183E-05	8.69852E-05
South Coast	2025	Annual	T7 NNOOS	DSL	70	6.761235548	1.56523E-07	2.85781E-08	2.73419E-08
South Coast	2025	Annual	T7 NOOS	DSL	5	171.9226655	0.000117558	2.31533E-06	2.21517E-06
South Coast	2025	Annual	T7 NOOS	DSL	10	345.6425496	0.000191414	4.18724E-06	4.00611E-06
South Coast	2025	Annual	T7 NOOS	DSL	15	848.2757531	0.000330847	8.8305E-06	8.44849E-06
South Coast	2025	Annual	T7 NOOS	DSL	20	1701.812074	0.000480168	1.58052E-05	1.51214E-05
South Coast	2025	Annual	T7 NOOS	DSL	25	4322.534038	0.000893783	3.65198E-05	3.494E-05
South Coast	2025	Annual	T7 NOOS	DSL	30	7287.625536	0.001110465	5.66915E-05	5.4239E-05
South Coast	2025	Annual	T7 NOOS	DSL	35	7213.191212	0.000809974	5.20918E-05	4.98383E-05
South Coast	2025	Annual	T7 NOOS	DSL	40	6961.74172	0.000576085	4.69518E-05	4.49207E-05
South Coast	2025	Annual	T7 NOOS	DSL	45	7572.144317	0.000461756	4.79062E-05	4.58338E-05
South Coast	2025	Annual	T7 NOOS	DSL	50	7043.086987	0.000316506	4.19453E-05	4.01307E-05
South Coast	2025	Annual	T7 NOOS	DSL	55	6861.440486	0.000227227	3.85721E-05	3.69035E-05
South Coast	2025	Annual	T7 NOOS	DSL	60	16422.38259	0.000466867	8.97706E-05	8.58872E-05
South Coast	2025	Annual	T7 NOOS	DSL	65	6852.009524	0.000194794	3.74555E-05	3.58352E-05
South Coast	2025	Annual	T7 NOOS	DSL	70	2.153776909	6.1229E-08	1.17733E-08	1.1264E-08
South Coast	2025	Annual	T7 POLA	DSL	5	635.3282286	0.000468389	9.3415E-06	8.93739E-06
South Coast	2025	Annual	T7 POLA	DSL	10	1277.297953	0.000762657	1.6894E-05	1.61632E-05
South Coast	2025	Annual	T7 POLA	DSL	15	3134.743927	0.001318204	3.56278E-05	3.40866E-05
South Coast	2025	Annual	T7 POLA	DSL	20	6288.927917	0.001913149	6.3768E-05	6.10094E-05
South Coast	2025	Annual	T7 POLA	DSL	25	15973.62329	0.003561125	0.000147344	0.00014097
South Coast	2025	Annual	T7 POLA	DSL	30	26930.91228	0.004424456	0.000228729	0.000218835
South Coast	2025	Annual	T7 POLA	DSL	35	26655.84542	0.003227204	0.000210171	0.000201079
South Coast	2025	Annual	T7 POLA	DSL	40	25726.63135	0.002295313	0.000189433	0.000181239
South Coast	2025	Annual	T7 POLA	DSL	45	27982.33161	0.001839789	0.000193284	0.000184923
South Coast	2025	Annual	T7 POLA	DSL	50	26027.23711	0.001261065	0.000169234	0.000161913
South Coast	2025	Annual	T7 POLA	DSL	55	25355.97513	0.000905346	0.000155624	0.000148892
South Coast	2025	Annual	T7 POLA	DSL	60	60687.77036	0.00186015	0.000362192	0.000346523
South Coast	2025	Annual	T7 POLA	DSL	65	25321.12367	0.000776122	0.000151119	0.000144582
South Coast	2025	Annual	T7 POLA	DSL	70	7.959132468	2.43957E-07	4.7501E-08	4.54462E-08
South Coast	2025	Annual	T7 tractor	DSL	5	625.2851773	0.000437774	8.63671E-06	8.26309E-06
South Coast	2025	Annual	T7 tractor	DSL	10	1257.106865	0.000712808	1.56194E-05	1.49437E-05
South Coast	2025	Annual	T7 tractor	DSL	15	3085.190968	0.001232043	3.29398E-05	3.15148E-05
South Coast	2025	Annual	T7 tractor	DSL	20	6189.514697	0.0017881	5.89569E-05	5.64065E-05
South Coast	2025	Annual	T7 tractor	DSL	25	15721.11772	0.00332836	0.000136227	0.000130334
South Coast	2025	Annual	T7 tractor	DSL	30	26505.19763	0.004135262	0.000211472	0.000202324
South Coast	2025	Annual	T7 tractor	DSL	35	26234.47894	0.003016265	0.000194315	0.000185909
South Coast	2025	Annual	T7 tractor	DSL	40	25319.95356	0.002145285	0.000175141	0.000167565
South Coast	2025	Annual	T7 tractor	DSL	45	27539.99648	0.001719535	0.000178701	0.000170971
South Coast	2025	Annual	T7 tractor	DSL	50	25615.80745	0.001178638	0.000156466	0.000149697
South Coast	2025	Annual	T7 tractor	DSL	55	24955.15655	0.00084617	0.000143883	0.000137659
South Coast	2025	Annual	T7 tractor	DSL	60	59728.43885	0.001738566	0.000334865	0.000320379
South Coast	2025	Annual	T7 tractor	DSL	65	24920.85601	0.000725392	0.000139718	0.000133674
South Coast	2025	Annual	T7 tractor	DSL	70	7.833317225	2.28011E-07	4.39172E-08	4.20174E-08
South Coast	2025	Annual	T7IS	GAS	5	66.32237815	0.000147991	4.97602E-07	4.57526E-07
South Coast	2025	Annual	T7IS	GAS	10	149.6585487	0.000210488	7.06751E-07	6.49832E-07
South Coast	2025	Annual	T7IS	GAS	15	333.0275083	0.000310957	1.0443E-06	9.60195E-07
South Coast	2025	Annual	T7IS	GAS	20	620.9663909	0.000405945	1.36404E-06	1.25419E-06
South Coast	2025	Annual	T7IS	GAS	25	1560.405385	0.000753623	2.53306E-06	2.32905E-06
South Coast	2025	Annual	T7IS	GAS	30	2464.770307	0.000928354	3.1193E-06	2.86809E-06
South Coast	2025	Annual	T7IS	GAS	35	2210.002355	0.000684507	2.30025E-06	2.11499E-06
South Coast	2025	Annual	T7IS	GAS	40	2063.687491	0.000554294	1.86359E-06	1.7135E-06
South Coast	2025	Annual	T7IS	GAS	45	2436.313655	0.000600834	2.01365E-06	1.85147E-06
South Coast	2025	Annual	T7IS	GAS	50	2292.350004	0.000546298	1.82934E-06	1.68201E-06
South Coast	2025	Annual	T7IS	GAS	55	1869.183012	0.000452686	1.5193E-06	1.39694E-06
South Coast	2025	Annual	T7IS	GAS	60	2243.552241	0.000576989	1.95937E-06	1.80157E-06
South Coast	2025	Annual	T7IS	GAS	65	1075.046518	0.000314589	1.06417E-06	9.78469E-07
South Coast	2025	Annual	T7IS	GAS	70	0.217210883	6.82875E-08	2.33546E-10	2.14737E-10

Idling Emissions Factors

Region	CalYr	Season	Veh_Class	Fuel	ROG (gms/hr)	PM10 (gms/hr)	PM2.5 (gms/hr)
South Coast	2025	Annual	T6	DSL	0.000398262	7.01049E-06	6.70722E-06
South Coast	2025	Annual	T7	DSL	0.002745895	0.000155652	0.000148919

APPENDIX B

MODELING REPORTS

HARP Project Summary Report 7/12/2017 5:20:59 PM

PROJECT INFORMATION
HARP Version: 17023
Project Name: HAWTHORNE RESIDENTIAL
Project Output Directory: P:\SWK1502\HRA\HAWTHORNE RESIDENTIAL
HARP Database: NA

EMISSION INVENTORY
No. of Pollutants:3751
No. of Background Pollutants:0

Emissions

ScrID	StkID	ProID	PolID	PolAbbrev	Multi	Annual Ems (lbs/yr)	MaxHr Ems (lbs/hr)	MWAF
1	0	0	9901	DieselExhPM	1	0.0998	1.14E-05	1
1	0	0	88101	PM25	1	0.0938	1.07E-05	1
1	0	0	106990	1,3-Butadiene	1	0.167	1.9E-05	1
1	0	0	71432	Benzene	1	0.8	9.12E-05	1
1	0	0	100414	Ethyl Benzene	1	0.325	3.71E-05	1
1	0	0	78933	MEK	1	0.00576	6.58E-07	1
1	0	0	91203	Naphthalene	1	0.0146	1.66E-06	1
1	0	0	115071	Propylene	1	0.949	0.000108	1
1	0	0	100425	Styrene	1	0.0382	4.36E-06	1
1	0	0	108883	Toluene	1	1.78	0.000203	1
1	0	0	1330207	Xylenes	1	1.1	0.000126	1
2	0	0	9901	DieselExhPM	1	0.0998	1.14E-05	1
2	0	0	88101	PM25	1	0.0938	1.07E-05	1
2	0	0	106990	1,3-Butadiene	1	0.167	1.9E-05	1
2	0	0	71432	Benzene	1	0.8	9.12E-05	1
2	0	0	100414	Ethyl Benzene	1	0.325	3.71E-05	1
2	0	0	78933	MEK	1	0.00576	6.58E-07	1
2	0	0	91203	Naphthalene	1	0.0146	1.66E-06	1
2	0	0	115071	Propylene	1	0.949	0.000108	1
2	0	0	100425	Styrene	1	0.0382	4.36E-06	1
2	0	0	108883	Toluene	1	1.78	0.000203	1
2	0	0	1330207	Xylenes	1	1.1	0.000126	1
3	0	0	9901	DieselExhPM	1	0.0998	1.14E-05	1
3	0	0	88101	PM25	1	0.0938	1.07E-05	1
3	0	0	106990	1,3-Butadiene	1	0.167	1.9E-05	1
3	0	0	71432	Benzene	1	0.8	9.12E-05	1
3	0	0	100414	Ethyl Benzene	1	0.325	3.71E-05	1
3	0	0	78933	MEK	1	0.00576	6.58E-07	1
3	0	0	91203	Naphthalene	1	0.0146	1.66E-06	1
3	0	0	115071	Propylene	1	0.949	0.000108	1
3	0	0	100425	Styrene	1	0.0382	4.36E-06	1
3	0	0	108883	Toluene	1	1.78	0.000203	1
3	0	0	1330207	Xylenes	1	1.1	0.000126	1
4	0	0	9901	DieselExhPM	1	0.0998	1.14E-05	1
4	0	0	88101	PM25	1	0.0938	1.07E-05	1
4	0	0	106990	1,3-Butadiene	1	0.167	1.9E-05	1
4	0	0	71432	Benzene	1	0.8	9.12E-05	1
4	0	0	100414	Ethyl Benzene	1	0.325	3.71E-05	1
4	0	0	78933	MEK	1	0.00576	6.58E-07	1
4	0	0	91203	Naphthalene	1	0.0146	1.66E-06	1
4	0	0	115071	Propylene	1	0.949	0.000108	1
4	0	0	100425	Styrene	1	0.0382	4.36E-06	1
4	0	0	108883	Toluene	1	1.78	0.000203	1
4	0	0	1330207	Xylenes	1	1.1	0.000126	1
5	0	0	9901	DieselExhPM	1	0.0998	1.14E-05	1
5	0	0	88101	PM25	1	0.0938	1.07E-05	1
5	0	0	106990	1,3-Butadiene	1	0.167	1.9E-05	1
5	0	0	71432	Benzene	1	0.8	9.12E-05	1

338	0	0	1330207	Xylenes	1	0	0	1
339	0	0	9901	DieselExhPM	1	14.6	0.00195	1
339	0	0	88101	PM25	1	0	0	1
339	0	0	106990	1,3-Butadiene	1	0	0	1
339	0	0	71432	Benzene	1	0	0	1
339	0	0	100414	Ethyl Benzene	1	0	0	1
339	0	0	78933	MEK	1	0	0	1
339	0	0	91203	Naphthalene	1	0	0	1
339	0	0	115071	Propylene	1	0	0	1
339	0	0	100425	Styrene	1	0	0	1
339	0	0	108883	Toluene	1	0	0	1
339	0	0	1330207	Xylenes	1	0	0	1
340	0	0	9901	DieselExhPM	1	14.6	0.00195	1
340	0	0	88101	PM25	1	0	0	1
340	0	0	106990	1,3-Butadiene	1	0	0	1
340	0	0	71432	Benzene	1	0	0	1
340	0	0	100414	Ethyl Benzene	1	0	0	1
340	0	0	78933	MEK	1	0	0	1
340	0	0	91203	Naphthalene	1	0	0	1
340	0	0	115071	Propylene	1	0	0	1
340	0	0	100425	Styrene	1	0	0	1
340	0	0	108883	Toluene	1	0	0	1
340	0	0	1330207	Xylenes	1	0	0	1
341	0	0	9901	DieselExhPM	1	14.6	0.00195	1
341	0	0	88101	PM25	1	0	0	1
341	0	0	106990	1,3-Butadiene	1	0	0	1
341	0	0	71432	Benzene	1	0	0	1
341	0	0	100414	Ethyl Benzene	1	0	0	1
341	0	0	78933	MEK	1	0	0	1
341	0	0	91203	Naphthalene	1	0	0	1
341	0	0	115071	Propylene	1	0	0	1
341	0	0	100425	Styrene	1	0	0	1
341	0	0	108883	Toluene	1	0	0	1
341	0	0	1330207	Xylenes	1	0	0	1

Background

PolID	PolAbbrev	Conc (ug/m^3)	MWAF

Ground level concentration files (\glc\)

100414MAXHR.txt
100414PER.txt
100425MAXHR.txt
100425PER.txt
106990MAXHR.txt
106990PER.txt
108883MAXHR.txt
108883PER.txt
115071MAXHR.txt
115071PER.txt
1330207MAXHR.txt
1330207PER.txt
71432MAXHR.txt
71432PER.txt
78933MAXHR.txt
78933PER.txt
88101MAXHR.txt
88101MAXHR.xlsx
88101PER.txt
91203MAXHR.txt
91203PER.txt
9901MAXHR.txt
9901MAXHR.xlsx

9901PER.txt

POLLUTANT HEALTH INFORMATION
Health Database: C:\HARP2\Tables\HEALTH1.mdb
Health Table Version: HEALTH16088
Official: True

PolID	PolAbbrev	InhCancer	OralCancer	AcuteREL	InhChronicREL	OralChronicREL	InhChronic8HRREL
9901	DieselExhPM	1.1			5		
88101	PM25						
106990	1,3-Butadiene	0.6		660	2		9
71432	Benzene	0.1		27	3		3
100414	Ethyl Benzene	0.0087			2000		
78933	MEK			13000			
91203	Naphthalene	0.12			9		
115071	Propylene				3000		
100425	Styrene			21000	900		
108883	Toluene			37000	300		
1330207	Xylenes			22000	700		

LIST OF RISK ASSESSMENT FILES
Health risk analysis files (\hra\)

30 Yr CancerRisk.csv
30 Yr CancerRiskSumByRec.csv
30 Yr GLCList.csv
30 Yr HRAInput.hra
30 Yr Output.txt
30 Yr PathwayRec.csv
30 Yr PolDB.csv
9 Yr CancerRisk.csv
9 Yr CancerRiskSumByRec.csv
9 Yr GLCList.csv
9 Yr HRAInput.hra
9 Yr Output.txt
9 Yr PathwayRec.csv
9 Yr PolDB.csv
AcuteGLCList.csv
AcuteHRAInput.hra
AcuteNCAcuteRisk.csv
AcuteNCAcuteRiskSumByRec.csv
AcuteOutput.txt
AcutePathwayRec.csv
AcutePolDB.csv
Chronic GLCList.csv
Chronic HRAInput.hra
Chronic NCChronicRisk.csv
Chronic NCChronicRiskSumByRec.csv
Chronic Output.txt
Chronic PathwayRec.csv
Chronic PolDB.csv

Spatial averaging files (\sa\)

```
**MODELOPTs:   RegDFAULT CONC      ELEV      FLGPOL    URBAN

                                          ***     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   354 Source(s),
  for Total of    1 Urban Area(s):
  Urban Population =    322424.0 ;  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:
        TEMP_Sub - Meteorological data includes TEMP substitutions

**Model Accepts FLAGPOLE Receptor Heights.

**The User Specified a Pollutant Type of:  TOXICS

**Model Calculates  1 Short Term Average(s) of:   1-HR
    and Calculates PERIOD Averages

**This Run Includes:    354 Source(s);     354 Source Group(s); and      54 Receptor(s)

               with:      0 POINT(s), including
                          0 POINTCAP(s) and      0 POINTHOR(s)
                and:    354 VOLUME source(s)
                and:      0 AREA type source(s)
                and:      0 LINE source(s)
                and:      0 OPENPIT source(s)


**Model Set To Continue RUNning After the Setup Testing.

**The AERMET Input Meteorological Data Version Date:  14134

**Output Options Selected:
         Model Outputs Tables of PERIOD Averages by Receptor
         Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
         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) =    20.00 ;  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 =      5.1 MB of RAM.

**File for Summary of Results:   AERMOD.sum
```

**MODELOPTs: RegDFAULT CONC ELEV FLGPOL URBAN

*** 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
EB91_01	0	0.10000E+01	458840.6	3752578.4	243.3	1.55	12.28	1.45	YES	
EB91_02	0	0.10000E+01	458862.5	3752593.2	244.4	1.55	12.28	1.45	YES	
EB91_03	0	0.10000E+01	458884.3	3752608.1	244.5	1.55	12.28	1.45	YES	
EB91_04	0	0.10000E+01	458906.2	3752622.9	244.5	1.55	12.28	1.45	YES	
EB91_05	0	0.10000E+01	458928.0	3752637.8	244.5	1.55	12.28	1.45	YES	
EB91_06	0	0.10000E+01	458949.9	3752652.6	244.6	1.55	12.28	1.45	YES	
EB91_07	0	0.10000E+01	458971.7	3752667.4	244.5	1.55	12.28	1.45	YES	
EB91_08	0	0.10000E+01	458993.6	3752682.2	244.5	1.55	12.28	1.45	YES	
EB91_09	0	0.10000E+01	459015.4	3752697.1	244.5	1.55	12.28	1.45	YES	
EB91_10	0	0.10000E+01	459037.3	3752711.9	244.4	1.55	12.28	1.45	YES	
EB91_11	0	0.10000E+01	459059.1	3752726.8	244.5	1.55	12.28	1.45	YES	
EB91_12	0	0.10000E+01	459081.0	3752741.6	244.5	1.55	12.28	1.45	YES	
EB91_13	0	0.10000E+01	459102.8	3752756.4	244.5	1.55	12.28	1.45	YES	
EB91_14	0	0.10000E+01	459124.7	3752771.3	244.4	1.55	12.28	1.45	YES	
EB91_15	0	0.10000E+01	459146.5	3752786.1	244.4	1.55	12.28	1.45	YES	
EB91_16	0	0.10000E+01	459168.4	3752800.9	244.4	1.55	12.28	1.45	YES	
EB91_17	0	0.10000E+01	459190.2	3752815.8	244.4	1.55	12.28	1.45	YES	
EB91_18	0	0.10000E+01	459212.1	3752830.6	244.4	1.55	12.28	1.45	YES	
EB91_19	0	0.10000E+01	459233.9	3752845.4	244.4	1.55	12.28	1.45	YES	
EB91_20	0	0.10000E+01	459255.8	3752860.3	244.4	1.55	12.28	1.45	YES	
EB91_21	0	0.10000E+01	459277.6	3752875.1	244.4	1.55	12.28	1.45	YES	
EB91_22	0	0.10000E+01	459299.5	3752889.9	244.2	1.55	12.28	1.45	YES	
EB91_23	0	0.10000E+01	459321.3	3752904.8	244.2	1.55	12.28	1.45	YES	
EB91_24	0	0.10000E+01	459343.2	3752919.6	244.0	1.55	12.28	1.45	YES	
EB91_25	0	0.10000E+01	459365.0	3752934.4	243.9	1.55	12.28	1.45	YES	
EB91_26	0	0.10000E+01	459386.9	3752949.3	243.6	1.55	12.28	1.45	YES	
EB91_27	0	0.10000E+01	459408.8	3752964.1	243.6	1.55	12.28	1.45	YES	
EB91_28	0	0.10000E+01	459430.6	3752978.9	243.4	1.55	12.28	1.45	YES	
EB91_29	0	0.10000E+01	459452.5	3752993.8	243.3	1.55	12.28	1.45	YES	
EB91_30	0	0.10000E+01	459474.3	3753008.6	243.2	1.55	12.28	1.45	YES	
EB91_31	0	0.10000E+01	459496.1	3753023.4	243.1	1.55	12.28	1.45	YES	
EB91_32	0	0.10000E+01	459518.0	3753038.3	243.1	1.55	12.28	1.45	YES	
EB91_33	0	0.10000E+01	459539.8	3753053.1	244.0	1.55	12.28	1.45	YES	
EB91_34	0	0.10000E+01	459561.7	3753067.9	245.8	1.55	12.28	1.45	YES	
EB91_35	0	0.10000E+01	459583.6	3753082.8	247.2	1.55	12.28	1.45	YES	
EB91_36	0	0.10000E+01	459605.4	3753097.6	248.8	1.55	12.28	1.45	YES	
EB91_37	0	0.10000E+01	459627.3	3753112.4	249.9	1.55	12.28	1.45	YES	
EB91_38	0	0.10000E+01	459649.1	3753127.3	250.3	1.55	12.28	1.45	YES	
EB91_39	0	0.10000E+01	459671.0	3753142.1	250.4	1.55	12.28	1.45	YES	
EB91_40	0	0.10000E+01	459692.8	3753156.9	250.6	1.55	12.28	1.45	YES	

**MODELOPTs: RegDFAULT CONC ELEV FLGPOL URBAN

*** 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
EB91_41	0	0.10000E+01	459714.7	3753171.8	250.6	1.55	12.28	1.45	YES	
EB91_42	0	0.10000E+01	459736.5	3753186.6	250.6	1.55	12.28	1.45	YES	
EB91_43	0	0.10000E+01	459758.4	3753201.4	250.7	1.55	12.28	1.45	YES	
EB91_44	0	0.10000E+01	459780.2	3753216.3	250.7	1.55	12.28	1.45	YES	
EB91_45	0	0.10000E+01	459802.1	3753231.1	250.7	1.55	12.28	1.45	YES	
EB91_46	0	0.10000E+01	459823.9	3753246.0	250.6	1.55	12.28	1.45	YES	
EB91_47	0	0.10000E+01	459845.8	3753260.8	250.6	1.55	12.28	1.45	YES	
EB91_48	0	0.10000E+01	459867.6	3753275.6	250.6	1.55	12.28	1.45	YES	
EB91_49	0	0.10000E+01	459889.5	3753290.5	250.5	1.55	12.28	1.45	YES	
EB91_50	0	0.10000E+01	459911.3	3753305.3	250.6	1.55	12.28	1.45	YES	
EB91_51	0	0.10000E+01	459933.2	3753320.1	250.6	1.55	12.28	1.45	YES	
EB91_52	0	0.10000E+01	459955.0	3753335.0	250.6	1.55	12.28	1.45	YES	
EB91_53	0	0.10000E+01	459976.9	3753349.8	250.5	1.55	12.28	1.45	YES	
EB91_54	0	0.10000E+01	459998.7	3753364.6	250.2	1.55	12.28	1.45	YES	
EB91_55	0	0.10000E+01	460020.6	3753379.5	250.2	1.55	12.28	1.45	YES	
EB91_56	0	0.10000E+01	460042.4	3753394.3	250.1	1.55	12.28	1.45	YES	
EB91_57	0	0.10000E+01	460064.3	3753409.1	250.1	1.55	12.28	1.45	YES	
EB91_58	0	0.10000E+01	460086.1	3753424.0	250.1	1.55	12.28	1.45	YES	
EB91_59	0	0.10000E+01	460108.0	3753438.8	250.1	1.55	12.28	1.45	YES	
EB91_60	0	0.10000E+01	460129.8	3753453.6	250.1	1.55	12.28	1.45	YES	
EB91_61	0	0.10000E+01	460151.7	3753468.5	250.0	1.55	12.28	1.45	YES	
EB91_62	0	0.10000E+01	460173.5	3753483.3	249.9	1.55	12.28	1.45	YES	
EB91_63	0	0.10000E+01	460195.4	3753498.1	249.7	1.55	12.28	1.45	YES	
EB91_64	0	0.10000E+01	460217.2	3753513.0	249.6	1.55	12.28	1.45	YES	
EB91_65	0	0.10000E+01	460239.1	3753527.8	249.4	1.55	12.28	1.45	YES	
EB91_66	0	0.10000E+01	460261.0	3753542.6	249.1	1.55	12.28	1.45	YES	
EB91_67	0	0.10000E+01	460282.8	3753557.5	248.9	1.55	12.28	1.45	YES	
EB91_68	0	0.10000E+01	460304.7	3753572.3	248.8	1.55	12.28	1.45	YES	
EB91_69	0	0.10000E+01	460326.5	3753587.1	248.7	1.55	12.28	1.45	YES	
EB91_70	0	0.10000E+01	460348.4	3753602.0	249.7	1.55	12.28	1.45	YES	
EB91_71	0	0.10000E+01	460370.2	3753616.8	250.7	1.55	12.28	1.45	YES	
EB91_72	0	0.10000E+01	460392.1	3753631.6	250.7	1.55	12.28	1.45	YES	
EB91_73	0	0.10000E+01	460413.9	3753646.5	250.7	1.55	12.28	1.45	YES	
EB91_74	0	0.10000E+01	460435.8	3753661.3	250.7	1.55	12.28	1.45	YES	
EB91_75	0	0.10000E+01	460457.6	3753676.1	250.7	1.55	12.28	1.45	YES	
EB91_76	0	0.10000E+01	460479.5	3753691.0	250.7	1.55	12.28	1.45	YES	
EB91_77	0	0.10000E+01	460501.3	3753705.8	250.7	1.55	12.28	1.45	YES	
EB91_78	0	0.10000E+01	460523.2	3753720.6	250.6	1.55	12.28	1.45	YES	
WB91_01	0	0.10000E+01	458833.0	3752598.1	243.6	1.55	12.26	1.45	YES	
WB91_02	0	0.10000E+01	458854.8	3752612.8	244.1	1.55	12.26	1.45	YES	

**MODELOPTs: RegDFAULT CONC ELEV FLGPOL URBAN

*** 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
WB91_03	0	0.10000E+01	458876.7	3752627.6	244.4	1.55	12.26	1.45	YES	
WB91_04	0	0.10000E+01	458898.5	3752642.3	244.5	1.55	12.26	1.45	YES	
WB91_05	0	0.10000E+01	458920.4	3752657.1	244.5	1.55	12.26	1.45	YES	
WB91_06	0	0.10000E+01	458942.2	3752671.9	244.5	1.55	12.26	1.45	YES	
WB91_07	0	0.10000E+01	458964.1	3752686.6	244.5	1.55	12.26	1.45	YES	
WB91_08	0	0.10000E+01	458985.9	3752701.4	244.5	1.55	12.26	1.45	YES	
WB91_09	0	0.10000E+01	459007.8	3752716.1	244.5	1.55	12.26	1.45	YES	
WB91_10	0	0.10000E+01	459029.6	3752730.9	244.4	1.55	12.26	1.45	YES	
WB91_11	0	0.10000E+01	459051.5	3752745.6	244.4	1.55	12.26	1.45	YES	
WB91_12	0	0.10000E+01	459073.3	3752760.4	244.4	1.55	12.26	1.45	YES	
WB91_13	0	0.10000E+01	459095.2	3752775.2	244.3	1.55	12.26	1.45	YES	
WB91_14	0	0.10000E+01	459117.0	3752789.9	244.5	1.55	12.26	1.45	YES	
WB91_15	0	0.10000E+01	459138.9	3752804.7	244.5	1.55	12.26	1.45	YES	
WB91_16	0	0.10000E+01	459160.7	3752819.4	244.5	1.55	12.26	1.45	YES	
WB91_17	0	0.10000E+01	459182.6	3752834.2	244.5	1.55	12.26	1.45	YES	
WB91_18	0	0.10000E+01	459204.4	3752849.0	244.5	1.55	12.26	1.45	YES	
WB91_19	0	0.10000E+01	459226.3	3752863.7	244.5	1.55	12.26	1.45	YES	
WB91_20	0	0.10000E+01	459248.1	3752878.5	244.5	1.55	12.26	1.45	YES	
WB91_21	0	0.10000E+01	459270.0	3752893.2	244.4	1.55	12.26	1.45	YES	
WB91_22	0	0.10000E+01	459291.8	3752908.0	244.4	1.55	12.26	1.45	YES	
WB91_23	0	0.10000E+01	459313.7	3752922.8	244.4	1.55	12.26	1.45	YES	
WB91_24	0	0.10000E+01	459335.5	3752937.5	244.0	1.55	12.26	1.45	YES	
WB91_25	0	0.10000E+01	459357.4	3752952.3	243.0	1.55	12.26	1.45	YES	
WB91_26	0	0.10000E+01	459379.2	3752967.0	241.7	1.55	12.26	1.45	YES	
WB91_27	0	0.10000E+01	459401.1	3752981.8	241.7	1.55	12.26	1.45	YES	
WB91_28	0	0.10000E+01	459423.0	3752996.5	241.5	1.55	12.26	1.45	YES	
WB91_29	0	0.10000E+01	459444.8	3753011.3	241.9	1.55	12.26	1.45	YES	
WB91_30	0	0.10000E+01	459466.6	3753026.1	241.9	1.55	12.26	1.45	YES	
WB91_31	0	0.10000E+01	459488.5	3753040.8	241.8	1.55	12.26	1.45	YES	
WB91_32	0	0.10000E+01	459510.4	3753055.6	241.7	1.55	12.26	1.45	YES	
WB91_33	0	0.10000E+01	459532.2	3753070.3	243.8	1.55	12.26	1.45	YES	
WB91_34	0	0.10000E+01	459554.1	3753085.1	247.1	1.55	12.26	1.45	YES	
WB91_35	0	0.10000E+01	459575.9	3753099.8	248.6	1.55	12.26	1.45	YES	
WB91_36	0	0.10000E+01	459597.8	3753114.6	249.7	1.55	12.26	1.45	YES	
WB91_37	0	0.10000E+01	459619.6	3753129.4	250.3	1.55	12.26	1.45	YES	
WB91_38	0	0.10000E+01	459641.5	3753144.1	250.6	1.55	12.26	1.45	YES	
WB91_39	0	0.10000E+01	459663.3	3753158.9	250.6	1.55	12.26	1.45	YES	
WB91_40	0	0.10000E+01	459685.2	3753173.6	250.7	1.55	12.26	1.45	YES	
WB91_41	0	0.10000E+01	459707.0	3753188.4	250.7	1.55	12.26	1.45	YES	
WB91_42	0	0.10000E+01	459728.9	3753203.2	250.7	1.55	12.26	1.45	YES	

**MODELOPTs: RegDFAULT CONC ELEV FLGPOL URBAN

*** 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
WB91_43	0	0.10000E+01	459750.7	3753217.9	250.7	1.55	12.26	1.45	YES	
WB91_44	0	0.10000E+01	459772.6	3753232.7	250.7	1.55	12.26	1.45	YES	
WB91_45	0	0.10000E+01	459794.4	3753247.4	250.7	1.55	12.26	1.45	YES	
WB91_46	0	0.10000E+01	459816.3	3753262.2	250.7	1.55	12.26	1.45	YES	
WB91_47	0	0.10000E+01	459838.1	3753276.9	250.7	1.55	12.26	1.45	YES	
WB91_48	0	0.10000E+01	459860.0	3753291.7	250.7	1.55	12.26	1.45	YES	
WB91_49	0	0.10000E+01	459881.8	3753306.5	250.7	1.55	12.26	1.45	YES	
WB91_50	0	0.10000E+01	459903.7	3753321.2	250.7	1.55	12.26	1.45	YES	
WB91_51	0	0.10000E+01	459925.5	3753336.0	250.7	1.55	12.26	1.45	YES	
WB91_52	0	0.10000E+01	459947.4	3753350.8	250.7	1.55	12.26	1.45	YES	
WB91_53	0	0.10000E+01	459969.2	3753365.5	250.7	1.55	12.26	1.45	YES	
WB91_54	0	0.10000E+01	459991.1	3753380.3	250.6	1.55	12.26	1.45	YES	
WB91_55	0	0.10000E+01	460012.9	3753395.0	250.5	1.55	12.26	1.45	YES	
WB91_56	0	0.10000E+01	460034.8	3753409.8	250.1	1.55	12.26	1.45	YES	
WB91_57	0	0.10000E+01	460056.6	3753424.5	249.9	1.55	12.26	1.45	YES	
WB91_58	0	0.10000E+01	460078.5	3753439.3	249.9	1.55	12.26	1.45	YES	
WB91_59	0	0.10000E+01	460100.3	3753454.1	249.9	1.55	12.26	1.45	YES	
WB91_60	0	0.10000E+01	460122.2	3753468.8	249.8	1.55	12.26	1.45	YES	
WB91_61	0	0.10000E+01	460144.0	3753483.6	249.7	1.55	12.26	1.45	YES	
WB91_62	0	0.10000E+01	460165.9	3753498.3	249.6	1.55	12.26	1.45	YES	
WB91_63	0	0.10000E+01	460187.7	3753513.1	249.4	1.55	12.26	1.45	YES	
WB91_64	0	0.10000E+01	460209.6	3753527.8	249.2	1.55	12.26	1.45	YES	
WB91_65	0	0.10000E+01	460231.4	3753542.6	249.0	1.55	12.26	1.45	YES	
WB91_66	0	0.10000E+01	460253.3	3753557.4	248.8	1.55	12.26	1.45	YES	
WB91_67	0	0.10000E+01	460275.1	3753572.1	248.7	1.55	12.26	1.45	YES	
WB91_68	0	0.10000E+01	460297.0	3753586.9	248.6	1.55	12.26	1.45	YES	
WB91_69	0	0.10000E+01	460318.8	3753601.6	248.6	1.55	12.26	1.45	YES	
WB91_70	0	0.10000E+01	460340.7	3753616.4	250.0	1.55	12.26	1.45	YES	
WB91_71	0	0.10000E+01	460362.5	3753631.2	250.7	1.55	12.26	1.45	YES	
WB91_72	0	0.10000E+01	460384.4	3753645.9	250.7	1.55	12.26	1.45	YES	
WB91_73	0	0.10000E+01	460406.2	3753660.7	250.7	1.55	12.26	1.45	YES	
WB91_74	0	0.10000E+01	460428.1	3753675.4	250.7	1.55	12.26	1.45	YES	
WB91_75	0	0.10000E+01	460449.9	3753690.2	250.7	1.55	12.26	1.45	YES	
WB91_76	0	0.10000E+01	460471.8	3753704.9	250.7	1.55	12.26	1.45	YES	
WB91_77	0	0.10000E+01	460493.6	3753719.7	250.7	1.55	12.26	1.45	YES	
WB91_78	0	0.10000E+01	460515.5	3753734.5	250.5	1.55	12.26	1.45	YES	
IND_01	0	0.10000E+01	460564.6	3753654.1	250.1	2.59	12.39	2.41	YES	
IND_02	0	0.10000E+01	460542.6	3753639.2	250.2	2.59	12.39	2.41	YES	
IND_03	0	0.10000E+01	460520.6	3753624.2	250.3	2.59	12.39	2.41	YES	
IND_04	0	0.10000E+01	460498.5	3753609.2	250.3	2.59	12.39	2.41	YES	

**MODELOPTs: RegDFAULT CONC ELEV FLGPOL URBAN

*** 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
IND_05	0	0.10000E+01	460476.5	3753594.3	250.2	2.59	12.39	2.41	YES	
IND_06	0	0.10000E+01	460454.5	3753579.3	250.1	2.59	12.39	2.41	YES	
IND_07	0	0.10000E+01	460432.4	3753564.4	249.8	2.59	12.39	2.41	YES	
IND_08	0	0.10000E+01	460410.4	3753549.4	249.4	2.59	12.39	2.41	YES	
IND_09	0	0.10000E+01	460388.4	3753534.5	249.1	2.59	12.39	2.41	YES	
IND_10	0	0.10000E+01	460366.3	3753519.5	249.1	2.59	12.39	2.41	YES	
IND_11	0	0.10000E+01	460344.3	3753504.5	249.4	2.59	12.39	2.41	YES	
IND_12	0	0.10000E+01	460322.3	3753489.6	249.7	2.59	12.39	2.41	YES	
IND_13	0	0.10000E+01	460300.2	3753474.6	250.0	2.59	12.39	2.41	YES	
IND_14	0	0.10000E+01	460278.2	3753459.7	250.2	2.59	12.39	2.41	YES	
IND_15	0	0.10000E+01	460256.2	3753444.7	250.6	2.59	12.39	2.41	YES	
IND_16	0	0.10000E+01	460234.1	3753429.8	251.1	2.59	12.39	2.41	YES	
IND_17	0	0.10000E+01	460212.1	3753414.8	251.3	2.59	12.39	2.41	YES	
IND_18	0	0.10000E+01	460190.1	3753399.9	251.4	2.59	12.39	2.41	YES	
IND_19	0	0.10000E+01	460168.0	3753384.9	251.5	2.59	12.39	2.41	YES	
IND_20	0	0.10000E+01	460146.0	3753369.9	251.5	2.59	12.39	2.41	YES	
IND_21	0	0.10000E+01	460124.0	3753355.0	251.6	2.59	12.39	2.41	YES	
IND_22	0	0.10000E+01	460101.9	3753340.0	251.7	2.59	12.39	2.41	YES	
IND_23	0	0.10000E+01	460079.9	3753325.1	251.6	2.59	12.39	2.41	YES	
IND_24	0	0.10000E+01	460057.9	3753310.1	251.7	2.59	12.39	2.41	YES	
IND_25	0	0.10000E+01	460035.8	3753295.2	251.7	2.59	12.39	2.41	YES	
IND_26	0	0.10000E+01	460013.8	3753280.2	251.8	2.59	12.39	2.41	YES	
IND_27	0	0.10000E+01	459991.8	3753265.2	251.8	2.59	12.39	2.41	YES	
IND_28	0	0.10000E+01	459969.7	3753250.3	251.8	2.59	12.39	2.41	YES	
IND_29	0	0.10000E+01	459947.7	3753235.3	251.8	2.59	12.39	2.41	YES	
IND_30	0	0.10000E+01	459925.7	3753220.4	251.7	2.59	12.39	2.41	YES	
IND_31	0	0.10000E+01	459903.6	3753205.4	251.6	2.59	12.39	2.41	YES	
IND_32	0	0.10000E+01	459881.6	3753190.5	251.6	2.59	12.39	2.41	YES	
IND_33	0	0.10000E+01	459859.6	3753175.5	251.7	2.59	12.39	2.41	YES	
IND_34	0	0.10000E+01	459837.5	3753160.5	251.8	2.59	12.39	2.41	YES	
IND_35	0	0.10000E+01	459815.5	3753145.6	251.9	2.59	12.39	2.41	YES	
IND_36	0	0.10000E+01	459793.5	3753130.6	251.9	2.59	12.39	2.41	YES	
IND_37	0	0.10000E+01	459771.4	3753115.7	251.9	2.59	12.39	2.41	YES	
IND_38	0	0.10000E+01	459749.4	3753100.7	251.8	2.59	12.39	2.41	YES	
IND_39	0	0.10000E+01	459727.4	3753085.8	251.7	2.59	12.39	2.41	YES	
IND_40	0	0.10000E+01	459705.3	3753070.8	251.6	2.59	12.39	2.41	YES	
IND_41	0	0.10000E+01	459683.3	3753055.9	251.5	2.59	12.39	2.41	YES	
IND_42	0	0.10000E+01	459661.3	3753040.9	251.5	2.59	12.39	2.41	YES	
IND_43	0	0.10000E+01	459639.2	3753025.9	251.5	2.59	12.39	2.41	YES	
IND_44	0	0.10000E+01	459617.2	3753011.0	251.4	2.59	12.39	2.41	YES	

**MODELOPTs: RegDFAULT CONC ELEV FLGPOL URBAN

*** 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
IND_45	0	0.10000E+01	459595.2	3752996.0	251.3	2.59	12.39	2.41	YES	
IND_46	0	0.10000E+01	459573.1	3752981.1	251.2	2.59	12.39	2.41	YES	
IND_47	0	0.10000E+01	459551.1	3752966.1	251.2	2.59	12.39	2.41	YES	
IND_48	0	0.10000E+01	459529.1	3752951.2	251.2	2.59	12.39	2.41	YES	
IND_49	0	0.10000E+01	459507.0	3752936.2	251.2	2.59	12.39	2.41	YES	
IND_50	0	0.10000E+01	459485.0	3752921.2	251.1	2.59	12.39	2.41	YES	
IND_51	0	0.10000E+01	459463.0	3752906.3	251.1	2.59	12.39	2.41	YES	
IND_52	0	0.10000E+01	459440.9	3752891.3	251.1	2.59	12.39	2.41	YES	
IND_53	0	0.10000E+01	459418.9	3752876.4	251.0	2.59	12.39	2.41	YES	
IND_54	0	0.10000E+01	459396.9	3752861.4	251.0	2.59	12.39	2.41	YES	
IND_55	0	0.10000E+01	459374.8	3752846.5	251.0	2.59	12.39	2.41	YES	
IND_56	0	0.10000E+01	459352.8	3752831.5	250.9	2.59	12.39	2.41	YES	
IND_57	0	0.10000E+01	459330.8	3752816.5	250.8	2.59	12.39	2.41	YES	
IND_58	0	0.10000E+01	459308.7	3752801.6	249.6	2.59	12.39	2.41	YES	
IND_59	0	0.10000E+01	459286.7	3752786.6	249.2	2.59	12.39	2.41	YES	
IND_60	0	0.10000E+01	459264.7	3752771.7	249.0	2.59	12.39	2.41	YES	
IND_61	0	0.10000E+01	459242.6	3752756.7	248.7	2.59	12.39	2.41	YES	
IND_62	0	0.10000E+01	459220.6	3752741.8	248.4	2.59	12.39	2.41	YES	
IND_63	0	0.10000E+01	459198.6	3752726.8	248.2	2.59	12.39	2.41	YES	
IND_64	0	0.10000E+01	459176.5	3752711.8	247.8	2.59	12.39	2.41	YES	
IND_65	0	0.10000E+01	459154.5	3752696.9	247.5	2.59	12.39	2.41	YES	
IND_66	0	0.10000E+01	459132.5	3752681.9	246.8	2.59	12.39	2.41	YES	
IND_67	0	0.10000E+01	459110.4	3752667.0	246.3	2.59	12.39	2.41	YES	
IND_68	0	0.10000E+01	459088.4	3752652.0	246.0	2.59	12.39	2.41	YES	
IND_69	0	0.10000E+01	459066.4	3752637.1	245.9	2.59	12.39	2.41	YES	
IND_70	0	0.10000E+01	459044.3	3752622.1	245.6	2.59	12.39	2.41	YES	
IND_71	0	0.10000E+01	459022.3	3752607.2	245.4	2.59	12.39	2.41	YES	
IND_72	0	0.10000E+01	459000.3	3752592.2	245.3	2.59	12.39	2.41	YES	
IND_73	0	0.10000E+01	458978.2	3752577.2	245.3	2.59	12.39	2.41	YES	
IND_74	0	0.10000E+01	458956.2	3752562.3	245.3	2.59	12.39	2.41	YES	
IND_75	0	0.10000E+01	458934.2	3752547.3	245.3	2.59	12.39	2.41	YES	
IND_76	0	0.10000E+01	458912.1	3752532.4	244.9	2.59	12.39	2.41	YES	
IND_77	0	0.10000E+01	458890.1	3752517.4	244.3	2.59	12.39	2.41	YES	
IND_78	0	0.10000E+01	458868.1	3752502.5	243.9	2.59	12.39	2.41	YES	
RR_001	0	0.10000E+01	460798.6	3753301.3	253.2	3.89	8.40	1.81	YES	
RR_002	0	0.10000E+01	460783.6	3753291.3	254.5	3.89	8.40	1.81	YES	
RR_003	0	0.10000E+01	460768.6	3753281.2	256.4	3.89	8.40	1.81	YES	
RR_004	0	0.10000E+01	460753.6	3753271.1	256.8	3.89	8.40	1.81	YES	
RR_005	0	0.10000E+01	460738.6	3753261.1	256.8	3.89	8.40	1.81	YES	
RR_006	0	0.10000E+01	460723.6	3753251.0	256.8	3.89	8.40	1.81	YES	

**MODELOPTs: RegDFAULT CONC ELEV FLGPOL URBAN

*** 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
RR_007	0	0.10000E+01	460708.6	3753240.9	256.8	3.89	8.40	1.81	YES	
RR_008	0	0.10000E+01	460693.7	3753230.9	256.8	3.89	8.40	1.81	YES	
RR_009	0	0.10000E+01	460678.7	3753220.8	256.8	3.89	8.40	1.81	YES	
RR_010	0	0.10000E+01	460663.7	3753210.7	256.8	3.89	8.40	1.81	YES	
RR_011	0	0.10000E+01	460648.7	3753200.7	256.8	3.89	8.40	1.81	YES	
RR_012	0	0.10000E+01	460633.7	3753190.6	256.8	3.89	8.40	1.81	YES	
RR_013	0	0.10000E+01	460618.7	3753180.5	256.8	3.89	8.40	1.81	YES	
RR_014	0	0.10000E+01	460603.8	3753170.5	256.7	3.89	8.40	1.81	YES	
RR_015	0	0.10000E+01	460588.8	3753160.4	256.8	3.89	8.40	1.81	YES	
RR_016	0	0.10000E+01	460573.8	3753150.3	256.8	3.89	8.40	1.81	YES	
RR_017	0	0.10000E+01	460558.8	3753140.3	256.8	3.89	8.40	1.81	YES	
RR_018	0	0.10000E+01	460543.8	3753130.2	256.8	3.89	8.40	1.81	YES	
RR_019	0	0.10000E+01	460528.8	3753120.1	256.8	3.89	8.40	1.81	YES	
RR_020	0	0.10000E+01	460513.8	3753110.1	256.8	3.89	8.40	1.81	YES	
RR_021	0	0.10000E+01	460497.8	3753101.9	256.8	3.89	8.40	1.81	YES	
RR_022	0	0.10000E+01	460481.2	3753094.9	256.8	3.89	8.40	1.81	YES	
RR_023	0	0.10000E+01	460464.5	3753087.9	256.9	3.89	8.40	1.81	YES	
RR_024	0	0.10000E+01	460447.9	3753080.9	257.0	3.89	8.40	1.81	YES	
RR_025	0	0.10000E+01	460430.9	3753075.0	257.1	3.89	8.40	1.81	YES	
RR_026	0	0.10000E+01	460413.3	3753071.2	257.1	3.89	8.40	1.81	YES	
RR_027	0	0.10000E+01	460395.6	3753067.3	257.2	3.89	8.40	1.81	YES	
RR_028	0	0.10000E+01	460378.0	3753063.5	257.4	3.89	8.40	1.81	YES	
RR_029	0	0.10000E+01	460360.4	3753059.6	257.5	3.89	8.40	1.81	YES	
RR_030	0	0.10000E+01	460342.7	3753055.8	257.7	3.89	8.40	1.81	YES	
RR_031	0	0.10000E+01	460325.1	3753051.9	257.8	3.89	8.40	1.81	YES	
RR_032	0	0.10000E+01	460307.5	3753048.1	258.0	3.89	8.40	1.81	YES	
RR_033	0	0.10000E+01	460289.8	3753044.2	258.1	3.89	8.40	1.81	YES	
RR_034	0	0.10000E+01	460272.2	3753040.4	258.2	3.89	8.40	1.81	YES	
RR_035	0	0.10000E+01	460254.5	3753036.5	258.3	3.89	8.40	1.81	YES	
RR_036	0	0.10000E+01	460236.9	3753032.7	258.3	3.89	8.40	1.81	YES	
RR_037	0	0.10000E+01	460219.3	3753028.8	258.4	3.89	8.40	1.81	YES	
RR_038	0	0.10000E+01	460201.6	3753025.0	258.4	3.89	8.40	1.81	YES	
RR_039	0	0.10000E+01	460184.0	3753021.1	258.4	3.89	8.40	1.81	YES	
RR_040	0	0.10000E+01	460166.3	3753017.3	258.3	3.89	8.40	1.81	YES	
RR_041	0	0.10000E+01	460148.7	3753013.4	258.4	3.89	8.40	1.81	YES	
RR_042	0	0.10000E+01	460131.1	3753009.6	258.4	3.89	8.40	1.81	YES	
RR_043	0	0.10000E+01	460113.4	3753005.7	258.4	3.89	8.40	1.81	YES	
RR_044	0	0.10000E+01	460095.8	3753001.9	258.4	3.89	8.40	1.81	YES	
RR_045	0	0.10000E+01	460078.2	3752998.0	258.3	3.89	8.40	1.81	YES	
RR_046	0	0.10000E+01	460060.5	3752994.2	258.3	3.89	8.40	1.81	YES	

**MODELOPTs: RegDFAULT CONC ELEV FLGPOL URBAN

*** 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
RR_047	0	0.10000E+01	460042.9	3752990.3	258.1	3.89	8.40	1.81	YES	
RR_048	0	0.10000E+01	460025.2	3752986.5	257.9	3.89	8.40	1.81	YES	
RR_049	0	0.10000E+01	460007.6	3752982.6	257.8	3.89	8.40	1.81	YES	
RR_050	0	0.10000E+01	459990.0	3752978.8	257.7	3.89	8.40	1.81	YES	
RR_051	0	0.10000E+01	459972.3	3752974.9	257.6	3.89	8.40	1.81	YES	
RR_052	0	0.10000E+01	459954.7	3752971.1	257.3	3.89	8.40	1.81	YES	
RR_053	0	0.10000E+01	459937.0	3752967.2	257.1	3.89	8.40	1.81	YES	
RR_054	0	0.10000E+01	459919.4	3752963.4	256.8	3.89	8.40	1.81	YES	
RR_055	0	0.10000E+01	459901.8	3752959.5	256.7	3.89	8.40	1.81	YES	
RR_056	0	0.10000E+01	459884.1	3752955.7	256.6	3.89	8.40	1.81	YES	
RR_057	0	0.10000E+01	459866.5	3752951.8	256.3	3.89	8.40	1.81	YES	
RR_058	0	0.10000E+01	459848.9	3752948.0	256.0	3.89	8.40	1.81	YES	
RR_059	0	0.10000E+01	459831.2	3752944.1	255.7	3.89	8.40	1.81	YES	
RR_060	0	0.10000E+01	459813.6	3752940.3	255.4	3.89	8.40	1.81	YES	
RR_061	0	0.10000E+01	459796.0	3752936.4	255.1	3.89	8.40	1.81	YES	
RR_062	0	0.10000E+01	459778.3	3752932.6	254.8	3.89	8.40	1.81	YES	
RR_063	0	0.10000E+01	459760.7	3752928.8	254.5	3.89	8.40	1.81	YES	
RR_064	0	0.10000E+01	459743.0	3752924.9	254.1	3.89	8.40	1.81	YES	
RR_065	0	0.10000E+01	459725.4	3752921.0	253.8	3.89	8.40	1.81	YES	
RR_066	0	0.10000E+01	459707.8	3752917.2	253.5	3.89	8.40	1.81	YES	
RR_067	0	0.10000E+01	459690.1	3752913.3	253.2	3.89	8.40	1.81	YES	
RR_068	0	0.10000E+01	459672.5	3752909.5	252.9	3.89	8.40	1.81	YES	
RR_069	0	0.10000E+01	459654.8	3752905.7	252.7	3.89	8.40	1.81	YES	
RR_070	0	0.10000E+01	459637.2	3752901.8	252.5	3.89	8.40	1.81	YES	
RR_071	0	0.10000E+01	459619.6	3752898.0	252.3	3.89	8.40	1.81	YES	
RR_072	0	0.10000E+01	459602.0	3752893.9	252.2	3.89	8.40	1.81	YES	
RR_073	0	0.10000E+01	459584.7	3752888.6	252.1	3.89	8.40	1.81	YES	
RR_074	0	0.10000E+01	459567.5	3752883.4	252.1	3.89	8.40	1.81	YES	
RR_075	0	0.10000E+01	459550.2	3752878.1	251.9	3.89	8.40	1.81	YES	
RR_076	0	0.10000E+01	459532.9	3752872.9	251.8	3.89	8.40	1.81	YES	
RR_077	0	0.10000E+01	459515.6	3752867.6	251.7	3.89	8.40	1.81	YES	
RR_078	0	0.10000E+01	459498.4	3752862.2	251.7	3.89	8.40	1.81	YES	
RR_079	0	0.10000E+01	459482.9	3752853.0	251.6	3.89	8.40	1.81	YES	
RR_080	0	0.10000E+01	459467.3	3752843.9	251.6	3.89	8.40	1.81	YES	
RR_081	0	0.10000E+01	459451.8	3752834.7	251.6	3.89	8.40	1.81	YES	
RR_082	0	0.10000E+01	459436.2	3752825.5	251.6	3.89	8.40	1.81	YES	
RR_083	0	0.10000E+01	459420.7	3752816.3	251.5	3.89	8.40	1.81	YES	
RR_084	0	0.10000E+01	459405.4	3752806.8	251.5	3.89	8.40	1.81	YES	
RR_085	0	0.10000E+01	459390.7	3752796.3	251.4	3.89	8.40	1.81	YES	
RR_086	0	0.10000E+01	459376.0	3752785.8	251.3	3.89	8.40	1.81	YES	

**MODELOPTs: RegDFAULT CONC ELEV FLGPOL URBAN

*** 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
RR_087	0	0.10000E+01	459361.4	3752775.2	251.2	3.89	8.40	1.81	YES	
RR_088	0	0.10000E+01	459346.7	3752764.7	251.1	3.89	8.40	1.81	YES	
RR_089	0	0.10000E+01	459332.0	3752754.2	251.0	3.89	8.40	1.81	YES	
RR_090	0	0.10000E+01	459318.0	3752743.0	251.0	3.89	8.40	1.81	YES	
RR_091	0	0.10000E+01	459306.9	3752728.8	251.0	3.89	8.40	1.81	YES	
RR_092	0	0.10000E+01	459295.9	3752714.5	251.0	3.89	8.40	1.81	YES	
RR_093	0	0.10000E+01	459284.8	3752700.2	251.1	3.89	8.40	1.81	YES	
RR_094	0	0.10000E+01	459273.8	3752685.9	251.0	3.89	8.40	1.81	YES	
RR_095	0	0.10000E+01	459262.8	3752671.6	250.9	3.89	8.40	1.81	YES	
RR_096	0	0.10000E+01	459251.7	3752657.3	250.9	3.89	8.40	1.81	YES	
RR_097	0	0.10000E+01	459240.7	3752643.0	250.9	3.89	8.40	1.81	YES	
RR_098	0	0.10000E+01	459229.7	3752628.8	250.8	3.89	8.40	1.81	YES	
RR_099	0	0.10000E+01	459218.6	3752614.5	250.6	3.89	8.40	1.81	YES	
RR_100	0	0.10000E+01	459207.6	3752600.2	250.3	3.89	8.40	1.81	YES	
RR_101	0	0.10000E+01	459196.6	3752585.9	249.8	3.89	8.40	1.81	YES	
RR_102	0	0.10000E+01	459185.5	3752571.6	249.4	3.89	8.40	1.81	YES	
RR_103	0	0.10000E+01	459174.5	3752557.3	249.1	3.89	8.40	1.81	YES	
RR_104	0	0.10000E+01	459163.5	3752543.0	248.8	3.89	8.40	1.81	YES	
RR_105	0	0.10000E+01	459152.4	3752528.8	248.7	3.89	8.40	1.81	YES	
RR_106	0	0.10000E+01	459141.4	3752514.5	248.7	3.89	8.40	1.81	YES	
RR_107	0	0.10000E+01	459130.3	3752500.2	248.7	3.89	8.40	1.81	YES	
RR_108	0	0.10000E+01	459119.3	3752485.9	248.6	3.89	8.40	1.81	YES	
RR_109	0	0.10000E+01	459108.3	3752471.6	248.6	3.89	8.40	1.81	YES	
RR_110	0	0.10000E+01	459097.2	3752457.3	248.6	3.89	8.40	1.81	YES	
RR_111	0	0.10000E+01	459086.2	3752443.0	248.6	3.89	8.40	1.81	YES	
RR_112	0	0.10000E+01	459075.2	3752428.7	248.5	3.89	8.40	1.81	YES	
RR_113	0	0.10000E+01	459064.1	3752414.5	248.6	3.89	8.40	1.81	YES	
RR_114	0	0.10000E+01	459053.1	3752400.2	248.5	3.89	8.40	1.81	YES	
RR_115	0	0.10000E+01	459042.0	3752385.9	248.5	3.89	8.40	1.81	YES	
RR_116	0	0.10000E+01	459031.0	3752371.6	248.4	3.89	8.40	1.81	YES	
RR_117	0	0.10000E+01	459020.0	3752357.3	248.4	3.89	8.40	1.81	YES	
RR_118	0	0.10000E+01	459008.9	3752343.0	248.2	3.89	8.40	1.81	YES	
RR_119	0	0.10000E+01	458997.9	3752328.7	248.1	3.89	8.40	1.81	YES	
RR_120	0	0.10000E+01	458986.9	3752314.4	248.0	3.89	8.40	1.81	YES	

**MODELOPTs: RegDFAULT CONC ELEV FLGPOL URBAN

*** DISCRETE CARTESIAN RECEPTORS ***
(X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)
(METERS)

(459691.3,	3753026.4,	252.0,	252.0,	0.0);	(459705.5,	3753036.0,	252.1,	252.1,	0.0);
(459721.8,	3753045.0,	252.2,	252.2,	0.0);	(459737.9,	3753055.6,	252.3,	252.3,	0.0);
(459751.4,	3753065.4,	252.4,	252.4,	0.0);	(459804.4,	3753102.3,	252.5,	252.5,	0.0);
(459820.1,	3753109.1,	252.6,	252.6,	0.0);	(459836.6,	3753118.6,	252.7,	252.7,	0.0);
(459851.3,	3753129.9,	252.7,	252.7,	0.0);	(459875.0,	3753148.8,	252.7,	252.7,	0.0);
(459886.3,	3753133.7,	253.3,	253.3,	0.0);	(459898.0,	3753117.5,	254.1,	254.1,	0.0);
(459908.3,	3753104.0,	254.7,	254.7,	0.0);	(459916.2,	3753088.7,	255.1,	255.1,	0.0);
(459926.3,	3753074.6,	255.7,	255.7,	0.0);	(459937.1,	3753060.3,	256.2,	256.2,	0.0);
(459949.2,	3753041.0,	256.8,	256.8,	0.0);	(459645.1,	3753002.3,	251.7,	251.7,	0.0);
(459759.6,	3753025.7,	253.1,	253.1,	0.0);	(459872.0,	3753064.5,	254.6,	254.6,	0.0);
(459886.7,	3753074.8,	254.8,	254.8,	0.0);	(459870.7,	3753096.8,	254.0,	254.0,	0.0);
(459745.5,	3753013.9,	253.0,	253.0,	0.0);	(459698.1,	3752984.8,	252.5,	252.5,	0.0);
(459714.2,	3752995.2,	252.7,	252.7,	0.0);	(459855.0,	3753086.2,	253.9,	253.9,	0.0);
(459840.9,	3753078.2,	253.8,	253.8,	0.0);	(459729.9,	3753004.9,	252.9,	252.9,	0.0);
(459683.3,	3752945.0,	252.7,	252.7,	0.0);	(459825.0,	3753067.0,	253.6,	253.6,	0.0);
(459810.4,	3753058.9,	253.5,	253.5,	0.0);	(459673.0,	3752959.9,	252.4,	252.4,	0.0);
(459662.6,	3752973.3,	252.2,	252.2,	0.0);	(459795.2,	3753048.8,	253.4,	253.4,	0.0);
(459652.8,	3752988.3,	252.0,	252.0,	0.0);	(459774.8,	3753034.9,	253.3,	253.3,	0.0);
(459729.3,	3752971.3,	253.3,	253.3,	0.0);	(459918.1,	3753013.3,	256.6,	256.6,	0.0);
(459911.2,	3753039.4,	255.9,	255.9,	0.0);	(459897.5,	3753030.4,	255.8,	255.8,	0.0);
(459881.8,	3753019.8,	255.6,	255.6,	0.0);	(459760.0,	3752991.3,	253.7,	253.7,	0.0);
(459746.3,	3752981.6,	253.5,	253.5,	0.0);	(459850.4,	3753000.0,	255.3,	255.3,	0.0);
(459838.1,	3752990.5,	255.2,	255.2,	0.0);	(459821.5,	3752979.9,	255.1,	255.1,	0.0);
(459775.6,	3753001.3,	253.9,	253.9,	0.0);	(459791.6,	3753011.5,	254.0,	254.0,	0.0);
(459866.2,	3753010.8,	255.5,	255.5,	0.0);	(459811.3,	3753021.9,	254.2,	254.2,	0.0);
(459826.4,	3753033.0,	254.3,	254.3,	0.0);	(459841.0,	3753044.0,	254.4,	254.4,	0.0);
(459714.2,	3752961.8,	253.1,	253.1,	0.0);	(459855.6,	3753053.7,	254.5,	254.5,	0.0);

**MODELOPTs: RegDFAULT CONC ELEV FLGPOL URBAN

*** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

Surface file: rivr8.sfc Met Version: 14134
Profile file: rivr8.pfl
Surface format: FREE
Profile format: FREE
Surface station no.: 0 Upper air station no.: 3190
Name: RIVERSIDE Name: MIRAMAR
Year: 2008 Year: 2008

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
08	01	01	1	01	-64.0	0.616	-9.000	-9.000	-999.	1157.	319.6	0.31	1.00	1.00	5.40	27.	9.1	287.5	5.5
08	01	01	1	02	-54.0	0.502	-9.000	-9.000	-999.	866.	204.9	0.31	1.00	1.00	4.50	40.	9.1	287.5	5.5
08	01	01	1	03	-16.4	0.152	-9.000	-9.000	-999.	347.	18.8	0.31	1.00	1.00	2.20	62.	9.1	287.0	5.5
08	01	01	1	04	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.31	1.00	1.00	3.10	67.	9.1	287.0	5.5
08	01	01	1	05	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.31	1.00	1.00	4.90	96.	9.1	286.4	5.5
08	01	01	1	06	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.31	1.00	1.00	3.10	342.	9.1	286.4	5.5
08	01	01	1	07	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.31	1.00	1.00	4.00	38.	9.1	287.0	5.5
08	01	01	1	08	-35.7	0.448	-9.000	-9.000	-999.	719.	220.9	0.31	1.00	0.53	4.00	62.	9.1	287.0	5.5
08	01	01	1	09	26.7	0.649	0.357	0.005	59.	1253.	-895.5	0.31	1.00	0.32	5.40	294.	9.1	288.1	5.5
08	01	01	1	10	76.5	0.503	0.700	0.009	157.	879.	-146.3	0.31	1.00	0.25	4.00	42.	9.1	289.2	5.5
08	01	01	1	11	123.5	0.418	1.124	0.012	404.	655.	-51.7	0.31	1.00	0.22	3.10	30.	9.1	290.9	5.5
08	01	01	1	12	130.9	0.715	1.311	0.005	605.	1451.	-245.0	0.31	1.00	0.21	5.80	37.	9.1	290.9	5.5
08	01	01	1	13	81.1	0.560	1.174	0.006	701.	1033.	-189.8	0.31	1.00	0.21	4.50	4.	9.1	290.9	5.5
08	01	01	1	14	76.4	0.604	1.171	0.005	739.	1124.	-252.5	0.31	1.00	0.23	4.90	13.	9.1	290.9	5.5
08	01	01	1	15	52.3	0.805	1.043	0.005	762.	1730.	-875.8	0.31	1.00	0.26	6.70	39.	9.1	290.9	5.5
08	01	01	1	16	11.1	0.377	0.624	0.011	767.	800.	-422.2	0.31	1.00	0.35	3.10	346.	9.1	290.4	5.5
08	01	01	1	17	-43.3	0.441	-9.000	-9.000	-999.	705.	173.6	0.31	1.00	0.63	4.00	9.	9.1	290.4	5.5
08	01	01	1	18	-29.0	0.400	-9.000	-9.000	-999.	608.	192.9	0.31	1.00	1.00	3.60	45.	9.1	289.9	5.5
08	01	01	1	19	-49.6	0.505	-9.000	-9.000	-999.	860.	227.3	0.31	1.00	1.00	4.50	25.	9.1	289.9	5.5
08	01	01	1	20	-64.0	0.730	-9.000	-9.000	-999.	1496.	533.1	0.31	1.00	1.00	6.30	60.	9.1	289.9	5.5
08	01	01	1	21	-29.1	0.400	-9.000	-9.000	-999.	736.	192.1	0.31	1.00	1.00	3.60	238.	9.1	288.8	5.5
08	01	01	1	22	-41.2	0.562	-9.000	-9.000	-999.	1010.	378.5	0.31	1.00	1.00	4.90	87.	9.1	287.5	5.5
08	01	01	1	23	-53.8	0.733	-9.000	-9.000	-999.	1504.	642.6	0.31	1.00	1.00	6.30	95.	9.1	287.0	5.5
08	01	01	1	24	-29.5	0.399	-9.000	-9.000	-999.	738.	189.5	0.31	1.00	1.00	3.60	37.	9.1	285.4	5.5

First hour of profile data

YR	MO	DY	HR	HEIGHT	F	WDIR	WSPD	AMB_TMP	sigmaA	sigmaW	sigmaV
08	01	01	01	5.5	0	-999.	-99.00	287.6	99.0	-99.00	-99.00
08	01	01	01	9.1	1	27.	5.40	-999.0	99.0	-99.00	-99.00

F indicates top of profile (=1) or below (=0)

**MODELOPTs: RegDFAULT CONC ELEV FLGPOL URBAN

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF TOXICS IN MICROGRAMS/M**3 **

GROUP ID			AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)					OF TYPE	NETWORK GRID-ID
EB91_01	HIGH	1ST HIGH VALUE IS	71.09508	ON 12071301: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
EB91_02	HIGH	1ST HIGH VALUE IS	66.96138	ON 12071301: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
EB91_03	HIGH	1ST HIGH VALUE IS	69.11663	ON 12071301: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
EB91_04	HIGH	1ST HIGH VALUE IS	71.93025	ON 12071301: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
EB91_05	HIGH	1ST HIGH VALUE IS	75.22528	ON 08082420: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
EB91_06	HIGH	1ST HIGH VALUE IS	79.35102	ON 08082420: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
EB91_07	HIGH	1ST HIGH VALUE IS	83.67315	ON 08082420: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
EB91_08	HIGH	1ST HIGH VALUE IS	87.99517	ON 08082420: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
EB91_09	HIGH	1ST HIGH VALUE IS	92.10355	ON 08081422: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
EB91_10	HIGH	1ST HIGH VALUE IS	97.40993	ON 08081422: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
EB91_11	HIGH	1ST HIGH VALUE IS	100.99249	ON 08081422: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
EB91_12	HIGH	1ST HIGH VALUE IS	105.39554	ON 12091120: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
EB91_13	HIGH	1ST HIGH VALUE IS	111.78301	ON 08061420: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
EB91_14	HIGH	1ST HIGH VALUE IS	120.30578	ON 08061420: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
EB91_15	HIGH	1ST HIGH VALUE IS	126.97273	ON 08061420: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
EB91_16	HIGH	1ST HIGH VALUE IS	133.85195	ON 08061420: AT (	459673.01,	3752959.93,	252.44,	252.44,	0.00)	DC	
EB91_17	HIGH	1ST HIGH VALUE IS	144.67941	ON 10081920: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
EB91_18	HIGH	1ST HIGH VALUE IS	154.76847	ON 10081920: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
EB91_19	HIGH	1ST HIGH VALUE IS	165.48782	ON 10081920: AT (	459673.01,	3752959.93,	252.44,	252.44,	0.00)	DC	
EB91_20	HIGH	1ST HIGH VALUE IS	177.58829	ON 10081920: AT (	459673.01,	3752959.93,	252.44,	252.44,	0.00)	DC	
EB91_21	HIGH	1ST HIGH VALUE IS	194.02286	ON 10081920: AT (	459662.62,	3752973.31,	252.21,	252.21,	0.00)	DC	
EB91_22	HIGH	1ST HIGH VALUE IS	211.43208	ON 10081920: AT (	459662.62,	3752973.31,	252.21,	252.21,	0.00)	DC	
EB91_23	HIGH	1ST HIGH VALUE IS	233.96922	ON 10081920: AT (	459652.79,	3752988.29,	251.96,	251.96,	0.00)	DC	
EB91_24	HIGH	1ST HIGH VALUE IS	258.81581	ON 10092824: AT (	459652.79,	3752988.29,	251.96,	251.96,	0.00)	DC	
EB91_25	HIGH	1ST HIGH VALUE IS	292.21124	ON 10081920: AT (	459645.15,	3753002.26,	251.74,	251.74,	0.00)	DC	

**MODELOPTs: RegDFAULT CONC ELEV FLGPOL URBAN

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF TOXICS IN MICROGRAMS/M**3 **

GROUP ID			AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)					OF TYPE	NETWORK GRID-ID
EB91_26	HIGH	1ST HIGH VALUE IS	330.29642	ON 10092824: AT (	459645.15,	3753002.26,	251.74,	251.74,	0.00)	DC	
EB91_27	HIGH	1ST HIGH VALUE IS	373.60874	ON 09070920: AT (	459645.15,	3753002.26,	251.74,	251.74,	0.00)	DC	
EB91_28	HIGH	1ST HIGH VALUE IS	426.18884	ON 08082820: AT (	459645.15,	3753002.26,	251.74,	251.74,	0.00)	DC	
EB91_29	HIGH	1ST HIGH VALUE IS	490.48914	ON 10080319: AT (	459645.15,	3753002.26,	251.74,	251.74,	0.00)	DC	
EB91_30	HIGH	1ST HIGH VALUE IS	569.12689	ON 08080421: AT (	459645.15,	3753002.26,	251.74,	251.74,	0.00)	DC	
EB91_31	HIGH	1ST HIGH VALUE IS	658.01200	ON 08090321: AT (	459645.15,	3753002.26,	251.74,	251.74,	0.00)	DC	
EB91_32	HIGH	1ST HIGH VALUE IS	764.41847	ON 12091021: AT (	459645.15,	3753002.26,	251.74,	251.74,	0.00)	DC	
EB91_33	HIGH	1ST HIGH VALUE IS	832.48688	ON 09083121: AT (	459645.15,	3753002.26,	251.74,	251.74,	0.00)	DC	
EB91_34	HIGH	1ST HIGH VALUE IS	891.61994	ON 11102508: AT (	459645.15,	3753002.26,	251.74,	251.74,	0.00)	DC	
EB91_35	HIGH	1ST HIGH VALUE IS	687.13172	ON 11102508: AT (	459645.15,	3753002.26,	251.74,	251.74,	0.00)	DC	
EB91_36	HIGH	1ST HIGH VALUE IS	786.37222	ON 11102508: AT (	459691.27,	3753026.45,	251.96,	251.96,	0.00)	DC	
EB91_37	HIGH	1ST HIGH VALUE IS	747.93115	ON 11102508: AT (	459705.46,	3753036.04,	252.06,	252.06,	0.00)	DC	
EB91_38	HIGH	1ST HIGH VALUE IS	703.99273	ON 11102508: AT (	459737.90,	3753055.65,	252.30,	252.30,	0.00)	DC	
EB91_39	HIGH	1ST HIGH VALUE IS	721.77401	ON 11102508: AT (	459751.38,	3753065.41,	252.36,	252.36,	0.00)	DC	
EB91_40	HIGH	1ST HIGH VALUE IS	614.12606	ON 10061906: AT (	459737.90,	3753055.65,	252.30,	252.30,	0.00)	DC	
EB91_41	HIGH	1ST HIGH VALUE IS	693.26216	ON 11102508: AT (	459804.42,	3753102.28,	252.50,	252.50,	0.00)	DC	
EB91_42	HIGH	1ST HIGH VALUE IS	702.61655	ON 11102508: AT (	459820.09,	3753109.07,	252.59,	252.59,	0.00)	DC	
EB91_43	HIGH	1ST HIGH VALUE IS	666.75010	ON 11102508: AT (	459851.28,	3753129.86,	252.71,	252.71,	0.00)	DC	
EB91_44	HIGH	1ST HIGH VALUE IS	643.45775	ON 11102508: AT (	459874.98,	3753148.83,	252.67,	252.67,	0.00)	DC	
EB91_45	HIGH	1ST HIGH VALUE IS	664.15500	ON 11102508: AT (	459874.98,	3753148.83,	252.67,	252.67,	0.00)	DC	
EB91_46	HIGH	1ST HIGH VALUE IS	598.78517	ON 10061906: AT (	459874.98,	3753148.83,	252.67,	252.67,	0.00)	DC	
EB91_47	HIGH	1ST HIGH VALUE IS	570.62234	ON 11073110: AT (	459874.98,	3753148.83,	252.67,	252.67,	0.00)	DC	
EB91_48	HIGH	1ST HIGH VALUE IS	470.79435	ON 11060807: AT (	459874.98,	3753148.83,	252.67,	252.67,	0.00)	DC	
EB91_49	HIGH	1ST HIGH VALUE IS	395.64330	ON 10112824: AT (	459874.98,	3753148.83,	252.67,	252.67,	0.00)	DC	
EB91_50	HIGH	1ST HIGH VALUE IS	330.92820	ON 11012224: AT (	459874.98,	3753148.83,	252.67,	252.67,	0.00)	DC	

**MODELOPTs: RegDFAULT CONC ELEV FLGPOL URBAN

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF TOXICS IN MICROGRAMS/M**3 **

GROUP ID			AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)					OF TYPE	NETWORK GRID-ID
EB91_51	HIGH	1ST HIGH VALUE IS	280.93096	ON 10112822: AT (	459874.98,	3753148.83,	252.67,	252.67,	0.00)	DC	
EB91_52	HIGH	1ST HIGH VALUE IS	246.41871	ON 10112822: AT (	459874.98,	3753148.83,	252.67,	252.67,	0.00)	DC	
EB91_53	HIGH	1ST HIGH VALUE IS	229.15328	ON 10093023: AT (	459937.08,	3753060.31,	256.19,	256.19,	0.00)	DC	
EB91_54	HIGH	1ST HIGH VALUE IS	221.25390	ON 10093023: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
EB91_55	HIGH	1ST HIGH VALUE IS	205.54776	ON 08082424: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
EB91_56	HIGH	1ST HIGH VALUE IS	193.27638	ON 10092621: AT (	459937.08,	3753060.31,	256.19,	256.19,	0.00)	DC	
EB91_57	HIGH	1ST HIGH VALUE IS	183.26955	ON 10092621: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
EB91_58	HIGH	1ST HIGH VALUE IS	164.84314	ON 10040704: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
EB91_59	HIGH	1ST HIGH VALUE IS	155.86695	ON 12080223: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
EB91_60	HIGH	1ST HIGH VALUE IS	144.71254	ON 09021920: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
EB91_61	HIGH	1ST HIGH VALUE IS	138.94876	ON 08101422: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
EB91_62	HIGH	1ST HIGH VALUE IS	131.56138	ON 08101422: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
EB91_63	HIGH	1ST HIGH VALUE IS	122.37222	ON 11120123: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
EB91_64	HIGH	1ST HIGH VALUE IS	116.62167	ON 10040703: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
EB91_65	HIGH	1ST HIGH VALUE IS	114.03059	ON 10040703: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
EB91_66	HIGH	1ST HIGH VALUE IS	109.88738	ON 10040703: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
EB91_67	HIGH	1ST HIGH VALUE IS	107.45286	ON 08111721: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
EB91_68	HIGH	1ST HIGH VALUE IS	104.21105	ON 08102223: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
EB91_69	HIGH	1ST HIGH VALUE IS	99.01044	ON 08102223: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
EB91_70	HIGH	1ST HIGH VALUE IS	85.45940	ON 09051723: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
EB91_71	HIGH	1ST HIGH VALUE IS	71.94471	ON 09051723: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
EB91_72	HIGH	1ST HIGH VALUE IS	68.30636	ON 08121707: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
EB91_73	HIGH	1ST HIGH VALUE IS	66.06617	ON 08121707: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
EB91_74	HIGH	1ST HIGH VALUE IS	63.37761	ON 08121707: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
EB91_75	HIGH	1ST HIGH VALUE IS	61.69128	ON 09092222: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	

**MODELOPTs: RegDFAULT CONC ELEV FLGPOL URBAN

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF TOXICS IN MICROGRAMS/M**3 **

GROUP ID			AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)					OF TYPE	NETWORK GRID-ID
EB91_76	HIGH	1ST HIGH VALUE IS	59.99218	ON 09092222: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
EB91_77	HIGH	1ST HIGH VALUE IS	57.99520	ON 09092222: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
EB91_78	HIGH	1ST HIGH VALUE IS	56.06960	ON 09092222: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
IND_01	HIGH	1ST HIGH VALUE IS	59.90142	ON 09092221: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
IND_02	HIGH	1ST HIGH VALUE IS	62.28442	ON 09092221: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
IND_03	HIGH	1ST HIGH VALUE IS	64.53667	ON 09092221: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
IND_04	HIGH	1ST HIGH VALUE IS	67.69875	ON 09092221: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
IND_05	HIGH	1ST HIGH VALUE IS	71.54608	ON 09092221: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
IND_06	HIGH	1ST HIGH VALUE IS	74.95386	ON 09092221: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
IND_07	HIGH	1ST HIGH VALUE IS	79.89328	ON 09092221: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
IND_08	HIGH	1ST HIGH VALUE IS	85.02655	ON 09092221: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
IND_09	HIGH	1ST HIGH VALUE IS	91.81402	ON 09092222: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
IND_10	HIGH	1ST HIGH VALUE IS	98.30830	ON 09092222: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
IND_11	HIGH	1ST HIGH VALUE IS	103.10297	ON 09092222: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
IND_12	HIGH	1ST HIGH VALUE IS	106.76672	ON 09092222: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
IND_13	HIGH	1ST HIGH VALUE IS	110.18507	ON 09092222: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
IND_14	HIGH	1ST HIGH VALUE IS	112.73741	ON 09092222: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
IND_15	HIGH	1ST HIGH VALUE IS	115.35643	ON 10010922: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
IND_16	HIGH	1ST HIGH VALUE IS	118.09235	ON 09051723: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
IND_17	HIGH	1ST HIGH VALUE IS	125.83402	ON 08102223: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
IND_18	HIGH	1ST HIGH VALUE IS	135.04784	ON 08102223: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
IND_19	HIGH	1ST HIGH VALUE IS	143.04463	ON 08111721: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
IND_20	HIGH	1ST HIGH VALUE IS	153.19216	ON 10040703: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
IND_21	HIGH	1ST HIGH VALUE IS	162.08582	ON 10040703: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
IND_22	HIGH	1ST HIGH VALUE IS	182.84545	ON 08101422: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	

**MODELOPTs: RegDFAULT CONC ELEV FLGPOL URBAN

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF TOXICS IN MICROGRAMS/M**3 **

GROUP ID			AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)					OF TYPE	NETWORK GRID-ID
IND_23	HIGH	1ST HIGH VALUE IS	201.87858	ON 08101422: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
IND_24	HIGH	1ST HIGH VALUE IS	221.15625	ON 12080223: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
IND_25	HIGH	1ST HIGH VALUE IS	245.50350	ON 10092621: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
IND_26	HIGH	1ST HIGH VALUE IS	271.54646	ON 10092621: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
IND_27	HIGH	1ST HIGH VALUE IS	301.94559	ON 09082522: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
IND_28	HIGH	1ST HIGH VALUE IS	366.38954	ON 10010201: AT (	459874.98,	3753148.83,	252.67,	252.67,	0.00)	DC	
IND_29	HIGH	1ST HIGH VALUE IS	478.82334	ON 10010201: AT (	459874.98,	3753148.83,	252.67,	252.67,	0.00)	DC	
IND_30	HIGH	1ST HIGH VALUE IS	643.67889	ON 10112905: AT (	459874.98,	3753148.83,	252.67,	252.67,	0.00)	DC	
IND_31	HIGH	1ST HIGH VALUE IS	976.10307	ON 10112822: AT (	459874.98,	3753148.83,	252.67,	252.67,	0.00)	DC	
IND_32	HIGH	1ST HIGH VALUE IS	1657.28661	ON 12070106: AT (	459874.98,	3753148.83,	252.67,	252.67,	0.00)	DC	
IND_33	HIGH	1ST HIGH VALUE IS	3278.02027	ON 11102508: AT (	459874.98,	3753148.83,	252.67,	252.67,	0.00)	DC	
IND_34	HIGH	1ST HIGH VALUE IS	2650.56006	ON 10061906: AT (	459851.28,	3753129.86,	252.71,	252.71,	0.00)	DC	
IND_35	HIGH	1ST HIGH VALUE IS	3057.98931	ON 11102508: AT (	459836.65,	3753118.57,	252.74,	252.74,	0.00)	DC	
IND_36	HIGH	1ST HIGH VALUE IS	3199.59191	ON 11102508: AT (	459820.09,	3753109.07,	252.59,	252.59,	0.00)	DC	
IND_37	HIGH	1ST HIGH VALUE IS	2889.86847	ON 11111816: AT (	459804.42,	3753102.28,	252.50,	252.50,	0.00)	DC	
IND_38	HIGH	1ST HIGH VALUE IS	2289.99334	ON 11073110: AT (	459751.38,	3753065.41,	252.36,	252.36,	0.00)	DC	
IND_39	HIGH	1ST HIGH VALUE IS	3575.09577	ON 11102508: AT (	459751.38,	3753065.41,	252.36,	252.36,	0.00)	DC	
IND_40	HIGH	1ST HIGH VALUE IS	3413.38737	ON 11102508: AT (	459721.75,	3753045.01,	252.21,	252.21,	0.00)	DC	
IND_41	HIGH	1ST HIGH VALUE IS	3840.32388	ON 11102508: AT (	459705.46,	3753036.04,	252.06,	252.06,	0.00)	DC	
IND_42	HIGH	1ST HIGH VALUE IS	3225.16542	ON 11111816: AT (	459691.27,	3753026.45,	251.96,	251.96,	0.00)	DC	
IND_43	HIGH	1ST HIGH VALUE IS	2063.50696	ON 10061906: AT (	459652.79,	3752988.29,	251.96,	251.96,	0.00)	DC	
IND_44	HIGH	1ST HIGH VALUE IS	3769.27078	ON 11071307: AT (	459645.15,	3753002.26,	251.74,	251.74,	0.00)	DC	
IND_45	HIGH	1ST HIGH VALUE IS	1659.03560	ON 10090707: AT (	459645.15,	3753002.26,	251.74,	251.74,	0.00)	DC	
IND_46	HIGH	1ST HIGH VALUE IS	1001.78382	ON 11060907: AT (	459645.15,	3753002.26,	251.74,	251.74,	0.00)	DC	
IND_47	HIGH	1ST HIGH VALUE IS	682.05411	ON 11060907: AT (	459645.15,	3753002.26,	251.74,	251.74,	0.00)	DC	

**MODELOPTs: RegDFAULT CONC ELEV FLGPOL URBAN

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF TOXICS IN MICROGRAMS/M**3 **

GROUP ID			AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)					OF TYPE	NETWORK GRID-ID
IND_48	HIGH	1ST HIGH VALUE IS	490.58647	ON 11060907: AT (	459645.15,	3753002.26,	251.74,	251.74,	0.00)	DC	
IND_49	HIGH	1ST HIGH VALUE IS	383.12521	ON 11060907: AT (	459652.79,	3752988.29,	251.96,	251.96,	0.00)	DC	
IND_50	HIGH	1ST HIGH VALUE IS	306.13140	ON 11060907: AT (	459652.79,	3752988.29,	251.96,	251.96,	0.00)	DC	
IND_51	HIGH	1ST HIGH VALUE IS	246.39516	ON 11060907: AT (	459652.79,	3752988.29,	251.96,	251.96,	0.00)	DC	
IND_52	HIGH	1ST HIGH VALUE IS	207.35069	ON 11060907: AT (	459662.62,	3752973.31,	252.21,	252.21,	0.00)	DC	
IND_53	HIGH	1ST HIGH VALUE IS	176.59940	ON 11060907: AT (	459662.62,	3752973.31,	252.21,	252.21,	0.00)	DC	
IND_54	HIGH	1ST HIGH VALUE IS	149.96439	ON 11060907: AT (	459662.62,	3752973.31,	252.21,	252.21,	0.00)	DC	
IND_55	HIGH	1ST HIGH VALUE IS	131.18106	ON 11060907: AT (	459673.01,	3752959.93,	252.44,	252.44,	0.00)	DC	
IND_56	HIGH	1ST HIGH VALUE IS	115.52595	ON 11060907: AT (	459673.01,	3752959.93,	252.44,	252.44,	0.00)	DC	
IND_57	HIGH	1ST HIGH VALUE IS	101.88443	ON 11060907: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
IND_58	HIGH	1ST HIGH VALUE IS	99.89928	ON 12091120: AT (	459821.49,	3752979.90,	255.05,	255.05,	0.00)	DC	
IND_59	HIGH	1ST HIGH VALUE IS	97.60232	ON 08081422: AT (	459821.49,	3752979.90,	255.05,	255.05,	0.00)	DC	
IND_60	HIGH	1ST HIGH VALUE IS	94.04786	ON 08082420: AT (	459821.49,	3752979.90,	255.05,	255.05,	0.00)	DC	
IND_61	HIGH	1ST HIGH VALUE IS	91.12217	ON 08082420: AT (	459821.49,	3752979.90,	255.05,	255.05,	0.00)	DC	
IND_62	HIGH	1ST HIGH VALUE IS	88.11155	ON 08082420: AT (	459821.49,	3752979.90,	255.05,	255.05,	0.00)	DC	
IND_63	HIGH	1ST HIGH VALUE IS	86.70790	ON 10080219: AT (	459729.28,	3752971.26,	253.26,	253.26,	0.00)	DC	
IND_64	HIGH	1ST HIGH VALUE IS	87.16928	ON 10080219: AT (	459714.21,	3752961.75,	253.09,	253.09,	0.00)	DC	
IND_65	HIGH	1ST HIGH VALUE IS	88.65202	ON 10080219: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
IND_66	HIGH	1ST HIGH VALUE IS	89.80768	ON 10080219: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
IND_67	HIGH	1ST HIGH VALUE IS	88.40399	ON 10092421: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
IND_68	HIGH	1ST HIGH VALUE IS	86.14064	ON 10092421: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
IND_69	HIGH	1ST HIGH VALUE IS	82.00167	ON 10092421: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
IND_70	HIGH	1ST HIGH VALUE IS	79.86482	ON 08070823: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
IND_71	HIGH	1ST HIGH VALUE IS	77.01402	ON 08070823: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
IND_72	HIGH	1ST HIGH VALUE IS	73.93129	ON 08070823: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	

**MODELOPTs: RegDFAULT CONC ELEV FLGPOL URBAN

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF TOXICS IN MICROGRAMS/M**3 **

GROUP ID			AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)					OF TYPE	NETWORK GRID-ID
IND_73	HIGH	1ST HIGH VALUE IS	70.51697	ON 08070823: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
IND_74	HIGH	1ST HIGH VALUE IS	67.18427	ON 08070823: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
IND_75	HIGH	1ST HIGH VALUE IS	64.57971	ON 08072021: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
IND_76	HIGH	1ST HIGH VALUE IS	63.72827	ON 08072021: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
IND_77	HIGH	1ST HIGH VALUE IS	63.73879	ON 08081324: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
IND_78	HIGH	1ST HIGH VALUE IS	63.26418	ON 08081324: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
RR_001	HIGH	1ST HIGH VALUE IS	25.80031	ON 11122102: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
RR_002	HIGH	1ST HIGH VALUE IS	26.62246	ON 11122102: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
RR_003	HIGH	1ST HIGH VALUE IS	27.44481	ON 11122102: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
RR_004	HIGH	1ST HIGH VALUE IS	28.25435	ON 11122102: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
RR_005	HIGH	1ST HIGH VALUE IS	29.06217	ON 11122102: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
RR_006	HIGH	1ST HIGH VALUE IS	29.86631	ON 11122102: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
RR_007	HIGH	1ST HIGH VALUE IS	30.65967	ON 11122102: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
RR_008	HIGH	1ST HIGH VALUE IS	31.43773	ON 11122102: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
RR_009	HIGH	1ST HIGH VALUE IS	32.19271	ON 11122102: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
RR_010	HIGH	1ST HIGH VALUE IS	32.91770	ON 11122102: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
RR_011	HIGH	1ST HIGH VALUE IS	33.60265	ON 11122102: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
RR_012	HIGH	1ST HIGH VALUE IS	34.58974	ON 12040703: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
RR_013	HIGH	1ST HIGH VALUE IS	35.87740	ON 12040703: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
RR_014	HIGH	1ST HIGH VALUE IS	37.20857	ON 11012405: AT (	459926.26,	3753074.62,	255.66,	255.66,	0.00)	DC	
RR_015	HIGH	1ST HIGH VALUE IS	38.93764	ON 11012405: AT (	459937.08,	3753060.31,	256.19,	256.19,	0.00)	DC	
RR_016	HIGH	1ST HIGH VALUE IS	40.63825	ON 11012405: AT (	459937.08,	3753060.31,	256.19,	256.19,	0.00)	DC	
RR_017	HIGH	1ST HIGH VALUE IS	42.40222	ON 11012405: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
RR_018	HIGH	1ST HIGH VALUE IS	44.49645	ON 11012405: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
RR_019	HIGH	1ST HIGH VALUE IS	46.54874	ON 11012405: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	

**MODELOPTs: RegDFAULT CONC ELEV FLGPOL URBAN

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF TOXICS IN MICROGRAMS/M**3 **

GROUP ID			AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)					OF TYPE	NETWORK GRID-ID
RR_020	HIGH	1ST HIGH VALUE IS	48.51851	ON 11012405: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
RR_021	HIGH	1ST HIGH VALUE IS	50.52532	ON 11012405: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
RR_022	HIGH	1ST HIGH VALUE IS	52.64069	ON 11012405: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
RR_023	HIGH	1ST HIGH VALUE IS	54.77662	ON 11012405: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
RR_024	HIGH	1ST HIGH VALUE IS	56.92651	ON 11012405: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
RR_025	HIGH	1ST HIGH VALUE IS	59.26402	ON 11012405: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
RR_026	HIGH	1ST HIGH VALUE IS	62.80358	ON 12122001: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
RR_027	HIGH	1ST HIGH VALUE IS	66.72310	ON 12122001: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
RR_028	HIGH	1ST HIGH VALUE IS	70.99499	ON 12122001: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
RR_029	HIGH	1ST HIGH VALUE IS	75.64237	ON 12122001: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
RR_030	HIGH	1ST HIGH VALUE IS	80.71671	ON 12122001: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
RR_031	HIGH	1ST HIGH VALUE IS	86.25267	ON 12122001: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
RR_032	HIGH	1ST HIGH VALUE IS	92.31515	ON 12122001: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
RR_033	HIGH	1ST HIGH VALUE IS	98.95521	ON 12122001: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
RR_034	HIGH	1ST HIGH VALUE IS	106.20244	ON 12122001: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
RR_035	HIGH	1ST HIGH VALUE IS	114.15813	ON 12122001: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
RR_036	HIGH	1ST HIGH VALUE IS	122.87794	ON 12122001: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
RR_037	HIGH	1ST HIGH VALUE IS	132.66298	ON 12122024: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
RR_038	HIGH	1ST HIGH VALUE IS	147.64542	ON 12122024: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
RR_039	HIGH	1ST HIGH VALUE IS	164.32192	ON 12122024: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
RR_040	HIGH	1ST HIGH VALUE IS	183.01289	ON 12122024: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
RR_041	HIGH	1ST HIGH VALUE IS	203.21486	ON 12122024: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
RR_042	HIGH	1ST HIGH VALUE IS	224.77529	ON 12122024: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
RR_043	HIGH	1ST HIGH VALUE IS	246.23602	ON 12122024: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
RR_044	HIGH	1ST HIGH VALUE IS	294.11927	ON 12111201: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	

**MODELOPTs: RegDFAULT CONC ELEV FLGPOL URBAN

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF TOXICS IN MICROGRAMS/M**3 **

GROUP ID			AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)					OF TYPE	NETWORK GRID-ID
RR_045	HIGH	1ST HIGH VALUE IS	350.02577	ON 12111201: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
RR_046	HIGH	1ST HIGH VALUE IS	406.97582	ON 12121823: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
RR_047	HIGH	1ST HIGH VALUE IS	491.78766	ON 12102008: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
RR_048	HIGH	1ST HIGH VALUE IS	594.92640	ON 12110208: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
RR_049	HIGH	1ST HIGH VALUE IS	888.93589	ON 12110208: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
RR_050	HIGH	1ST HIGH VALUE IS	1116.90263	ON 11081107: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
RR_051	HIGH	1ST HIGH VALUE IS	1227.50331	ON 11081207: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
RR_052	HIGH	1ST HIGH VALUE IS	1652.18495	ON 12110208: AT (	459918.12,	3753013.28,	256.56,	256.56,	0.00)	DC	
RR_053	HIGH	1ST HIGH VALUE IS	2002.44741	ON 11081207: AT (	459918.12,	3753013.28,	256.56,	256.56,	0.00)	DC	
RR_054	HIGH	1ST HIGH VALUE IS	1952.79930	ON 11071207: AT (	459918.12,	3753013.28,	256.56,	256.56,	0.00)	DC	
RR_055	HIGH	1ST HIGH VALUE IS	1572.53104	ON 09051207: AT (	459918.12,	3753013.28,	256.56,	256.56,	0.00)	DC	
RR_056	HIGH	1ST HIGH VALUE IS	1635.58391	ON 12110208: AT (	459850.36,	3753000.02,	255.33,	255.33,	0.00)	DC	
RR_057	HIGH	1ST HIGH VALUE IS	2067.44955	ON 11081107: AT (	459838.12,	3752990.52,	255.24,	255.24,	0.00)	DC	
RR_058	HIGH	1ST HIGH VALUE IS	2471.39046	ON 12110208: AT (	459821.49,	3752979.90,	255.05,	255.05,	0.00)	DC	
RR_059	HIGH	1ST HIGH VALUE IS	3047.47817	ON 11081207: AT (	459821.49,	3752979.90,	255.05,	255.05,	0.00)	DC	
RR_060	HIGH	1ST HIGH VALUE IS	2589.51796	ON 11071207: AT (	459821.49,	3752979.90,	255.05,	255.05,	0.00)	DC	
RR_061	HIGH	1ST HIGH VALUE IS	1990.98952	ON 09051207: AT (	459821.49,	3752979.90,	255.05,	255.05,	0.00)	DC	
RR_062	HIGH	1ST HIGH VALUE IS	1592.43230	ON 11081107: AT (	459746.33,	3752981.56,	253.54,	253.54,	0.00)	DC	
RR_063	HIGH	1ST HIGH VALUE IS	1786.75558	ON 11081107: AT (	459729.28,	3752971.26,	253.26,	253.26,	0.00)	DC	
RR_064	HIGH	1ST HIGH VALUE IS	2119.38755	ON 12110208: AT (	459714.21,	3752961.75,	253.09,	253.09,	0.00)	DC	
RR_065	HIGH	1ST HIGH VALUE IS	2558.34691	ON 11081207: AT (	459714.21,	3752961.75,	253.09,	253.09,	0.00)	DC	
RR_066	HIGH	1ST HIGH VALUE IS	2949.35010	ON 12110208: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
RR_067	HIGH	1ST HIGH VALUE IS	3608.94290	ON 11081207: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
RR_068	HIGH	1ST HIGH VALUE IS	2903.56690	ON 09051207: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
RR_069	HIGH	1ST HIGH VALUE IS	2004.03804	ON 09051207: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	

**MODELOPTs: RegDFAULT CONC ELEV FLGPOL URBAN

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF TOXICS IN MICROGRAMS/M**3 **

GROUP ID			AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)					OF TYPE	NETWORK GRID-ID
RR_070	HIGH	1ST HIGH VALUE IS	1253.17347	ON 09051207: AT (	459673.01,	3752959.93,	252.44,	252.44,	0.00)	DC	
RR_071	HIGH	1ST HIGH VALUE IS	879.76193	ON 09051207: AT (	459662.62,	3752973.31,	252.21,	252.21,	0.00)	DC	
RR_072	HIGH	1ST HIGH VALUE IS	654.57520	ON 11060907: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
RR_073	HIGH	1ST HIGH VALUE IS	536.06206	ON 11060907: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
RR_074	HIGH	1ST HIGH VALUE IS	447.33757	ON 11060907: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
RR_075	HIGH	1ST HIGH VALUE IS	380.09627	ON 11060907: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
RR_076	HIGH	1ST HIGH VALUE IS	327.11620	ON 11060907: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
RR_077	HIGH	1ST HIGH VALUE IS	283.88095	ON 11060907: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
RR_078	HIGH	1ST HIGH VALUE IS	247.72373	ON 11060907: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
RR_079	HIGH	1ST HIGH VALUE IS	213.32148	ON 11060907: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
RR_080	HIGH	1ST HIGH VALUE IS	185.40027	ON 11060907: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
RR_081	HIGH	1ST HIGH VALUE IS	161.78281	ON 11060907: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
RR_082	HIGH	1ST HIGH VALUE IS	142.53510	ON 11060907: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
RR_083	HIGH	1ST HIGH VALUE IS	126.32029	ON 11060907: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
RR_084	HIGH	1ST HIGH VALUE IS	112.33342	ON 11060907: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
RR_085	HIGH	1ST HIGH VALUE IS	100.36100	ON 10070507: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
RR_086	HIGH	1ST HIGH VALUE IS	92.36906	ON 12081020: AT (	459652.79,	3752988.29,	251.96,	251.96,	0.00)	DC	
RR_087	HIGH	1ST HIGH VALUE IS	86.88102	ON 12071301: AT (	459918.12,	3753013.28,	256.56,	256.56,	0.00)	DC	
RR_088	HIGH	1ST HIGH VALUE IS	84.25557	ON 10080219: AT (	459918.12,	3753013.28,	256.56,	256.56,	0.00)	DC	
RR_089	HIGH	1ST HIGH VALUE IS	82.18371	ON 10080219: AT (	459918.12,	3753013.28,	256.56,	256.56,	0.00)	DC	
RR_090	HIGH	1ST HIGH VALUE IS	79.80276	ON 10080219: AT (	459918.12,	3753013.28,	256.56,	256.56,	0.00)	DC	
RR_091	HIGH	1ST HIGH VALUE IS	77.40976	ON 10080219: AT (	459918.12,	3753013.28,	256.56,	256.56,	0.00)	DC	
RR_092	HIGH	1ST HIGH VALUE IS	74.86094	ON 10092421: AT (	459918.12,	3753013.28,	256.56,	256.56,	0.00)	DC	
RR_093	HIGH	1ST HIGH VALUE IS	72.20692	ON 10092421: AT (	459918.12,	3753013.28,	256.56,	256.56,	0.00)	DC	
RR_094	HIGH	1ST HIGH VALUE IS	70.41898	ON 08070823: AT (	459918.12,	3753013.28,	256.56,	256.56,	0.00)	DC	

**MODELOPTs: RegDFAULT CONC ELEV FLGPOL URBAN

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF TOXICS IN MICROGRAMS/M**3 **

GROUP ID			AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)					OF TYPE	NETWORK GRID-ID
RR_095	HIGH	1ST HIGH VALUE IS	68.44578	ON 08070823: AT (	459918.12,	3753013.28,	256.56,	256.56,	0.00)	DC	
RR_096	HIGH	1ST HIGH VALUE IS	66.00429	ON 08072021: AT (	459918.12,	3753013.28,	256.56,	256.56,	0.00)	DC	
RR_097	HIGH	1ST HIGH VALUE IS	64.09051	ON 08072021: AT (	459918.12,	3753013.28,	256.56,	256.56,	0.00)	DC	
RR_098	HIGH	1ST HIGH VALUE IS	62.95062	ON 08072920: AT (	459918.12,	3753013.28,	256.56,	256.56,	0.00)	DC	
RR_099	HIGH	1ST HIGH VALUE IS	62.09256	ON 08072920: AT (	459918.12,	3753013.28,	256.56,	256.56,	0.00)	DC	
RR_100	HIGH	1ST HIGH VALUE IS	63.83146	ON 12072020: AT (	459850.36,	3753000.02,	255.33,	255.33,	0.00)	DC	
RR_101	HIGH	1ST HIGH VALUE IS	67.02499	ON 12072020: AT (	459821.49,	3752979.90,	255.05,	255.05,	0.00)	DC	
RR_102	HIGH	1ST HIGH VALUE IS	66.89995	ON 12072020: AT (	459821.49,	3752979.90,	255.05,	255.05,	0.00)	DC	
RR_103	HIGH	1ST HIGH VALUE IS	66.28653	ON 08080620: AT (	459821.49,	3752979.90,	255.05,	255.05,	0.00)	DC	
RR_104	HIGH	1ST HIGH VALUE IS	65.20557	ON 08080620: AT (	459821.49,	3752979.90,	255.05,	255.05,	0.00)	DC	
RR_105	HIGH	1ST HIGH VALUE IS	63.28383	ON 08080620: AT (	459821.49,	3752979.90,	255.05,	255.05,	0.00)	DC	
RR_106	HIGH	1ST HIGH VALUE IS	61.58648	ON 08081222: AT (	459821.49,	3752979.90,	255.05,	255.05,	0.00)	DC	
RR_107	HIGH	1ST HIGH VALUE IS	60.27524	ON 12071222: AT (	459821.49,	3752979.90,	255.05,	255.05,	0.00)	DC	
RR_108	HIGH	1ST HIGH VALUE IS	59.05783	ON 10010717: AT (	459821.49,	3752979.90,	255.05,	255.05,	0.00)	DC	
RR_109	HIGH	1ST HIGH VALUE IS	57.72079	ON 10010717: AT (	459821.49,	3752979.90,	255.05,	255.05,	0.00)	DC	
RR_110	HIGH	1ST HIGH VALUE IS	56.56686	ON 10010717: AT (	459821.49,	3752979.90,	255.05,	255.05,	0.00)	DC	
RR_111	HIGH	1ST HIGH VALUE IS	55.49368	ON 12081020: AT (	459821.49,	3752979.90,	255.05,	255.05,	0.00)	DC	
RR_112	HIGH	1ST HIGH VALUE IS	54.44471	ON 12081020: AT (	459821.49,	3752979.90,	255.05,	255.05,	0.00)	DC	
RR_113	HIGH	1ST HIGH VALUE IS	53.14954	ON 12081020: AT (	459821.49,	3752979.90,	255.05,	255.05,	0.00)	DC	
RR_114	HIGH	1ST HIGH VALUE IS	52.01871	ON 12081020: AT (	459821.49,	3752979.90,	255.05,	255.05,	0.00)	DC	
RR_115	HIGH	1ST HIGH VALUE IS	50.77257	ON 12081020: AT (	459821.49,	3752979.90,	255.05,	255.05,	0.00)	DC	
RR_116	HIGH	1ST HIGH VALUE IS	49.66045	ON 12081020: AT (	459821.49,	3752979.90,	255.05,	255.05,	0.00)	DC	
RR_117	HIGH	1ST HIGH VALUE IS	48.54369	ON 12081020: AT (	459821.49,	3752979.90,	255.05,	255.05,	0.00)	DC	
RR_118	HIGH	1ST HIGH VALUE IS	47.45708	ON 12081020: AT (	459821.49,	3752979.90,	255.05,	255.05,	0.00)	DC	
RR_119	HIGH	1ST HIGH VALUE IS	46.45788	ON 12081020: AT (	459821.49,	3752979.90,	255.05,	255.05,	0.00)	DC	

**MODELOPTs: RegDFAULT CONC ELEV FLGPOL URBAN

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF TOXICS IN MICROGRAMS/M**3 **

GROUP ID			AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)					OF TYPE	NETWORK GRID-ID
RR_120	HIGH	1ST HIGH VALUE IS	45.78993	ON 12080822: AT (	459918.12,	3753013.28,	256.56,	256.56,	0.00)	DC	
WB91_01	HIGH	1ST HIGH VALUE IS	68.89251	ON 12071301: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
WB91_02	HIGH	1ST HIGH VALUE IS	69.21257	ON 08082420: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
WB91_03	HIGH	1ST HIGH VALUE IS	71.17340	ON 08082420: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
WB91_04	HIGH	1ST HIGH VALUE IS	73.86130	ON 08082420: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
WB91_05	HIGH	1ST HIGH VALUE IS	76.59085	ON 08082420: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
WB91_06	HIGH	1ST HIGH VALUE IS	79.93905	ON 08081422: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
WB91_07	HIGH	1ST HIGH VALUE IS	83.29017	ON 08081422: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
WB91_08	HIGH	1ST HIGH VALUE IS	86.70138	ON 08081422: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
WB91_09	HIGH	1ST HIGH VALUE IS	90.30925	ON 12091120: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
WB91_10	HIGH	1ST HIGH VALUE IS	95.62930	ON 12092620: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
WB91_11	HIGH	1ST HIGH VALUE IS	101.82018	ON 08061420: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
WB91_12	HIGH	1ST HIGH VALUE IS	107.74295	ON 08061420: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
WB91_13	HIGH	1ST HIGH VALUE IS	113.11558	ON 08061420: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
WB91_14	HIGH	1ST HIGH VALUE IS	118.21921	ON 08061420: AT (	459673.01,	3752959.93,	252.44,	252.44,	0.00)	DC	
WB91_15	HIGH	1ST HIGH VALUE IS	126.74019	ON 10081920: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
WB91_16	HIGH	1ST HIGH VALUE IS	134.47526	ON 10081920: AT (	459683.32,	3752944.96,	252.74,	252.74,	0.00)	DC	
WB91_17	HIGH	1ST HIGH VALUE IS	142.15082	ON 10081920: AT (	459673.01,	3752959.93,	252.44,	252.44,	0.00)	DC	
WB91_18	HIGH	1ST HIGH VALUE IS	151.50255	ON 10081920: AT (	459673.01,	3752959.93,	252.44,	252.44,	0.00)	DC	
WB91_19	HIGH	1ST HIGH VALUE IS	163.57359	ON 10081920: AT (	459662.62,	3752973.31,	252.21,	252.21,	0.00)	DC	
WB91_20	HIGH	1ST HIGH VALUE IS	173.82183	ON 10081920: AT (	459662.62,	3752973.31,	252.21,	252.21,	0.00)	DC	
WB91_21	HIGH	1ST HIGH VALUE IS	191.23529	ON 10081920: AT (	459652.79,	3752988.29,	251.96,	251.96,	0.00)	DC	
WB91_22	HIGH	1ST HIGH VALUE IS	206.75009	ON 10081920: AT (	459645.15,	3753002.26,	251.74,	251.74,	0.00)	DC	
WB91_23	HIGH	1ST HIGH VALUE IS	227.56827	ON 10081920: AT (	459645.15,	3753002.26,	251.74,	251.74,	0.00)	DC	
WB91_24	HIGH	1ST HIGH VALUE IS	255.35746	ON 10092824: AT (	459645.15,	3753002.26,	251.74,	251.74,	0.00)	DC	

**MODELOPTs: RegDFAULT CONC ELEV FLGPOL URBAN

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF TOXICS IN MICROGRAMS/M**3 **

GROUP ID			AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)					OF TYPE	NETWORK GRID-ID
WB91_25	HIGH	1ST HIGH VALUE IS	304.56276	ON 09080421: AT (	459645.15,	3753002.26,	251.74,	251.74,	0.00)	DC	
WB91_26	HIGH	1ST HIGH VALUE IS	365.05891	ON 08090621: AT (	459645.15,	3753002.26,	251.74,	251.74,	0.00)	DC	
WB91_27	HIGH	1ST HIGH VALUE IS	406.47018	ON 09071021: AT (	459645.15,	3753002.26,	251.74,	251.74,	0.00)	DC	
WB91_28	HIGH	1ST HIGH VALUE IS	460.48709	ON 08071121: AT (	459645.15,	3753002.26,	251.74,	251.74,	0.00)	DC	
WB91_29	HIGH	1ST HIGH VALUE IS	506.83718	ON 09071022: AT (	459645.15,	3753002.26,	251.74,	251.74,	0.00)	DC	
WB91_30	HIGH	1ST HIGH VALUE IS	574.51714	ON 08090321: AT (	459645.15,	3753002.26,	251.74,	251.74,	0.00)	DC	
WB91_31	HIGH	1ST HIGH VALUE IS	646.60208	ON 08100620: AT (	459645.15,	3753002.26,	251.74,	251.74,	0.00)	DC	
WB91_32	HIGH	1ST HIGH VALUE IS	726.63687	ON 08090421: AT (	459645.15,	3753002.26,	251.74,	251.74,	0.00)	DC	
WB91_33	HIGH	1ST HIGH VALUE IS	741.93092	ON 10082121: AT (	459645.15,	3753002.26,	251.74,	251.74,	0.00)	DC	
WB91_34	HIGH	1ST HIGH VALUE IS	709.01813	ON 11102508: AT (	459645.15,	3753002.26,	251.74,	251.74,	0.00)	DC	
WB91_35	HIGH	1ST HIGH VALUE IS	544.13065	ON 11111816: AT (	459691.27,	3753026.45,	251.96,	251.96,	0.00)	DC	
WB91_36	HIGH	1ST HIGH VALUE IS	598.93234	ON 11102508: AT (	459691.27,	3753026.45,	251.96,	251.96,	0.00)	DC	
WB91_37	HIGH	1ST HIGH VALUE IS	563.91356	ON 11102508: AT (	459721.75,	3753045.01,	252.21,	252.21,	0.00)	DC	
WB91_38	HIGH	1ST HIGH VALUE IS	566.94684	ON 11102508: AT (	459737.90,	3753055.65,	252.30,	252.30,	0.00)	DC	
WB91_39	HIGH	1ST HIGH VALUE IS	541.10453	ON 11102508: AT (	459751.38,	3753065.41,	252.36,	252.36,	0.00)	DC	
WB91_40	HIGH	1ST HIGH VALUE IS	488.23012	ON 11111816: AT (	459804.42,	3753102.28,	252.50,	252.50,	0.00)	DC	
WB91_41	HIGH	1ST HIGH VALUE IS	580.61734	ON 11102508: AT (	459804.42,	3753102.28,	252.50,	252.50,	0.00)	DC	
WB91_42	HIGH	1ST HIGH VALUE IS	542.81839	ON 11102508: AT (	459820.09,	3753109.07,	252.59,	252.59,	0.00)	DC	
WB91_43	HIGH	1ST HIGH VALUE IS	566.09241	ON 11102508: AT (	459851.28,	3753129.86,	252.71,	252.71,	0.00)	DC	
WB91_44	HIGH	1ST HIGH VALUE IS	568.50898	ON 11102508: AT (	459874.98,	3753148.83,	252.67,	252.67,	0.00)	DC	
WB91_45	HIGH	1ST HIGH VALUE IS	479.36278	ON 10020924: AT (	459874.98,	3753148.83,	252.67,	252.67,	0.00)	DC	
WB91_46	HIGH	1ST HIGH VALUE IS	477.56271	ON 10061906: AT (	459874.98,	3753148.83,	252.67,	252.67,	0.00)	DC	
WB91_47	HIGH	1ST HIGH VALUE IS	451.74121	ON 11073110: AT (	459874.98,	3753148.83,	252.67,	252.67,	0.00)	DC	
WB91_48	HIGH	1ST HIGH VALUE IS	397.74917	ON 11060807: AT (	459874.98,	3753148.83,	252.67,	252.67,	0.00)	DC	
WB91_49	HIGH	1ST HIGH VALUE IS	323.39973	ON 10040523: AT (	459874.98,	3753148.83,	252.67,	252.67,	0.00)	DC	

**MODELOPTs: RegDFAULT CONC ELEV FLGPOL URBAN

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF TOXICS IN MICROGRAMS/M**3 **

GROUP ID			AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)					OF TYPE	NETWORK GRID-ID
WB91_50	HIGH	1ST HIGH VALUE IS	301.46053	ON 10112824: AT (	459874.98,	3753148.83,	252.67,	252.67,	0.00)	DC	
WB91_51	HIGH	1ST HIGH VALUE IS	250.20457	ON 10092621: AT (	459874.98,	3753148.83,	252.67,	252.67,	0.00)	DC	
WB91_52	HIGH	1ST HIGH VALUE IS	225.45570	ON 10112822: AT (	459874.98,	3753148.83,	252.67,	252.67,	0.00)	DC	
WB91_53	HIGH	1ST HIGH VALUE IS	208.59090	ON 09020321: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
WB91_54	HIGH	1ST HIGH VALUE IS	198.24767	ON 10093023: AT (	459937.08,	3753060.31,	256.19,	256.19,	0.00)	DC	
WB91_55	HIGH	1ST HIGH VALUE IS	189.99481	ON 09082522: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
WB91_56	HIGH	1ST HIGH VALUE IS	185.64449	ON 08082424: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
WB91_57	HIGH	1ST HIGH VALUE IS	175.94407	ON 10092621: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
WB91_58	HIGH	1ST HIGH VALUE IS	166.33026	ON 10092621: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
WB91_59	HIGH	1ST HIGH VALUE IS	151.93440	ON 11080705: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
WB91_60	HIGH	1ST HIGH VALUE IS	145.70766	ON 12080223: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
WB91_61	HIGH	1ST HIGH VALUE IS	136.34471	ON 09021920: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
WB91_62	HIGH	1ST HIGH VALUE IS	132.03689	ON 08101422: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
WB91_63	HIGH	1ST HIGH VALUE IS	126.40386	ON 08101422: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
WB91_64	HIGH	1ST HIGH VALUE IS	118.31017	ON 11120123: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
WB91_65	HIGH	1ST HIGH VALUE IS	111.89957	ON 10040703: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
WB91_66	HIGH	1ST HIGH VALUE IS	111.04616	ON 10040703: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
WB91_67	HIGH	1ST HIGH VALUE IS	106.65355	ON 10040703: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
WB91_68	HIGH	1ST HIGH VALUE IS	102.54003	ON 08111721: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
WB91_69	HIGH	1ST HIGH VALUE IS	98.57151	ON 08102223: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
WB91_70	HIGH	1ST HIGH VALUE IS	82.40238	ON 08102223: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
WB91_71	HIGH	1ST HIGH VALUE IS	72.17671	ON 09051723: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
WB91_72	HIGH	1ST HIGH VALUE IS	68.49894	ON 09051723: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
WB91_73	HIGH	1ST HIGH VALUE IS	64.65000	ON 11110221: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
WB91_74	HIGH	1ST HIGH VALUE IS	61.98446	ON 08121707: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	

**MODELOPTs: RegDFAULT CONC ELEV FLGPOL URBAN

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF TOXICS IN MICROGRAMS/M**3 **

GROUP ID			AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)					OF TYPE	NETWORK GRID-ID
WB91_75	HIGH	1ST HIGH VALUE IS	59.98203	ON 08121707: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
WB91_76	HIGH	1ST HIGH VALUE IS	57.61637	ON 08121707: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
WB91_77	HIGH	1ST HIGH VALUE IS	56.25354	ON 09092222: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	
WB91_78	HIGH	1ST HIGH VALUE IS	55.74237	ON 09092222: AT (	459949.25,	3753041.05,	256.83,	256.83,	0.00)	DC	

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

**MODELOPTs: RegDFAULT CONC ELEV FLGPOL URBAN

*** Message Summary : AERMOD Model Execution ***

--------- Summary of Total Messages --------

A Total of 0 Fatal Error Message(s)
A Total of 638 Warning Message(s)
A Total of 2006 Informational Message(s)

A Total of 43848 Hours Were Processed

A Total of 7 Calm Hours Identified

A Total of 1999 Missing Hours Identified (4.56 Percent)

******** FATAL ERROR MESSAGES ********
*** NONE ***

******** WARNING MESSAGES ********

```
OU W565    1257       OUPLOT: Possible Conflict With Dynamically Allocated FUNIT     PLOTFILE
OU W565    1258       OUPLOT: Possible Conflict With Dynamically Allocated FUNIT     PLOTFILE
OU W565    1259       OUPLOT: Possible Conflict With Dynamically Allocated FUNIT     PLOTFILE
OU W565    1260       OUPLOT: Possible Conflict With Dynamically Allocated FUNIT     PLOTFILE
OU W565    1261       OUPLOT: Possible Conflict With Dynamically Allocated FUNIT     PLOTFILE
OU W565    1262       OUPLOT: Possible Conflict With Dynamically Allocated FUNIT     PLOTFILE
OU W565    1263       OUPLOT: Possible Conflict With Dynamically Allocated FUNIT     PLOTFILE
OU W565    1264       OUPLOT: Possible Conflict With Dynamically Allocated FUNIT     PLOTFILE
OU W565    1265       OUPLOT: Possible Conflict With Dynamically Allocated FUNIT     PLOTFILE
OU W565    1266       OUPLOT: Possible Conflict With Dynamically Allocated FUNIT     PLOTFILE
OU W565    1267       OUPLOT: Possible Conflict With Dynamically Allocated FUNIT     PLOTFILE
OU W565    1268       OUPLOT: Possible Conflict With Dynamically Allocated FUNIT     PLOTFILE
OU W565    1269       OUPLOT: Possible Conflict With Dynamically Allocated FUNIT     PLOTFILE
OU W565    1270       OUPLOT: Possible Conflict With Dynamically Allocated FUNIT     PLOTFILE
OU W565    1271       OUPLOT: Possible Conflict With Dynamically Allocated FUNIT     PLOTFILE
OU W565    1272       OUPLOT: Possible Conflict With Dynamically Allocated FUNIT     PLOTFILE
OU W565    1273       OUPLOT: Possible Conflict With Dynamically Allocated FUNIT     PLOTFILE
OU W565    1274       OUPLOT: Possible Conflict With Dynamically Allocated FUNIT     PLOTFILE
OU W565    1275       OUPLOT: Possible Conflict With Dynamically Allocated FUNIT     PLOTFILE
OU W565    1276       OUPLOT: Possible Conflict With Dynamically Allocated FUNIT     PLOTFILE
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   *** AERMOD Finishes Successfully ***
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Appendix C:
Burrowing Owl Habitat Assessment

BERKELEY
CARLSBAD
FRESNO
IRVINE
LOS ANGELES
PALM SPRINGS
POINT RICHMOND
RIVERSIDE
ROSEVILLE
SAN LUIS OBISPO

May 8, 2017

Mr. Steve Berzansky
BP Partners Riverside, LLC
7111 Indiana Avenue, Suite 300
Riverside California 92508

Subject: Results of Burrowing Owl Habitat Assessment for the Hawthorne School Site, City of Riverside, California (LSA Project No. BPR1601)

Dear Mr. Berzansky:

This report documents the results of a burrowing owl (*Athene cunicularia*) habitat assessment LSA conducted on the 7-acre property (Assessor's Parcel Numbers 233-180-007 and 233-170-001) located at 9170 Indiana Avenue in the City of Riverside, Riverside County, California (attached Figure 1). No burrowing owls or features potentially occupied by burrowing owls occur on the property or on the accessible adjacent open land to the west.

METHODS

The habitat assessment for burrows and owls was conducted in accordance with the MSHCP *Burrowing Owl Survey Instructions for the Western Riverside Multiple Species Habitat Conservation Plan Area* (County of Riverside Environmental Programs Department, March 29, 2006). The survey was conducted by Maria Lum. Table A lists the survey dates, times, and weather conditions.

Table A: Habitat Assessment Dates, Times, and Weather Conditions

Survey	Date (2016)	Time (24-Hour) (start/finish)	Temp. (°F) (start/finish)	Wind (mph)	Cloud Cover
Habitat Assessment	April 4	0900/1000	64	0	0%
Burrowing Owl Focused Survey	Not Required				

The habitat assessment was conducted by walking belt transects throughout the project site and on a portion of the vacant field located on the west side of the project site. Transects spaced approximately 50 feet allowed for 100 percent visual coverage of the ground surface (attached Figure 2). The entire site was examined for suitable habitat conditions, ground squirrel activity, suitable burrows, burrowing owls, and owl sign (e.g., feathers, pellets, whitewash, and prey remnants).

1500 Iowa Avenue, Suite 200, Riverside, California 92507 951.781.9310 www.lsa.net

EXISTING SETTING

The project site is located in a highly developed area of the City of Riverside. It is surrounded by residential development to the north and east, vacant land to the west, and railroad tracks to the south. The western grassy play yard is mowed. The adjacent open parcel located to the west of the project is used as staging area for the road work on Gibson Avenue. The east play yard is unmaintained and disturbed with tall weedy vegetation and mulch. Numerous shade trees, some dying from lack of irrigation, were planted along the fences and next to the school buildings. Most of the property is paved and occupied by school buildings. In the grassy areas, one playground is located next to the railroad tracks and another is located east of the school buildings. Attached Figure 3 shows existing conditions and indicates photograph locations. Site photographs are attached as Figure 4 to show typical conditions of the project.

RESULTS

A list of dominant species occurring on the project is attached. Dominant non-native grassland species include rat-tail fescue (*Festuca myuros*) and mouse barley (*Hordeum murinum*). Tansy mustard (*Descurainia pinnata*) is common in the eastern playground area. Bird species observed during the survey are typical species found in urban areas and consisted of mourning dove (*Zenaida macroura*), European starling (*Sturnus vulgaris*), house finch (*Carpodacus mexicanus*), and lesser goldfinch (*Carduelis psaltria*). Numerous inactive old nests are in the dying trees along the railroad fence and the east fence. Intact nests, possibly active, are in the walkway awnings and in suitable perches on the school buildings.

One fossorial mammal burrow is outside the project but could not be used by a burrowing owl because the entrance was blocked by chain link fence and surrounded by tall vegetation. No burrowing owls or burrowing owl sign (e.g., whitewash, pellets, scat, tracks, and/or feathers) were observed during the habitat suitability assessment on the project site and adjacent vacant area.

CONCLUSIONS

The project site is developed and paved with unsuitable habitat conditions for burrowing owl due to the presence of several mature ornamental trees, tall dense vegetation, compacted soils, and lack of adjacent foraging grassland areas. No burrows potentially occupied by burrowing owl were found during the initial survey. Therefore, focused burrowing owl surveys are not required for the project because of the unsuitable site conditions. The site is unsuitable for burrowing owls due to lack of foraging areas on site and in the adjacent areas and the numerous buildings and trees that provide cover for avian and mammalian predators and increase risk of predation.

The project must avoid take of nesting birds to comply with California Fish and Game Code Sections 3500–3516 and the Migratory Bird Treaty Reform Act of 2004 (MBTRA) (Pub. L. No. 108-447, 118 Stat. 2809, 3071-72). The regulations are not applicable to European starlings or house sparrows since they are non-native species. LSA suggests the following biological mitigation measure:

Mitigation Measure BIO-1: If project activities are planned during the bird nesting season (February 15 to August 31), nesting bird survey(s) consisting of up to three site visits within the week prior to clearing and demolition activities shall be conducted to ensure birds protected under the MBTA are not disturbed by on-site activities. Any such survey(s) shall be conducted by a qualified biologist. If no active nests are found, no additional measures are required. If active nests are found, the nest locations shall be mapped by the biologist. The nesting bird species will be documented and, to the degree feasible, the nesting stage (e.g., incubation of eggs, feeding of young, near fledging) determined. Based on the species present and surrounding habitat, a no-disturbance buffer shall be established around each active nest. The buffer shall be identified by a qualified biologist and confirmed by the City. No construction or ground disturbance activities shall be conducted within the buffer until the biologist has determined the nest is no longer active and has informed the City and construction supervisor that activities may resume.

Sincerely,

LSA ASSOCIATES, INC.

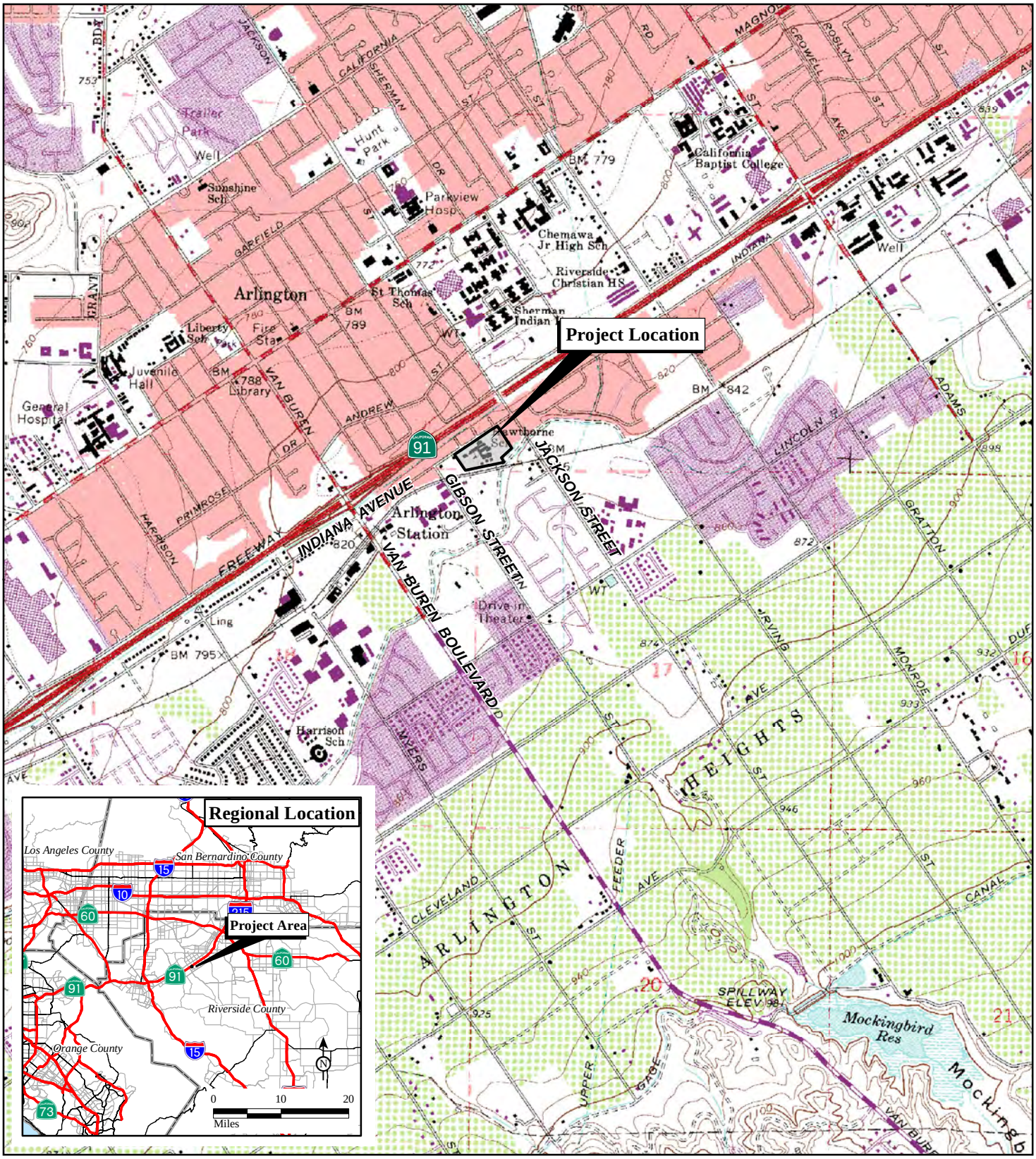
Maria A. Lum

Maria A. Lum
Associate/Biologist

Attachments: List of Species Observed
Figure 1: Regional and Project Location Map
Figure 2: Project Study Area
Figure 3: Existing Site Conditions Photograph Key Map
Figure 4: Site Photographs

List of Species Observed at the Hawthorne Project Site, Riverside California on April 4, 2017

Scientific Name	Common Name
MAGNOLIOPHYTA: MAGNOLIOPSIDA	**DICOT FLOWERING PLANTS**
Anacardiaceae	**Sumac family**
Schinus molle (non-native species)	Peruvian peppertree
Bomacaceae	**Baobab family**
Chorisia speciosa (non-native species)	Floss-silk tree
Brassicaceae	**Mustard family**
Sisymbrium irio	London rocket
Fagaceae	**Beech family**
Quercus virginiana (non-native species)	Southern live oak
Moraceae	**Mulberry family**
Morus alba (non-native species)	White mulberry
Sapindaceae	**Soapberry family**
Cupaniopsis anacardioides (non-native species)	Carrotwood
Ulmaceae	**Elm family**
Ulmus parvifolia (non-native species)	Chinese elm
MAGNOLIOPHYTA: LILIOPSIDA	**MONOCOT FLOWERING PLANTS**
Poaceae	**Grass family**
Festuca myrous	rat-tail fescue
Hordeum murinum	mouse barley
REPTILIA	**REPTILES**
Crotaphytidae	**Collared and Leopard Lizards**
Sceloporus occidentalis	Western fence lizard
AVES	**BIRDS**
Columbidae	**Pigeons and Doves**
Zenaida macroura	Mourning dove
Mimidae	**Mockingbirds and Thrashers**
Mimus polyglottos	Northern mockingbird
Sturnidae	**Starlings**
Sturnus vulgaris (non-native species)	European starling
Fringillidae	**Finches**
Carpodacus mexicanus	House finch
Spinus psaltria	Lesser goldfinch



LSA

FIGURE 1

Hawthorne
Burrowing Owl Pre-Construction Study

Regional and Project Location

SOURCE: USGS 7.5' Quad: Riverside West (80), CA; ESRI Streetmap, 2013/Riverside County, 2015.

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LSA

LEGEND

Burrowing Owl Survey Area

Survey Transects

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SOURCE: Bing Aerial, 2016.

FIGURE 2

Hawthorne
Burrowing Owl Pre-Construction Study

Project Study Area

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LSA

LEGEND

- Study Area
- Bird Nest
- Mammal Burrow
- Oak Tree
- Photograph Location

N

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SOURCE: Bing Aerial, 2016.

FIGURE 3

Hawthorne
Burrowing Owl Pre-Construction Study

Existing Site Conditions
Photograph Key Map

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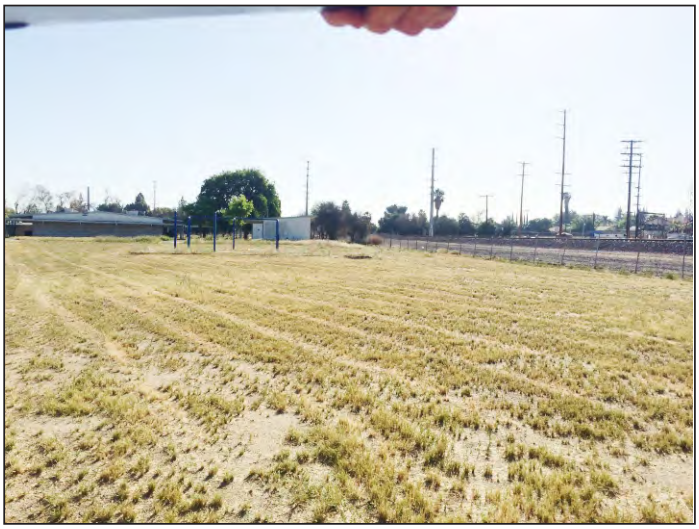
Photograph 1: *View of school parking lot on Indiana Avenue.*

Photograph 2: *View of flat, compact mowed play yard from the west side of school property.*



Photograph 3: *View of recently mowed grassy play yard on southwest area next to railroad tracks.*

Photograph 4: *View of tall vegetation and dead eucalyptus trees in the east field.*

LSA

FIGURE 4a

Hawthorne
Burrowing Owl Pre-Construction Study

Site Photographs

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Photograph 5: *View of the northeast corner of school property with deep wood mulch.*

Photograph 6: *View of large carrotwood trees at paved playground on east side of school buildings.*

Photograph 7: *View of paved playground west of school buildings.*

Photograph 8: *Bird nests were in several trees planted along the south fence.*

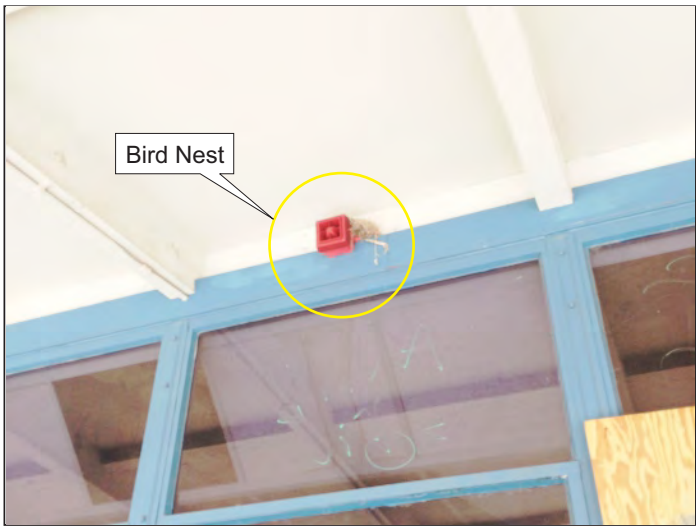
LSA

FIGURE 4b

Hawthorne
Burrowing Owl Pre-Construction Study

Site Photographs

Photograph 9: *Bird nests were in several locations in the walkway awnings.*



Photograph 10: *Birds constructed nests outside of school buildings. Nests may also be inside since many windows are broken.*

LSA

FIGURE 4c

Hawthorne
Burrowing Owl Pre-Construction Study

Site Photographs

Appendix D:
Cultural Resources Assessment

CULTURAL RESOURCES ASSESSMENT

HAWTHORNE ELEMENTARY SCHOOL PROJECT

ASSESSOR'S PARCEL NUMBERS 233-180-007 & 233-170-001

CITY OF RIVERSIDE

RIVERSIDE COUNTY, CALIFORNIA

LSA

May 2017

CULTURAL RESOURCES ASSESSMENT

HAWTHORNE ELEMENTARY SCHOOL PROJECT

ASSESSOR'S PARCEL NUMBERS 233-180-007 & 233-170-001

CITY OF RIVERSIDE

RIVERSIDE COUNTY, CALIFORNIA

Prepared for:

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Prepared by:

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LSA Associates, Inc.
1500 Iowa Avenue, Suite 200
Riverside, California 92507

LSA Project No. SWK1602

May 2017

MANAGEMENT SUMMARY

At the request of Steven Walker Communities, Inc., LSA Associates, Inc. (LSA) conducted a cultural resources assessment for a proposed single-family residential subdivision Project on 6.85 acres involving two parcels (Assessor's Parcel Numbers [APNs] 233-180-007 and 233-170-001) located at 9170 Indiana Avenue within the City of Riverside (City), Riverside County, California. The proposed development would consist of 54 residential lots and related streets. To facilitate the Project, all of the existing buildings and structures will be removed. In compliance with the California Environmental Quality Act (CEQA), the City, as Lead Agency for the Project, required this study as part of the environmental review process.

The purpose of the study is to provide the City with the necessary information and analysis to determine whether the proposed Project would cause substantial adverse changes to any historical/ archaeological resources that may exist in or around the project area, as mandated by CEQA. In order to identify and evaluate such resources, LSA conducted a historical/archaeological resources records search, pursued historical background research, and carried out intensive-level field surveys. As a result of these efforts, one historic-period resource, the former Hawthorne Elementary School, was identified within the project area and evaluated as part of this study. However, it was determined that this built environment resource is not a "historical resource" as defined by CEQA. No archaeological resources were identified within the project area, which is both severely disturbed and partially obscured; the sensitivity of the Project for potential subsurface resources is negligible. A segment of the Upper Riverside Canal (33-4495H) is adjacent to the southern boundary of the Project and was found to be abandoned; this segment has sustained alterations and has lost integrity. Therefore, it is not historically significant individually and does not contribute to the significance of the larger resource. Therefore, no further cultural resource investigations or monitoring are recommended. In the event any archaeological resources are identified during earthmoving activities, work in the area should be halted until the nature and significance of the find can be assessed by a qualified archaeologist.

In the event human remains are encountered, State Health and Safety Code Section 7050.5 states that no further disturbance shall occur until the County Coroner has made a determination of origin and disposition pursuant to Public Resources Code Section 5097.98. The County Coroner must be notified of the find immediately. If the remains are determined to be prehistoric, the Coroner will notify the Native American Heritage Commission (NAHC), which will determine and notify a Most Likely Descendant (MLD). With the permission of the landowner or his/her authorized representative, the MLD may inspect the site of the discovery. The MLD shall complete the inspection within 48 hours of notification by the NAHC. The MLD may recommend scientific removal and nondestructive analysis of human remains and items associated with Native American burials.

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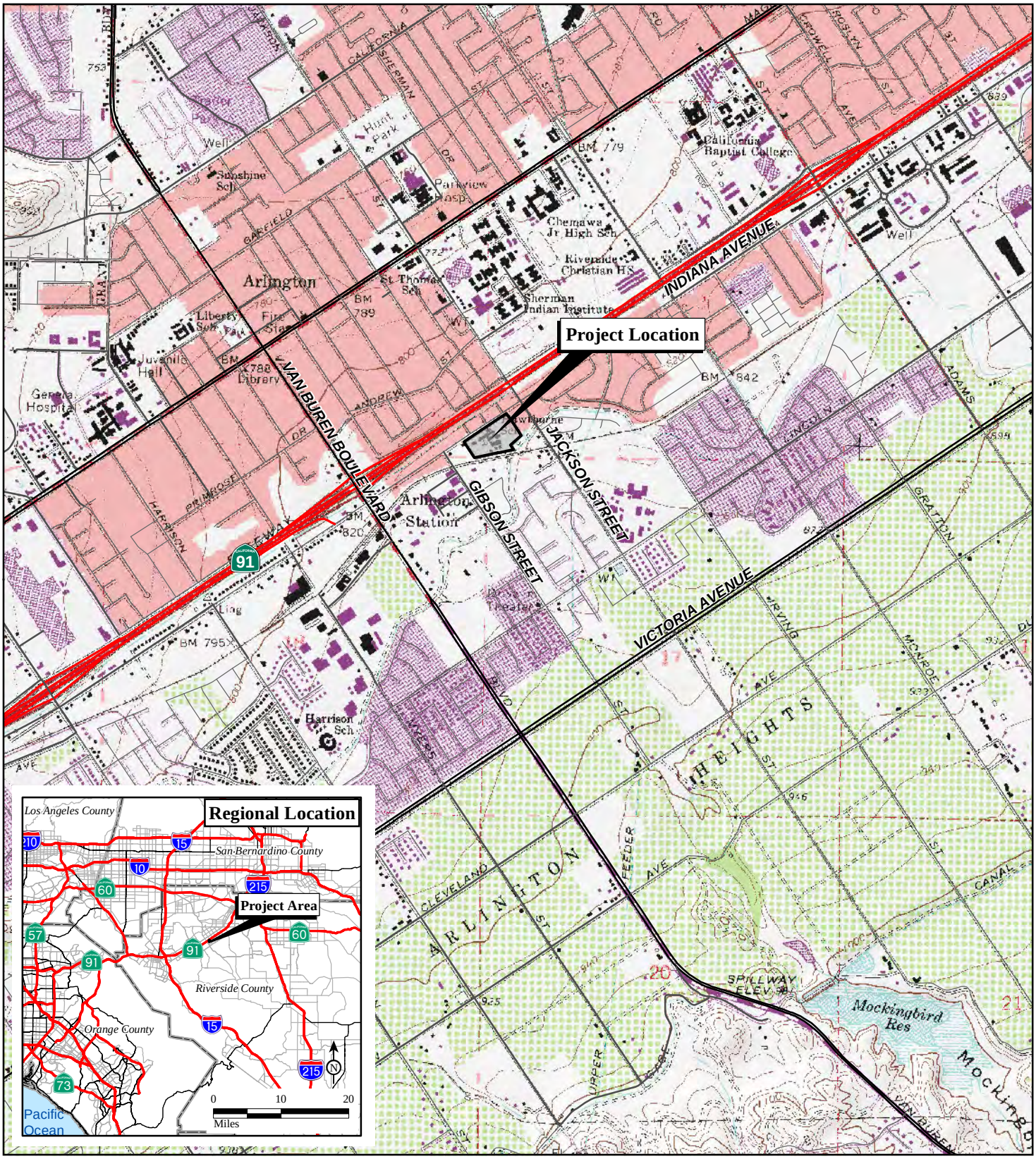
A: DEPARTMENT OF PARKS AND RECREATION (DPR) 523 FORMS

INTRODUCTION

LSA Associates, Inc. (LSA) is under contract to Steven Walker Communities, Inc. to conduct a cultural resources assessment for the proposed development of a single-family residential subdivision on 6.85 acres involving two parcels (Assessor's Parcel Numbers [APNs] 233-180-007 and 233-170-001) located at 9170 Indiana Avenue within the City of Riverside (City), Riverside County, California. This assessment was completed pursuant to the California Environmental Quality Act (CEQA), Public Resources Code (PRC) Chapter 2.6, Section 21083.2, and the California Code of Regulations, Title 14, Chapter 3, Article 5, Section 15064.5.

The project area is located east of Van Buren Boulevard, west of Jackson Street, and south of State Route 91 (SR-91) within an unsectioned portion of Township 3 South, Range 5 West as shown on the *Riverside West, California* 7.5-minute U.S. Geologic Survey (USGS) topographic map dated 1980 (Figure 1). The project area is developed with one historic-period property (the former Hawthorne Elementary School). Residential development is located across Indiana Avenue to the northwest, north, and northeast; immediately to the east; and across Jackson Street to the northeast, east, and southeast. The adjacent property west of the project area is vacant (Figure 2). The proposed project is a 54-lot single-family residential subdivision and related streets. To accommodate this development, all of the existing buildings and structures will be removed.



LSA

FIGURE 1

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Hawthorne Elementary School

Cultural Resources Assessment

Regional and Project Location

SOURCE: USGS 7.5' Quad: Riverside West, 1980, CA; Riverside County, 2015.

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LSA

FIGURE 2

Project Boundary

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FEET

SOURCE: Google Earth, 2016

Hawthorne Elementary School

Cultural Resources Assessment

Project Location

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METHODS

RECORDS SEARCH

On August 18, 2016, LSA Archaeologist Gini Austerman completed a cultural resources records search for the project area and a one-mile radius around it at the Eastern Information Center (EIC) of the California Historical Resources Information System (CHRIS) located at the California University of California, Riverside. The EIC is the state-designated repository for records pertaining to cultural resources in Riverside County. The objectives of this research were (1) to establish the status and extent of previously recorded cultural resources sites, surveys, and studies, (2) to note the likelihood of encountering cultural resources and their type(s) based on previously recorded resources within one mile of the project area, and (3) to uncover relevant historical contexts. Data sources consulted at the EIC include archaeological site records, historic USGS topographic maps, reports from previous studies, and the State Historic Resource Inventory (HRI) for Riverside County, which contains listings for the National Register of Historic Places (National Register), California Register of Historical Resources (California Register), California Historical Landmarks (CHL), and California Points of Historical Interest (CPHI).

ARCHIVAL RESEARCH

LSA conducted archival research in August and September 2016. Research methodology focused on the review of a variety of primary and secondary source materials relating to the history and development of the project area. Sources included, but were not limited to, online sources, published literature in local and regional history, historic aerial photographs, historic maps, and news articles. Based on archival research, historic context information relevant to the project area was developed. All references are included at the end of this report.

ARCHITECTURAL FIELD SURVEY

On August 31, 2016, LSA Architectural Historian Elisa Bechtel conducted an intensive-level architectural survey of the historic-period building and features. During the surveys, numerous photographs were taken of the exteriors of the buildings, as well as other features, and detailed notations were made regarding the structural and architectural characteristics and current conditions of the school and its associated features. A brief reconnaissance survey of the immediate vicinity was also conducted.

ARCHAEOLOGICAL FIELD SURVEY

Ms. Austerman conducted a concurrent intensive-level pedestrian survey of the entire Project Area for prehistoric and historic cultural residues utilizing transects spaced approximately 10 meters apart. Special attention was given to rodent burrows and associated backdirt for evidence of subsurface artifacts and deposits. The purpose of this survey was to identify and document any cultural resources that might be exposed and locate areas within the project area that might be sensitive for cultural

resources prior to the beginning of ground-disturbing activities. At the City of Riverside's direction, a small segment of the Upper Riverside Canal, located adjacent to the southern boundary of the project area, was examined and evaluated.

HISTORICAL OVERVIEW

PREHISTORY

The description of various prehistoric stages or chronologies identifying cultural evolution in the southern California area has been attempted numerous times, several of which chronologies are reviewed in Moratto (2004). No single description is universally accepted. The various chronologies are based primarily on material developments identified by researchers familiar with sites in a region, and variation exists essentially due to the differences in those items found at the sites. Small differences occur over time and space, which combine to form patterns that are variously interpreted.

Currently, two primary regional culture chronology syntheses are commonly referenced in the archaeological literature. The first, Wallace (1955), describes four cultural horizons or time periods: Horizon I – Early Man (9000–6500 BC), Horizon II – Milling Stone Assemblages (6500–2000 BC), Horizon III – Intermediate Cultures (2000 BC–AD 200), and Horizon IV – Late Prehistoric Cultures (AD 200–historic contact). This chronology was refined (Wallace 1978) using absolute chronological dates unavailable in 1955.

The second cultural chronology (Warren 1986) is based broadly on southern California prehistoric cultures, and was also revised (Warren 1984; Warren and Crabtree 1986). Warren's chronology includes five periods in prehistory: Lake Mojave (7000–5000 BC), Pinto (4000–3000 BC), Gypsum (1000 BC–AD 1), Saratoga Springs (AD 500–1000), and Protohistoric (AD 1500–historic contact). Changes in settlement pattern and subsistence focus are viewed as cultural adaptations to a changing environment, which begins with gradual environmental warming in the late Pleistocene, continues with the desiccation of the desert lakes, followed by a brief return to pluvial conditions, and concludes with a general warming and drying trend, with periodic reversals that continue to the present (Warren 1986).

ETHNOGRAPHY

The project area is situated near the intersection of the traditional tribal boundaries of the Cahuilla, Gabrielino, and Luiseño (Bean and Smith 1978; Kroeber 1925). According to Bean (1978), the Cahuilla probably occupied the project area at the time of Spanish contact.

Typically, the native culture groups in southern California are named after nearby Spanish period missions, and such is the case for these coastal Takic populations. For instance, the term "Gabrielino" is applied to the natives inhabiting the region around Mission San Gabriel, and "Luiseño" was given to those native people living within the "ecclesiastical jurisdiction of Mission San Luis Rey... [and who shared] an ancestral relationship which is evident in their cosmogony, and oral tradition, common language, and reciprocal relationship in ceremonies" (Oxendine 1983). The Cahuilla are one exception to this naming convention, as their territory was distant enough from the missions for them to be only marginally affected/assimilated by the missions in the last few years of the Spanish period.

The territory of the Cahuilla included most of Riverside County and portions of San Bernardino, San Diego, and Imperial Counties (Bean 1978). The territory of the Gabrielino included portions of Los Angeles, Orange, and San Bernardino Counties during ethnohistoric times, and also extended inland into northwestern Riverside County (Kroeber 1925; Heizer 1968). The territory of the Luiseño included portions of San Diego, Riverside, and Orange Counties (Kroeber 1925; Heizer 1968).

The Gabrielino, Cahuilla, and Luiseño were all hunters and gatherers; these Native American groups shared similar semi-sedentary lifestyles. They caught and collected seasonally available food resources, living in permanent communities along watercourses. Individuals from these villages took advantage of the varied resources available. Seasonally, as foods became available, native groups moved to temporary camps to collect plant foods and to conduct communal rabbit and deer hunts. Unlike the landlocked Cahuilla, the territories of the Gabrielino and Luiseño included coastline, allowing them to establish seasonal camps along the coast and near bays and estuaries to gather shellfish and hunt waterfowl (Hudson 1971).

Gabrielino

The Gabrielino were hunters and gatherers who utilized food resources along the coast as well as inland areas of Los Angeles, Orange, San Bernardino, and Riverside Counties during ethnographic times (Kroeber 1925; Heizer 1968).

The lifestyle of the Gabrielino was considered semi-sedentary, living in permanent communities near inland watercourses and coastal estuaries. They caught and collected seasonally available food, and moved to temporary camps to collect plant resources such as acorns, buckwheat, berries, and fruit as well as conducting communal rabbit and deer hunts. Seasonal camps were also established along the coast and near estuaries where they would gather shellfish and hunt waterfowl (Hudson 1971).

Social organization for the Gabrielino was focused on families living in small communities. Patrilineally organized, extended families would occupy villages; both clans and villages would marry outside of the clan or village (Heizer 1968). The villages were administered by a chief whose position was patrilineal, passed from the father to the son. Spiritual and medical activities were guided by a shaman; group hunting and fishing were supervised by individually appointed male leaders (Bean and Smith 1978).

Cahuilla

The other Native American tribe inhabiting the Riverside area was the Cahuilla, whose traditional territory encompassed diverse topography ranging from the Salton Sink to the San Bernardino Mountains and San Gorgonio Pass (Bean 1978; Kroeber 1925). The Cahuilla were generally divided into three groups: Desert Cahuilla, Mountain Cahuilla, and Pass Cahuilla (Kroeber 1925). Like other southern California Native American tribes, the Cahuilla were semi-nomadic peoples leaving their villages and using temporary camps near available plant and animal resources.

Cahuilla villages usually were in canyons or near adequate sources of water and food plants. The immediate village territory was owned in common by a lineage group or band. The other lands were divided into tracts owned by clans, families, or individuals. Trails used for hunting, trading, and

social interaction connected the villages. Each village was near numerous sacred sites that included rock art panels (Bean and Shipek 1978).

Social organization of the Cahuilla was patrilineal clans and kinships groups known as moieties. Lineages within a clan cooperated in defense, subsistence activities, and religious ceremonies. Most lineages owned their own village sites and resource plots, although the majority of their territory was open to all Cahuilla people (Bean 1978).

Luiseño

Prior to Spanish occupation of California, the territory of the Luiseño extended along the coast from Agua Hedionda Creek to the south, Aliso Creek to the northwest, and the Elsinore Valley and Palomar Mountain to the east. These territorial boundaries were somewhat fluid and changed through time. They encompassed an extremely diverse environment that included coastal beaches, lagoons and marshes, inland river valleys and foothills, and mountain groves of oaks and evergreens (Bean 1978a; Bean and Shipek 1978).

The Luiseño lived in small communities, which were the focus of family life. Patrilineally linked, extended families occupied each village (Kroeber 1925; Bean and Shipek 1978). The Luiseño believed in the idea of private property. Property rights covered items and land owned by the village as well as items (houses, gardens, ritual equipment, trade beads, eagle nests, and songs) owned by individuals. Trespass against any property was punished (Bean and Shipek 1978). Luiseño villages were politically independent, and were administered by a chief, who inherited his position from his father.

Luiseño subsistence was based primarily on seeds like acorns, grass seed, manzanita, sunflower, sage, chía, and pine nuts and game animals such as deer, rabbit, jackrabbit, wood rat, mice, antelope, and many types of birds (Bean and Shipek 1978). Seeds were dried and ground to be cooked into a mush. The Luiseño utilized fire for crop management and communal rabbit drives (Bean and Shipek 1978).

The Luiseño conducted elaborate rituals related to the god Chinigchinich including the taking of datura, a hallucinogenic, and painting with sand (Bean and Shipek 1978). Painting with sand appears to be a non-recent import from the Southwest. Other southern California Shoshonean coastal tribes practice sand painting, but there is no evidence that any of the tribes which reside between these two groups also practice sand painting (Kroeber 1925).

HISTORY

In California, the historic era is generally divided into three periods: the Spanish Period (1769 to 1821), the Mexican Period (1821 to 1848), and the American Period (1848 to present). Because the resource within the project area dates to the mid-20th century, the Spanish and Mexican periods are discussed only briefly.

Spanish Period

On January 8, 1774, the Juan Bautista de Anza expedition crossed the Colorado River and entered California. Bautista de Anza's second excursion into Riverside County included 29 soldiers and their wives and children, who would form the new community at the Presidio of San Francisco (Beattie 1925).

With the Spanish intrusion of the late 18th century came a drastic change in lifestyle for the natives of southern California. Incorporation of the indigenous populations into the mission system generally led to the disruption of native cultures and changes in subsistence and land use practices (Harley 1988).

Mexican Period

In 1821, Mexico overthrew Spanish rule and the missions began to decline. By 1833, the Mexican government passed the Secularization Act, and the missions, reorganized as parish churches, lost their vast land holdings, and released their neophytes. In 1834, a prominent group of Californians, including the Lugos, the Vallejos, the Picos, and the Ortegas, coerced Governor Figueroa in to creating the "Provisional Regulations." These regulations made mission lands available for their occupation (Beattie and Beattie 1939).

During the Mexican Period, the ranchos were predominantly devoted to cattle, with great tracts of land used for grazing. Until the Gold Rush of 1849, livestock and horticulture dominated the economics of California (Ingersoll 1904; Beattie 1925; Beattie and Beattie 1951). Sixteen ranchos were granted in Riverside County; one of these was the Sobrante de San Jacinto, granted to Miguel de Pedrorena and Rosario Estudillo de Agüirre, comprising over one hundred thousand acres (the project area is on the southwestern corner of the former rancho lands).

American Period

The American Period, 1848–present, began with the signing of the Treaty of Guadalupe Hidalgo. In 1850, California was accepted into the United States primarily because of the population increase created by the Gold Rush of 1849. The discovery of gold in the northern portion of the state increased Anglo settlement of the region. Mexican land grants had created large pastoral estates in California and the demand for beef during the Gold Rush led to a cattle boom that lasted from 1849–1855 (Jackson 1982). However, beginning around 1855, the demand for beef began to decline due to imports of sheep from New Mexico and cattle from the Mississippi and Missouri Valleys (Jackson 1982). When the beef market collapsed, many California ranchers lost their ranchos through foreclosure. A series of disastrous floods in 1861 and 1862, followed by two years of extreme drought, which continued to some extent until 1876, altered ranching forever in the area (Jackson 1982).

As travel along the Santa Fe Trail during the early American Period brought more settlers, the pattern of settlement developed along the Santa Ana and San Jacinto waterways. The Southern Pacific Railroad completed its line from Los Angeles through the San Gorgonio Pass in 1876. The trains were eventually used to transport settlers into the area, creating a period of agricultural and land development, ultimately resulting in the establishment of Riverside County in 1893. Transportation,

agriculture, and the control of water have continued to be central themes in the settlement, development, and growth of Riverside County (Robinson 1979).

Riverside. Originally part of the Jurupa Rancho, Riverside was founded in September 1870 by the Southern California Colony Association. The land was surveyed and platted with 10-acre parcels to the north and south and a one-square mile town site. The commercial core of the Mile Square began developing along Main Street in the center of town, while residential areas developed to the north, south, and east. In 1875, the Southern California Colony joined with the nearby New England and Santa Ana Colonies to form the Riverside Land and Irrigation Company, combining their land holdings. Riverside was predominantly an agricultural community, initially specializing in raisin grapes, alfalfa, hay, and stone fruits before these were supplanted by citrus production. With the completion of a canal system and the beginnings of a railroad infrastructure, Riverside rapidly became an economic boomtown. The City of Riverside was incorporated in 1883 and at the time encompassed approximately 56 square miles. By 1893, when Riverside became the county seat, public transportation lines of one kind or another connected Riverside to most other communities in southern California, attracting settlers and tourists alike. Through the early part of the 20th century, Riverside remained a relatively small but prosperous city, with its population increasing significantly during the 1920s and the citrus industry dominating the local economy.

However, following a period of decline in building during the Great Depression, the United States' entry into the Second World War prompted drastic change for the area. "Wartime increases in manufacturing industries prompted a complete shift in California's economy, with southern California leading the state's production. In addition, another wave of migration headed west in the post-war era with the most gains recorded in southern California" (Historic Resources Group 2013). The increase in population led to an unprecedented building boom. In Riverside, the economic shift and population growth reflected regional trends. In 1953, the *Press Enterprise* reported that Riverside was 14th among the fastest growing cities in the western United States (*The Press Enterprise* 1953). "As the dependence on agriculture lessened and population pressures increased, the groves and fields that dotted Riverside gave way to urban expansion, as it did elsewhere in southern California. Unlike the piecemeal sale of vacant lots seen in earlier decades, postwar development was characterized by the appearance of uniformly constructed tract homes along curving streets and cul-de-sacs and was supported by loans guaranteed by the Federal Housing Administration. Subsequently, historic downtown centers, such as Riverside's, were abandoned for new regional shopping centers that were developed to serve the suburban sprawl and responded to automobile culture, such as those focused around Arlington and Magnolia Avenues and westward along SR-91" (Historic Resources Group 2013). Development of other related amenities, such as schools and churches, were also a direct result of this residential boom. The subject property was constructed during the height of this period of suburban development.

RESULTS

RECORDS SEARCH

Data from the EIC noted 26 cultural resources outside of the project area, but within a one-mile radius of it. These include 17 residences, 2 commercial properties, 1 utility building, the Arlington Branch Library and Fire Hall, 2 water conveyance canals, and 2 historic roads. All but one (33-000107) of these resources dates to the historic-period (pre-1967). Site 33-00107 is presumed to be a prehistoric site and is located almost one mile west of the project area. The nearest resource to the project area is the Riverside Upper Canal (33-004495), which is adjacent to the southeastern Project Area boundary. A review of the HRI revealed that numerous historic-period resources within the one-mile radius have been previously documented and/or evaluated, but none was determined to be historically significant.

Table A lists the cultural resources within a one-mile radius of the project area that are mapped, documented on DPR forms, and on file at the EIC. Brief site descriptions are included in the table and a more detailed discussion of pertinent reports and resources is provided below.

Table A: Cultural Resources within One Mile of the Project

Primary #	Site Description
33-000107	No site description other than area of 40 by 50 meters; presumed to be a prehistoric site
33-004495	Upper Riverside Canal
33-004791	Lower Riverside Canal
33-008167	Woodcraft Home Historic District
33-009046	3519 Van Buren Boulevard, 1941 residence
33-009047	3605 Van Buren Boulevard, 1945 residence
33-009048	3619 Van Buren Boulevard, 1946 residence
33-009050	3645 Van Buren Boulevard, 1936 residence
33-009051	3719 Van Buren Boulevard, 1900 residence
33-009052	3729 Van Buren Boulevard, 1900 residence
33-009518	9556 Magnolia Avenue, Arlington Branch Library and Fire Hall, 1908
33-010974	9568 Arlington Avenue, 1920s residence
33-011087	3751 Everest Avenue, 1910 residence, demolished
33-011251	9525–9529 Magnolia Avenue, 1912 commercial building and horseshoes embedded in concrete
33-011361	Historic Victoria Avenue
33-011632	9720 Magnolia Avenue, 1912 residence
33-012172	3290 Monroe Avenue, 1948 residence
33-012183	4026 Van Buren Boulevard, 1949 residence
33-012901	3201 Gibson Street, 1949 residence
33-013080	3510 Van Buren Boulevard, 1956 residence

Table A: Cultural Resources within One Mile of the Project

Primary #	Site Description
33-013082	3473 Farnham Place, 1953 residence
33-013083	9484 Martha Way, 1954 residence
33-013084	9374 Martha Way, 1954 residence
33-015012	2547 Van Buren Boulevard, 1931 residence
33-023887	Van Buren/Rudicill intersection BNSF Rail Road siding and concrete platform
33-024194	9129 Magnolia Avenue, 1968 utility building

Resources

33-4495H. This resource is known as the Riverside Upper Canal; numerous segments of this resource have been previously documented. A segment near East La Cadena Drive and Spruce Street was documented in 1991 by Patricia Jertberg, but was not evaluated. Robert Wlodarksy and Dan Larson surveyed a segment of the canal in north Riverside in 1992 and noted that the integrity was good at that time; however, they did not formally evaluate it. In 1996, Richard Starzak and Lora Zier evaluated a segment of the canal at Spruce Street in Riverside and found the segment retained a high degree of integrity and recommended it as eligible for the National Register (California Historical Resource [CHR] Status Code of 3S).

The entire canal was evaluated in 2001 by Angie Gustafson. Originally the canal was just a ditch; in 1892, it was lined in concrete up to the Mile Square. This lining increased the speed of the water and limited the amount of water lost to seepage. In 2001, it was estimated that 40 percent of the canal was still used for its original purpose of irrigation. Portions have been abandoned and sections have been removed and replaced with newer materials, culverts, underground pipes or concrete tunnels. Gustafson found the canal no longer retains adequate integrity of setting, materials, and workmanship; although the overall integrity of the resource is poor, segments and features of the canal retain a greater degree of integrity. Gustafson recommended that, although the overall integrity of the canal was poor, if the canal was restored, the entire resource may be eligible for the National Register (CHR Status Code 4S7, now 7N1).

In 2009, Daniel Ballester documented a segment of the canal along the southwest side of Van Buren Boulevard and indicated that only 50 feet of the approximately 350-foot-long segment retained integrity. Ballester did not formally evaluate the segment. The segment in the project area does not appear to have been previously evaluated.

Reports

Data from the EIC indicate that there have been 12 previous cultural resource studies conducted in the records search area, one of which (RI-8247) includes the project area.

RI-8247. This study was conducted in 2009 by CRM TECH and consisted of a Phase I survey of approximately 150 acres of undeveloped land. The undertaking involved sinking wells at three of 12 possible locations, creating five new discharge stations, and installing two pump stations for the purpose

of increasing the capacity of the Arlington Desalting System. One well site (233-170-009) is located within the project area; no cultural resources were noted within the project area as a result of this study.

ARCHIVAL RESEARCH

The following historic context information relevant to the project area was developed based on archival research. As part of this study, the previous surveys were reviewed and additional research was conducted in an effort to verify and add to the data that have already been collected, as well as to explore other contexts within which the property might be significant. Building permit history of the property was sought for information regarding architects and contractors, as well as documentation of alterations to the property.

According to Hawthorne Elementary School's website, the school was originally founded in 1923 under the name Independiente School and was located on the subject property (Hawthorne Elementary School 2016). In 1958, plans were made to demolish the first iteration of the campus and construct the Modern-style complex evaluated in this report. It was during this time that the school also underwent a name change, becoming Hawthorne Elementary School (ibid.). Building permits dated from that year reveal that Bolton Moise, Jr. and Jones Brothers were hired as the architect and builders respectively (City of Riverside var.). Multipurpose alterations to the school were made in 1965 (ibid.). Historic maps and aerial photos indicate that the land to the southeast of the project area was predominantly vacant or agricultural in 1966, but aerial photos from 1967, 1994, and 2005 show residential tracts beginning to creep toward the subject property (HistoricAerials.com var.). The property itself remained largely unchanged during this period (ibid.). The school occupied this location until 2008, when it moved to a new facility located at 2700 Irving Street (Hawthorne Elementary School 2016). The subject property has remained unoccupied since, which has led to vandalism of the buildings and substantial overgrowth of the vacant land.

Architect

Pittsburgh-born architect Bolton Moise, Jr. (1905–1989) received his Bachelor's (1927) and Master's degrees (1931) in architecture from Harvard University where he received the AIA School Medal, which was given to the top-ranking graduating student in each architecture program accredited by the National Architectural Accrediting Board (City of Riverside Planning Department 2009:26). As a result of a prize he won as an architecture student, he spent two years studying in Paris under French architect Eduard Leon (ibid.). Upon his return to the United States, Moise worked for famed Modernist Edward Durrell Stone as a draftsman in 1934, before moving to the firm Franklin and Brown to be a designer in 1936. Stone was one of the three primary architects prominent in the development of New Formalism architecture, a style Moise would specialize in during the height of his career (Historic Resources Group 2013). "In 1938, he became a designer for the firm Desmond and Lord in Boston. While practicing on the east coast, Moise was involved in high-profile projects including the Museum of Modern Art, the New York World's Fair, and as a structural engineer on the wartime defenses of Boston Harbor. He also worked as a designer for General Motors" (Historic Resources Group 2013: Appendix B). With the onset of World War II, Moise joined the army and served as Captain in the Aviation Engineers, working as an engineering officer (Historic Resources Group 2013). After the war, he was assigned to March Air Force Base and, attracted by the impending development boom in the area, he decided to stay and open an office in downtown Riverside in 1947 (City of Riverside Planning Department 2009:26). He

practiced in Riverside until his retirement in 1970. Like Hawthorne Elementary, the majority of his work included public and educational buildings, such as La Granada Elementary School (1949), University Heights Middle School gym and music department (1950), Madison Elementary School (1952), Emerson Elementary School (1955), Alcott Elementary School (1958), and Polytechnic High School (1961–1965). The majority of these school buildings are modernist in style, and few maintain high integrity. His most prominent building in Riverside is the New Formalism-style main branch of the Riverside Public Library (1963–1965; City of Riverside Planning Department 2009:26). The library, which Moise designed with Edward Fickers, is a designated Landmark under the City's ordinance (City of Riverside Planning Department 2009:26). Another of his designs, the Modern-style Central Fire Station (1957), is listed in the California Register (ibid.).

No information was found regarding the contractor Jones Brothers.

Modernism

The Hawthorne Elementary School was designed in the Modern style of architecture. The Modern style, which is sometimes called Mid-Century Modern, gained favor generally between 1930 and 1970 and is an attempt to leave historic precedents behind. It combines Frank Lloyd Wright's principles of organic architecture with elements from the International and Bauhaus movements and uses modern construction methods, such as post-and-beam or concrete tilt-up designs (Fletcher n.d.). In addition, most Modern buildings incorporate modern appliances and innovations. The style is characterized by clean simple geometric or organic lines and typically incorporates concrete, metal, and glass. Some common elements include a low-profile, wide eaves and fascia, clerestory windows and geometric decorative accents. The City of Riverside Citywide Modernism Intensive Survey notes that the City has a large collection of schools built during the post-World War II period; most were built in or possess elements of the Modern style (Historic Resources Group 2013). It should also be noted that Hawthorne Elementary was not individually called out by the Survey as noteworthy.

ARCHAEOLOGICAL FIELD SURVEY

The archaeological survey was hindered by the ground surface being partially covered by buildings, concrete walkways and corridors, and asphalt driveway (approximately 70%). The entire project area has been moderately to severely disturbed by development. The playground area has been covered with a rubberized surface; the open space outside of the buildings has been used for recreation purposes. Mature trees and shrubbery were noted throughout the project area. No evidence of native soil was present in the project area. No archaeological resources were identified.

At the direction of the City, a segment of the Upper Riverside Canal was examined and evaluated. The segment, measuring approximately 400 feet in length, is located adjacent to the southern boundary of the project area between Jackson Street and the Burlington Northern and Santa Fe (BNSF) railroad tracks (Figures 3 and 4). The width of the canal segment ranges from approximately 50 feet at the western end near the railroad tracks and gradually decreases to approximately 20 feet at the eastern terminus at Jackson Street. The sides are slightly sloped inward. This segment is isolated from the rest of the canal by development at either end; it is filled with dirt and debris, and appears to be walled off at the intersection of the railroad tracks.

Figure 3: Location of Riverside Upper Canal segment (yellow arrow; Google 2016).

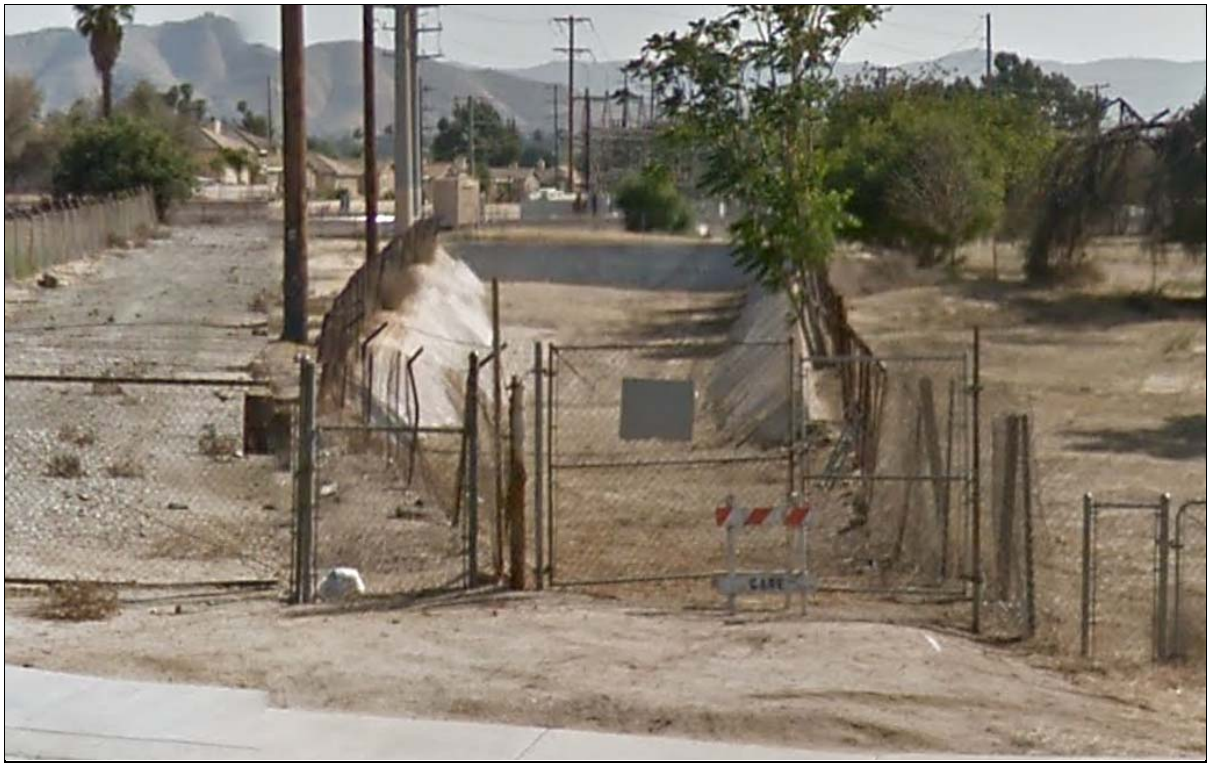

Figure 4: Segment of Riverside Upper Canal, view to the southwest from Jackson Street (Google 2015)

ARCHITECTURAL FIELD SURVEY

The now vacant Hawthorne Elementary School is located on Indiana Avenue in a predominantly residential neighborhood east of Van Buren Boulevard, west of Jackson Street, and south of SR-91. The school complex comprises eight buildings, several shade structures, playground equipment, many large trees, asphalt basketball courts, and several acres of vacant and overgrown land (Figures 5 through 23). The school's frontage along Indiana Avenue also features a long parking lot and bus turnout. Covered walkways link Buildings 1 through 3, 6, and 8. The school is in poor condition and has been vandalized (i.e., graffiti, broken windows, and various other damages) since its closure. The property also had several portable classroom buildings on the property (visible in Figure 5) but they have been removed and only foundation slabs remain.

Building 1 (Figures 6 and 7) is situated at the northern end of the complex and has a rectangular plan. It is surmounted by a very low side-gabled roof with eaves that extend out to shelter the northwestern and southeastern elevations. The exterior walls are clad in stucco. The building is utilitarian in nature with single doors on the northwestern, northeastern, and southeastern elevations. The northeastern elevation (Figure 7) also includes several aluminum vents.

Building 2 (Figures 8 through 10) is situated southwest of Building 1, along the parking lot and Indiana Avenue. It has a rectangular plan and is surmounted by a very low, nearly flat side-gabled roof with very wide eaves. The exterior walls are clad in modern stucco with red brick siding on the northwestern façade. The asymmetrical façade features covered walkways with metal pole supports; a full-width porch sheltered beneath projecting eaves; banks of aluminum-framed, fixed windows, and a ribbon of two-over-two, fixed clerestory windows that run the full length of the façade. Some of the windows are boarded up. The southeastern elevation includes several single doors that serve as entrances to what appear to be individual classrooms.

Building 3 (Figures 11 through 13) is situated at the northwest corner of the complex and fronts the parking lot and Indiana Avenue. It has a rectangular plan and is surmounted by a very low, nearly flat side-gabled roof with very wide eaves. The exterior walls are clad in modern stucco with red brick siding on the northwestern façade. The asymmetrical façade features a full-width porch sheltered beneath projecting eaves; banks of aluminum-framed, fixed windows; a ribbon of fixed clerestory windows that run the full length of the façade; and several single doors that serve as entrances to what appear to be individual classrooms.

The southeastern elevation, visible in Figure 13, includes a full-width porch sheltered beneath extended eaves supported by metal poles; large banks of aluminum-framed, fixed windows; and several single doors that serve as entrances to the individual classrooms. Several windows throughout the building are boarded up.

Building 4 (Figure 14) is a small rectangular building located at the southern end of the parcel. It is surmounted by a nearly flat roof and its exterior walls are clad in modern stucco. It is nondescript and utilitarian in nature. The only features are located on its north-facing façade. These include a full-width porch sheltered beneath an extended eave supported by metal poles and three single metal doors. It appears to have functioned as restroom facilities during the property's use as a school.

Building 5 (Figure 15) is also located at the southern end of the parcel, just northeast of Building 4. It has a rectangular plan, a shed roof, and modern stucco wall cladding. It is nondescript and utilitarian

in nature and all windows have been boarded up. The north-facing, symmetrical façade features two single doors.

Building 6 (Figures 16 through 18) is located at the northeastern corner of the complex and has a rectangular plan. It is surmounted by a very low-pitched side gabled roof with wide eaves. The exterior walls are clad in modern stucco. The northwestern and southeastern elevations feature full-width porches sheltered beneath extended eaves supported by metal poles and several single doors that serve as entrances to the individual classrooms. The covered porches are lined by low, brick planters.

Building 7 (Figure 19) is located at the eastern end of the complex and has a rectangular plan. It is surmounted by a shed roof with wide projecting eaves. The exterior walls are clad in modern stucco. Its southwestern façade features a single door and a bank of fixed windows. The northeastern elevation includes a full-width ribbon of fixed clerestory windows, some of which are boarded up.

Building 8 (Figure 20) is located at the eastern end of the complex and has a rectangular plan. The exterior walls are clad in modern stucco. The building is surmounted by a low-pitched shed roof with a wide extended eave on its southeastern elevation. This eave, supported by metal poles, creates a full-width porch along the elevation. This elevation also features low, brick planters, several single doors that serve as entrances to the individual classrooms, and additional doors can be found in the remaining elevations.

Figure 5: Overview of property with Indiana Avenue at the bottom left (Google 2016).

Figure 6: Building 1 façade and southwestern elevation, view to the east (8/31/16).

Figure 7: Building 1, northeastern elevation, view to the southwest (8/31/16).

Figure 8: Building 2 façade, view to the southeast (8/31/16).

Figure 9: Building 2 façade, view to the east (8/31/16).

Figure 10: Building 2, view to the north (8/31/16).

Figure 11: Building 3 façade, view to the southeast (8/31/16).

Figure 12: Building 3 southwestern elevation, view to the northeast (8/31/16).

Figure 13: Building 3 southeastern elevation, view to the northwest (8/31/16).

Figure 14: Building 4, northern elevation, view to the southeast (8/31/16).

Figure 15: Building 5, northern elevation, view to the southeast (8/31/16).

Figure 16: Building 6, southwestern and southeastern elevations, view to the northeast (8/31/16).

Figure 17: Building 6, southeastern elevation, view to the north (8/31/16).

Figure 18: Building 6, southeastern elevation, view to the north (8/31/16).

Figure 19: Building 7, southeastern and northeastern elevations, view to the northwest (8/31/16).

Figure 20: Building 8 view to the north (8/31/16).

Figure 21: Shade structure between buildings 1 and 8, view to the southwest (8/31/16).

Figure 22 Playground, view to the northeast (8/31/16).

Figure 23: Northeastern field/vacant land, view to the north (8/31/16).

SIGNIFICANCE EVALUATION

Based on the research and field results discussed above, the following sections present the historical significance evaluation for the Hawthorne Elementary School and the conclusion on whether it qualifies as a "historical resource" as defined by CEQA. Pursuant to City of Riverside requirements, although this is a CEQA project, the resource is also evaluated under the National Register of Historic Places (National Register) criteria.

The isolated and modernized segment of the Riverside Upper Canal, located adjacent to the project area, has sustained significant alterations and has lost integrity. Therefore, it is not being formally evaluated in this section. However, a DPR Update form, which provides additional detail and a map, has been completed for it and can be found in Appendix A.

DEFINITIONS

CEQA (PRC Chapter 2.6, Section 21083.2 and CCR Title 145, Chapter 3, Article 5, Section 15064.5) calls for the evaluation of resources to determine whether they qualify as "historical resources" as defined by CEQA. The criteria for determining the historical significance of resources are based on Section 15064.5 of the CEQA Guidelines and Guidelines for the Nomination of Properties to the California Register. Properties eligible for listing in the California Register and subject to review under CEQA are those meeting the criteria for listing in the California Register, National Register, or designation under a local ordinance. Once a resource has been determined to be a "historical resource," it must be determined whether there will be impacts to the resource.

National Register of Historic Places

A cultural resource is evaluated for eligibility for listing in the National Register according to four criteria. These criteria generally require that the resource be 50 years of age or older and significant at the local, state, or national level according to one or more of the following:

A. It is associated with events that have made a significant contribution to the broad patterns of local or regional history;

B. It is associated with the lives of persons significant in our past;

C. It 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 that represent a significant and distinguishable entity whose components lack individual distinction; and/or

D. It has yielded, or has the potential to yield, information important to the prehistory or history of the local area, California, or the nation.

Properties that are not 50 years of age or older must have "exceptional significance" in accordance with National Register Criteria Considerations. The National Register also requires that a resource

possess integrity, which is defined as "the ability of a property to convey its significance." The aspects of integrity are location, design, setting, materials, workmanship, feeling, and association. To determine which of these factors are most important will depend on the particular National Register criterion under which the resource is considered eligible for listing.

California Register of Historical Resources

For a property to be eligible for inclusion in the California Register, one or more of the following criteria must be met:

1. It is associated with the events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States;
2. It is associated with the lives of persons important to local, California, or national history;
3. It embodies the distinctive characteristics of a type, period, region, or method or construction, or represents the work of a master, or possesses high artistic values; and/or
4. It has yielded, or has the potential to yield, information important to the prehistory or history of the local area, California, or the nation.

In addition to meeting one or more of the above criteria, the California Register requires that sufficient time has passed since a resource's period of significance to "obtain a scholarly perspective on the events or individuals associated with the resource." Fifty years is used as a general estimate of time needed to develop the perspective to understand the resource's significance (CCR 4852 [d][2]).

The California Register also requires that a resource possess integrity, which is defined as "the authenticity of an historical resource's physical identity evidenced by the survival of characteristics that existed during the resource's period of significance" (California Office of Historic Preservation 1999:2). To retain integrity, a resource should have its original location, design, setting, materials, workmanship, feeling, and association. Which of these factors is most important depends on the particular criterion under which the resource is considered eligible for listing (California Office of Historic Preservation 1999). There are seven aspects of integrity:

a) *Location* is the place where the historic property was constructed or the place where the historic event occurred.
b) *Design* is the combination of elements that create the form, plan, space, structure, and style of a property.
c) *Setting* is the physical environment of a historic property.
d) *Materials* are the physical elements that were combined or deposited during a particular period of time and in a particular pattern or configuration to form a historic property.
e) *Workmanship* is the physical evidence of the crafts of a particular culture or people during any given period in history or prehistory.
f) *Feeling* is a property's expression of the aesthetic or historic sense of a particular period of time.
g) *Association* is the direct link between an important historic event or person and a historic property.

City of Riverside Cultural Resources Ordinance

The City of Riverside's Cultural Resources Ordinance provides four categories of historical significance: Landmark, Structure or Resource of Merit, Historic District, and Neighborhood Conservation Area. The criteria for these are outlined in the Riverside Municipal Code (RMC) 20.50.010. Since the school property does not appear to be part of a potential Historic District or Neighborhood Conservation Area, those designations are not discussed further. Consideration of the Landmark and Structure of Merit categories is appropriate for this property. The primary difference between these categories is that Landmarks typically require a higher degree of integrity.

A Landmark is defined as "any improvement or natural feature that is an exceptional example of a historical, archaeological, cultural, architectural, community, aesthetic or artistic heritage of the City, retains a high degree of integrity, and meets one or more of the following criteria":

1. Exemplifies or reflects special elements of the City's cultural, social, economic, political, aesthetic, engineering, architectural, or natural history;
2. Is identified with persons or events significant in local, state, or national history;
3. Embodies distinctive characteristics of a style, type, period, or method of construction, or is a valuable example of the use of indigenous materials or craftsmanship;
4. Represents the work of a notable builder, designer, or architect, or important creative individual;
5. Embodies elements that possess high artistic values or represents a significant structural or architectural achievement or innovation;
6. Reflects significant geographical patterns, including those associated with different eras of settlement and growth, particular transportation modes, or distinctive examples of park or community planning, or cultural landscape;
7. Is one of the last remaining examples in the City, region, state, or nation possessing distinguishing characteristics of an architectural or historical type or specimen; or
8. Has yielded, or may be likely to yield, information important in history or prehistory.

A Structure or Resource of Merit is defined as "any improvement or natural feature which contributes to the broader understanding of the historical, archaeological, cultural, architectural, community, aesthetic, or artistic heritage of the City, retains sufficient integrity, and" meets one or more of the following criteria:

1. Has a unique location or singular physical characteristics or is a view or vista representing an established and familiar visual feature of a neighborhood community or of the City;
2. Is an example of a type of building which was once common but is now rare in its neighborhood, community, or area;
3. Is connected with a business or use which was once common but is now rare;
4. A Cultural Resource that could be eligible under Landmark Criteria no longer exhibiting a high level of integrity, however, retaining sufficient integrity to convey significance under one or more of the Landmark Criteria;
5. Has yielded or may be likely to yield, information, important in history or prehistory; or

6. An improvement or resource that no longer exhibits the high degree of integrity sufficient for Landmark designation, yet still retains sufficient integrity under one or more of the Landmark criteria to convey cultural resource significance as a Structure or Resource of Merit. (Ord. 7248 §5, 2014; Ord. 7206 §24, 2013; Ord. 7108 §1, 2010)

EVALUATION

Summary of History

The project area consists of 6.85 acres involving two parcels (APNs 233-180-007 and 233-170-001) developed with one historic-period property (the former Hawthorne Elementary School). The school complex was designed by noted Riverside architect Bolton Moise, Jr. and constructed in 1958 by Jones Brothers. The school complex comprises eight buildings, several shade structures, playground equipment, many large trees, asphalt basketball courts, and several acres of vacant and overgrown land.

During the Modern period (1967 to present), the complex has sustained relatively few alterations, but has fallen into disrepair and has been vandalized numerous times since school operations were moved to a new facility in 2008. Today, the property is remains vacant and overgrown.

Significance Evaluation

As previously stated, the property is being evaluated for significance under the National Register criteria, California Register criteria, and the City's criteria for local designation. Because the National Register and California Register criteria are so similar, they are addressed together.

National Register and California Register Criteria. Under Criteria A/1, the former Hawthorne Elementary School is associated with the post-World War II (WWII) residential boom that swept southern California and the nation. This residential boom resulted in the construction of related amenities, such as schools, churches, and commercial buildings. The Riverside City School District's decision to build on this site reflects the general shift of Riverside's population away from the downtown area toward suburban subdivisions focused around Arlington and Magnolia Avenues and west along SR-91. However, Riverside has a large collection of schools built during the post-WWII period, making the subject property no more representative of this trend than any other from this period. Within the historic context of the postwar population boom, this modest, altered school campus is not individually significant. Therefore, it is not significant under these criteria.

Under Criteria B/2, no information was found to suggest that this property is associated with any person significant in local, state, or national history. Therefore, it is not significant under these criteria.

Under Criteria C/3, the property embodies some characteristics of the Modern style, such as the buildings' low profiles; clean, simple lines; incorporation of concrete and glass; wide eaves; and clerestory windows. However, the buildings are not an exceptional example of the Modern style and, according to a 2013 survey of the City, there are at least 150 other buildings, including several

schools, in the City that are better examples of the style. The property does not appear to have a unique method of construction or use unique materials.

Building permits reveal that the property was designed by prominent local Modernist architect Bolton Moise, Jr., who is considered significant at a local level for his contributions to the architectural aesthetic of Riverside (where the majority, if not all, of his work can be found) during the mid- to late-20th century. This property, however, is a very modest example of Moise's work. As noted previously, a more fully realized example of the style that also exhibits a high degree of integrity, Moise's 1957 Central Fire Station located downtown, is listed in the California Register. While Moise was a well-established fixture in Riverside and the region, and while the building is a representative, although modest, example of his work, there are other, more elaborate buildings in Riverside area that convey a stronger association with his career and design aesthetic. Consequently, the school is not significant for its association with this prominent architect.

Online searches, including use of Ancestry.com, provided no evidence indicating that the contractor, Jones Brothers, is significant in local, state, or national history.

Under Criteria D/4, which typically relates to archaeological resources, the former Hawthorne Elementary School property does not have the potential to yield information on 20th century construction techniques. Therefore, it is not significant under these criteria.

CA-RIV-4495H. This segment of the Riverside Upper Canal does not appear to be eligible for listing in the National Register or California Register or for designation under the local ordinance. It is an isolated segment that is cut off from the remainder of the canal.

Under National Register and California Register criteria A/1, although the Riverside Upper Canal is associated with events that have made a significant contribution to the settlement of Riverside, this segment no longer retains adequate integrity to convey its association with those events.

Under National Register and California Register criteria B/2, the canal is not associated with the lives of persons significant in our past.

Under National Register and California Register criteria C/3, this segment of the Riverside Upper Canal does not embody distinctive characteristics of a type, period, or method of construction. It does not represent the work of a master, possess high artistic values, or represent a significant and distinguishable entity whose components may lack individual distinction.

Under National Register and California Register criteria D/4 this segment of the Riverside Upper Canal is not likely to yield, information important in prehistory or history due to the fact that segments of the canal have been abandoned and removed; the subject segment is completely isolated from the original canal by development and is walled off between Jackson Street and the railroad.

This resource is outside of the project and was evaluated at the request of the City. The current project will not result in changes to the canal; therefore, this resource is not a historical resource under CEQA.

City of Riverside Landmark Criteria. The former Hawthorne Elementary School is not an exceptional example of historical, archaeological, cultural, architectural, community, aesthetic, or artistic heritage of the City. Landmark criteria require that the building be both exceptional and retain high integrity in order to be considered for designation as a Landmark. If either of those criteria is missing, the property does not meet the basic requirements for designation as a Landmark. Since the subject property is not exceptional, it does not meet the minimum qualifications and no further discussion of the Landmark criteria is provided.

City of Riverside Structure of Merit Criteria. Under Structure of Merit Criterion 1, the property does not have a unique location or singular physical characteristics, nor is it a view or vista representing an established and familiar feature of a neighborhood, community, or of the City. Therefore, it is not eligible under this criterion.

Under Structure of Merit Criterion 2, the property is not an example of a type of building that was once common but is now rare in its neighborhood, community, or area. As discussed previously, Riverside has a large collection of schools built during the post-WWII period and this example is merely one of many. Therefore, it is not eligible under this criterion.

Structure of Merit Criterion 3 is for properties connected with a business or use which was once common but is now rare. As the property was used for educational purposes, a use that continues to be common and not rare, this criterion does not apply.

Structure of Merit Criterion 4 is for properties that retain sufficient, but not necessarily high integrity, and that meet one or more of the Landmark criteria. As discussed above under National Register/ California Criterion C/3, the property is a modest example of the work of locally significant Modernist architect Bolton Moise, Jr. and that there are other, more fully realized examples of his work that convey a stronger association with his career, as well as being more representative examples the Modern style in the Riverside area. Therefore, it is not eligible under this criterion.

Under Structure of Merit Criterion 5, which typically relates to archaeological resources, the former Hawthorne Elementary School property does not have the potential to yield information important in history or prehistory. Therefore, it is not eligible under this criterion.

Structure of Merit Criterion 6 is essentially the same as Criterion 4 in that it is for properties that retain sufficient integrity to convey significance under one or more of the Landmark criteria. Since this has been addressed under Criterion 4, no further discussion is provided.

CONCLUSION

Based on the above analysis, the property does not meet any of the criteria for listing in the National Register or California Register or for local designation. Therefore, it is not a historical resource as defined by CEQA.

As previously noted, a segment of the Upper Riverside Canal (33-4495H) is adjacent to the southern boundary and outside of the project area. The segment has sustained alterations and has lost integrity. Per the request of the City to consider the effects of the current project on the canal, LSA evaluated

the adjacent segment. This segment lacks the necessary elements to qualify as a historical resource under CEQA. Therefore, it is not historically significant individually and does not contribute to the significance of the larger resource.

RECOMMENDATIONS

The foregoing report has provided background information on the project area and outlined the research, field survey, methods, and results. Throughout the course of the study, no "historical resources," as defined by CEQA, were encountered within or adjacent to the project area. Therefore, the City may reach a finding of *No Impact* regarding cultural resources. No mitigation measures are recommended for cultural resources. No further cultural resources investigation is recommended for the Project unless development plans change to include areas not covered by this study.

In the event any archaeological resources are identified during earthmoving activities, work in the area should be halted until the nature and significance of the find can be assessed by a qualified archaeologist.

In the event human remains are encountered, State Health and Safety Code Section 7050.5 states that no further disturbance shall occur until the County Coroner has made a determination of origin and disposition pursuant to PRC Section 5097.98. The County Coroner must be notified of the find immediately. If the remains are determined to be prehistoric, the Coroner will notify the Native American Heritage Commission (NAHC), which will determine and notify a Most Likely Descendant (MLD). With the permission of the landowner or his/her authorized representative, the MLD may inspect the site of the discovery. The MLD shall complete the inspection within 48 hours of notification by the NAHC. The MLD may recommend scientific removal and nondestructive analysis of human remains and items associated with Native American burials.

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APPENDIX A

DEPARTMENT OF PARKS AND RECREATION (DPR) 523 FORMS

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

Primary # _____
HRI # _____
Trinomial _____
NRHP Status Code 6Z
Other Listings _____
Review Code _____ Reviewer _____ Date _____

 Resource Name or #: 9170 Indiana Avenue

P1. Other Identifier: former Hawthorne Elementary School

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County:** Riverside **and** (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad:** *Riverside West, CA* **Date:** 1967 PR 1980 **T** 3S ; **R** 5W ; Sec. 5 S.B.**B.M.**

c. Address: 9170 Indiana Avenue **City:** Riverside **Zip:** 92503

d. UTM: Zone: 11; _____mE/ _____mN (G.P.S.)

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate) APN: 233-180-007; 233-170-001

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

The now vacant Hawthorne Elementary School is located on Indiana Avenue in a predominantly residential neighborhood northeast of Van Buren Boulevard, southwest of Jackson Street, and southeast of SR-91. The school complex comprises eight buildings, several shade structures, playground equipment, many large trees, asphalt basketball courts, and several acres of vacant and overgrown land. The school's frontage along Indiana Avenue also features a long parking lot and bus turnout. Covered walkways link Buildings 1, 2, 3, 6, and 8. The school is in poor condition and has been vandalized (i.e., graffiti, broken windows, and various other damages) since its closure. The property also had several portable classroom buildings on the property (visible in P5a) but they have been removed and only foundation slabs remain.

Building 1 is situated at the northern end of the complex and has a rectangular plan. It is surmounted by a very low side-gabled roof with eaves that extend out to shelter the northwestern and southeastern elevations. The exterior walls are clad in stucco. The building is utilitarian in nature with single doors on the northwestern, northeastern, and southeastern elevations. The northeastern elevation also includes several aluminum vents.

Building 2 is situated southwest of Building 1, along the parking lot and Indiana Avenue. It has a rectangular plan and is surmounted by a very low, nearly flat side-gabled roof with very wide eaves. The exterior walls are clad in modern stucco with red brick siding on the northwestern façade. The asymmetrical façade features covered walkways with metal pole supports; a full-width porch sheltered beneath projecting eaves; banks of aluminum-framed, fixed windows, and a ribbon of two-over-two, fixed clerestory windows that run the full length of the façade. Some of the windows are boarded up. The southeastern elevation includes several single doors that serve as entrances to what appear to be individual classrooms. *See Continuation Sheet.*

***P3b. Resource Attributes:** (List attributes and codes) HP15. Educational building

***P4. Resources Present:** ☒Building ☐Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5a. Photo or Drawing (Photo required for buildings, structures, and objects.)

See Continuation Sheet

P5b. Description of Photo: (View, date, accession #) Overview of school site (Google 2016).

***P6. Date Constructed/Age and Sources:** ☒Historic ☐Prehistoric ☐Both
1958 (Building permits)

***P7. Owner and Address:** Unknown

***P8. Recorded by:** (Name, affiliation, and address)
Elisa Bechtel, MLitt
LSA Associates, Inc.
1500 Iowa Avenue, Suite 200
Riverside, CA 92507

***P9. Date Recorded:** September 2016

***P10. Survey Type:** (Describe) Intensive-level Section 106 and CEQA compliance

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") Bechtel and Austerman 2016. Cultural Resources Assessment, Hawthorne Elementary School Project, City of Riverside, County of Riverside, California.

***Attachments:** ☐NONE ☐Location Map ☐Sketch Map ☒Continuation Sheet ☒Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☐Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

*NRHP Status Code 6Z

*Resource Name or # (Assigned by recorder) 9170 Indiana Avenue

B1. Historic Name: Hawthorne Elementary School
B2. Common Name: former Hawthorne Elementary School
B3. Original Use: Educational building **B4. Present Use:** Vacant
***B5. Architectural Style:** Modern
***B6. Construction History:** (Construction date, alterations, and date of alterations)
1958- Original building permit for Hawthorne School. Bolton Moise, Jr. and Jones Brothers listed as architect and contractor.
1965- Building permits for unspecified, "multi-purpose" alterations.
***B7. Moved?** ☒No ☐Yes ☐Unknown **Date:** _____ **Original Location:** _____
***B8. Related Features:**
Outdoor play equipment, parking lot south of the building, and overgrown, vacant land.
B9a. Architect: Bolton Moise, Jr. **b. Builder:** Jones Brothers
***B10. Significance: Theme:** Modernism Architecture **Area:** City of Riverside
Period of Significance: 1958 **Property Type:** Educational building **Applicable Criteria:** NA
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)
This 1958 Modern school complex does not appear to meet the criteria for listing in the National Register of Historic Places, the California Register of Historic Places, or for local designation.

Historic Context. In summary, the project area is developed with the former Hawthorne Elementary School. According to Hawthorne Elementary School's website, the school was originally founded in 1923 under the name Independiente School and was located on the subject property (Hawthorne Elementary School 2016). In 1958, plans were made to demolish the first iteration of the campus and construct the Modern-style complex evaluated in this report. It was during this time that the school also underwent a name change, becoming Hawthorne Elementary School (ibid.). Building permits dated from that year reveal that Bolton Moise, Jr. and Jones Brothers were hired as the architect and builders respectively (City of Riverside var.). Multipurpose alterations to the school were made in 1965 (ibid.). Historic maps and aerial photos indicate that the land to the southeast of the project area was predominantly vacant or agricultural in 1966, but aerial photos from 1967, 1994, and 2005 show residential tracts beginning to creep toward the subject property (HistoricAerials.com var.). The property itself remained largely unchanged during this period (ibid.). The school occupied this location until 2008, when it moved to a new facility located at 2700 Irving Street (Hawthorne Elementary School 2016). The subject property has remained unoccupied since, which has led to vandalism of the buildings and substantial overgrowth of the vacant land.

For a more detailed context on the history of Riverside, the periods of significance, Modern architecture, and architect Bolton Moise, Jr., please refer to the related report (P11 above). *See Continuation Sheet*

B11. Additional Resource Attributes: (List attributes and codes)
***B12. References:**

Hawthorne Elementary School
2016 "About Hawthorne Elementary." Accessed online in September 2016 at: http://www.rusdlink.org/domain/1812.
Historic Aerials (HistoricAerials.com)
var. 1948, 1966, 1967, 1994, and 2002 Aerial photograph of project area.
Riverside, City of
var. Building permits for 9170 Indiana Avenue. On file at the Riverside Department of Building and Safety.

B13. Remarks:
***B14. Evaluator:** Elisa Bechtel, MLitt, LSA Associates, Inc., 1500 Iowa Avenue, Suite 200, Riverside, CA 92507
***Date of Evaluation:** September 2016

(Sketch Map with north arrow required.)

(This space reserved for official comments.)

***P3a. Description.** (continued from page 1) Building 3 is situated at the northwest corner of the complex and fronts the parking lot and Indiana Avenue. It has a rectangular plan and is surmounted by a very low, nearly flat side-gabled roof with very wide eaves. The exterior walls are clad in modern stucco with red brick siding on the northwestern façade. The asymmetrical façade features a full-width porch sheltered beneath projecting eaves; banks of aluminum-framed, fixed windows; a ribbon of fixed clerestory windows that run the full length of the façade; and several single doors that serve as entrances to what appear to be individual classrooms. The southeastern elevation includes a full-width porch sheltered beneath extended eaves supported by metal poles; large banks of aluminum-framed, fixed windows; and several single doors that serve as entrances to the individual classrooms. Several windows throughout the building are boarded up.

Building 4 is a small rectangular building located at the southern end of the parcel. It is surmounted by a nearly flat roof and its exterior walls are clad in modern stucco. It is nondescript and utilitarian in nature. The only features are located on its north-facing façade. These include a full-width porch sheltered beneath an extended eave supported by metal poles and three single metal doors. It appears to have functioned as restroom facilities during the property's use as a school.

Building 5 is also located at the southern end of the parcel, just northeast of Building 4. It has a rectangular plan, a shed roof, and modern stucco wall cladding. It is nondescript and utilitarian in nature and all windows have been boarded up. The north-facing, symmetrical façade features two single doors.

Building 6 is located at the northeastern corner of the complex and has a rectangular plan. It is surmounted by a very low-pitched side gabled roof with wide eaves. The exterior walls are clad in modern stucco. The northwestern and southeastern elevations feature full-width porches sheltered beneath extended eaves supported by metal poles and several single doors that serve as entrances to the individual classrooms. The covered porches are lined by low, brick planters.

Building 7 is located at the eastern end of the complex and has a rectangular plan. It is surmounted by a shed roof with wide projecting eaves. The exterior walls are clad in modern stucco. Its southwestern façade features a single door and a bank of fixed windows. The northeastern elevation includes a full-width ribbon of fixed clerestory windows, some of which are boarded up.

Building 8 is located at the eastern end of the complex and has a rectangular plan. The exterior walls are clad in modern stucco. The building is surmounted by a low-pitched shed roof with a wide extended eave on its southeastern elevation. This eave, supported by metal poles, creates a full-width porch along the elevation. This elevation also features low, brick planters, several single doors that serve as entrances to the individual classrooms, and additional doors can be found in the remaining elevations.

P5a. Photo or Drawing (continued from page 1)

Building 1 façade and southwestern elevation, view to the east (8/31/16).

Building 1, northeastern elevation, view to the southwest (8/31/16).

(*See Continuation Sheet)*

Building 2 façade, view to the east (8/31/16).

Building 3 façade, view to the southeast (8/31/16).

Left: Building 4, northern elevation, view to the southeast; right: Building 5, northern elevation, view to the southeast (8/31/16).

(See Continuation Sheet)

Building 6, southeastern elevation, view to the north (8/31/16).

Building 7, southeastern and northeastern elevations, view to the northwest (8/31/16).

Building 8 view to the north (8/31/16).

***B10. Significance**. (continued from page 2) As previously stated, the property is being evaluated for significance under the National Register criteria, California Register criteria, and the City's criteria for local designation. Because the National Register and California Register criteria are so similar, they are addressed together.

National Register and California Register Criteria. Under Criteria A/1, the former Hawthorne Elementary School is associated with the post-World War II (WWII) residential boom that swept southern California and the nation. This residential boom resulted in the construction of related amenities, such as schools, churches, and commercial buildings. The Riverside City School District's decision to build on this site reflects the general shift of Riverside's population away from the downtown area toward suburban subdivisions focused around Arlington and Magnolia Avenues and west along SR-91. However, Riverside has a large collection of schools built during the post-WWII period, making the subject property no more representative of this trend than any other from this period. Within the historic context of the postwar population boom, this modest, altered school campus is not individually significant. Therefore, it is not significant under these criteria. (*See Continuation Sheet)*

***B10. Significance**. (continued from page 5)
Under Criteria B/2, no information was found to suggest that this property is associated with any person significant in local, state, or national history. Therefore, it is not significant under these criteria.

Under Criteria C/3, the property embodies some characteristics of the Modern style, such as the buildings' low profiles; clean, simple lines; incorporation of concrete and glass; wide eaves; and clerestory windows. However, the buildings are not an exceptional example of the Modern style and, according to a 2013 survey of the City, there are at least 150 other buildings, including several schools, in the City that are better examples of the style. Furthermore, the property has suffered from neglect since school operations were moved to a new location in 2008. Damage to the buildings and grounds has compromised the property's integrity. The property does not appear to have a unique method of construction or use unique materials.

Building permits reveal that the property was designed by prominent local Modernist architect Bolton Moise, Jr., who is considered significant at a local level for his contributions to the architectural aesthetic of Riverside (where the majority, if not all, of his work can be found) during the mid- to late-20th century. This property, however, is a very modest example of Moise's work. As noted previously, a more fully realized example of the style that also exhibits a high degree of integrity, Moise's 1957 Central Fire Station located downtown, is listed in the California Register. While Moise was a well-established fixture in Riverside and the region, and while the building is a representative, although modest, example of his work, there are other, more elaborate buildings in Riverside area that convey a stronger association with his career and design aesthetic. Consequently, the school is not significant for its association with this prominent architect.

Online searches, including use of Ancestry.com, provided no evidence indicating that the contractor, Jones Brothers, is significant in local, state, or national history.

Under Criteria D/4, which typically relates to archaeological resources, the former Hawthorne Elementary School property does not have the potential to yield information on 20th century construction techniques. Therefore, it is not significant under these criteria.

City of Riverside Landmark Criteria. The former Hawthorne Elementary School is not an exceptional example of historical, archaeological, cultural, architectural, community, aesthetic, or artistic heritage of the City. Based on information previously opined by Assistant City Attorney Anthony Beaumon, the Landmark criteria require that the building be both exceptional and retain high integrity in order to be considered for designation as a Landmark. If either of those criteria is missing, the property does not meet the basic requirements for designation as a Landmark. Since the subject property is not exceptional, it does not meet the minimum qualifications and no further discussion of the Landmark criteria is provided.

City of Riverside Structure of Merit Criteria. Under Structure of Merit Criterion 1, the property does not have a unique location or singular physical characteristics, nor is it a view or vista representing an established and familiar feature of a neighborhood, community, or of the City. Therefore, it is not eligible under this criterion.

Under Structure of Merit Criterion 2, the property is not an example of a type of building that was once common but is now rare in its neighborhood, community, or area. As discussed previously, Riverside has a large collection of schools built during the post-WWII period and this example is merely one of many. Therefore, it is not eligible under this criterion.

Structure of Merit Criterion 3 is for properties connected with a business or use which was once common but is now rare. As the property was used as for educational purposes and was never associated with a business, this criterion does not apply.

Structure of Merit Criterion 4 is for properties that retain sufficient, but not necessarily high integrity, and that meet one or more of the Landmark criteria. As discussed above under California Criterion 3, the property is a modest example of the work of locally significant Modernist architect Bolton Moise, Jr. and that there are other, more fully realized examples of his work that convey a stronger association with his career, as well as being more representative examples the Modern style in the Riverside area. Therefore, it is not eligible under this criterion.

Under Structure of Merit Criterion 5, which typically relates to archaeological resources, the former Hawthorne Elementary School property does not have the potential to yield information important in history or prehistory. Therefore, it is not eligible under this criterion.

(*See Continuation Sheet)*

***B10. Significance**. (continued from page 6)

Structure of Merit Criterion 6 is essentially the same as Criterion 4 in that it is for properties that retain sufficient integrity to convey significance under one or more of the Landmark criteria. Since this has been addressed under Criterion 4, no further discussion is provided.

Significance Evaluation Conclusion. Based on the above analysis, the property does not meet any of the criteria for listing in the National Register, California Register, or for local designation. Therefore, it is not a historical resource as defined by CEQA.

Background. Numerous segments of this canal have been previously documented and/or evaluated. In 2001, the entire canal was documented and evaluated as potentially eligible for listing in the National Register of Historic Places (National Register) if it is restored. The subject segment has not been previously documented or evaluated.

P2. Location. The segment is located between Jackson and Gibson Streets, south of Indiana Avenue in Riverside. Refer to Location Map (page 3).

P3a. Description. This short segment of the Upper Riverside Canal is isolated from the rest of the canal by development at either end. The walls have been updated with modern concrete, it is filled with dirt and debris, and it appears to be walled off at the intersection of Gibson Street. It no longer retains integrity of setting, feeling, materials, or association.

B6. Construction History. Refer to previous documentation.

***P11. Report Citation:** Bechtel and Austerman 2016. Cultural Resources Assessment, Hawthorne Elementary School Project, City of Riverside, County of Riverside, California.

B10. Significance Evaluation. This segment of the Riverside Upper Canal does not appear to be eligible for listing in the National Register or California Register or for designation under the local ordinance. It is an isolated segment that is cut off from the remainder of the canal and the walls appear to have been updated with modern concrete.

Under National Register and California Register criteria A/1, although the Riverside Upper Canal is associated with events that have made a significant contribution to the settlement of Riverside, this segment no longer retains adequate integrity to convey its association with those events.

Under National Register and California Register criteria B/2, the canal is not associated with the lives of persons significant in our past.

Under National Register and California Register criteria C/3, this segment of the Riverside Upper Canal does not embody distinctive characteristics of a type, period, or method of construction. It does not represent the work of a master, possess high artistic values, or represent a significant and distinguishable entity whose components may lack individual distinction.

Under National Register and California Register criteria D/4 this segment of the Riverside Upper Canal is not likely to yield, information important in prehistory or history due to having been modified with modern concrete.

City of Riverside Landmark Criteria. This segment of the Riverside Upper Canal is not an exceptional example of historical, archaeological, cultural, architectural, community, aesthetic, or artistic heritage of the City. The Landmark criteria require that the resource be both exceptional and retain high integrity in order to be considered for designation as a Landmark. If either of those criteria is missing, the resource does not meet the basic requirements for designation as a Landmark. Since this segment of the canal has lost integrity and is not exceptional, it does not meet the minimum qualifications for this designation.

City of Riverside Structure of Merit Criteria. Under Structure of Merit Criterion 1, the resource does not have a unique location or singular physical characteristics, nor is it a view or vista representing an established and familiar feature of a neighborhood, community, or of the City. Therefore, it is not eligible under this criterion

Under Structure of Merit Criterion 2, the canal is an example of a property type that was once common but is now rare in its neighborhood, community, or area. However, as discussed previously, this segment was updated with modern concrete and has been separated from the original canal by development; therefore, it does not retain adequate integrity and is not eligible under this criterion. *See Continuation Sheet*

B10. Significance Evaluation (continued from page 1)

Structure of Merit Criterion 3 is for properties connected with a business or use which was once common but is now rare. The canal was originally associated with agricultural uses, but this segment no longer appears to be in use. Therefore, the association has been lost and this criterion does not apply.

Structure of Merit Criterion 4 is for properties that retain sufficient, but not necessarily high integrity, and that meet one or more of the Landmark criteria. As discussed above, the resource has lost integrity.

Under Structure of Merit Criterion 5, this segment of the canal has been altered and does not have the potential to yield information important in history or prehistory. Therefore, it is not eligible under this criterion.

Structure of Merit Criterion 6 is essentially the same as Criterion 4 in that it is for properties that retain sufficient integrity to convey significance under one or more of the Landmark criteria. Since this has been addressed under Criterion 4, no further discussion is provided.

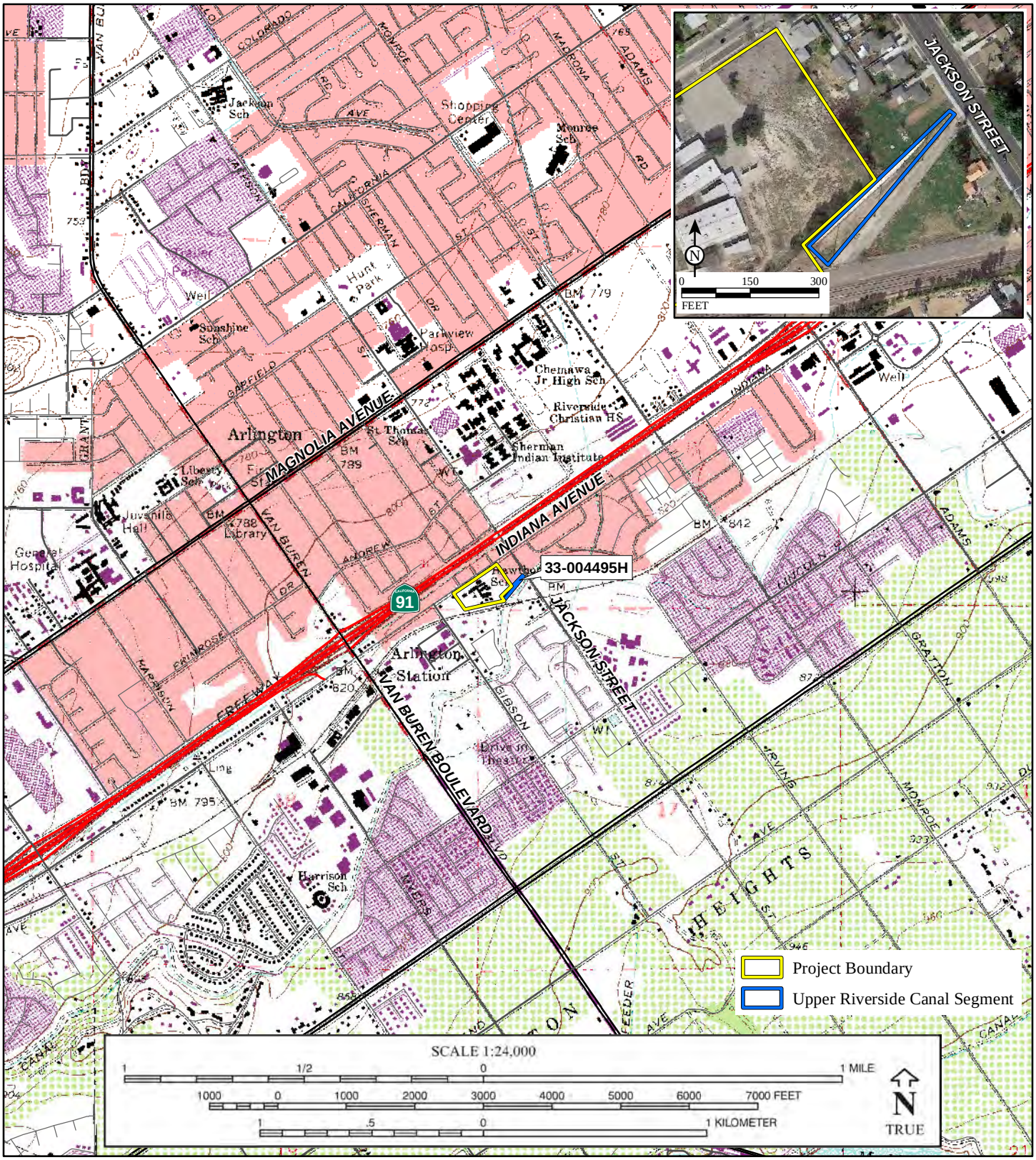
State of California - Resource Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary # 33-004495H (Update)
HRI #
Trinomial CA-RIV-4495H (Update)

*Resource Name or # (Assigned by recorder) Upper Riverside Canal

*Map Name: USGS 7.5' Quads, Riverside West; Google Earth

*Scale: 1:24000; 1:1200 *Date of Map: 1980; 2016



I:\SWK1601\Reports\Cultural\DPRlocation_RivCanal.mxd (9/30/2016)

DPR 523J (1/95)

***Required Information**

State of California--The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

CONTINUATION SHEET

Primary # 33-004495 update
HRI #
Trinomial CA-RIV-4495H

Page 1 of 1 Resource name or # (Assigned by recorder)

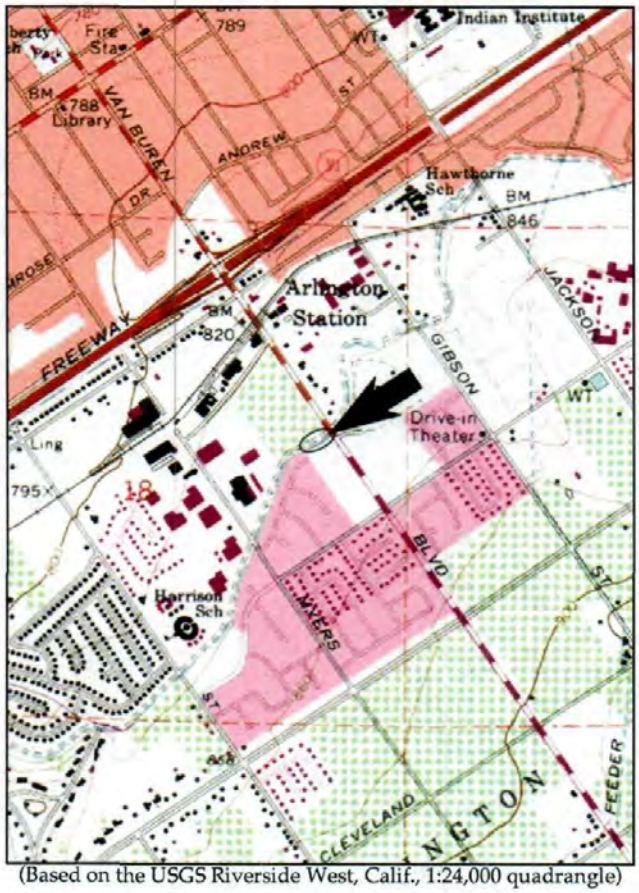
Recorded by Daniel Ballester Date March 10, 2009 Continuation √ Update
Affiliation: CRM TECH, Colton Project No: CRM TECH 2331

Site CA-RIV-4495H represents the historic Upper Riverside Canal, which was constructed of mortared stone retaining walls lined with concrete. On March 10, 2009, a portion of the canal was inspected during an intensive-level archaeological field survey of the adjacent parcel to the southeast of the canal, along the southwest side of Van Buren Boulevard. The segment of the canal inspected is approximately 350 feet in total length, but only some 50 feet of it is still in the original state. Near its crossing under Van Buren Boulevard, the canal is lined with concrete and measures approximately eight feet wide at the top and 2.5 feet wide at the bottom. The concrete lining is now in very poor condition, with many cracks and some fragments missing. Fifty feet from Van Buren Boulevard, the open canal turns into large concrete pipe with an opening of 2-3 feet. The pipeline is partially covered with dirt, and runs in a southwesterly direction toward a nearby residential neighborhood.

RECEIVED IN
JUL 10 2009
EIC

Report Citation:

Deirdre Encarnación, Daniel Ballester, and Laura H. Shaker
2009 Historical/Archaeological Resources Survey Report: Assessor's Parcel No. 234-270-020, City of Riverside, Riverside County, California. On file, Eastern Information Center, University of California, Riverside.



(Based on the USGS Riverside West, Calif., 1:24,000 quadrangle)

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

Primary # 33-4495
HRI #
Trinomial CA-RIV-4495H, CA-RIV-4791H, CA-SBR-7172H Update
NRHP Status Code
Other Listings
Review Code Reviewer Date RECEIVED IN

DEC 1 0 2001
EIC

 *Resource Name or #: Riverside Canal

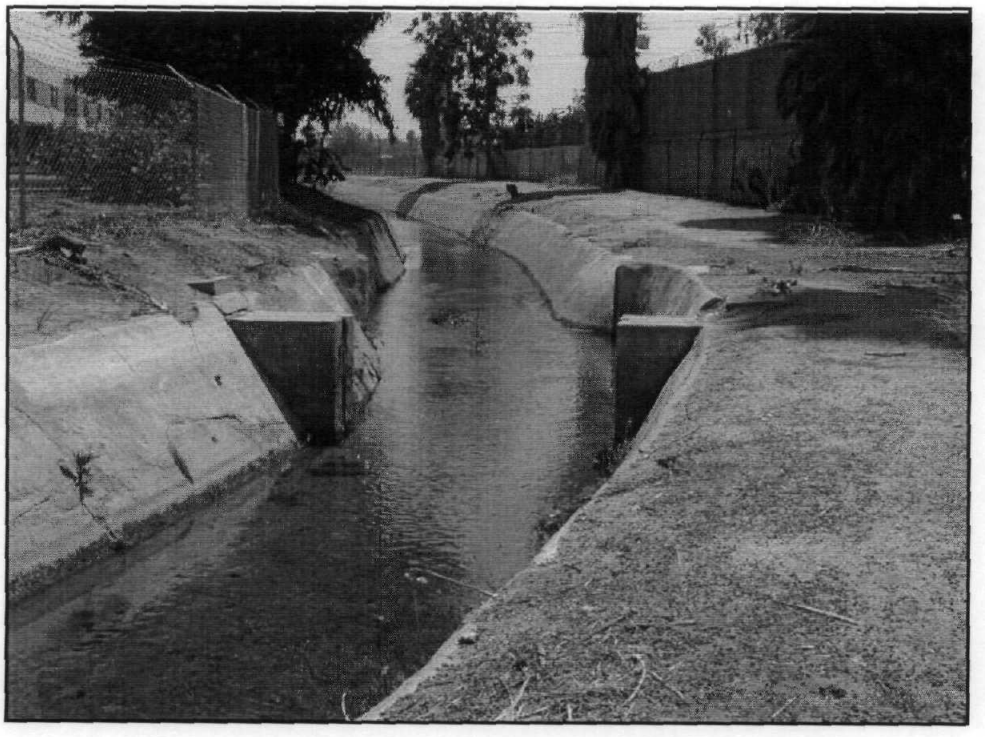
P1. Other Identifier: Riverside Upper Canal, Riverside Lower Canal

*P2. Location: ☐ Not for Publication ■ Unrestricted *a. County Riverside and San Bernardino and P2c, P2e, and P2b or P2d.
*b. USGS 7.5′ Quad San Bernardino South Date 1980 T ; R ¼ of ¼ of Sec ; B.M.
c. Address City Riverside Zip
d. UTM: Zone: 11 ; 46780 mE/ 3761110 mN
*e. Other Locational Data: Canal begins at Warm Creek in Colton, travels through downtown Riverside, and ends at the Temescal Wash in Home Gardens. Headgates are located off of Mount Vernon Drive and I-10.

*P3a. Description: The canal is approximately 19 miles long, constructed of mortared stone retaining walls lined with concrete. Wooden and concrete bridges cross the canal along its length. The associated features of the canal are the headgates, levees, suction pipes, division walls, flume remains, canal intakes, overflow gates, gate controls, siphons, and conduits. Construction of the Upper Canal began in October, 1870. The initial canal was7 1/4 miles long, from the river to the Mile Square. Riverside extended the canal to fourteen miles by 1874. See Continuation Sheet.

*P3b. Resource Attributes: HP20. canal/aqueduct AH6. water conveyance system

*P4. Resources Present: ☐ Building ■ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)



P5b. Description of Photo: View of canal at Palmyrita Ave., looking south. 08/08/01, 1K048-02-DSC-a11

*P6. Date Constructed / Age and Sources: ■ Historic ☐ Prehistoric ☐ Both
1870- 1875

*P7. Owner and Address:
City of Riverside, 3900 Main Street, Riverside, CA 95722

*P8. Recorded by: Angie Gustafson and Mike McGrath
EDAW Inc.
1420 Kettner Blvd., Ste. 620
San Diego, CA 92101

*P9. Date Recorded: 08/08/01

*P10. Survey Type: intensive survey

*P11. Report Citation: Cultural Resource Survey of the Riverside Canal

*Attachments: ☐ None ■ Location Map ☐ Sketch Map ■ Continuation Sheet ■ Building, Structure, and Object Record ■ Linear Resource Record ☐ Archaeological Record ☐ District Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other (List)

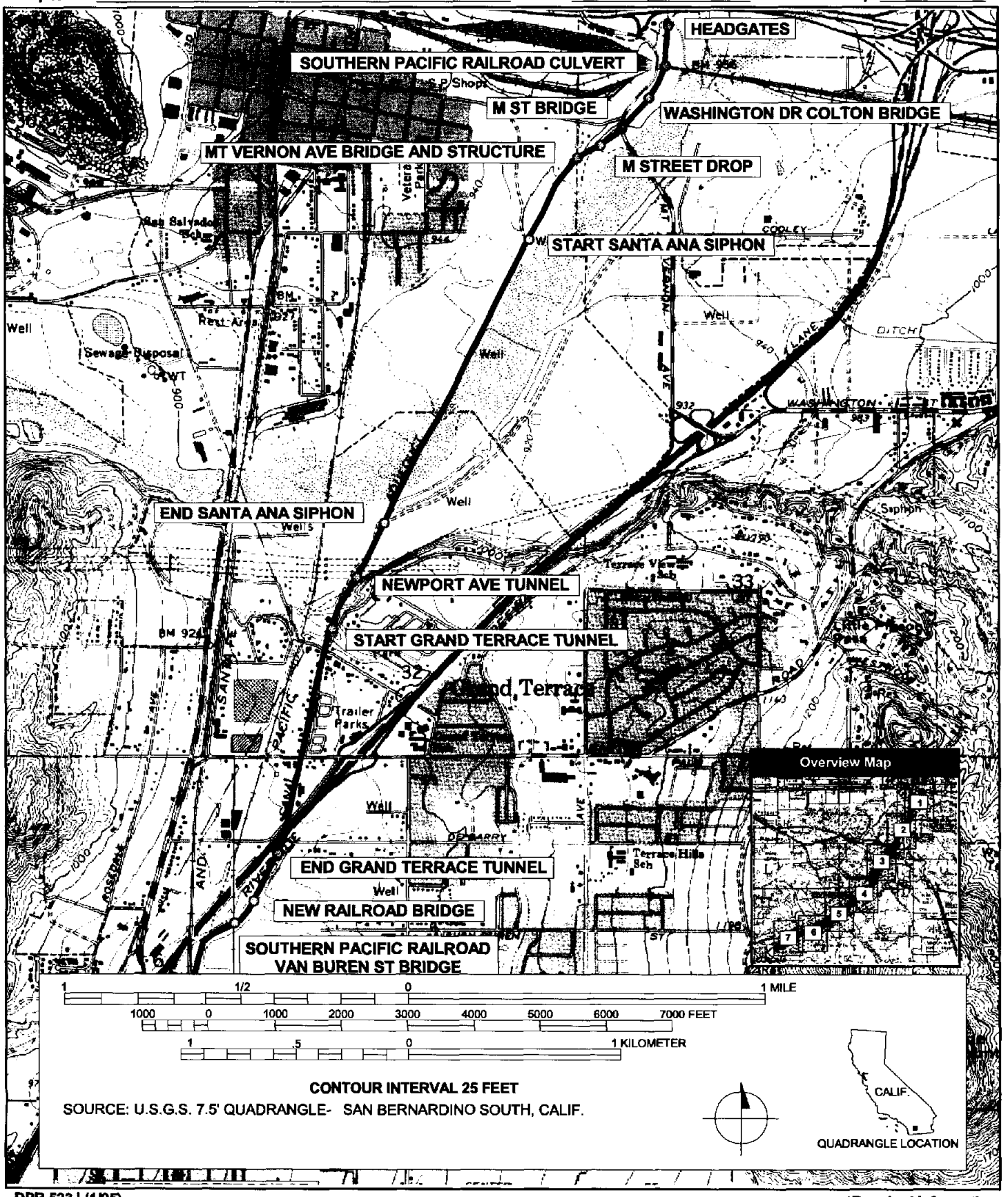
State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

Primary #
HRI #
Trinomial CA-RIV-4495H, CA-RIV-4791H, CA-SBR-7172H Update

Page 2 of 12 * Resource Name or # (Assigned by recorder) Riverside Canal

* Map Name: San Bernardino South * Scale: 1:24,000 * Date of Map: 1980



DPR 523J (1/95) *Required Information

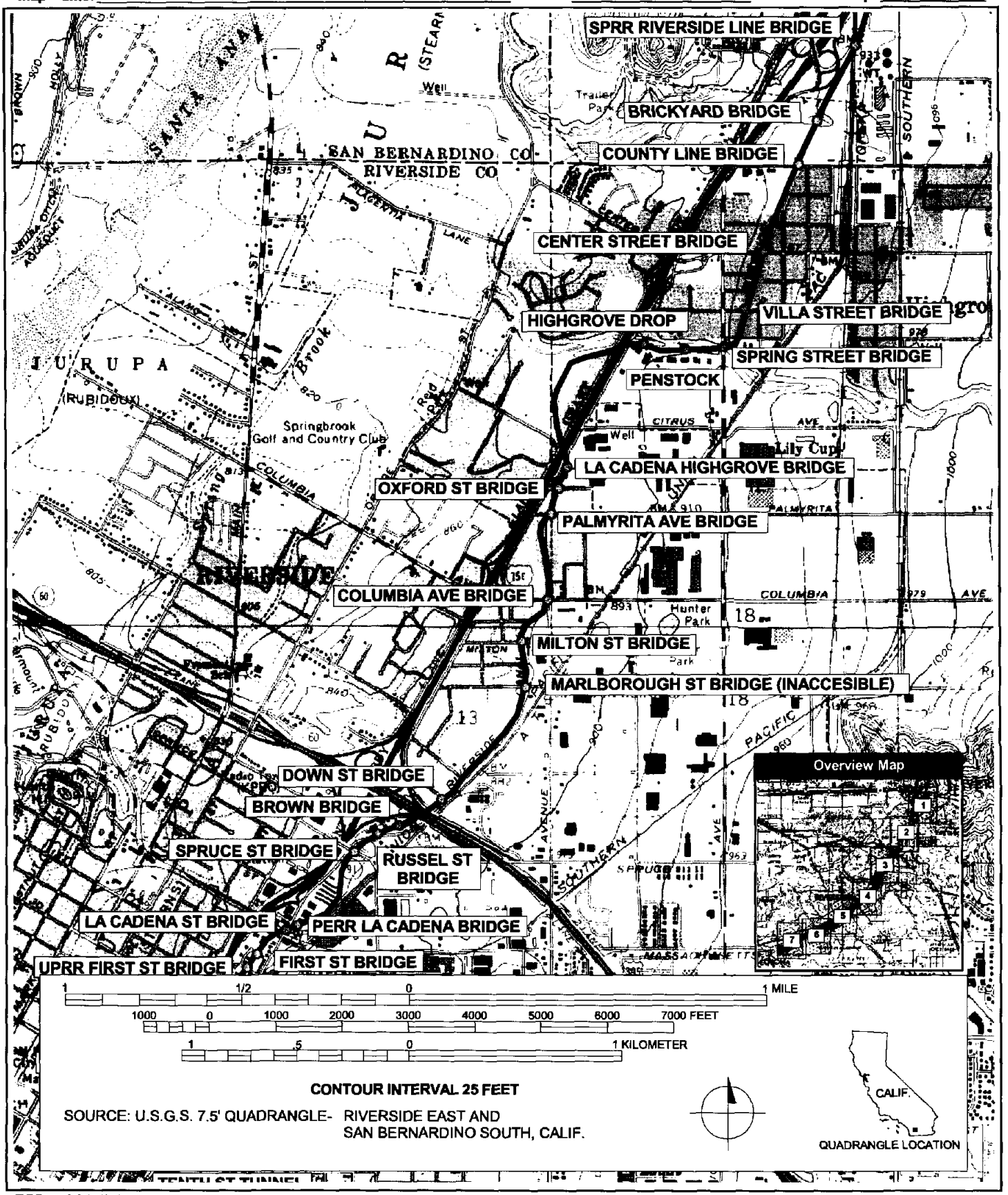
State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

Primary #
HRI #
Trinomial CA-RIV-4495H, CA-RIV-4791H, CA-7172H Update

Page 3 of 12 * Resource Name or # (Assigned by recorder) Riverside Canal

* Map Name: Riverside East, San Bernardino South * Scale: 1:24,000 * Date of Map: 1980



State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

Primary #
HRI #
Trinomial CA-RIV-4495H, CA-RIV-4791H, CA-SBR-7172H Update

Page 4 of 12 * Resource Name or # (Assigned by recorder) Riverside Canal

* Map Name: Riverside East, Riverside West * Scale: 1:24,000 * Date of Map: 1980

CONTOUR INTERVAL 25 FEET

SOURCE: U.S.G.S. 7.5' QUADRANGLE-RIVERSIDE EAST AND RIVERSIDE WEST, CALIF.

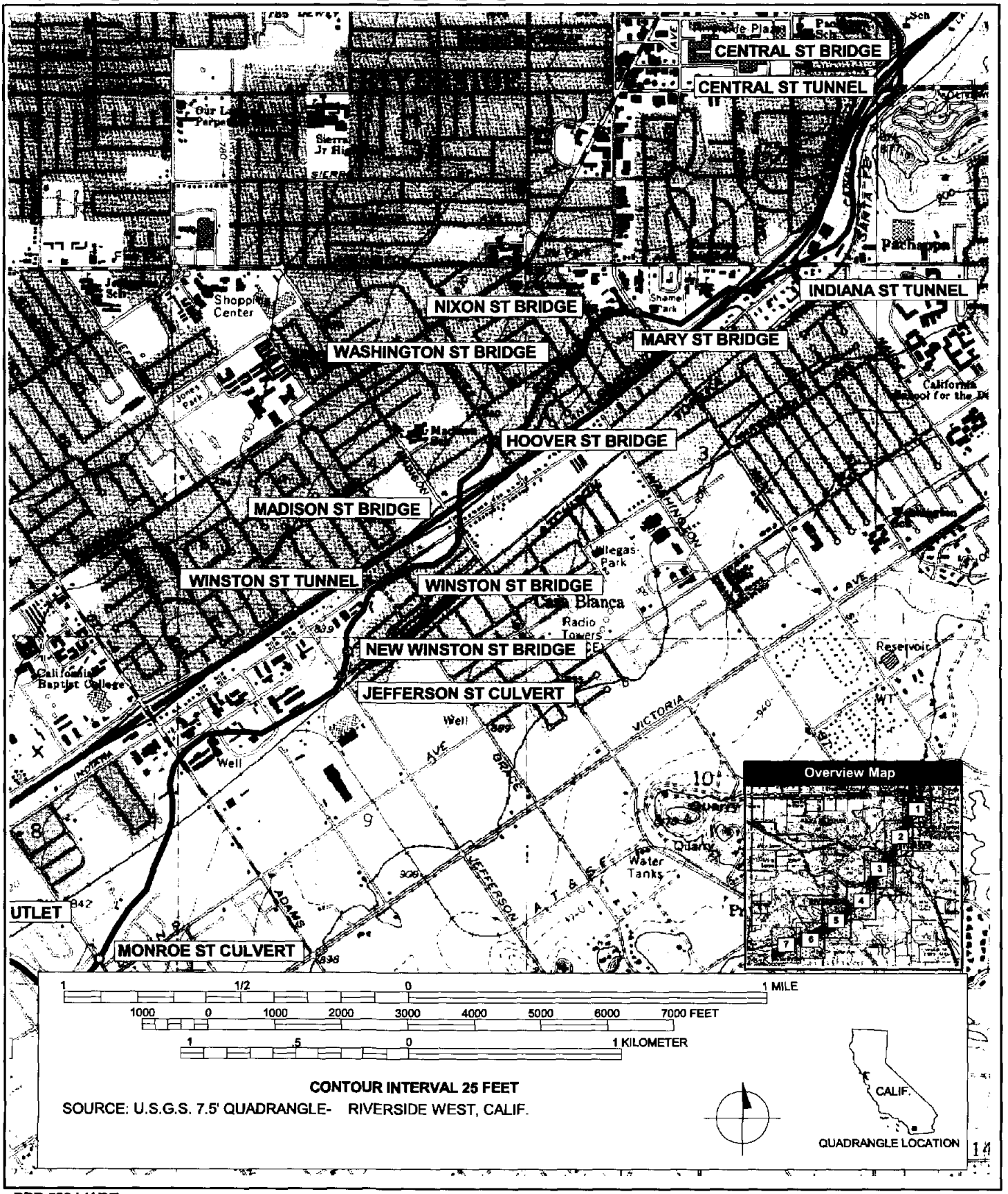
State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

Primary #
HRI #
Trinomial CA-RIV-4495H, CA-RIV-4791H, CA-SBR-7172H Update

Page 5 of 12 * Resource Name or # (Assigned by recorder) Riverside Canal

* Map Name: Riverside West * Scale: 1:24,000 * Date of Map: 1980



DPR 523J (1/95) *Required Information

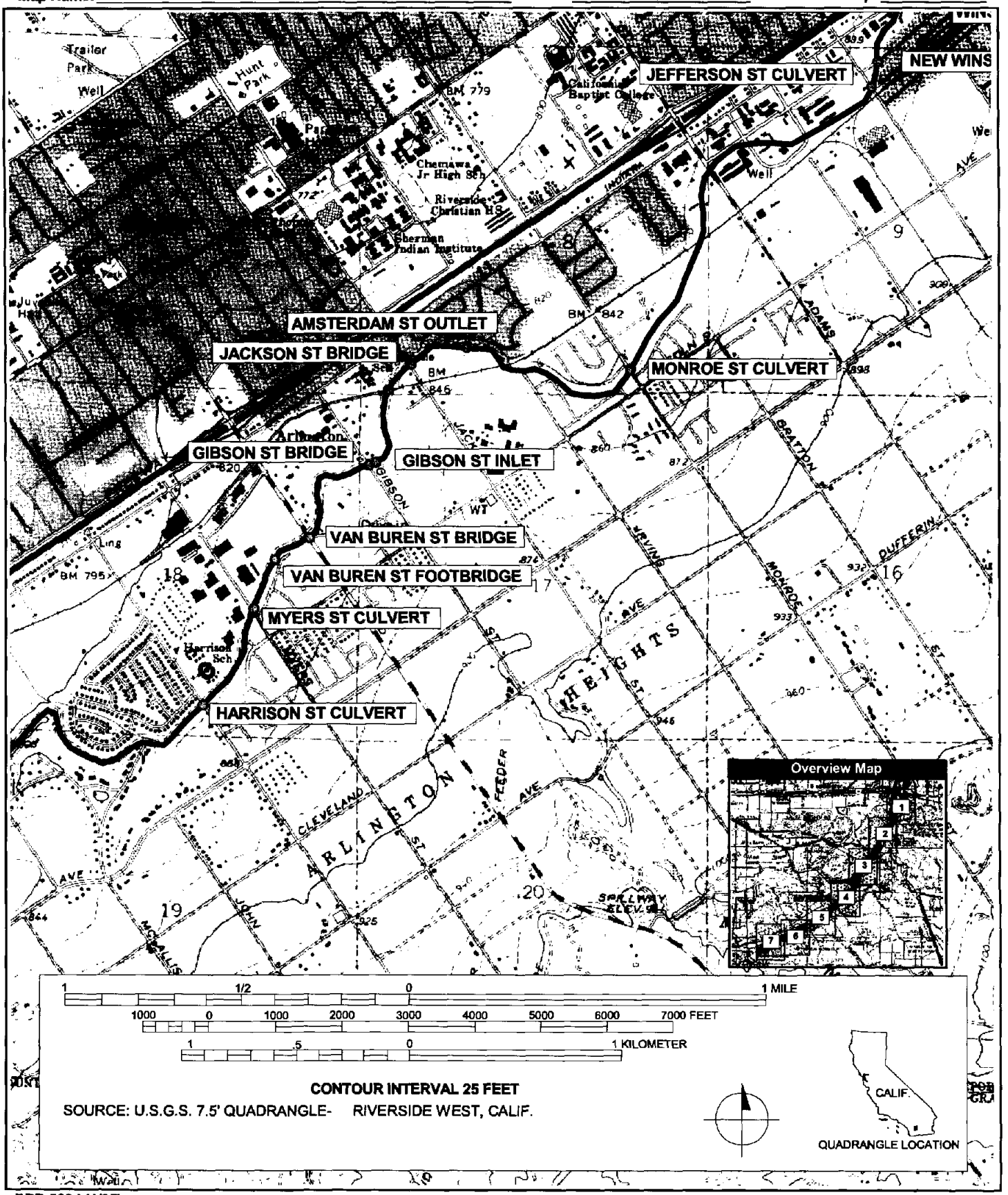
State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

Primary #
HRI #
Trinomial CA-RIV-4495H, CA-RIV-4791H, CA-SBR-7172H Update

Page 6 of 12 * Resource Name or # (Assigned by recorder) Riverside Canal

* Map Name: Riverside West * Scale: 1:24,000 * Date of Map: 1980



DPR 523J (1/95) *Required Information

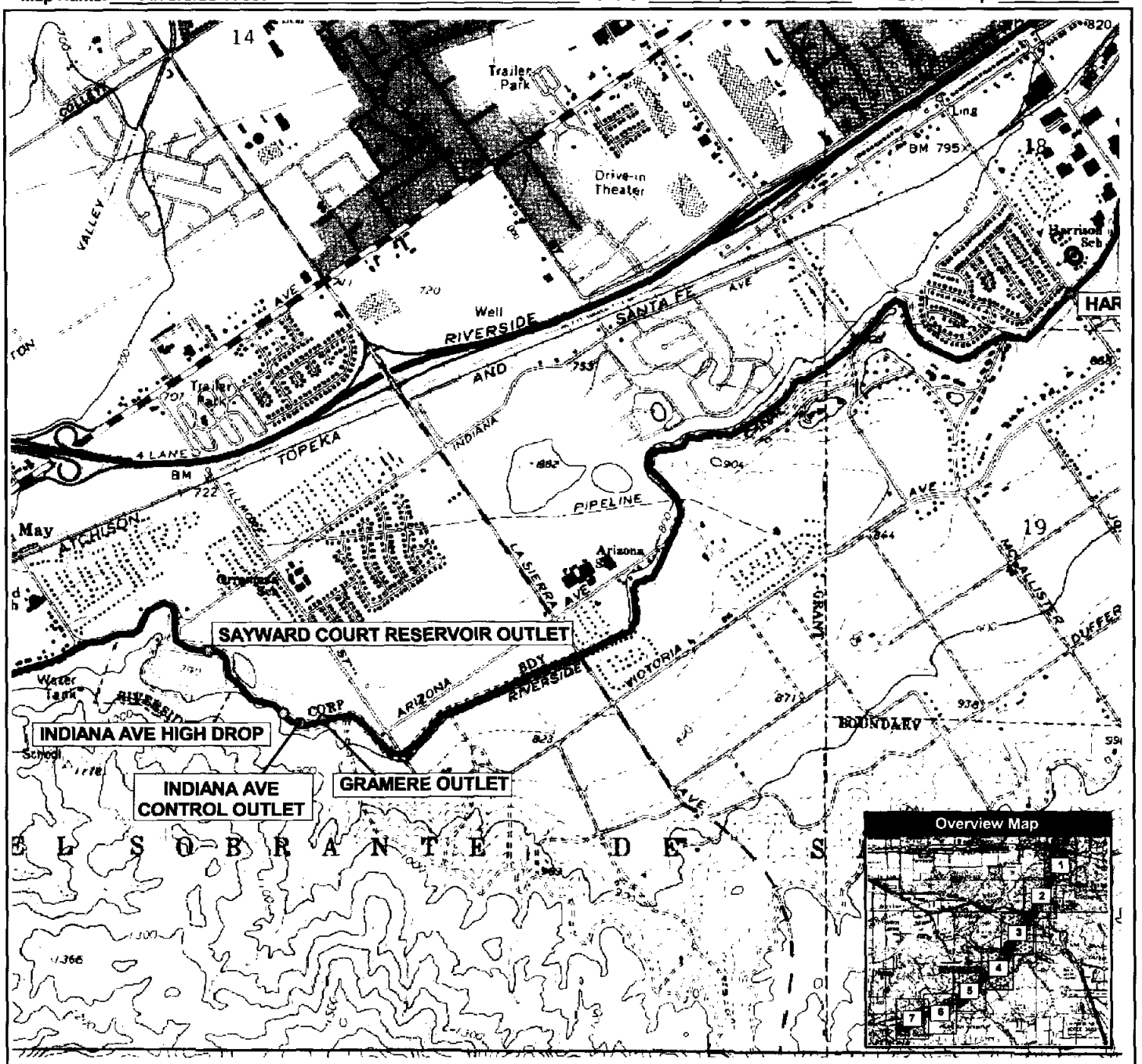
State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

Primary #
HRI #
Trinomial CA-RIV-4495H, CA-RIV-4791H, CA-SBR-7172H Update

Page 7 of 12 * Resource Name or # (Assigned by recorder) Riverside Canal

* Map Name: Riverside West * Scale: 1:24,000 * Date of Map: 1980



1 1/2 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER

CONTOUR INTERVAL 25 FEET

SOURCE: U.S.G.S. 7.5' QUADRANGLE- RIVERSIDE WEST, CALIF.

CALIF.

QUADRANGLE LOCATION

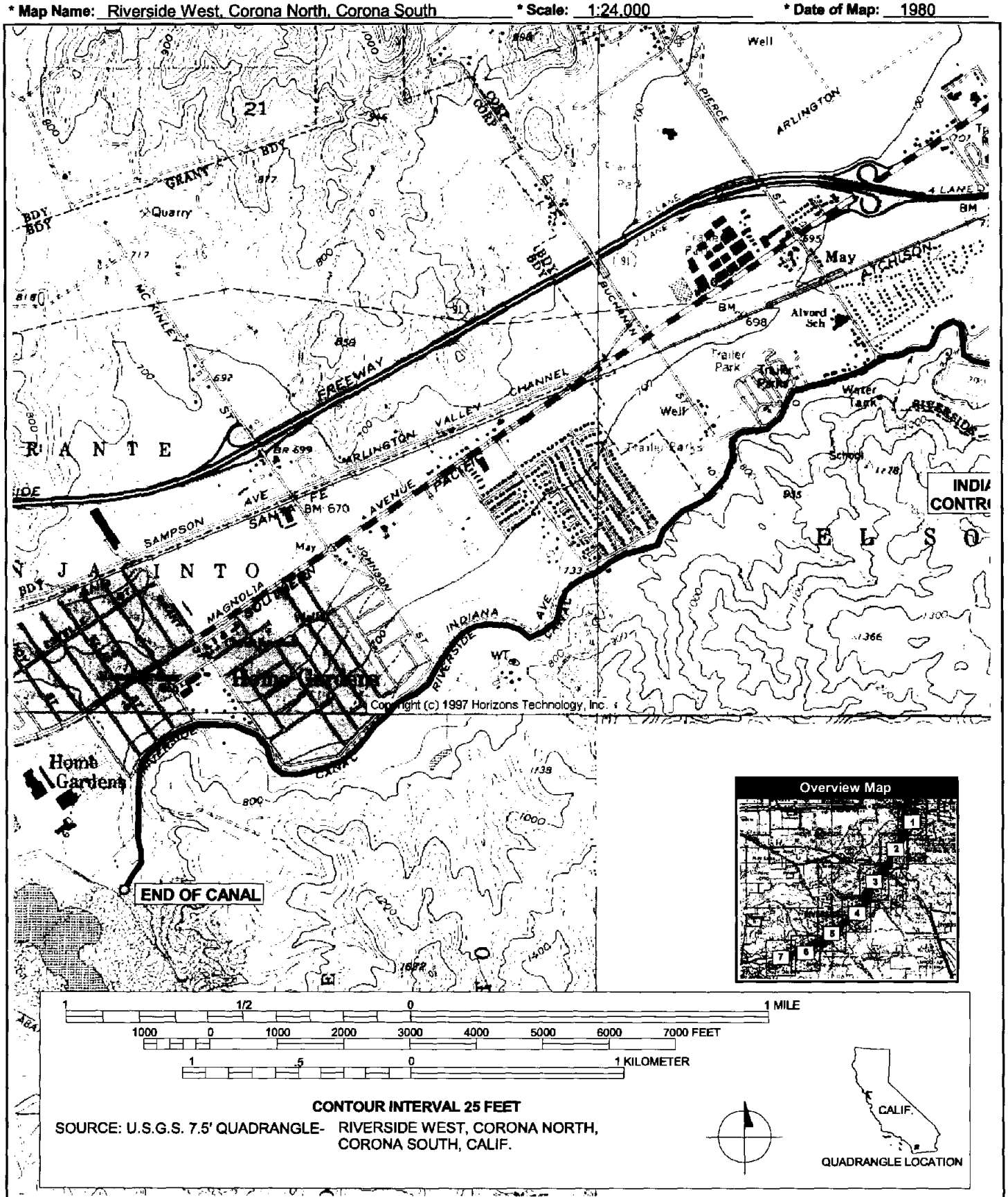
State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

Primary #
HRI #
Trinomial CA-RIV-4495H, CA-RIV-4791H, CA-SBR-7172H Update

Page 8 of 12 * Resource Name or # (Assigned by recorder) Riverside Canal

* Map Name: Riverside West, Corona North, Corona South * Scale: 1:24,000 * Date of Map: 1980



CONTOUR INTERVAL 25 FEET

SOURCE: U.S.G.S. 7.5' QUADRANGLE- RIVERSIDE WEST, CORONA NORTH, CORONA SOUTH, CALIF.

*NRPH Status Code 4S7
*Resource Name or # Riverside Canal

B1. **Historic Name:** Riverside Upper Canal, Riverside Lower Canal

B2. **Common Name:** Riverside Canal

B3. **Original Use:** Irrigation canal

B4. **Present Use:** Storm water runoff and irrigation canal

*B5. **Architectural Style:** n/a

*B6. **Construction History:** The Riverside Canal is actually the composite of two different canals, the Upper Canal and the Lower Canal, with an addition at the head of the Upper Canal near the Santa Ana River. The Association built the Upper Canal first, and a competing colony constructed the Lower Canal shortly after. The water company combined the canals after completion of the Lower Canal. The community built the Warm Creek Canal, an extension to the head of the Upper Canal, in 1886. Construction of the Upper Canal began in October, 1870. The initial canal was7 1/4 miles long, from the river to the Mile Square. Riverside extended the canal to fourteen miles by 1874. The water company built the original headworks on the south side of the Santa Ana River, about1/2 mile downstream from the Atchison, Topeka, and Santa Fe Railway bridge. From there it followed a contoured grade on the west side of La Loma Hills, and down to the existing canal. It then crossed La Cadena near Spring Street, followed the route of La Cadena to downtown. The total path was approximately nineteen miles. See Continuation Sheet.

*B7. **Moved?** ■ No □ Yes □ Unknown **Date**: **Original Location:**

*B8. **Related Features:** The associated features of the canal are the headgates, levees, suction pipes, division walls, flume remains, canal intakes, overflow gates, gate controls, siphons, and conduits

B9a. **Architect:** Goldsworthy & Higbie (Surveyors)

B9b. **Builder:** Thomas Cover, Superintendent

*B10. **Significance: Theme** Irrigation **Area** Southern California
Period of Significance 1870-1915 **Property Type** Canal **Applicable Criteria** N/A

The City of Riverside with the Southern California Colony Association in 1870. The mission of the Association was to buy and sell land already equipped with a water conveyance system. In most of the advertisements for the community, the colonists stressed the significance of the navel orange and tropical fruit industry. The navel orange, Riverside's biggest export, soon became the supporting agriculture of the area. The following excerpt, from a leaflet named "The Riverside Colony," describes the new colony in 1875. See Continuation Sheet.

B11. **Additional Resource Attributes:**

*B12. **References:** see Continuation Sheet

B13. **Remarks:**

*B14. **Evaluator:** Angie Gustafson, EDAW, Inc., San Diego, CA

***Date of Evaluation:** 08/20/01

(Sketch Map with north arrow required.)

See Location Maps.

(This space reserved for official comments.)

Resource Name or # (Assigned by recorder) Riverside Canal

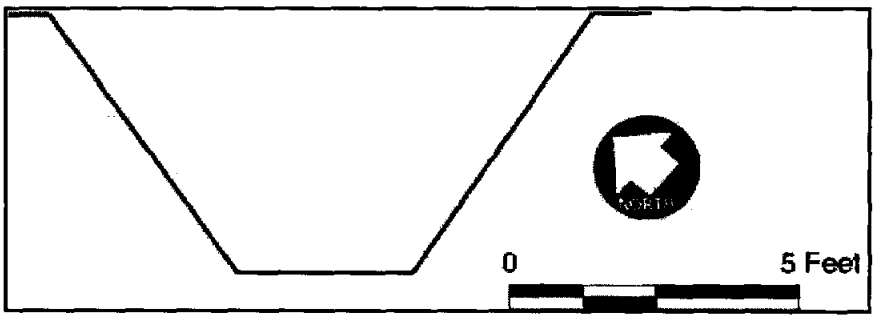
L1. Historic and/or Common Name: Riverside Upper Canal, Riverside Lower Canal

L2a. Portion Described: ■ Entire Resource □ Segment □ Point Observation **Designation:**

b. Location of point or segment: Canal begins at Warm Creek in Colton, travels through downtown Riverside, and ends at the Temescal Wash in Home Gardens. Headgates are located off of Mount Vernon Drive and I-10.

L3. Description: The canal is approximately 19 miles long, constructed of mortared stone retaining walls lined with concrete. Wooden and concrete bridges cross the canal along its length. The associated features of the canal are the headgates, levees, suction pipes, division walls, flume remains, canal intakes, overflow gates, gate controls, siphons, and conduits. Construction of the Upper Canal began in October, 1870. The initial canal was7 1/4 miles long, from the river to the Mile Square. Riverside extended the canal to fourteen miles by 1874. See Continuation Sheet.

L4. Dimensions: (In feet) Approximate
- **a. Top Width** 8' - 11', varies
- **b. Bottom Width** 2' - 4', varies
- **c. Height or Depth** 4'
- **d. Length of Segment** 19 miles



L5. Associated Resources: The associated features of the canal are the headgates, levees, suction pipes, division walls, flume remains, canal intakes, overflow gates, gate controls, siphons, and conduits.

L6. Setting: The canal begins north of the Santa Ana River. A siphon transfers the water under the dry bed of the river. It runs through downtown Riverside, along commercial, residential, and industrial properties. Most of the land along the canal is cleared, and a dirt vehicle path runs along one side of the canal for most of its length. Mature palms line the length of the canal.

L7. Integrity Considerations: Approximately 40% of the canal is in use for its original purpose of irrigation. Portions of the Lower Canal have been abandoned. The canal follows the original route set out by the Riverside colony. Sections of the canal have been removed and replaced with newer materials. The setting of the canal has changed over time, with the build-up of Riverside. The landscape has changed from rural agricultural lands to industrial, residential, and commercial properties. Portions of the canal have been replaced with culverts, underground pipes, or concrete tunnels.

L8b. Describe of Photo, Map, or Drawing View of Upper Canal at I-215, looking northeast, 1K048-01-DSC00005, 08/08/01

L9. Remarks:

L10. Form Prepared by: Angie Gustafson
EDAW, Inc.
1420 Kettner Blvd., Suite 620
San Diego, CA 92101

L11. Date: 08/20/01

P3/L3. Description (continued): The water company built the original headworks on the south side of the Santa Ana River, about1/2 mile downstream from the Atchison, Topeka, and Santa Fe Railway bridge. From there it followed a contoured grade on the west side of La Loma Hills, and down to the existing canal. It then crossed La Cadena near Spring Street, followed the route of La Cadena to downtown. The total path was approximately nineteen miles. The canal diverted water from the Santa Ana River to the main area of Riverside, the Mile Square. Originally just a ditch, the canal irrigated the farm lands along its path. The upper part of the Lower Canal, built in 1875, originally followed the route of an older canal, the Trujillo Ditch, serving the La Placita (originally known as Spanishtown) community. The Lower Canal diverted water from the Santa Ana River, downstream from the headworks of the Upper Canal. It followed roughly parallel to the Upper Canal to the Mile Square, and then traveled by Casa Blanca on its way to Arlington. The water company built a small canal to carry water from the Upper to the Lower Canal following the Box Springs Arroyo, entering the Mile Square near Eleventh Street. It connected with the Lower Canal at Market Street. The total cost of the Upper and Lower Canals in 1885 was approximately $225,631. The canal begins north of the Santa Ana River, and a siphon transfers the water under the dry bed of the river. It runs through downtown Riverside, along commercial, residential, and industrial properties. Most of the land along the canal is cleared, and a dirt vehicle path runs along one side of the canal for most of its length. Mature palms line the length of the canal. An early description of the canal, written in 1888, documented its construction.

"As originally projected the canal was eight feet wide on the bottom, twelve feet on the top, and three feet deep, and with a grade of 52.8 inches per mile, or one inch per hundred feet. The work was prosecuted continuously during the winter and spring of 1870-71, but the excavation was not made uniform in width, and in places not taken down to grade. It was very crooked – running far up into the arroyos or depressions before crossing them, and skirting outside of many low points in the plain, instead of cutting through them (Hall 1888:223)."

The original specifications for the Upper Canal called for a depth of 3' 6", a width of 12' at the surface, and 8' 6" at the bottom. The Spanishtown Flume, across the Highgrove arroyo, was 528' long, the longest of the canal. It is no longer standing.

B6. Construction History (continued): The canal diverted water from the Santa Ana River to the main area of Riverside, the Mile Square. Originally just a ditch, the canal irrigated the farm lands along its path.

The upper part of the Lower Canal, built in 1875, originally followed the route of an older canal, the Trujillo Ditch, serving the La Placita (originally known as Spanishtown) community. The Lower Canal diverted water from the Santa Ana River, downstream from the headworks of the Upper Canal. It followed roughly parallel to the Upper Canal to the Mile Square, and then traveled by Casa Blanca on its way to Arlington. The water company built a small canal to carry water from the Upper to the Lower Canal following the Box Springs Arroyo, entering the Mile Square near Eleventh Street. It connected with the Lower Canal at Market Street. The total cost of the Upper and Lower Canals in 1885 was approximately $225,631 (Creason 1975:23; Hall 1888:204).

The water company completed the first major repair, the addition of the Warm Creek Canal to the head of the Upper Canal, in 1886. Part of the new construction included building a tunnel on a portion of the Upper Canal and constructing the first hydroelectric development in South California at the Highgrove drop of the canal. The total cost of the Warm Creek Canal was approximately $72,883 in 1886 (Hall 1888:207).

Although the canal served the needs of the community during the early settlement period, about half of the water was lost due to seepage and evaporation by the time it reached the Mile Square. To solve this problem, the water company lined the canal in concrete up to the Mile Square in 1892 (Creason 1975:3). The concrete lining increased the speed of the water, and decreased the amount lost to seepage.

The water company maintained the intakes of the Upper and Lower Canals until 1914, to assure water rights for every drop of water that could be collected. Riverside abandoned the Lower Canal in 1914, due to the extreme maintenance costs. At the same time, the water company abandoned the original headworks of the Upper Canal, although they can still partially be seen. After the flood of 1938, Riverside rebuilt the Upper Canal from the second headworks to Mill Drop. Diversion from the river ended in 1959 and the water supply came from wells located in downtown Riverside.

B6. Construction History (continued): Riverside depended on the Riverside Canal during the town's initial period of growth. The canal no longer has the importance that it once did, but the Upper Canal is operational and used for the original purpose of irrigation. The Lower Canal is only used for storm water run-off and has been abandoned. Much of the land has been sold and parts of the Lower Canal have been removed.

B10. Significance (continued): "We now have about 300 inhabitants, 3,000 acres under cultivation, 10,000 shade and ornamental trees, 10,000 fruit trees in orchard and 200,000 in nursery. We are already receiving fruit from our trees and vines. Grapes, limes, pomegranites (sic) and strawberries are raised the present season and the time is near when our orange and lemon groves will be in bearing. The wonderful growth of our trees, vines and flowers has far surpassed our expectations. Riverside has a post office, hotel, store, drug store, meat market, mechanic shops, school house, public library and church (Patterson 1971:56)."

Spanish missionaries grew oranges and other citrus fruit from the 1770s, but it wasn't until the Southern pacific Railroad linked Southern California with the rest of the nation that the citrus culture boomed. The Agricultural Department sent the first three navel orange trees to Riverside from Brazil in the mid-1870s. Coming from Brazil by request of the U.S. Secretary of Agriculture, Senora Tibbetts brought the orange trees to Riverside. The three trees were planted in different places, and were not initially impressive. It was not until a tree had been planted near the Santa Ana River, that the navel orange got attention. The fruit grown from this tree trumped that produced by its neighbors, and the tree was propagated by the new technique of grafting. The navel orange became the most important crop of Riverside growers by 1887. The citrus industry was so successful that population boomed, and the City of Riverside was incorporated in 1883. Riverside quickly surpassed the other colonies in California in the cultivation of citrus, especially oranges and lemons. One component of Riverside's success was due to the fact that, unlike any other grove in California, the Riverside trees were free from black fungus and scale (Riverside Museum Associates 1965:154).

Although the navel orange was an important part of the agricultural community, the citrus groves were also the main cause of the real estate boom in the area. In 1902, the estimated cost of land without trees was from $250 to $300 per acre, while the land with bearing orange trees, was valued as high as $2000 per acre. The profits of a navel orange grower could reach approximately 12% per year.

The prosperity of Riverside and the surrounding communities depended on the supply of water. The Riverside Canal provided the water needed for the citrus industry of La Placita, High Grove, and Riverside. Today, the canal is used for irrigation from the headgates to Olivewood Ave. The rest of the canal is used for seasonal storm water run off. The City of Riverside owns most of the canal, although portions of the Lower Canal are owned by individual property owners.

Approximately 40% of the canal is in use for its original purpose of irrigation. Portions of the Lower Canal have been abandoned. The canal follows the original route set out by the Riverside colony. Sections of the canal have been removed and replaced with newer materials. The setting of the canal has changed over time, with the build-up of Riverside. The landscape has changed from rural agricultural lands to industrial, residential, and commercial properties. Portions of the canal have been replaced with culverts, underground pipes, or concrete tunnels. The overall integrity of the resource is poor, although individual segments and features of the canal retain a greater degree of integrity.

References:

Creason, Howard
1975 *History of Riverside Water Company Canal System.* Riverside Press, Riverside.
Hall, William H.
1888 *Irrigation in Southern California.* State Printing Office, Sacramento.
Patterson, Tom.
1971 *A Colony for California: Riverside's First Hundred Years.* Riverside: Press- Enterprise Co.
Riverside Museum Associates.
1965 Reproduction of Wallace W. Elliott's History of San Bernardino and San Diego Counties California with Illustrations, 1883. Riverside: Riverside Museum Press.

UPDATE ASOE-33-97-033-00

State of California -- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

UPDATE

PRIMARY RECORD

Primary # _____
HRI # _____
Trinomial CA-RIV-004495/H
NRHP Status Code 3S (Portions) 2S2 A
Other Listings _____
Review Code _____ Reviewer _____ Date / /

Page 1 of 5

*Resource Name or #: Riverside Upper Canal

P1. Other Identifier: _____

*P2. Location: ☐ Not for Publication ☒ Unrestricted a. County Riverside

b. USGS 7.5' Quad Riverside East Date 1980 T ____; R ____; ____1/4 of ____1/4 of Sec ____; _____ B.M.

c. Address _____ City Riverside Zip _____

d. UTM: (Give more than one for large and/or linear feature) Zone 11, 467130 mE/ 3761060 mN

e. Other Locational Data: (e.g. parcel #, legal description, directions to resource, elevation, additional UTMs, etc. as appropriate)

APE Map L-3. Site Number 38. Headwaters located near I-215, La Cadena, Cannes, and Chase, Riverside. Terminus of the canal is at Temescal Canyon, Corona. UTM above is for NE point in APE, SW point is 466830mE 3760640mN.

*P3a. Description: (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries.)

The Riverside Upper Canal is a cement lined irrigation ditch which includes headgates, levees, suction pipes, division walls, flume remains, canal intakes, overflow gates, gate controls, siphons, and conduits. The original headworks were located on the south side of the Santa Ana River, about a half mile downstream from the Atchison, Topeka and Santa Fe Railway bridge, but was changed in 1886 to its present location near La Cadena, I-215, Chase and Cannes. The portions analyzed near the project area are limited to the cement slab bridges and gently rounded open trenches, U-shape in cross section. Many of the slab bridges also have associated cement pedestrian railings with decorative panels and corner piers. Near the portion within the Area of Potential Effects at the La Cadena East realignment are some remnants of granite block retaining walls. In some neighborhoods, such as the nineteenth century group at 1st and Vine Streets, residential retaining walls of a pebble-textured art stone have also been incorporated in an attempt to be stylistically compatible. In places of high traffic, such as the railroad yards between Commerce and Vine, unadorned slab covers span the trenches. The terminus of the canal is at Temescal Canyon. Mature palms follow the canal along its course.

*P3b. Resource Attributes: (List attributes and codes) 20-Canal/Aqueduct

*P4. Resources Present: ☐ Building ☒ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

P5b. Description of Photo: (View, date, etc.)
Photo #pp-27, 02/04/1997 view of La Cadena crossing in APE

*P6. Date Constructed/Age and Sources: ☐ Prehistoric ☒ Historic ☐ Both
1870-71 Factual
1886 (headworks)

*P7. Owner and Address:
City Of Riverside

C--City

*P8. Recorded by: (Name, affiliation, address)
Rick Starzak, Molly Fitzgerald
Myra L. Frank & Assoc., Inc.
811 West 7th Street, Suite 800
Los Angeles, CA 90017

*P9. Date Recorded: 09/13/1996

*P10. Survey Type: (Describe)
Intensive survey effort
Section 106 Eligibility Findings
P--Project Review

P11. Report Citation: (Cite survey report/other sources or "none") RCTC/I-215 Improvement Project, Riverside County Historic Architectural Survey Report. FHWA, RCTC, Caltrans--May 1996/Feb. 1997

*Attachments: ☐ NONE ☒ Location Map ☐ Sketch Map ☒ Continuation Sheet ☒ Building, Structure and Object Record ☐ Archaeological Record ☐ District Record ☒ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other: (List) _____

State of California -- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Primary # _____
HRI # _____

BUILDING, STRUCTURE, AND OBJECT RECORD

*NRHP Status Code 3S (Portions)

Resource Name or #: Riverside Upper Canal

B1. Historic Name: Riverside Upper Canal

B2. Common Name: Same

B3. Original Use: Irrigation Canal B4. Present Use: P--Public

*B5. Architectural Style: N/A

*B6. Construction History: (Construction date, alterations, and date of alterations.)

No significant alterations except nineteenth century extensions, early twentieth century lining with concrete and decking over at some locations.

*B7. Moved? ☒ No ☐ Yes ☐ Unknown Date: _____ Original Location: _____

*B8. Related Features:

Palm and pepper trees, access road.

B9a. Architect: Goldsworthy & Higbie (Surveyors) b. Builder: Cover, Thomas (Superintendent)

*B10. Significance: Theme Citrus Industry Area Riverside

Period of Significance 1870-1946 Property Type Canal Applicable Criteria A

(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

The Upper Canal was constructed by the Southern California Colony Association from 1870 to 1871 under the supervision of Thomas Cover. Major wooden flumes were constructed on trestles to maintain the grade, the longest having been known as the Spanishtown Flume which spanned 528 feet (no longer extant). The introduction of the Upper Canal water supply was essential to the survival of the young colony and the development of the early citrus industry in La Placita, High Grove, and Riverside. Its flow was supplemented in 1875-76 with the addition of the Lower Canal by the Riverside Land and Irrigating Company. The Lower Canal was abandoned in 1914 but the Upper Canal is still operational. The Riverside Upper Canal appears eligible for inclusion in the National Register of Historic Places under Criterion A, for its role as the earliest reliable water supply to the Southern California Colony Association and its historic association with the origin, development and growth of the citrus industry in Riverside. Although a full evaluation of contributing and non-contributing elements are out of a reasonable scope for this project, the "open" segments illustrated on the location map should be considered the most intact portions of the resource.

B11. Additional Resource Attributes: (List attributes and codes) _____

*B12. References:

Brown, James T. Harvest of the Sun; An Illustrated History of Riverside County. Windsor Publications, 1985.

LSA Associates, Inc. "Historic Property Clearance Report
See CONTINUATION SHEET

B13. Remarks:

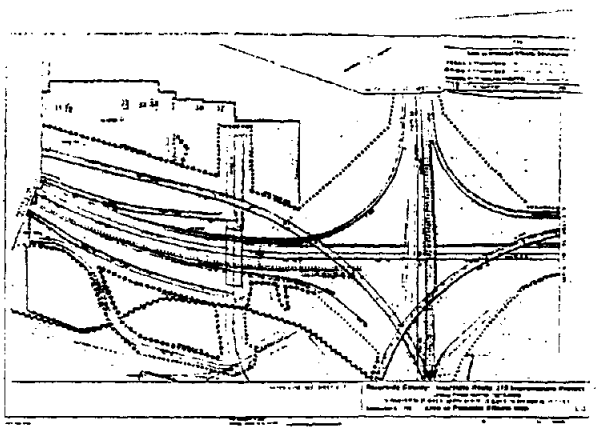
Threats: Project related -- La Cadena Drive East realignment would cross the canal at grade.

*B14. Evaluator: Richard Starzak, MFA, Inc.

Date of Evaluation: 11/20/1992

(This space reserved for official comments.)

(Sketch Map with north arrow required)



State of California -- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LINEAR FEATURE RECORD

Primary # _____
HRI # _____
Trinomial CA-RIV-004495/H

Resource Name or #: Riverside Upper Canal

L1. Historic and/or Common Name: Riverside Upper Canal

L2a. Portion Described: ☐ Entire Resource ☒ Segment ☐ Point Observation Designation: _____

b. Location of point or segment: (Provide UTM coordinates, legal description, etc. Show field inspected area on a Location Map.)

This segment of the Riverside Upper Canal is bounded by Spruce Street to the north and the Union Pacific Railroad to the south. It is located between East La Cadena to the west and the Atchison, Topeka and Santa Fe Railroad to the east.

L3. Description: (Describe construction details, materials, and artifacts found at this segment or point. Provide plans or sections as appropriate.)

This segment of the Riverside Upper Canal ran through the estate of E.G. Brown, one of the founders of the Southern California Colony Association. It is believed that this portion of the estate was devoted to agriculture because the resources found along this segment are agriculture-related. The northern end of this segment contains remnants of a granite block retaining wall. The height of the wall is about 16 to 18 inches and 12 inches wide. The exposed section extends 17 feet. Other portions are visible for 71 feet to the south. Two historic archaeological features, a weir box and structural building remnants, are See CONTINUATION SHEET

L4. Dimensions: (In feet for historic features and meters for prehistoric features.)

a. Top Width From 13.4 to 20 ft
b. Bottom Width From 8.25 to 16.8 ft
c. Height or Depth 4.1 ft
d. Length of Segment Approx. 1400 ft

L4e. Sketch of Cross-Section (include scale) Facing: _____

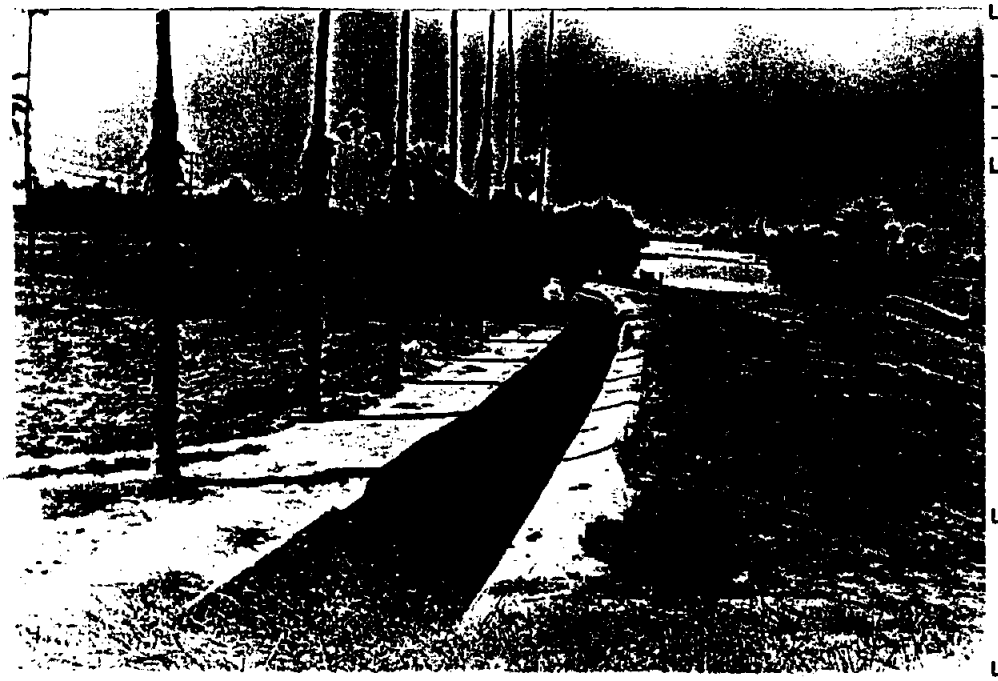
L5. Associated Resources:

L6. Setting: (Describe natural features, landscape characteristics, slope, etc. as appropriate.):

This segment of the canal sits in an open field with trees along the canal.

L7. Integrity Considerations:

This portion of the Upper Canal retains a high degree of all aspects of integrity. The granite wall, which is part of the original Upper Canal, contributes to the integrity of materials, workmanship, See CONTINUATION SHEET



L8b. Description of Photo, Map, or Drawing: (View, scale, etc.)

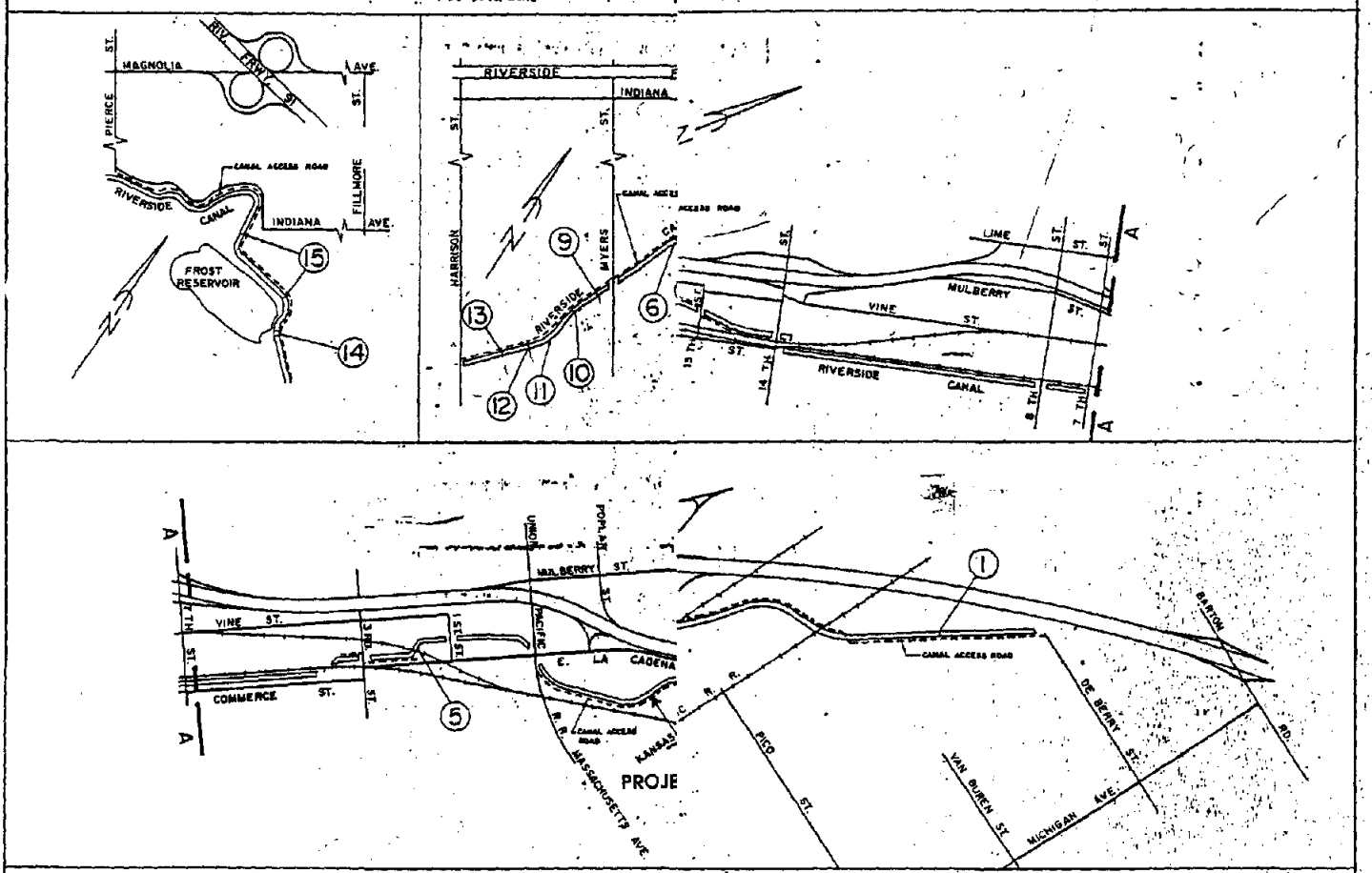
L9. Remarks:

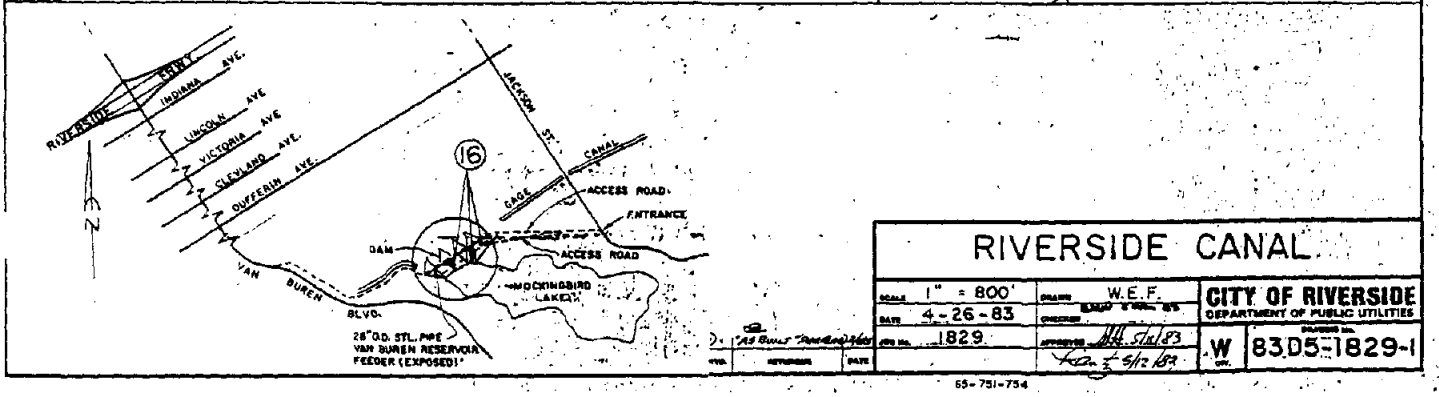
L10. Form Prepared by: (Name, affiliation & address)

Richard Starzak
Myra L. Frank & Associates, Inc.
811 West 7th Street; Suite 800
Los Angeles, CA 90017

L11. Date: 09/13/1996

GT.





RIVERSIDE CANAL

SCALE 1" = 800'	DRAWN W.E.F.	CITY OF RIVERSIDE DEPARTMENT OF PUBLIC UTILITIES	
DATE 4-26-83	CHECKED		
JOB NO. 1829	APPROVED	W	83D5-1829-1

65-751-754

CONTINUED from B12.
for the Proposed Acquisition of Two Parcels in Southeast and Southwest Quadrants of Route 60/91/215 Interchange." Prepared by Beth Padon, December 20, 1991.

CONTINUED from L3.
also located near this segment of the canal. The weir box was used to irrigate land by drawing water from the canal via an intake pipe. It is located immediately east of the canal in the northern portion of this segment. The weir box consists of a concrete platform with a concrete block measuring 2.75 feet square and 1 foot high. Four wood planks form a square on top of the concrete block.

Remnants of a structural foundation are also located about 38 meters (125 feet) east of the weir box. The foundation measures 9.6 meters (31 feet 6 inches) by 10.8 meters (35 feet 7 inches). The foundation remnants are constructed of stucco over chicken wire and wood pieces. Trash and debris lay about the remnants. It appears that the original use of this building was farm-worker housing.

CONTINUED from L7.
and design. The weir box and structural foundation remnants contribute to the setting, feeling, and association of the historic agricultural uses of this property. The canal, granite retaining wall, weir box, and structural foundation remnants remain in their original location.

RECEIVED IN
JUN 0 9 1992
EIC

CA-RIV- 4495 H

ARCHAEOLOGICAL SITE RECORD

PERMANENT TRINOMIAL: CA-RIV-4495-H
OTHER DESIGNATIONS: MFA-3H/Riverside Upper Canal

1. COUNTY: Riverside
2. USGS QUADRANGLES: San Bernardino, South 7.5 minute (1967:Photorevised-1980); Riverside West, 7.5 minute (1967:Photorevised-1980); Riverside East, 7.5 minute (1967:Photorevised-1980); .

3. UTM COORDINATES: Zone 11: 468020m-3763270m EASTING/NORTHING (northern terminus); 458~~395~~400m-3751300m EASTING/NORTHING (southern terminus).

4. TOWNSHIP: 2S; RANGE: 4W; SECTIONS: 7, 18; TOWNSHIP: 2S; RANGE: 5W; SECTIONS: 13, 23, 24, 26, 34, 35; TOWNSHIP: 3S; RANGE 5W; SECTIONS: 3, 4, 8, 9, 17, 18. BASE MERIDIAN: San Bernardino.

5. MAP COORDINATES: 1090mm EAST; 510mm NORTH [northern terminus] (SW corner).
1925mm EAST; 1278mm NORTH [southern terminus] (SW corner).

6. ELEVATION: 880 feet (northern terminus); 800 feet (southern terminus).

7. LOCATION: northern terminus of the Riverside Upper Canal is located west of LaCadena and the I-215, south of Cannes Avenue and north of Chase Road. The canal then travels approximately ten miles northeast to southwest, with it's southern terminus at Hughes Alley between Balmoral Court, Shady View Street, and Tyler Street. The Upper and Lower canals joined at Hughes Alley, with the Lower Canal continuing to Temescal Canyon in Home Gardens. Portions of the canal lie within the Area of Potential Effects [APE] (Pages 9 of 14 through 14 of 14.

8. PREHISTORIC_____; HISTORIC X ; PROTOHISTORIC_____; ETHNOGRAPHIC_____

9. SITE DESCRIPTION: Construction of an upper and lower canal system began in October of 1870 and was completed in 1877. The headworks for the canal was on the south side of the Santa Ana River, about a half a mile downstream from the present Atchison, Topeka and Santa Fe railroad bridge, near the base of the La Loma Hills. The canal passed through La Placita, High Grove and Riverside, skirting arroyos which cut through the floodplain, or by way of flumes which were constructed to bridge the low areas. By 1886, forty-six miles of canals, and two hundred miles of laterals wound through Riverside. Improvements occurred from 1877 to 1886 including the extension of the Upper Canal to Hughes Alley.

10. AREA: 15,455 meters in length (51,000 feet - 9.7 miles].
METHOD OF DETERMINATION: Historic maps; field inspection.

11. DEPTH OF DEPOSIT: The open canal was approximately 91 cm. [3 feet] to 122 cm. [4 feet] below ground surface. Underground pipes, conduits and other related features exist along its route.
METHOD OF DETERMINATION: Historical information; field inspection.

12. FEATURES: Cement-lined canal with headgates; levees; suction pipes; division walls; flume remains; canal intakes; overflow gates; gate controls; intakes; siphons and conduits.

13. ARTIFACTS: See feature description.
14. NON-ARTIFACTUAL CONSTITUENTS AND FAUNAL REMAINS: None observed.
15. DATE RECORDED: 6-4-92 16. RECORDED BY: Robert Wlodarski & Dan Larson.

17. AFFILIATION: Historical, Environmental, Archaeological, Research, Team, 5516 Las Virgenes Road, Calabasas, California 91302-1080, (818) 880-6338

18. HUMAN REMAINS: None observed

19. INTEGRITY OF SITE/SITE DISTURBANCES: Good to Very Good. Water still flows through the open canal to Jefferson Street where the canal is then used for overflow, drainage and runoff.

20. NEAREST WATER: Type: Spring Brook Creek adjacent at the northern terminus; and Mockingbird Creek to the east of the southern terminus.

21. VEGETATION COMMUNITY (site vicinity): Non-native plants/agricultural crops.

22. VEGETATION COMMUNITY (on-site): Non-native plants/agricultural crops.

23. SITE SOIL: Alluvial fan and terrace deposits; alluvial adobe; gray clay; marly earth; and heavy red mesa soil.

24. SURROUNDING SOIL: Alluvial fan and terrace deposits and gravels.

25. GEOLOGY: Recent alluvium/Pleistocene Non-marine Sedimentary Deposits/Mesozoic Granitic Rocks.

26. LANDFORM: Santa Ana river; floodplain; alluvial fan and terrace.

27. SLOPE: Less than 5 percent.

28. EXPOSURE: Total.

29. LANDOWNER/TENANT (Address): City of Riverside Public Utilities Department, 3900 Main Street, Riverside, California 92522.

30. REMARKS: The construction of the Upper and Lower Riverside canals allowed Riverside to grow and flourish. Without water, there was nothing but dry, arid, undeveloped land which could not sustain a large settlement. The canal system still appears to possess integrity of location, design, setting, workmanship, feeling and association that have made a significant contribution to local and regional history.

31. REFERENCES: (1897) Riverside 15 min. USGS (1901 edition); (1940-1941) Arrowhead 15 min. USGS (1936 edition); Scott (1976) Development of Water Facilities in the Santa Ana River Basin, California.

32. NAME OF PROJECT: An Archaeological Survey Report (ASR) Documenting the Effects of Widening Interstate 215 (I-215) From the Route 60/I-125 Interchange in Moreno Valley, Riverside County, to Orange Show Road in the City of San Bernardino, San Bernardino County, California.

33. TYPE OF INVESTIGATION: Phase I Archaeological Study - Archaeological Survey Report (ASR).

34. SITE ACCESSION NUMBER: None.

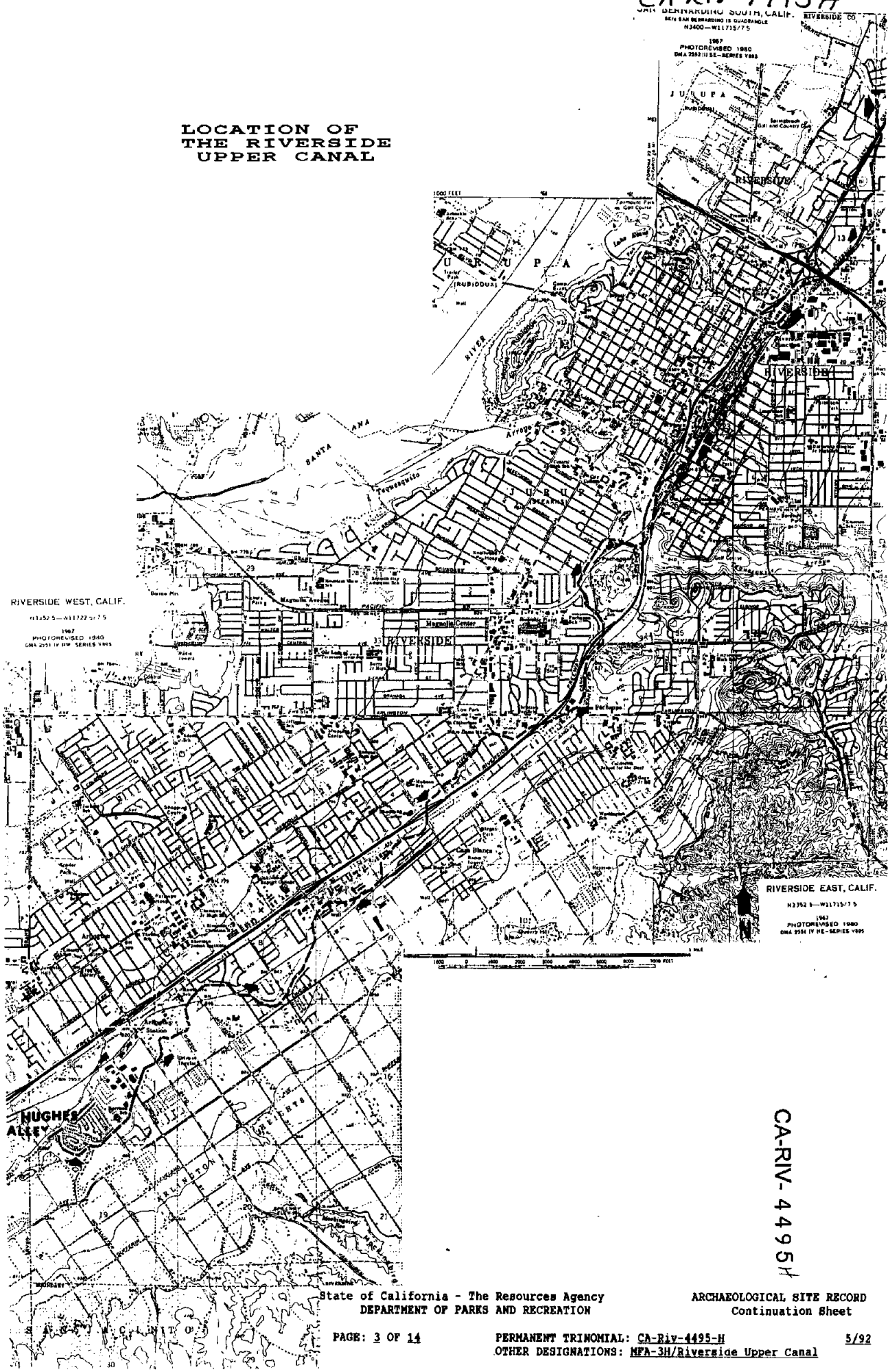
CURATED AT: None.

35. PHOTOGRAPHS: None

TAKEN BY: N/A

CA-RIV-4495 H

LOCATION OF
THE RIVERSIDE
UPPER CANAL



CA-RIV-4495H

3/14

CA-RIV-4495H

CA-RIV- 4495H

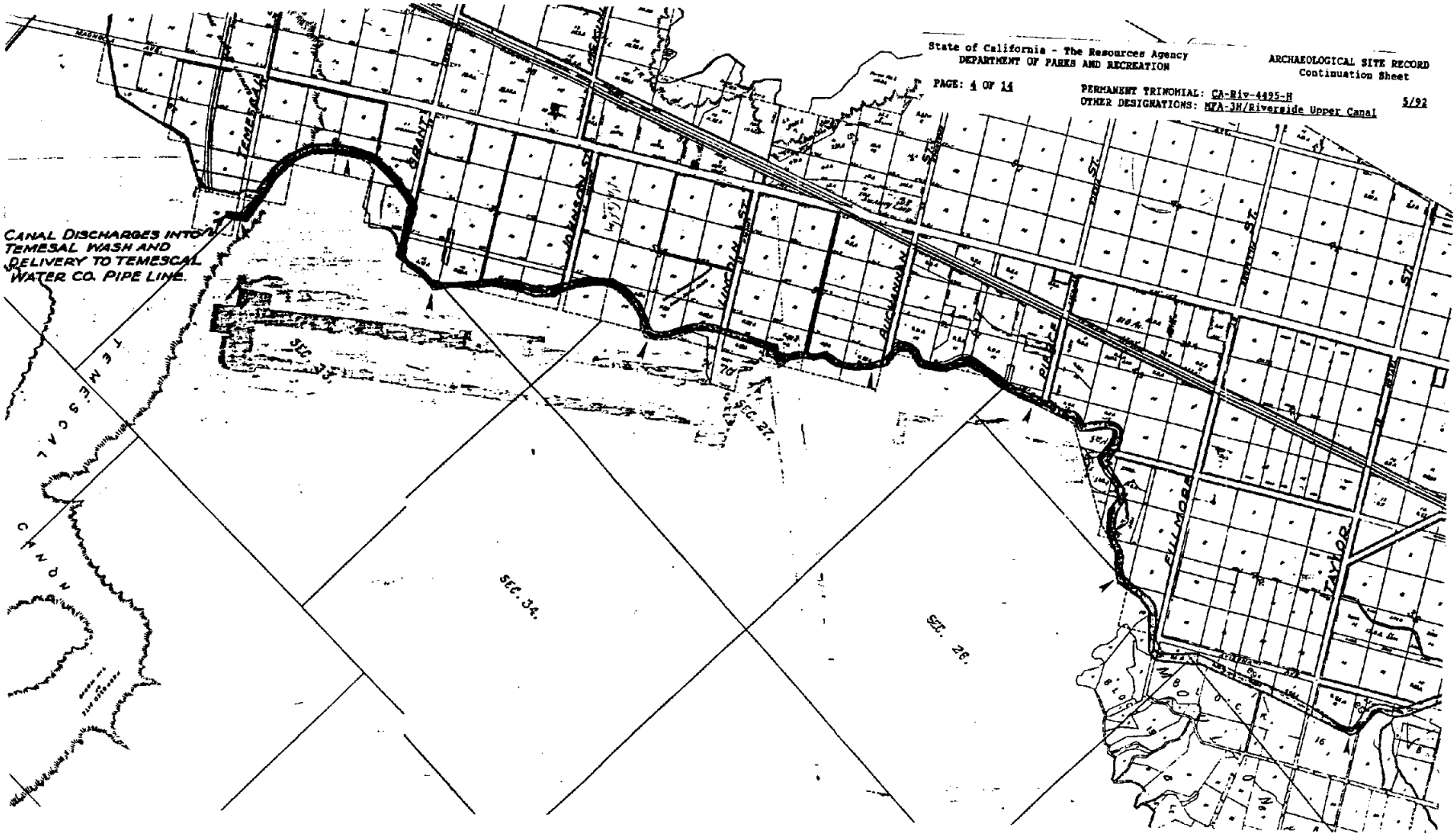
State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

ARCHAEOLOGICAL SITE RECORD
Continuation Sheet

PAGE: 4 OF 14

PERMANENT TRINOMIAL: CA-Riv-4495-H
OTHER DESIGNATIONS: HFA-3H/Riverside Upper Canal

5/92



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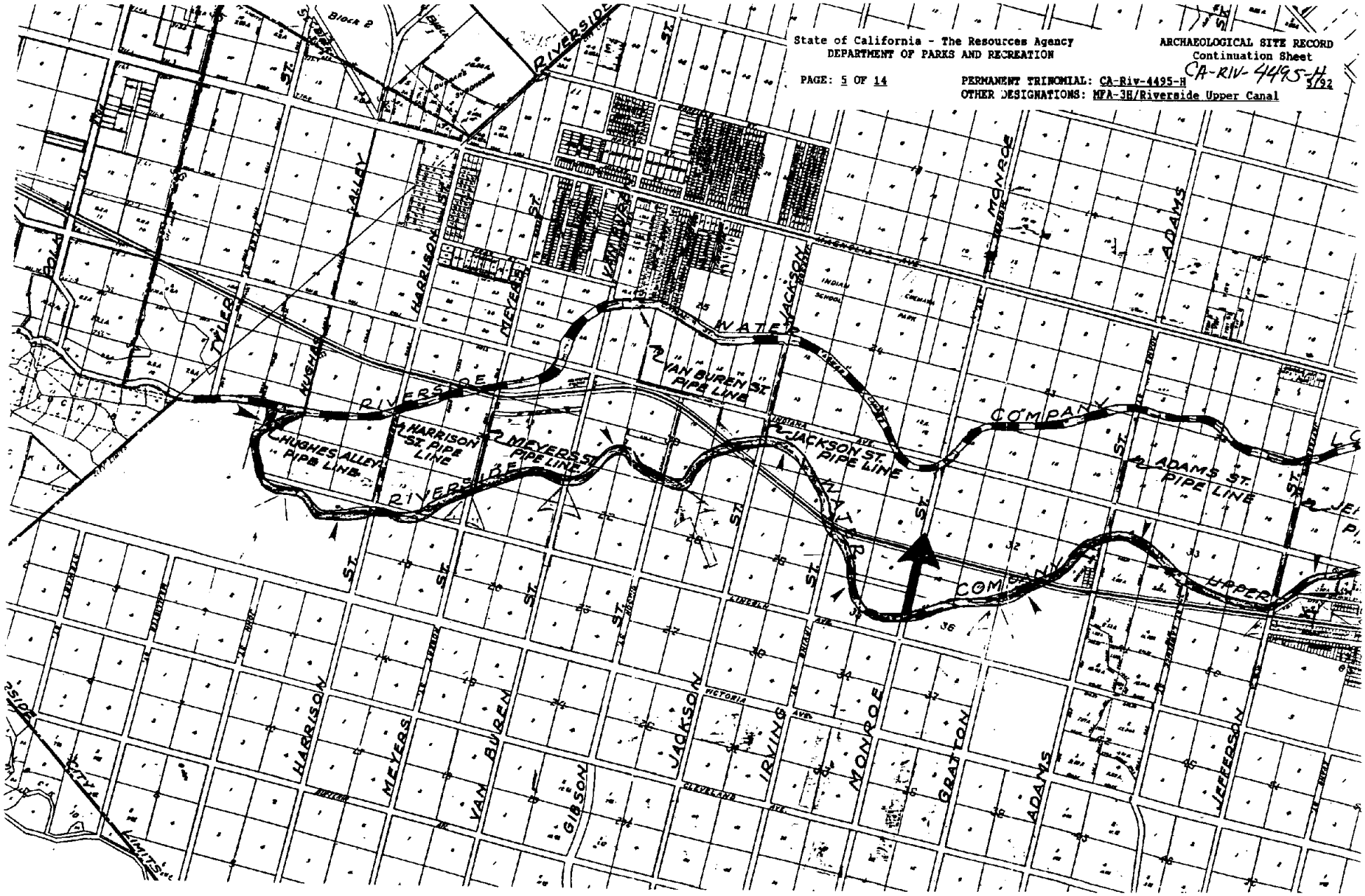
CA-RIV-4495H

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

ARCHAEOLOGICAL SITE RECORD
Continuation Sheet
CA-RIV-4495-H 3/92

PAGE: 5 OF 14

PERMANENT TRINOMIAL: CA-Riv-4495-H
OTHER DESIGNATIONS: MFA-3H/Riverside Upper Canal



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CA-RIV-4495H

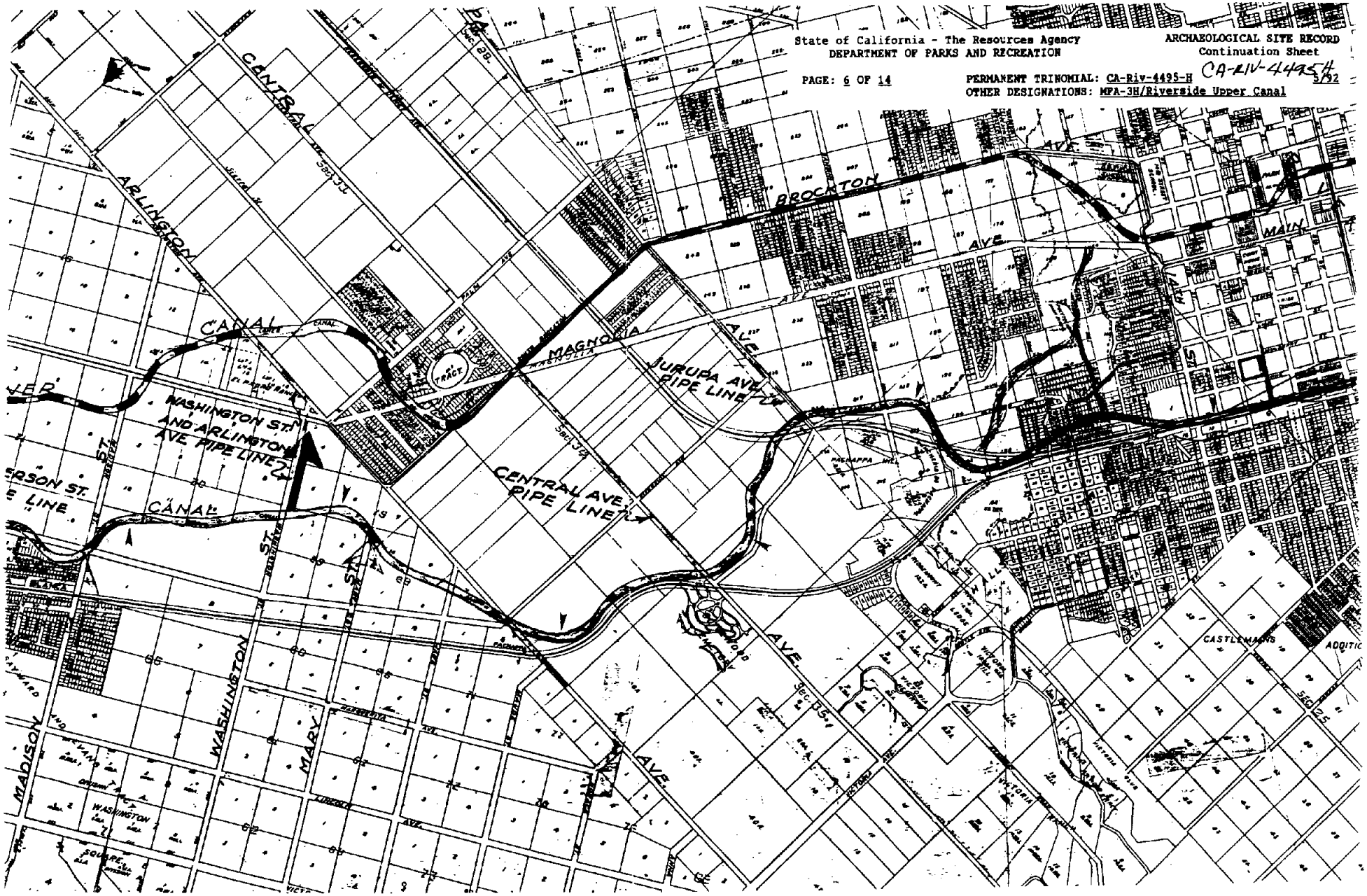
State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

ARCHAEOLOGICAL SITE RECORD
Continuation Sheet

CA-RIV-4495H

PERMANENT TRINOMIAL: CA-Riv-4495-H
OTHER DESIGNATIONS: MFA-3H/Riverside Upper Canal

3/92



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CA-RIV-4495H

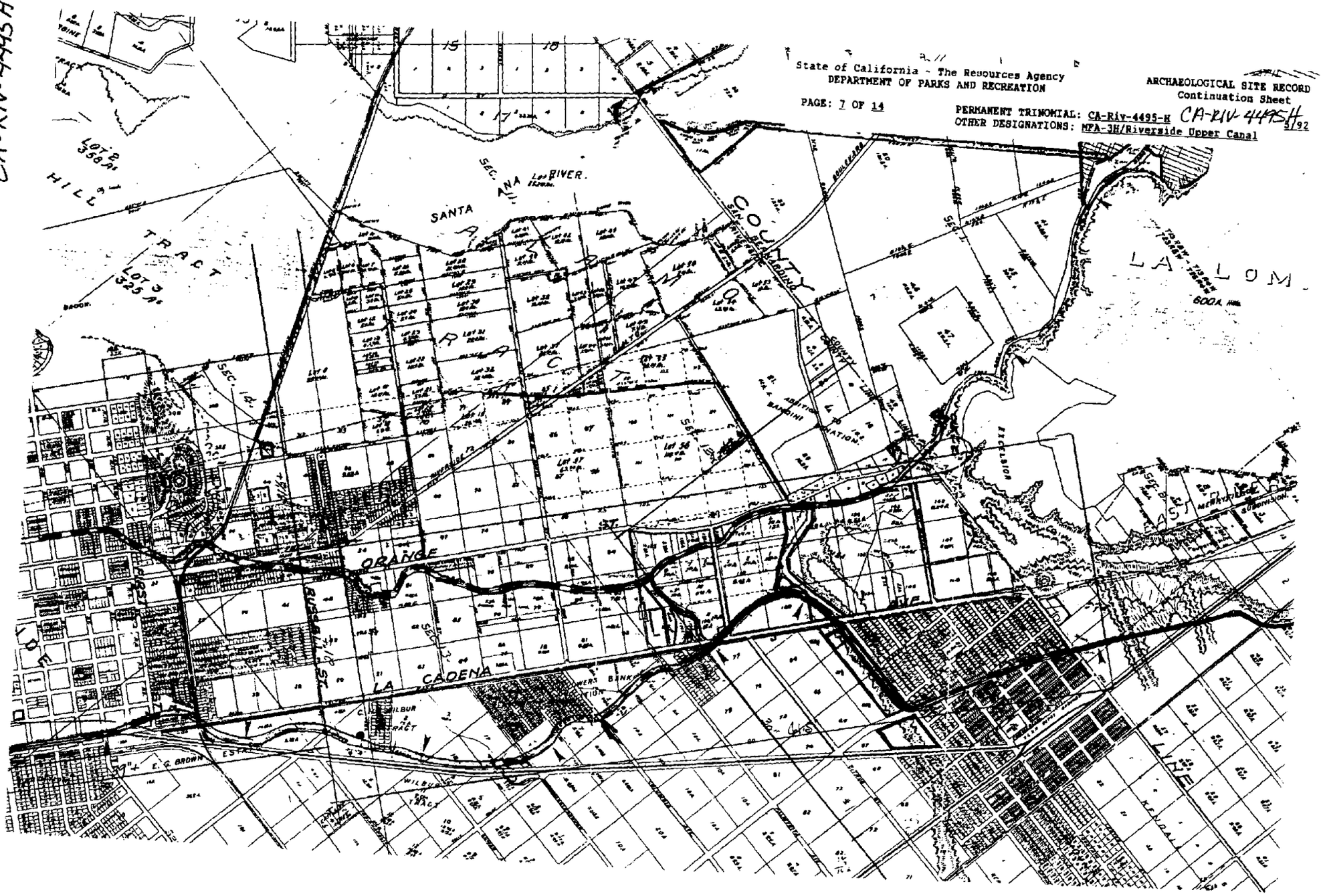
State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

ARCHAEOLOGICAL SITE RECORD
Continuation Sheet

PAGE: 7 OF 14

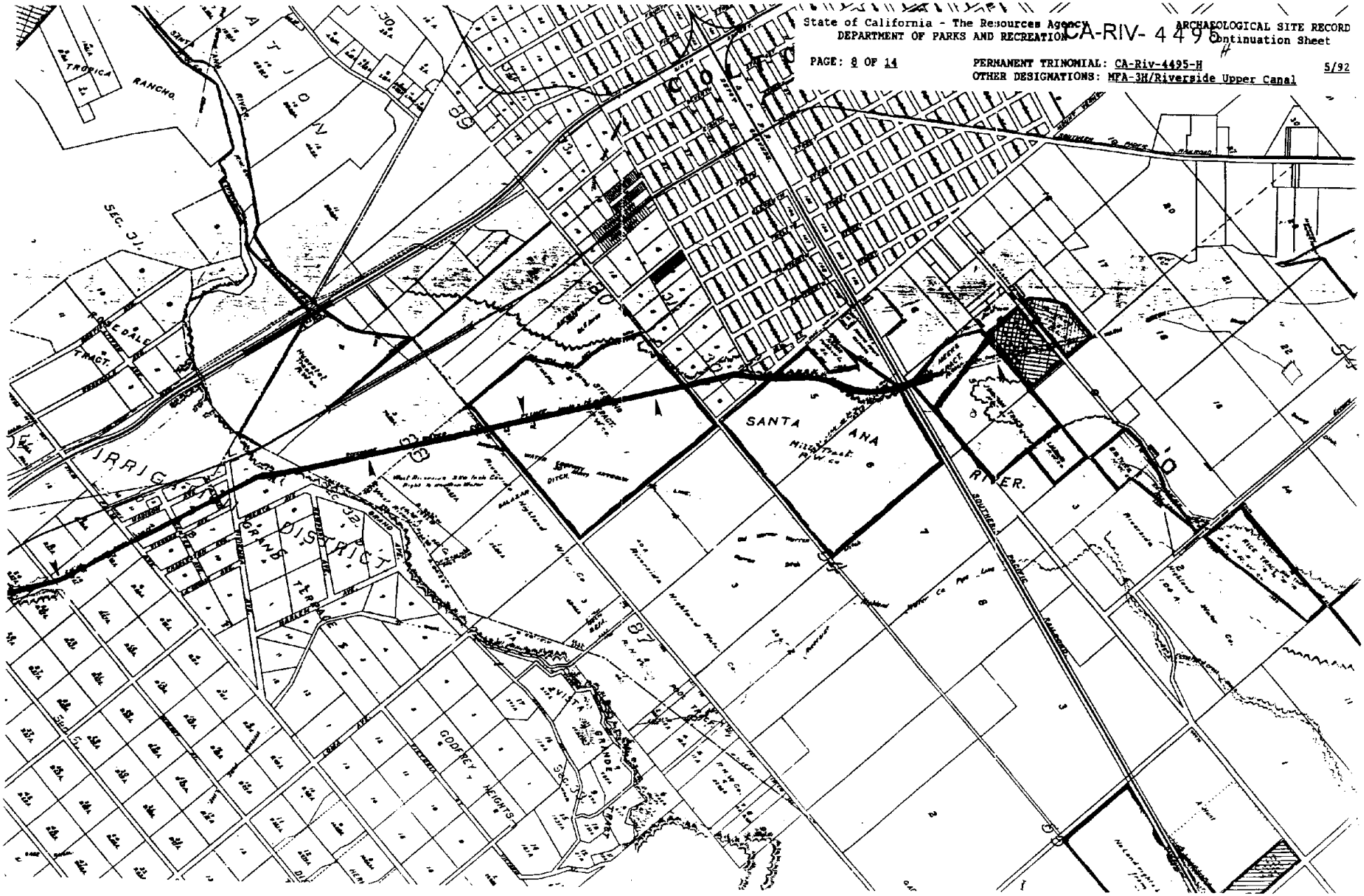
PERMANENT TRINOMIAL: CA-Riv-4495-H CA-RIV-4495H
OTHER DESIGNATIONS: MFA-3H/Riverside Upper Canal

3/92

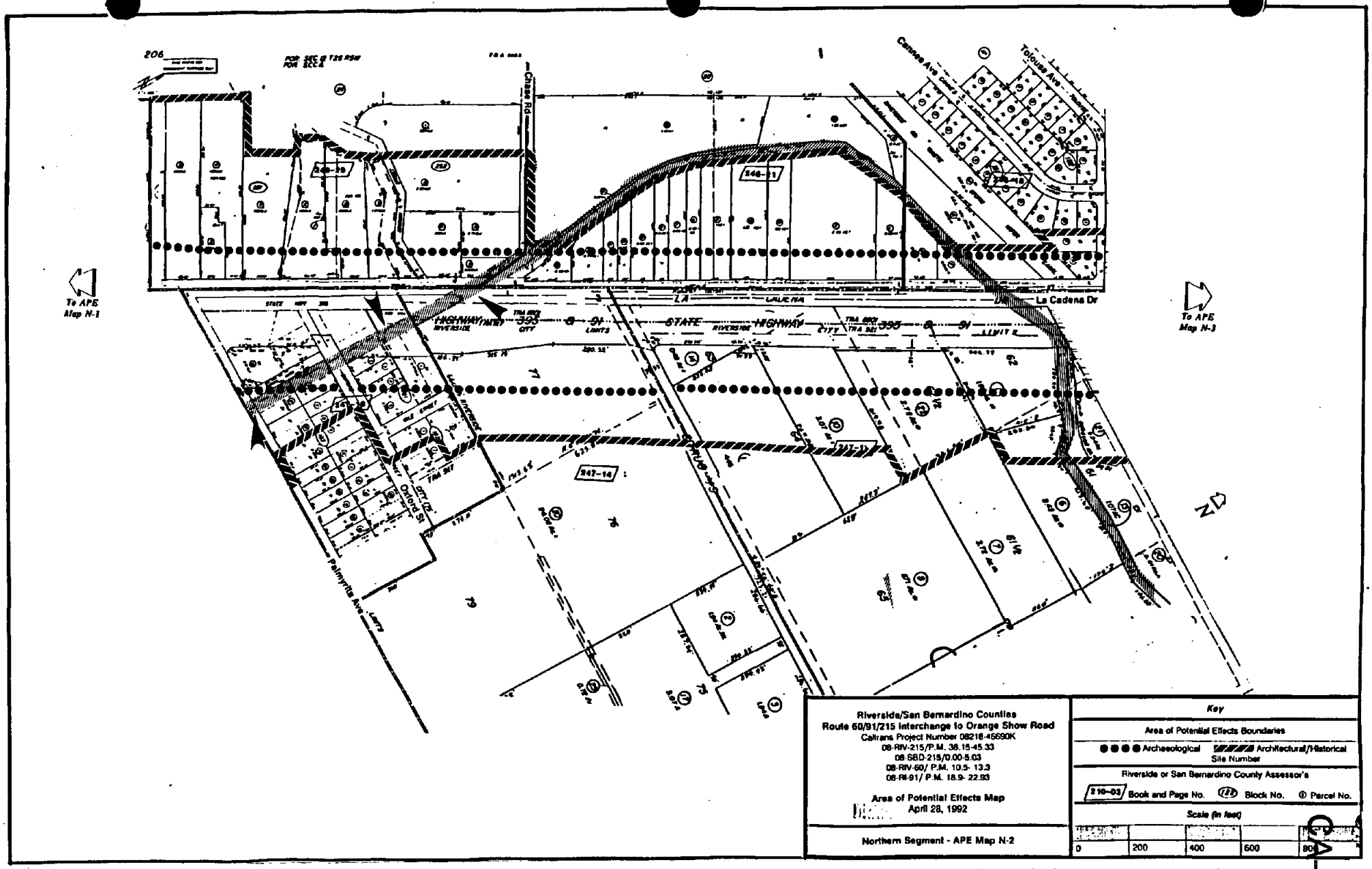


7 of 14

CA-RIV-4495 H



8 of 14



State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

ARCHAEOLOGICAL SITE RECORD
Continuation Sheet

PAGE: 9 OF 14

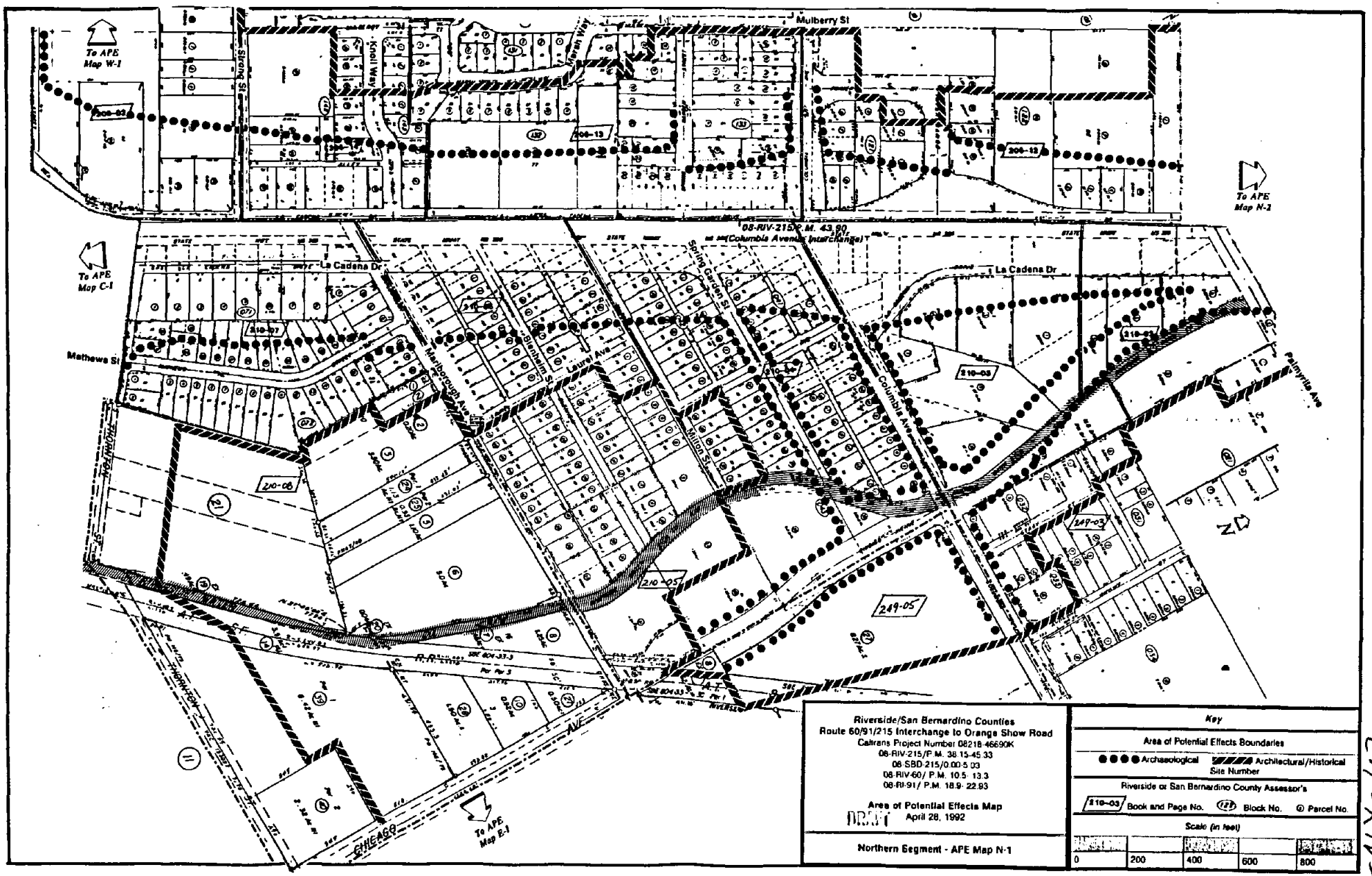
PERMANENT TRINOMIAL: CA-Riv-4495-H

OTHER DESIGNATIONS: MFA-3H/Riverside Upper Canal

5/92

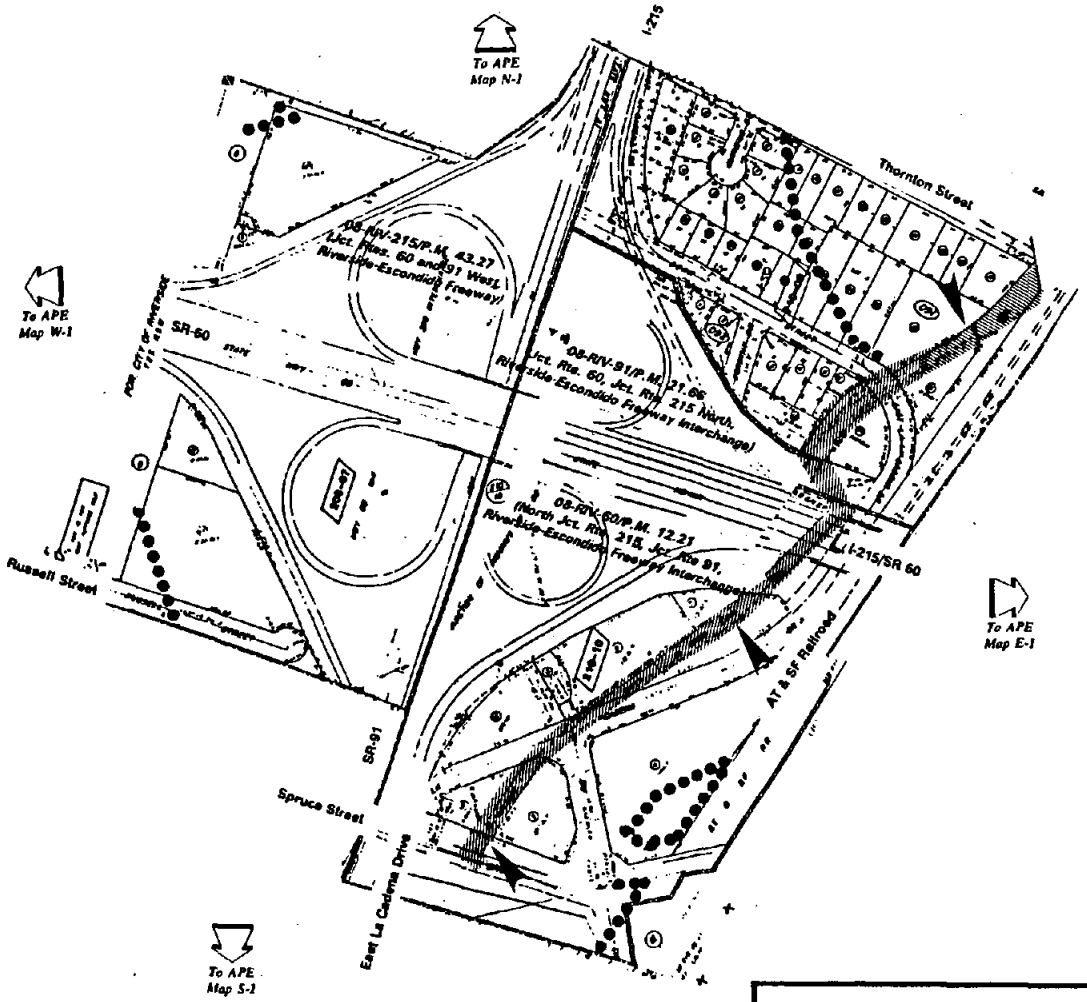
CA-RIV-4495H

9 of 14



CA-RIV-4495H

10 of 14



Riverside/San Bernardino Counties
Route 60/91/215 Interchange to Orange Show Road
Caltrans Project Number 08218-46690K
08-RIV-215/P.M. 38.15-45.33
08-SBD-215/0.00-5.03
08-RIV-60/ P.M. 10.5- 13.3
08-RIV-91/ P.M. 18.9- 22.93

Area of Potential Effects Map
DRAFT April 28, 1992

Central Interchange Segment - APE Map C-1

Key

Area of Potential Effects Boundaries

Archaeological — Architectural/Historical Site Number

Riverside or San Bernardino County Assessor's

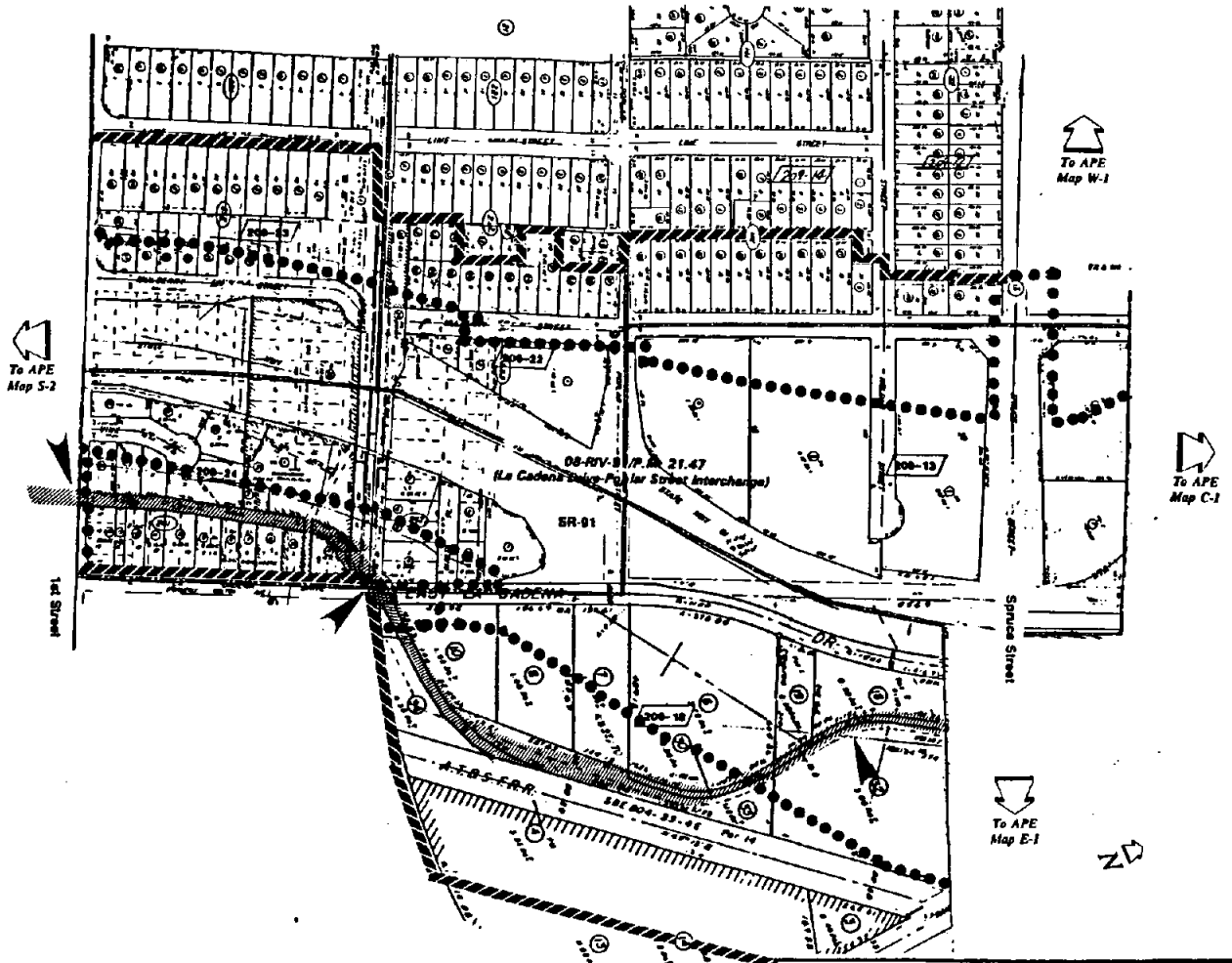
210-03 Book and Page No. (127) Block No. (2) Parcel No.

Scale (in feet)

0	200	400	600	800

CA-RIV-4495H

11 of 14



Riverside/San Bernardino Counties
Route 60/91/215 Interchange to Orange Show Road
Caltrans Project Number 08218-46690K
08-RIV-215/P.M. 38.15-45.33
08-SBD-215/0.00-5.03
08-RIV-60/ P.M. 10.5- 13.3
08-RIV-91/ P.M. 18.9- 22.93

Area of Potential Effects Map
April 28, 1992
DRAFT

Southern Segment - APE Map S-1

Key

Area of Potential Effects Boundaries

Archaeological — Architectural/Historical

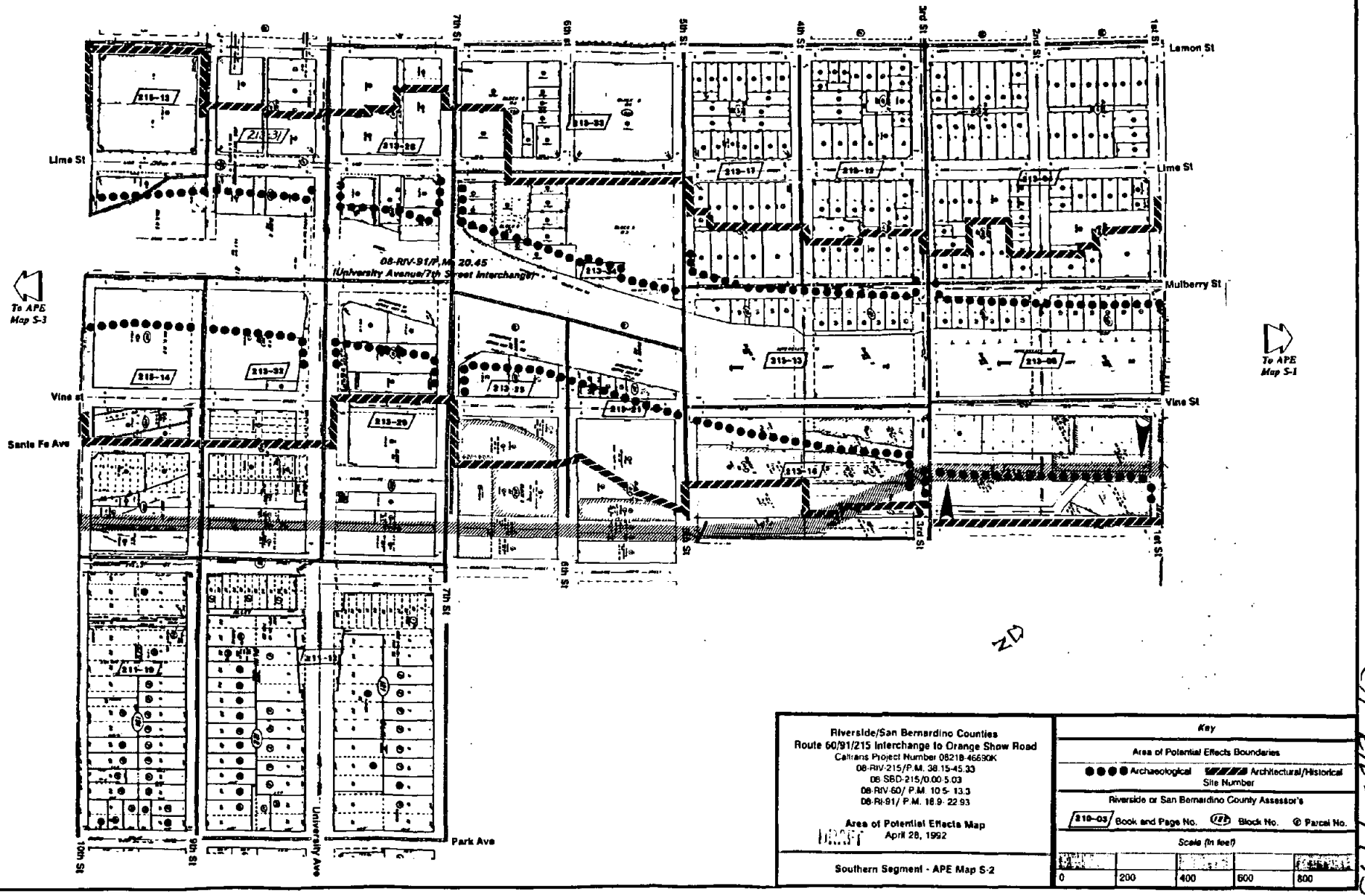
Site Number

Riverside or San Bernardino County Assessor's

210-03 Book and Page No. — 127 Block No. — 0 Parcel No.

Scale (in feet)

0 | 200 | 400 | 600 | 800



CA-RIV-4495-H

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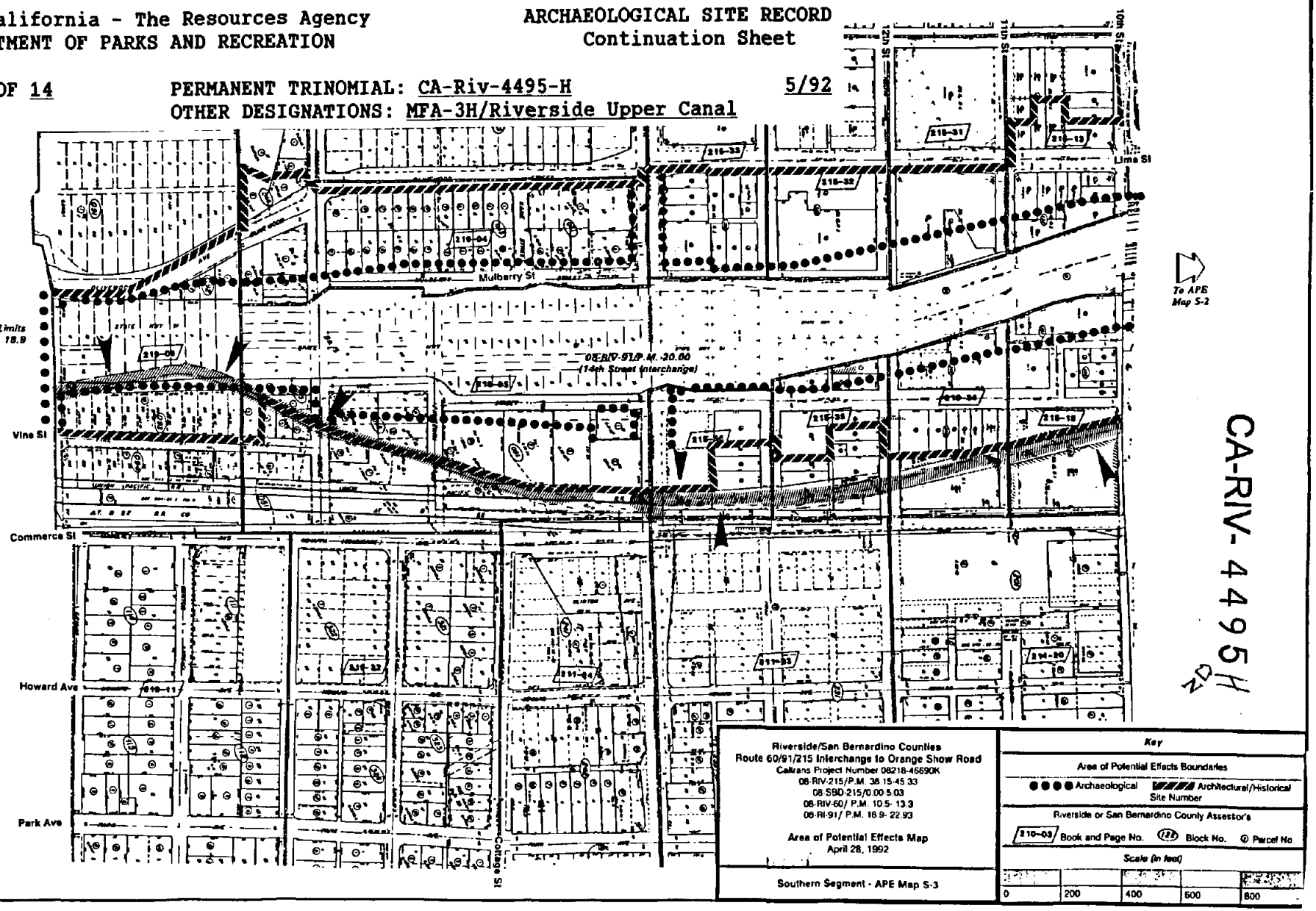
State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

ARCHAEOLOGICAL SITE RECORD
Continuation Sheet

PERMANENT TRINOMIAL: CA-Riv-4495-H

5/92

OTHER DESIGNATIONS: MFA-3H/Riverside Upper Canal



CA-RIV-4495H

14814

CA-RIV- 4495H

State of California - The Resources Agency Permanent Trinomial: CA-Riv-4495H Supplement ____

DEPARTMENT OF PARKS AND RECREATION

ARCHAEOLOGICAL SITE RECORD

Other Designations: RCTC Parcel 5 - Upper Canal Remnants

1. County: Riverside

2. USGS Quad: Riverside East (7.5') 1967 (15') ____ Photorevised 1980

3. UTM Coordinate: Zone 11 46692 m Easting 3760860 m Northing ( )

4. Township 2 South Range 5 West : NW ¼ of NE ¼ NE ¼ NW ¼ of Section 24 Base Mer. SBM ( )

5. Map Coordinates: 48 mmS 65 mmE (from NW corner of map) 6. Elevation 880' ( )

7. Location: Assessor Parcel Number 210-180-018. The Upper Canal remnants are located on the west side of the canal on the southeast side of the parcel. East La Cadena Drive is approximately 210 feet west and Spruce St. is approximately 400' north, of the wall location. The original Upper Canal is now the Riverside Water Company Canal. ( )

8. Prehistoric ___ Historic X Protohistoric ___ 9. Site Description 17 feet of granite block retaining wall is exposed with an additional 71 feet partially exposed to the south. The granite blocks appear to have been covered over with the concrete canal lining. The exposed wall is 16" to 18" high and 12" to 15" wide. ( )

10. Area 88 feet long m( )x ____ m( ) ____ m^2

Method of Determination: Tape ( )

11. Depth: None apparent cm Method of Determination: Visual ( )

12. Features: Dressed granite blocks generally three courses high. No other associated features. ( )

13. Artifacts: None observed. ( )

14. Non-Artifactual Constituents and Faunal Remains: None observed. ( )

15. Date Recorded: 9/12/91 16. Recorded By: Patricia Jertberg ( )

17. Affiliation and Address: LSA Associates, Inc., 3403 10th Street, Suite 520, Riverside, CA 92501 ( )

RECEIVED IN
DEC 04 1991
EIC

WPFORMS\ARCH.1 See Continuation Sheet (X)

11/14/91(I:\RCT901\ARCH1-2.FRM)

CA-RIV- 4495 H

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Permanent Trinomial: CA-Riv-4495H

9 | 91
Mo. Yr.

ARCHAEOLOGICAL SITE RECORD

Other Designations: RCTC Parcel 5 - Upper Canal Remnants

18. Human Remains: None observed ( )

19. Site Disturbances: Upper Canal has been lined with concrete and may have covered original granite block construction present in some places. Erosion has damaged some of the concrete and granite block retaining wall. ( )

20. Nearest Water (type, distance, direction) Canal is on the east side of the granite retaining wall. ( )

21. Vegetation Community (site vicinity): Non-native Plant List ( )

22. Vegetation (on site): Introduced grasses and weeds. A large pepper tree is adjacent to the granite wall on the west side. Some Datura plants are in the disced area west of the canal.

23. Site Soil: Recent alluvium, medium brown with some cobbles. ( )

24. Surrounding Soil: Same as above. ( )

25. Geology: Recent alluvium with some granite and metavolcanic cobbles and boulders. ( )

26. Landform: Alluvial deposition area. ( )

27. Slope: Vertical 28. Exposure: Open ( )

29. Landowner(s) (and/or tenants) and Address: Riverside County Transportation Commission (RCTC), 3560 University Avenue, Suite 100, Riverside, CA 92501 (in process of purchasing). ( )

30. Remarks: Per Howard Creason (personal communication) the granite block retaining wall may have been part of the early efforts to improve the original earthen canal and prevent seepage after the drought of the 1890s. The land on the west is below the canal and a retaining wall would have been necessary. ( )

31. References: Historic Property Clearance Report - Supplement. November 1991 (in progress). ( )

32. Name of Project: RCTC (RCT901) ( )

33. Type of Investigation: Phase I - Archaeological survey for proposed property acquisition by RCTC ( )

34. Site Accession Number: None Curated At:

35. Photos: Photo record forms included. Color prints. ( )

WPFORMS\ARCH.2

See Continuation Sheet (X)

CA-RIV- 4495H

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Permanent Trinomial: CA-Riv-4495H 9/91
Mo. Yr.

ARCHAEOLOGICAL PHOTOGRAPHIC RECORD

Other Designations: RCTC Parcels 4 and 5 (RCT901)

Camera and Lens Types
Minolta 7000i: 23-135

Film Type and Speed
Color print 400: Roll #1

On File at: LSA Associates, Inc.
3403 10th Street, Suite 520
Riverside, CA 92501

Mo.	Day	Time	Exposure/ Frame	Subject/Description	View Toward	Accession Number
9	12	9:00	14	Friis parcel - Friis and Company	south	
9	12	9:00	15	Friis parcel - overview	south	
9	12	9:00	16	Friis parcel - overview	south	
9	12	9:30	17	Saedi parcel overview from northeast corner, Spruce overcross in background	west	
9	12	9:30	18	Saedi parcel overview from northeast corner, Call America building in background	southwest	
9	12	9:30	19	Saedi parcel overview from northeast corner, RR on left	south	
9	12	9:30	20	Saedi parcel, former structure site	southeast	
9	12	9:30	21	Saedi parcel, former structure site	north	
9	12	9:30	22	Saedi parcel, structure remnants, east wall	west	
9	12	9:30	23	Saedi parcel, structure remnants, north wall	south	
9	12	9:30	24	Saedi parcel, structure remnants, west wall	east	
9	12	9:30	25	Saedi parcel, structure remnants, south wall	north	
9	12	9:30	26	Saedi parcel, old metal door knob	NA	
9	12	9:30	27	Saedi parcel, structure, stucco skin	NA	
9	12	9:30	28	Saedi parcel, structure, exterior wall	northeast	
9	12	9:30	29	Saedi parcel, structure, curve in northwest corner exterior wall	west	
9	12	9:30	30	Saedi parcel, west side overview from southwest corner, Call America on right	east	
9	12	9:30	31	Saedi parcel, west side overview from southwest corner	northeast	
9	12	9:30	32	Saedi parcel, west side overview from southwest corner, La Cadena East on left	north	
9	12	9:30	33	Saedi parcel, Upper Canal wall area	east	
9	12	9:30	34	Saedi parcel, Upper Canal exposed granite block wall area	east	
9	12	9:30	35	Saedi parcel, Upper Canal exposed granite block wall, close up	east	
9	12	9:30	36	Saedi parcel, Upper Canal exposed granite block wall	north	

CA-RIV- 4495 H

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Permanent Trinomial: ~~CA-RIV-4495H~~ 9/91
Mo./Yr.

ARCHAEOLOGICAL PHOTOGRAPHIC RECORD

Other Designations: RCTC Parcel 5 - Historic Features (RCT901)/Jurupa Ave. Extension (CTR101)

Camera and Lens Types
Minolta 7000i: 28-135

Film Type and Speed
Color Print 400: Roll #2

On File at: LSA Associates, Inc.
3403 10th Street, Suite 520
Riverside, CA 92501

Mo.	Day	Time	Exposure/ Frame	Subject/Description	View Toward	Accession Number
11	5	10:00	1	Irrigation weir box	north	
11	5	10:00	2	Irrigation weir box	east	
11	5	10:00	3	Irrigation weir box	west	
11	5	10:00	4	Upper Canal from weir box	north	
11	5	10:00	5	Outlet to weir box, vertical	east	
11	5	10:00	6	Outlet to weir box, horizontal	east	
11	5	10:00	7	Outlet north of weir box with brick	east	
11	5	10:00	8	Quartz rock exposed beneath concrete overcoat on west side of canal	north	
11	5	10:00	9	Exposed wall - area mapped	southeast	
11	5	10:00	10	Close-up of wall construction	east	
11	5	10:00	11	Canal with wall	south	
11	5	10:00	12	Canal from wall area	north	
11	5	10:00	13	Wall close-up	south	
11	5	10:00	14	Canal and wall	south	
11	5	10:00	15	Canal with exposed rock area center from southeast corner of fence line and canal, with tape	north	
11	5	10:00	16	Same as above without tape	north	
11	5	10:00	17	Exposed wall and canal	north	
11	7	9:00	18	Parcel 6 overview from Orange Street	northwest	
11	7	9:00	19	Parcel 6 overview from Orange Street	west	
11	7	9:00	20	Parcel 6 overview from Orange Street	southwest	
11	7	10:00	21	Jurupa Avenue Extension, drainage and levee	north	
11	7	10:00	22	Jurupa Avenue Extension, east portion of project area	east	

CA-RIV- 4495 H

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

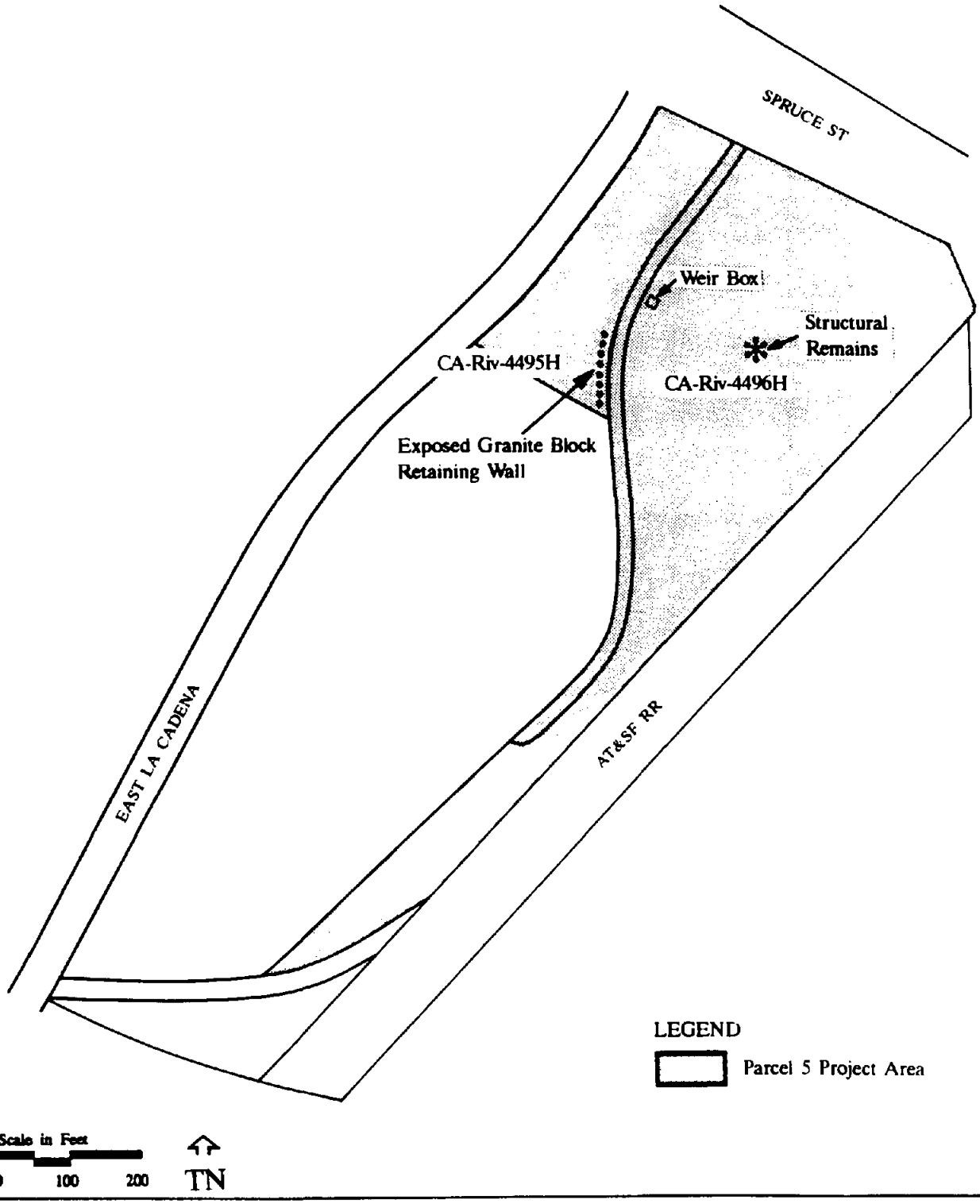
ARCHEOLOGICAL SITE MAP

Page 5 of 8.

Permanent Trinomial: CA-Riv-4495H

9 | 91
Mo. Yr.

Other Designations: RCTC - Parcel 5 Historic Features



DPR 422 F (Rev. 4/88)

CA-RIV- 4495 H

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

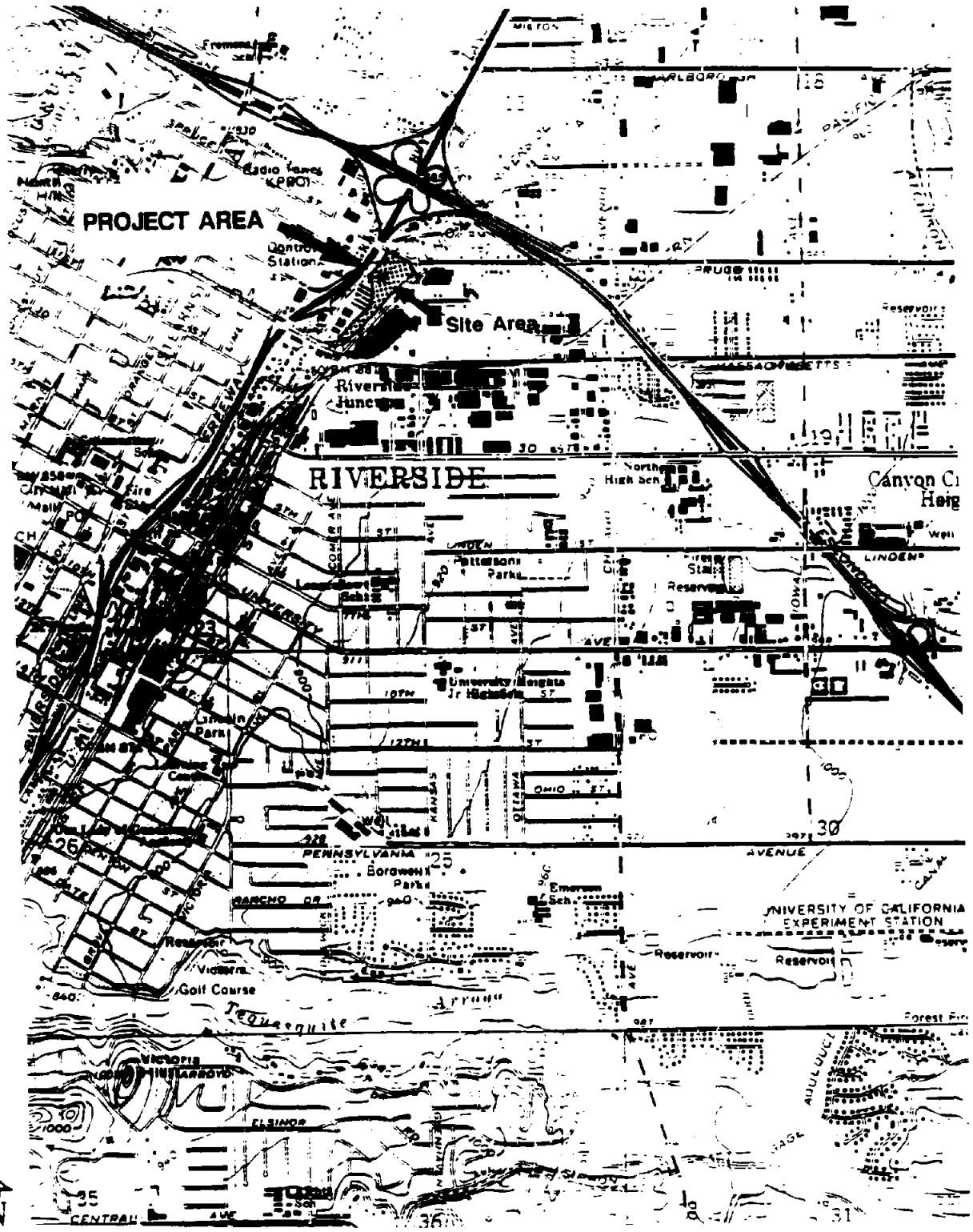
ARCHEOLOGICAL SITE LOCATION MAP

Permanent Trinomial: CA-Riv-4495H

9 / 91
Mo. Yr.

Other Designations: RCTC Parcel 5 - Upper Canal Remnants

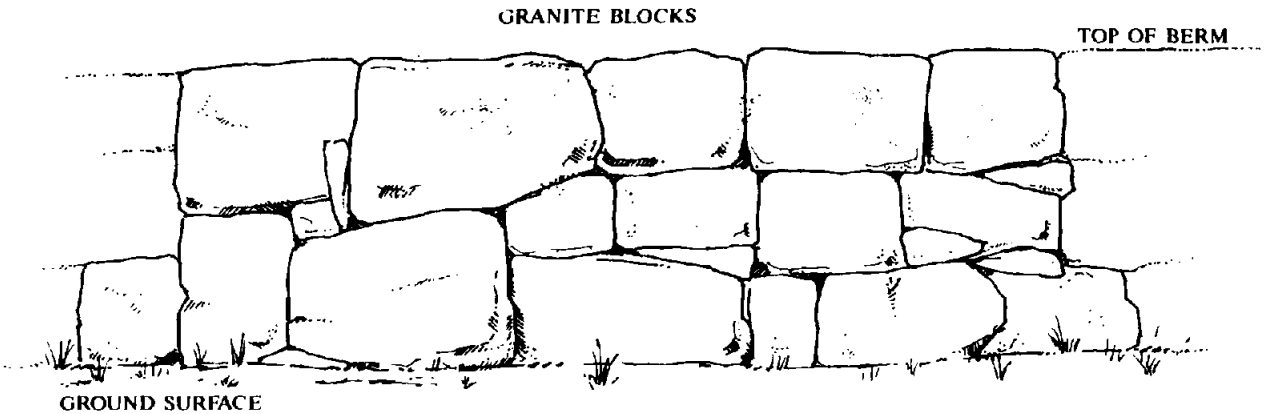
Page 6 of 8.



Scale: 1" = 2000'

USGS 7.5' Riverside East Quadrangle

DPR 422 G (Rev. 4/86)



TN

Scale in Feet

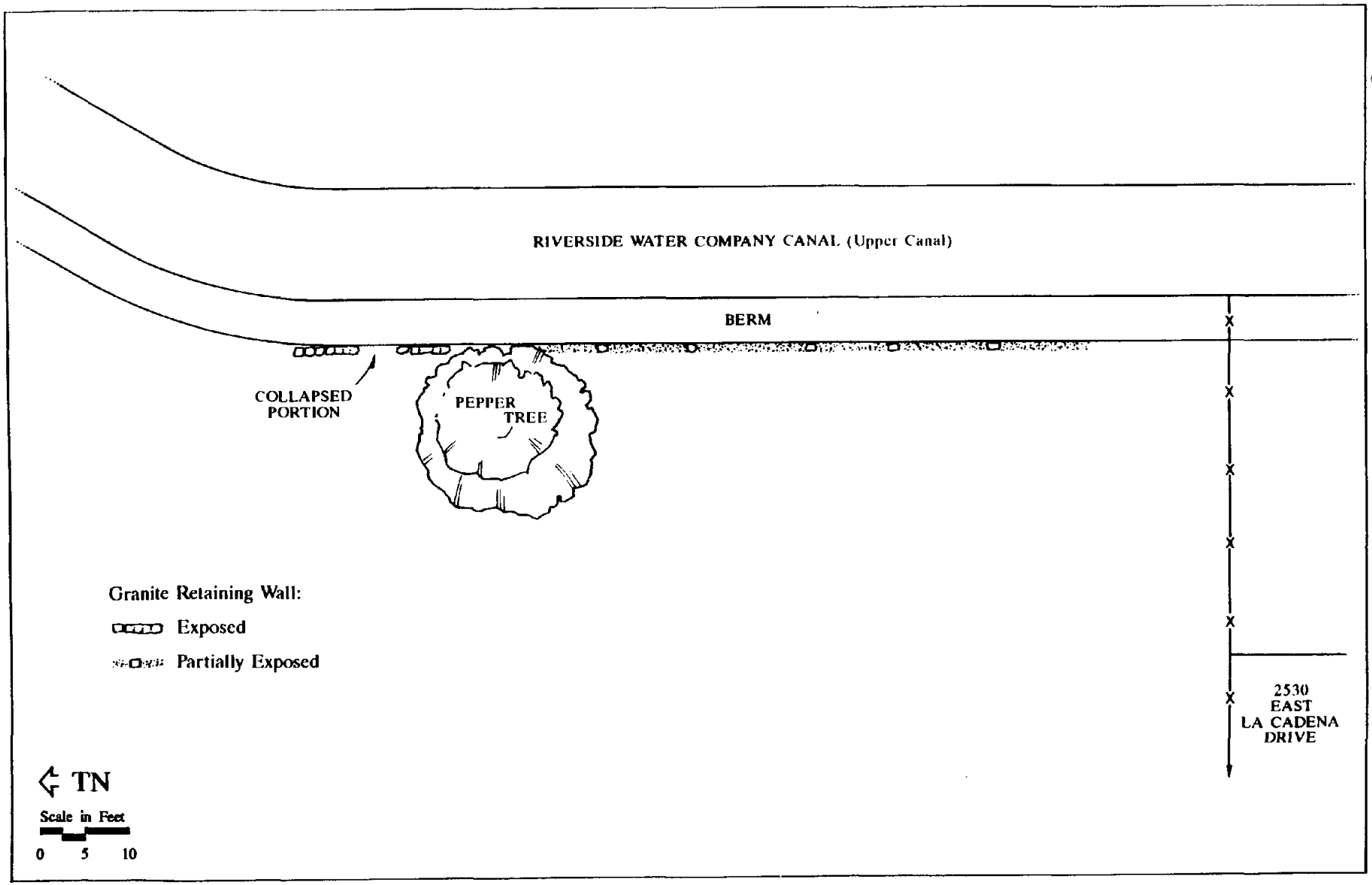
0 .5 1

11/20/91

Route 60/91/215 Interchange
Riverside County
Post Miles: 08-Riv-91/21.47
08-Riv-60/11.82
Charge unit: 08213
E.A.: 462702

CA-Riv-4495H
Parcel 5
Partial Profile of Exposed Granite Retaining Wall

CA-RIV-4495H



11/20/91

Route 60/91/215 Interchange
Riverside County
Post Miles: 08-Riv-91/21.47
08-Riv-60/11.82
Charge unit: 08213
E.A.: 462702

CA-Riv-4495H
Parcel 5 - Plan View
Exposed & Partially Exposed Granite Retaining Wall

CA-RIV-4495H

Background. Numerous segments of this canal have been previously documented and/or evaluated. In 2001, EDAW updated the site record for the canal and stated that, although the overall integrity is poor, if it were restored it would potentially be eligible for listing in the National Register of Historic Places (National Register). The subject segment has not been previously documented.

P2. Location. The segment is located between Jackson Street and the Burlington Northern and Santa Fe (BNSF) railroad tracks, south of Indiana Avenue in Riverside. Refer to Location Map (page 3). The segment measures approximately 400 feet in length.

P3a. Description. This short segment of the Upper Riverside Canal is adjacent to a dirt utility access road, is fenced and was not accessible; therefore only estimate measurements are available for this segment. The segment, measuring approximately 400 feet in length, is located adjacent to the southern boundary of the Project Area between Jackson Street and the Burlington Northern and Santa Fe (BNSF) railroad tracks. The width of the canal segment is approximately 50 feet at the western end near the railroad tracks and gradually decreases to approximately 20 feet at the eastern terminus at Jackson Street. Due to the accumulation of dirt and debris, the depth cannot be determined. The sides are slightly sloped inward as a result of being channelized. This segment is isolated from the rest of the canal by development at either end; it is filled with dirt and debris, and appears to be walled off at the intersection of the railroad tracks. This segment of the canal no longer retains integrity of setting, feeling, materials, or association.

***P11. Report Citation:** Bechtel and Austerman 2016. Cultural Resources Assessment, Hawthorne Elementary School Project, City of Riverside, County of Riverside, California.

B10. Significance Evaluation. This segment of the Riverside Upper Canal does not appear to be eligible for listing in the National Register or California Register or for designation under the local ordinance. It is an isolated segment that is cut off from the remainder of the canal.

Under National Register and California Register criteria A/1, although the Riverside Upper Canal is associated with events that have made a significant contribution to the settlement of Riverside, this segment no longer retains adequate integrity to convey its association with those events.

Under National Register and California Register criteria B/2, the canal is not associated with the lives of persons significant in our past.

Under National Register and California Register criteria C/3, this segment of the Riverside Upper Canal does not embody distinctive characteristics of a type, period, or method of construction. It does not represent the work of a master, possess high artistic values, or represent a significant and distinguishable entity whose components may lack individual distinction.

Under National Register and California Register criteria D/4 this segment of the Riverside Upper Canal is not likely to yield, information important in prehistory or history due to the fact it has been channelized.

City of Riverside Landmark Criteria. This segment of the Riverside Upper Canal is not an exceptional example of historical, archaeological, cultural, architectural, community, aesthetic, or artistic heritage of the City. The Landmark criteria require that the resource be both exceptional and retain high integrity in order to be considered for designation as a Landmark. If either of those criteria is missing, the resource does not meet the basic requirements for designation as a Landmark. Since this segment of the canal has lost integrity and is not exceptional, it does not meet the minimum qualifications for this designation.

City of Riverside Structure of Merit Criteria. Under Structure of Merit Criterion 1, the resource does not have a unique location or singular physical characteristics, nor is it a view or vista representing an established and familiar feature of a

neighborhood, community, or of the City. Therefore, it is not eligible under this criterion

Under Structure of Merit Criterion 2, the canal is an example of a property type that was once common but is now rare in its neighborhood, community, or area. However, as discussed previously, this segment was updated with modern concrete and has been separated from the original canal by development; therefore, it does not retain adequate integrity and is not eligible under this criterion. *See Continuation Sheet*

B10. Significance Evaluation (continued from page 1)

Structure of Merit Criterion 3 is for properties connected with a business or use which was once common but is now rare. The canal was originally associated with agricultural uses, but this segment no longer appears to be in use. Therefore, the association has been lost and this criterion does not apply.

Structure of Merit Criterion 4 is for properties that retain sufficient, but not necessarily high integrity, and that meet one or more of the Landmark criteria. As discussed above, the resource has lost integrity.

Under Structure of Merit Criterion 5, this segment of the canal has been altered and does not have the potential to yield information important in history or prehistory. Therefore, it is not eligible under this criterion.

Structure of Merit Criterion 6 is essentially the same as Criterion 4 in that it is for properties that retain sufficient integrity to convey significance under one or more of the Landmark criteria. Since this has been addressed under Criterion 4, no further discussion is provided.

Overview of canal segment looking west

Appendix E:
Preliminary Soil Investigation

GeoMat Testing Laboratories, Inc.

Soil Engineering, Environmental Engineering, Materials Testing, Geology

January 23, 2017

Project No. 16193-01

TO: Kingsfield Development
7111 Indiana Avenue, Suite 300
Riverside, California 92504

ATTENTION: Ms. Carol Carter

SUBJECT: Preliminary Soil Investigation Report, Hawthorne Heights Project, Single Family Homes, APNs 233-170-001 and 233-180-007, City of Riverside, California

Introduction

In accordance with your authorization, GeoMat Testing Laboratories, Inc. has conducted a preliminary soil investigation for the subject site. This report should be considered only preliminary in nature; its purpose is to determine the general foundation system for the structures described herein. The following presents a summary of our findings, conclusions, recommendations, and limitations of our work for the proposed construction.

Scope of Work

- Review soils, seismic, groundwater data, and maps in our files.
- Exploration of the site at accessible location by means of a drill rig.
- Field engineer for logging, observe drilling resistance/caving.
- Sampling of select soils.
- Conduct laboratory testing of select soil samples for classification, direct shear, soluble sulfate content, and hydrocollapse.
- Prepare CBC seismic design parameters.
- Preparation of a soil investigation report to include: Site preparation recommendations, Liquefaction Analysis, Overexcavation depth, Allowable soil bearing value, Foundation recommendations, Slab-on-grade recommendations, Earth pressures, Grading specifications, Pavement design, Site Class, CBC seismic design parameters.

Existing Site Condition

The subject site is located in a residential neighborhood, on the south side of Indiana Avenue between Jackson Street and Gibson Street, in the city of Riverside, California. Access on site is on Indiana Avenue which is a paved street with concrete curb and gutter.

The site is bordered by a vacant lot on the west, residential homes on the east, and BNSF railroad tracks and Riverside Canal on the south. The geographical relationship of the site and surrounding vicinity is shown on our Site Location Map, Figure 1.

Currently, the site has an old abandoned elementary school on it. The school consists of approximately 6 single story wood framed buildings, asphalt and concrete drives and play areas, and grass fields. There are several mature trees on site. Historic aerial photos (Google Earth) show construction debris, woodchips, sand, and possibly soil stockpiled on site, mostly on the east end. The site is approximately 6.74 acres.

Proposed Development

We understand that the site is proposed for a development of single family homes. The residential structures are expected to be light weight wood frame construction. Proposed site grades are not anticipated to change significantly from existing grades. A grading plan is not available, however based on flat/level site topography, we have assumed that minor cut and/or fill grading not exceeding three feet may be proposed. We should be provided with a copy of the grading plans when available to review the recommendations contained herein.

Our recommendations are based upon the assumed grading information. We should be notified if the actual loads and/or grades change significantly during the project design to either confirm or modify our recommendations

Field Work

Seven exploratory boreholes were drilled on January 14, 18, 19, 20, and 21, 2017, and one borehole drilled on October 24, 2015, to a maximum depth of 50 feet below existing ground surface utilizing a CME 45 equipped with 6-inch hollows stem augers and a Dames and Moore California Ring Sampler. A field engineer from this office observed the drilling and prepared the boring logs. Stratification lines on the logs represent the approximate boundary between soil types, although the transitions may actually be gradual. Refer to Plate 1 for location of exploratory borehole.

Sampling with Drill Rig

Relatively undisturbed samples were obtained with the California Ring Sampler (ASTM D 1587). This sampler has three inches external diameter, 2.5 inches inside diameter, and is lined with one inch high brass rings, with an inside diameter of 2.41-inches. The sample barrel is driven into the ground at the bottom of the boring with 140-pound hammer with a free fall of approximately 30-inches.

Sampler driving resistance, expressed as blows per six inches of penetration, is presented on the boring logs at the respective sampling depths. Ring samples were retained in close-fitting, moisture tight canisters for transport to our laboratory for testing. A bulk sample was also collected from the auger cuttings during drilling. The sample was collected in a plastic bag, tied, and tagged for the location and depth.

Sampling with Dames and Moore

Exploratory boreholes were drilled utilizing a gas operated limited access drill equipped with solid stem augers. Sampling was conducted by Dames and Moore California Ring Sampler (see Exploratory Boring Location Map, Plate 1). This sampler has three inches external diameter, 2.5 inches inside diameter, and is lined with one inch high brass rings, with an inside diameter of 2.41-inches.

The sample barrel was driven into the ground at the bottom of the excavation with 35-pound hammer with a free fall of approximately 36-inches. Sampler driving resistance, expressed as number of blows for 12-inch of penetration, was recorded. Ring samples were retained in close-fitting, moisture tight canisters for transport to our laboratory for testing. A bulk sample was collected in sealable from the auger cuttings during drilling.

To convert the field blow count to an SPT equivalent, we have utilized the conversion formula by D.M. Burmister, 1948, "The importance and practical use of relative density in soil mechanics: *Proceedings of ASTM, v. 48:1249."*

$$N_{(corrected)} = N_{(raw)} \times \frac{W. \times H}{(140)\,(30)} \times \frac{[(2)^2 - (1.375)^2]}{(D_o)^2 - (D_i)^2}$$

W: hammer weight=35 (lb), H: Drop Height 36 in D_o: Diameter of sample barrel= 3 in D_i: Diameter of drive sample= 2.4 in

The geotechnical boring log is presented in Appendix B and may include a description and classification of each stratum, sample locations, blow counts, groundwater conditions encountered during drilling, results from selected types of laboratory tests, and coring information.

Each boring, unless noted otherwise, was backfilled with cuttings at the completion of the logging and sampling. The backfill, however, may settle with time, and it is the responsibility of owner to ensure that such settlement does not become a liability.

Subsurface Findings

Based on our exploratory borings, the exposed surficial material is generally classified as medium dense silty sand (USCS "SM"). Underlying the silty sand is lateral layering of medium dense sand with silt and sand (USCS "SP-SM", "SW-SM", and "SP"), medium dense silty sand (USCS "SM"), and very firm sandy silt (USCS "ML"). No groundwater, or perched water, was encountered during any of the borings.

Loose silty sand was encountered at 5 feet below ground surface on the south end of the site (see borehole B-6). From our past experience, loose sandy soil is anticipated north of the BNSF railroad tracks in this area of riverside.

Approximately one foot thick layer of wood chips was encountered at the surface in borehole B-3, and appeared to be spread out on the northeast section of the site.

Laboratory Testing

Laboratory tests were performed on selected soil samples. The tests consisted primarily of moisture, density, sieve analysis, direct shear, sulfate content, and hydrocollapse.

The soil classifications are in conformance with the Unified Soil Classifications System (USCS), as outlined in the Classification and Symbols Chart (Appendix B). A summary of our laboratory testing and ASTM designation is presented in Appendix C.

Groundwater

Groundwater study is not within the scope of this work. Groundwater was not encountered in our exploratory borings drilled at the site up to 50 feet below ground surface. Depth to groundwater is not expected to impact site grading.

Highest historical groundwater records were researched utilizing the State of California, Department of Water Resources, Steve Mains' Cooperative Well Measuring Program, USGS Groundwater Watch, and USGS National Water Information System. The following information was obtained:

Resource	Well No.	Highest Historical Depth (ft)	Water Surface Elevation (ft)	Date
Steve Mains	3S5W7J002S	43	768	01/24/2001
	3S5W18B	40	780	04/01/1994
CDWR	3S5W8E002S	30	755	11/29/2012
USGS	No Pertinent Information obtained			
Site's lowest elevation is approximately 835 feet (Google Earth)				

A contour map showing minimum depths to ground water in the Santa Ana River Valley Region was constructed by the United States Geological Survey (USGS) and subsequently, a report (USGS Map MF-1802) was published in 1985. The map was constructed by contouring the shallowest water level measurements reported to the California Department of Water Resources (CDWR) for the period from 1973-1979. Based on our review of the map, the minimum depth to ground water in the project site area, during this period, was indicated to be around 30 feet below ground surface.

Please note that the potential for rain or irrigation water locally seeping through from elevated areas and showing up near grades cannot be precluded. Our experience indicates that surface or near-surface groundwater conditions can develop in areas where groundwater conditions did not exist prior to site development, especially in areas where a substantial increase in surface water infiltration results from landscape irrigation. Fluctuations in perched water elevations are likely to occur in the future due to variations in precipitation, temperature, consumptive uses, and other factors including mounding of perched water over bedrock. Mitigation for nuisance shallow seeps moving from elevated lower areas will be needed if encountered. These mitigations may include subdrains, horizontal drains, toe drains, french drains, heel drains or other devices.

Shrinkage

Based on laboratory test results, we estimate that shrinkage of soils onsite should be approximately 12 (±5) percent. Shrinkage is defined as the decrease in volume of soil upon removal and recompaction expressed as a percentage of the in-place volume. This shrinkage is exclusive of any losses due to removal of roots or any underground structures and is based on an average 92 percent relative compaction. An increase in relative compaction obtained would increase the shrinkage factor.

Furthermore, a subsidence of approximately 0.10 (± 0.05) feet may also be considered during site preparation. The above shrinkage and subsidence estimates should be used with caution since they are not absolute values. We recommend that an earthwork balance area should be designated to allow for variations in the indicated shrinkage and subsidence estimates.

Collapsible Soil

Soil hydroconsolidation is a phenomenon that results in relatively rapid settlement of soil deposits due to addition of water. This generally occurs in soils having a loose particle structure cemented together with soluble minerals or with small quantities of clay. Water infiltration into such soils can break down the interparticle cementation, resulting in collapse of the soil structure. Collapsible soils are found primarily in Holocene alluvial fan deposits.

A representative soil sample representing the upper ten feet of soil was tested in the laboratory for collapse potential. Test result indicates that hydrocollapse potential is less the 1.0%, a negligible value, see Appendix C.

Soil Type

In accordance with OSHA, the surficial older alluvium may be classified as Soil Type “B”.

Excavation Characteristics

The upper subgrade soil is generally medium dense silty sand. This material is not expected to exhibit hard excavation resistance for typical grading equipment.

Temporary Excavations

General

All excavations must comply with applicable local, state, and federal safety regulations including the current OSHA Excavation and Trench Safety Standards. Construction site safety generally is the sole responsibility of the Contractor, who should also be solely responsible for the means, methods, and sequencing of construction operations.

Safe Vertical Cut

Temporary un-surcharged excavations of 7 feet high may be made at a vertical gradient for short period of time. Temporary un-surcharged excavations greater than 7 feet may be trimmed at 1H:1V gradient.

Exposed condition during construction should be verified by the project geotechnical engineer. No excavations should take place without the direct supervision of the project geotechnical engineer.

All applicable requirements of the California Construction and general Industry Safety Orders, the Occupational Safety and Health Act, and current amendments, and the Construction safety Act should be met. Cuts should be observed during excavation by the project's geotechnical consultant. If potentially unstable soil conditions are encountered, modifications of slope ratios for temporary cuts may be required.

Precaution for Excavations

The Contractor should be aware that unsupported excavation depths should in no case exceed those specified in local, state, and/or federal safety regulations (e.g., OSHA Health and Safety Standards for Excavations, 29 CFR Part 1926, or successor regulations).

Such regulations are strictly enforced and, if they are not followed, the Owner, Contractor, and/or earthwork and utility subcontractors could be liable for substantial penalties. The contractor's "responsible person", as defined in 29 CFR Part 1926, should evaluate the soil exposed in the excavations as part of the contractor's safety procedures.

Sloping the sides of temporary excavations should be required beyond the recommended safe cut where trench/excavation is expected to be left open for a long time or where trench/excavation is along foundation or where adjacent utilities exist or public right-of-way. Temporary excavation should not extend below a 1H:1V plane extending beyond and down from the bottom of the existing utility lines or structures.

Geologic Findings

Topographically, the site is relatively flat and slopes down to the north toward Indiana Avenue at a rate of approximately 1.8 percent. Total relief on site is approximately 8 feet. The lot is underlain by alluvial material. Based on the USGS Geologic map of the Riverside West/South 1/2 of Fontana Quadrangles, Figure 2, the regional area prior to development was mapped as old alluvial fan deposits. The alluvium is generally indurated; dissected alluvial fan deposits derived from local terrains of plutonic rocks and generally consist of tan to light reddish brown sand and minor gravel.

Seismicity Considerations

Active faults

The site is not located within an Alquist-Priolo Earthquake Fault Zone. According to the California Department of Conservation, Fault Activity Map, the site is located approximately 9.7 miles northeast of the Elsinore Fault, see Figure 3.

Ground Shaking

Although there are no known active surface faults within or adjacent to the site that will significantly impact the project, the project is located in a region with active earthquakes and strong seismic motion of those earthquakes could affect the project, see Figure 4. The structures that are proposed to be constructed on the site will be required to meet and comply with all applicable city and State building codes to reduce seismic ground shaking at the site to less-than-significant.

Surface Rupture Zones

The site is not within a currently established Earthquake Fault Zone for surface fault rupture hazards. Therefore, the potential for surface rupture is very low. It is probable that not all-active or potentially active faults in the region have been identified. Furthermore, seismic potential of the smaller and less notable faults is not sufficiently developed for assignment of maximum magnitudes and associated levels of ground shaking that might occur at the site due to these faults.

Tsunamis, Seiches

The setting is inland and no large bodies of water are located within the sites vicinity, therefore, the potential of Tsunamis or seiches affecting the site is considered low.

Slope Stability

There are no slopes on site and no slopes are proposed.

Landslides

The site and the surrounding properties are flat and not prone to slope instability hazards, such as landslides. The project will not be impacted by a landslide or impact adjacent properties due to a project generated landslide.

Liquefaction

According to the City of Riverside's General Plan, the site is mapped in an area with high liquefaction potential. The potential for liquefaction and dynamic settlement has been evaluated as outlined in Chapter 6 of the California Division of Mines and Geology (DMC) Special Publication 117 ("Guidelines for Evaluation and Mitigation of Seismic Hazards in California") and "Recommended Procedures for Implementation of DMG Special Publication 117 - Guidelines for Analyzing and Mitigating Liquefaction in California", published by the Southern California Earthquake Center, 2008 edition.

The design and construction recommendations presented below in this report include results of liquefaction and dynamic settlement evaluation. The analysis results are included in Appendix E.

The analysis indicates that 0.31 inch total dynamic settlement is estimated during large earthquake episode. An estimated dynamic differential settlement of 1/2 of total settlement may be anticipated. The safety factor against liquefaction on all layers is above 1 for all layers to a depth of 50 feet below ground surface. Safety factor less than one is an indication for liquefaction potential. The historical high ground water during a seismic event has been assumed at 25 feet below existing ground surface.

Based on SCEC (1999) guidelines, a potential for loss of bearing capacity due to liquefaction is not expected at the site since there is not an upper potentially liquefiable layer at a depth shallower than the estimated depth where the induced vertical stress in the soil is 10% of the bearing pressure imposed by the proposed foundation systems. Furthermore, tied foundation systems are designed to dissipate structural loads. Therefore no loss of bearing capacity is expected for grade beams or lightly loaded slabs-on-grade.

In significant conformance with Youd, Hanson, and Bartlett (ASCE Geotechnical Jr. April 1995, and Lecture by Youd on July 7, 1999), no lateral spreading due to liquefaction is expected at this site due to the following reasons:

- Alluvial subsurface soils are essentially horizontally layered.
- There is not a free-face toward which liquefied soils could move laterally.
- No saturated liquefiable sand with values of N1(60) <15 exist at the site, refer to Geotechnical logs in Appendix B.

If loose clean sand exists between sampling intervals, their occurrence is expected to be thin and considered to be scattered or have minimal occurrence throughout the site, and cannot reasonably be connected_to form a hypothetical "continuous" line of significant length that could reasonably be expected to "exit" on a slope or a free-face, or move significantly below the gentle slope of the site.

Although it is extremely difficult to predict the overall behavior of any site during seismic shaking, it is our opinion that proper design of foundation can substantially improve the structure's resistance to deformation. This is most commonly accomplished by providing adequate lateral connections between all footings with reinforced grade beams and strengthened stem walls. If the owner wishes a higher degree of confidence, then the structures should be designed for higher probable events.

Please note that foundation design is under the purview of the structural engineer. All foundations should be designed by a qualified structural engineer in accordance with the CBC and the latest applicable building codes and structural considerations may govern.

Site Class

The proposed building is less than 25 feet in height, of conventional light frame construction, and a fundamental period of vibration of less than 0.5 seconds. Accordingly site specific evaluation to determine spectral acceleration for liquefiable soils is not required and therefore the structure need not be designed as if it is Seismic Site Class "F:" It is our opinion that structures should be designed in accordance with the current seismic building code for Site Class "D"

Ground Motion And Seismic Design Parameters:

The peak ground acceleration (PGA) and 2013 CBC seismic design parameters are presented in Appendix D.

Expansive Soil Characteristics

Based on visual observations and laboratory classification the upper foundation soils are sandy and considered to be very low in expansion potential.

Conclusions

- Based on laboratory classification, the expansion potential of onsite soils is expected to be very low (EI<20). This would require verification subsequent to completion of new footing excavations.

- The site is located in a region of generally high seismicity, as is all of southern California. During its design life, the site is expected to experience strong ground motions from earthquakes on regional and/or local causative faults. Therefore typical structural design mitigations should be considered by the structural engineer.

- The potential for seismically induced dynamic settlement of the onsite soils is low.

- The use of shallow foundation is feasible for the proposed construction.

- No groundwater and/or seepage were encountered during our subsurface investigation. However, the potential for rain or irrigation water moving through from adjacent and elevated areas cannot be precluded. Our experience indicates that surface or near-surface groundwater conditions can develop in areas where groundwater conditions did not exist prior to site excavation, especially in areas where a substantial increase in surface water infiltration results from landscape irrigation. We therefore recommend that local landscape irrigation and landscape irrigation from surrounding areas be kept to the minimum necessary to maintain plant vigor and that any leaking pipes/sprinklers, etc. should be promptly repaired. We have no way of predicting depth to the groundwater which may fluctuate with seasonal changes and from one year to the next. Subdrains, horizontal drains, French drains or other devices may be recommended in future for graded areas that exhibit nuisance seepage.

- Overall, the geologic setting of the property is favorable for the use intended, provided the engineering designs are properly carried out.

Recommendations

Building Pad Preparation

All grading should be performed in accordance with our General Earthwork and Grading Specifications presented in Appendix F except as modified within the text of this report.

All debris, abandoned utility lines, roots, irrigation appurtenances, underground structures, leach lines, seepage pits, deleterious materials, etc., should be removed and hauled offsite. Seepage pits should be backfilled with one sac sand-cement slurry. Cavities created during site clearance should be backfilled in a controlled manner. Old fills associated with site previous use should be traced and removed prior to its use as compacted fill.

Subsequent to site clearance, proposed building pad area should be overexcavated to a depth of at least seven feet below existing ground surface or proposed finished grade, whichever is greater. This overexcavation may be extended deeper if loose soil is encountered in the bottom of the overexcavation. The lateral extent of overexcavation should be equal to the depth of fill but no less than five feet.

Because loose soil was encountered and is expected on site, special care should be taken to ensure that the bottom of the overexcavations are into firm, competent, native soil, before proceeding with grading operations. A representative from GeoMat will require full-time observation during all grading activities.

After any overexcavation, the exposed surfaces should be observed and then scarified to a depth of at least 12-inches, moisture conditioned as necessary and recompacted to at least 90 percent of the maximum dry density, as determined by ASTM D1557 Test Method; prior to placement of fill.

Compacted Fills/Imported Soils

Any soils to be placed as fill, whether presently onsite or import, should be approved by the soil engineer or his representative prior to its placement. All onsite soils to be used as fill should be cleansed of any roots, or other deleterious materials. Material larger than 6-inches in diameter should not be placed in the vicinity of foundations and utility lines trenches.

All fills should be placed in 6- to -8 inch loose lifts, thoroughly watered, or aerated to near optimum moisture content, mixed and compacted to at least 90 percent relative compaction. This is relative to the maximum dry density determined by ASTM D1557 Test Method.

Any imported soils should be sandy (preferably USCS "SM" or "SW", and very low in expansion potential) and approved by the soil engineer. The soil engineer or his representative should observe the placement of all fill and take sufficient tests to verify the moisture content and the uniformity and degree of compaction obtained.

Tentative Foundation Recommendations

The use of shallow spread footings in compacted fill is feasible. A maximum allowable bearing value of 2000 psf is recommended for the following residential footing system.

- Footing system soil should be designed and constructed in a manner that will minimize damage to structure from movement of the soil that occur in the moisture variation depth zone.
- Depth of continuous footings below natural and finish grade in liquefaction zones should be at least 24 inches. Pad footings should be at least 24 inch square and 24 inches below lowest adjacent firm grade.
- Footing reinforcement should be determined by the structural engineer; however, minimum reinforcement should be at least two No. 4 reinforcing bars, top and bottom.
- Expansion potential of foundation soils should be verified subsequent to completion of rough grading.
- The above recommended bearing value may be increased by one third for temporary (wind or seismic) loads.

Resistance to lateral footing will be provided by passive earth pressure and base friction. For footings bearing against firm native material, passive earth pressure may be considered to be developed at a rate of 260 psf per foot of depth to a maximum of 2000 psf. Base friction may be computed at 0.40 times the normal load. If passive earth pressure and friction are combined to provide required resistance to lateral forces, the value of the passive pressure should be reduced to two-thirds the value.

Foundation design comes under the purview of the structural engineer. The above recommendations should not preclude more restrictive structural requirements. The structural engineer should determine the actual footing sizes and reinforcement to resist vertical, horizontal, and uplift forces under static and seismic conditions.

Reinforcement and size recommendations presented in this report are considered the minimum necessary for the soil conditions present at foundation level and are not intended to supersede the design of the project structural engineer or criteria of the governing agencies for the project.

Retaining Walls

The following lateral earth pressures and soil parameters in conjunction with the above allowable soil bearing value for shallow foundation may be used for design of conventional retaining walls with free draining compacted backfills.

If passive earth pressure and friction are combined to provide required resistance to lateral forces, the value of the passive pressure should be reduced to two-thirds the following recommendations.

Active Earth Pressure with level backfill (P_a)	37 psf (EFP) drained, yielding
At Rest Pressure (P_0)	56 psf (EFP), drained, non-yielding (part of building wall)
Passive Earth Pressure (P_p)	260 psf (EFP), drained, maximum of 1800 psf
Horizontal Coefficient of Friction (μ)	0.40
Unit Soil Weight (γ_t)	110 pcf

We recommend drainage for retaining walls to be provided in accordance with the attached Plate 2. Drainage pipes and ditches should be connected to an approved drainage device. Maximum precautions should be taken when placing drainage materials and during backfilling.

Wall backfill should be properly compacted to at least 90 percent relative compaction. Back-cut distance behind the top of wall should be at least 18 inches or other practical distance to facilitate compaction. Retaining walls part of building walls should be provided with waterproofing per the project Architect recommendations.

Slabs-on-Grade

Interior slabs-on-grade may be at least four inches thick, reinforced with at least No 4 bars at 12-inches on-center both ways, properly centered in mid thickness of slabs. Slab-on-grades should be underlain with four inches of sand. If moisture intrusion is objectionable, the concrete slab should be provided by a 10-mil Visqueen moisture barrier placed and sealed over the sand. This slab recommendation meets California Green Residential Code.

Slab-on-grade thickness and reinforcement should be evaluated by the structural engineer and designed in compliance with applicable codes. Excess soils generated from foundation excavations should not be placed on any building pads without proper moisture and compaction.

All slab subgrades should be verified to be saturated to a depth of 12 inches prior to placement of slab building materials. Moisture content should be tested in the field by the soil engineer. Slabs subgrade should be kept moist and the surface should not be allowed to desiccate.

The addition of fiber mesh in the concrete and careful control of water/cement ratios may lessen the potential for slab cracking. In hot or windy weather, the contractor must take appropriate curing precautions after the placement of concrete.

The use of mechanically compacted low slump concrete (not exceeding 4 inches at the time of placement) is recommended. We recommend that a slipsheet (or equivalent) be utilized if grouted tiles or other crack sensitive flooring (such as marble tiles) is planned directly on concrete slabs.

Total Settlement

The foundation will be embedded into compacted fill. Native soils below the fill possess relatively high strengths and will not be subject to significant stress increases from the foundations of the new structure. Therefore settlements are expected to be within tolerable limits. Total long-term settlement between similarly loaded adjacent foundation systems should not exceed one inch. The structures should be designed to tolerate a differential settlement on the order of 1/2 to 3/4-inch.

Cement Type

Laboratory testing conducted for a soil sample showed that water soluble sulfate is less than 0.015 percent (negligible sulfate exposure risk). We recommend Type II cement for all concrete work in contact with soil. Ferrous metal pipes should be protected from potential corrosion by bituminous coating, etc. We recommend that all utility pipes be nonmetallic and/or corrosion resistant.

Recommendations should be verified by soluble sulfate and corrosion testing of soil samples obtained from specific locations at the completion of grading.

Trench Backfill

All utility trenches and retaining wall backfills should be mechanically compacted to the minimum requirements of at least 90 percent relative compaction.

Onsite soils derived from trench excavations can be used as trench backfill. Backfills should be placed in thin lifts and compacted by mechanical means. Material with sand equivalent of at least 30 should be utilized for the pipe zone. No jetting, ponding, or flooding should be permitted within the building area or where trenches are in zone of influence of footing loads. Excavated material from footing trenches should not be placed in slab-on-grade areas unless properly compacted and tested.

Site Drainage

Positive drainage should be provided and maintained for the life of the project around the perimeter of all structures and all foundations toward streets or approved drainage devices to minimize water infiltrating into the underlying natural and engineered fill soils, and prevent erosion. In addition, finish subgrade adjacent to exterior footings should be sloped down (at least 2%) and away to facilitate surface drainage. Roof drainage should be collected and directed away from foundations via nonerosive devices. Water, either natural or by irrigation, should not be permitted to pond or saturate the foundation soils.

Planter areas and large trees adjacent to the foundations are not recommended. All planters and terraces should be provided with drainage devices. Internal drainage should be directed to approve drainage collection devices, per the civil engineer recommendations. Location of drainage devices should be in accordance with the design civil engineers drainage and erosion control recommendations.

The owner should be made aware of the potential problems, which may develop when drainage is altered through construction of retaining walls, patios and other devices. Ponded water, leaking irrigation systems, over watering or other conditions which could lead to ground saturation should be avoided. Surface and subsurface runoff from adjacent properties should be controlled. Area drainage collection should be directed away from structures through approved drainage devices. Drainage devices should be maintained.

Tentative Asphalt Pavement

On the basis of classifications of onsite soils, an assumed Traffic Indices, and estimated R-value of 15, the minimum recommended pavement thickness is as follows:

Location	Traffic Index	Minimum Recommended Pavement Section
Private Drives	5.0	3.0” AC over 8.5” Class 2 Base

Street subgrade should be overexcavated 12 inches below proposed grade or existing grade, whichever is deeper. The exposed bottom should be scarified an additional 12 inches, watered as necessary, and compacted to at least 90 percent of the maximum density as determined by ASTM D1557 test method. Aggregate base should be compacted to at least 95 percent of the maximum density as determined by ASTM D1557 test method.

Final pavement design recommendations should be based on laboratory test results of representative pavement subgrade soils upon the completion of rough grading.

We Should be Retained for Plan Reviews

The recommendations provided in this report are based on preliminary information and subsurface conditions as interpreted from limited exploratory boreholes at the site. We should be retained to review final grading and foundation plans to revise our conclusions and recommendations, as necessary. Professional fees will apply for each review.

Our conclusions and recommendations should also be reviewed and verified during site grading, and revised accordingly if exposed geotechnical conditions vary from our preliminary findings and interpretations.

Additional Observation and/or Testing

GeoMat Testing Laboratories, Inc. should observe and/or test at the following stages of construction.

- During overexcavation and backfills.
- Following footing excavation and prior to placement of footing materials.
- During wetting of slab subgrade and prior to placement of slab materials.
- During all trench and wall backfill.
- When any unusual conditions are encountered.

Final Report of Compaction During Grading

A final report of compaction control should be prepared subsequent to the completion of grading. The report should include a summary of work performed, laboratory test results, and the results and locations of field density tests performed during grading.

Geotechnical Risk

The concept of risk is an important aspect of the geotechnical evaluation. The primary reason for this is that the analytical methods used to develop geotechnical recommendations do not comprise an exact science. The analytical tools which geotechnical engineers use are generally empirical and must be used in conjunction with engineering judgment and experience. Therefore, the solutions and recommendations presented in the geotechnical evaluation should not be considered risk-free and, more importantly, are not a guarantee that the interaction between the soils and the proposed structure will perform as planned.

The engineering recommendations presented in the preceding sections constitute GeoMat Testing Laboratories professional estimate of those measures that are necessary for the proposed structure to perform according to the proposed design based on the information generated and referenced during this evaluation, and GeoMat Testing Laboratories experience in working with these conditions.

Limitation Of Investigation

This report was prepared for the exclusive use on the subject site. The use by others, or for the purposes other than intended, is at the user's sole risk.

Our investigation was performed using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable Geotechnical Engineers practicing in this or similar locations within the limitations of scope, schedule, and budget. No other warranty, expressed or implied, is made as to the conclusions and professional advice included in this report.

The field and laboratory test data are believed representative of the project site; however, soil conditions can vary significantly. As in most projects, conditions revealed during grading may be at variance with preliminary findings. If this condition occurs, the possible variations must be evaluated by the Project Geotechnical Engineer and adjusted as required or alternate design recommended.

This report is issued with the understanding that it is the responsibility of the owner, or his representative, to ensure that the information and recommendations contained herein are brought to the attention of the architect and engineer for the project and incorporated into the plans, and the necessary steps are taken to see that the contractor and subcontractor carry out such recommendations in the field. This firm does not practice or consult in the field of safety engineering. We do not direct the contractor's operations, and we cannot be responsible for other than our own personnel on the site; therefore, the safety of others is the responsibility of the contractor.

The contractor should notify the owner if he considers any of the recommended actions presented herein to be unsafe. The findings, conclusions, and recommendations presented herein are based on our understanding of the project and on subsurface conditions observed during our site work, and are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether they be due to natural processes or the works of man on this or adjacent properties. In additions, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge.

If you should have any questions regarding this report, please do not hesitate to call our office. We appreciate this opportunity to be of service.

Submitted for GeoMat Testing Laboratories, Inc.

Haytham Nabilsi, GE 2375
Principal Engineer

REGISTERED PROFESSIONAL ENGINEER
HAYTHAM NABILSI
No. 2375
Exp. 12/31/18
GEOTECHNICAL
STATE OF CALIFORNIA

Art Martinez
Staff Engineer

Distribution: [3] Addressee

Attachments:

Figure 1	Site Location Map
Figure 2	Geologic Map
Figure 3	Regional Fault Map
Figure 4	Ground Shaking Map
Plate 1	Exploratory Borehole Location Map
Plate 2	Retaining Wall Drainage Detail
Appendix A	References
Appendix B	Exploratory Borehole Logs
Appendix C	Laboratory Test Results
Appendix D	2013 CBC Seismic Design Parameters
Appendix E	Liquefaction Analysis
Appendix F	General Earthwork and Grading Specifications

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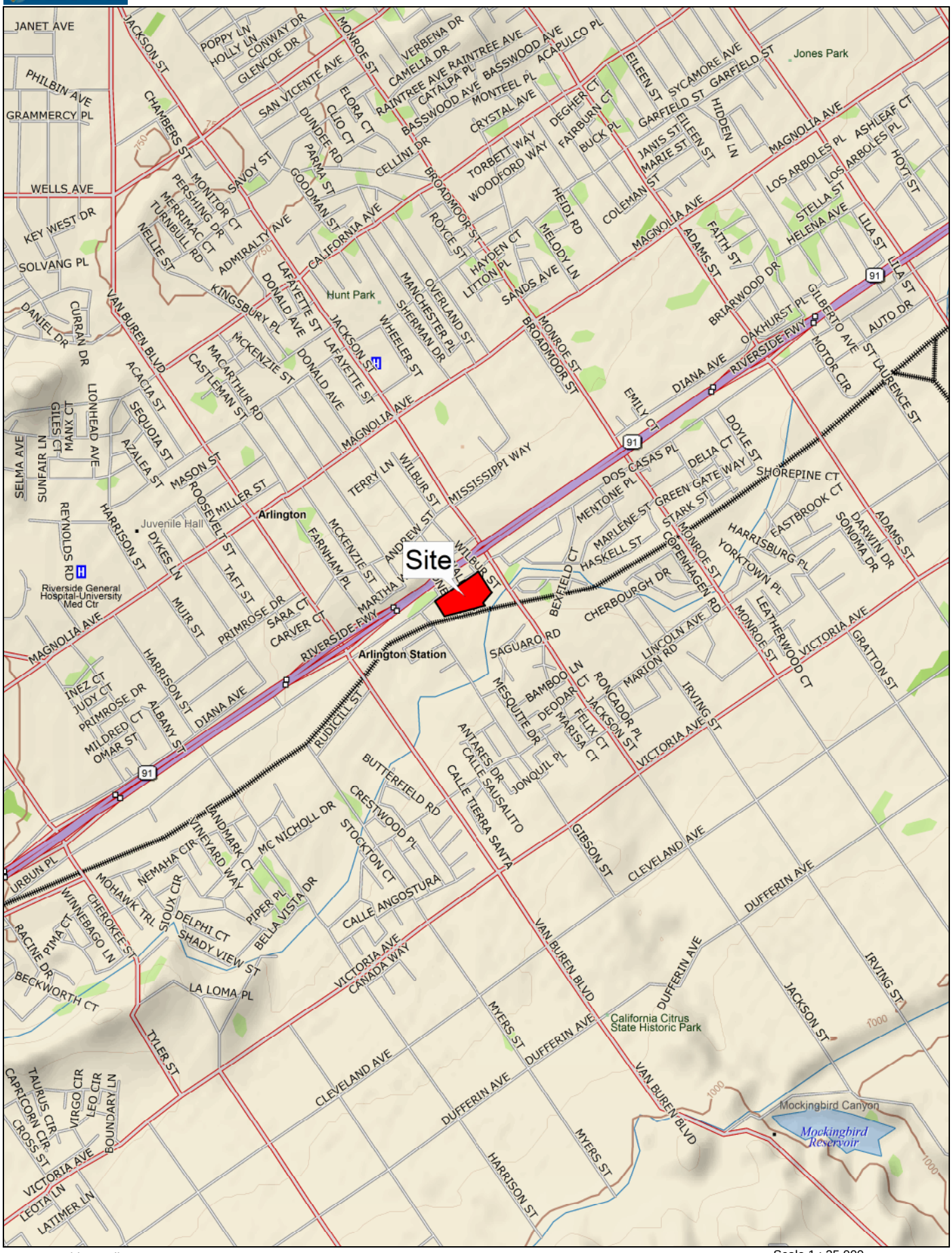

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TN

MN (11.9°E)

Figure 1

Scale 1 : 25,000

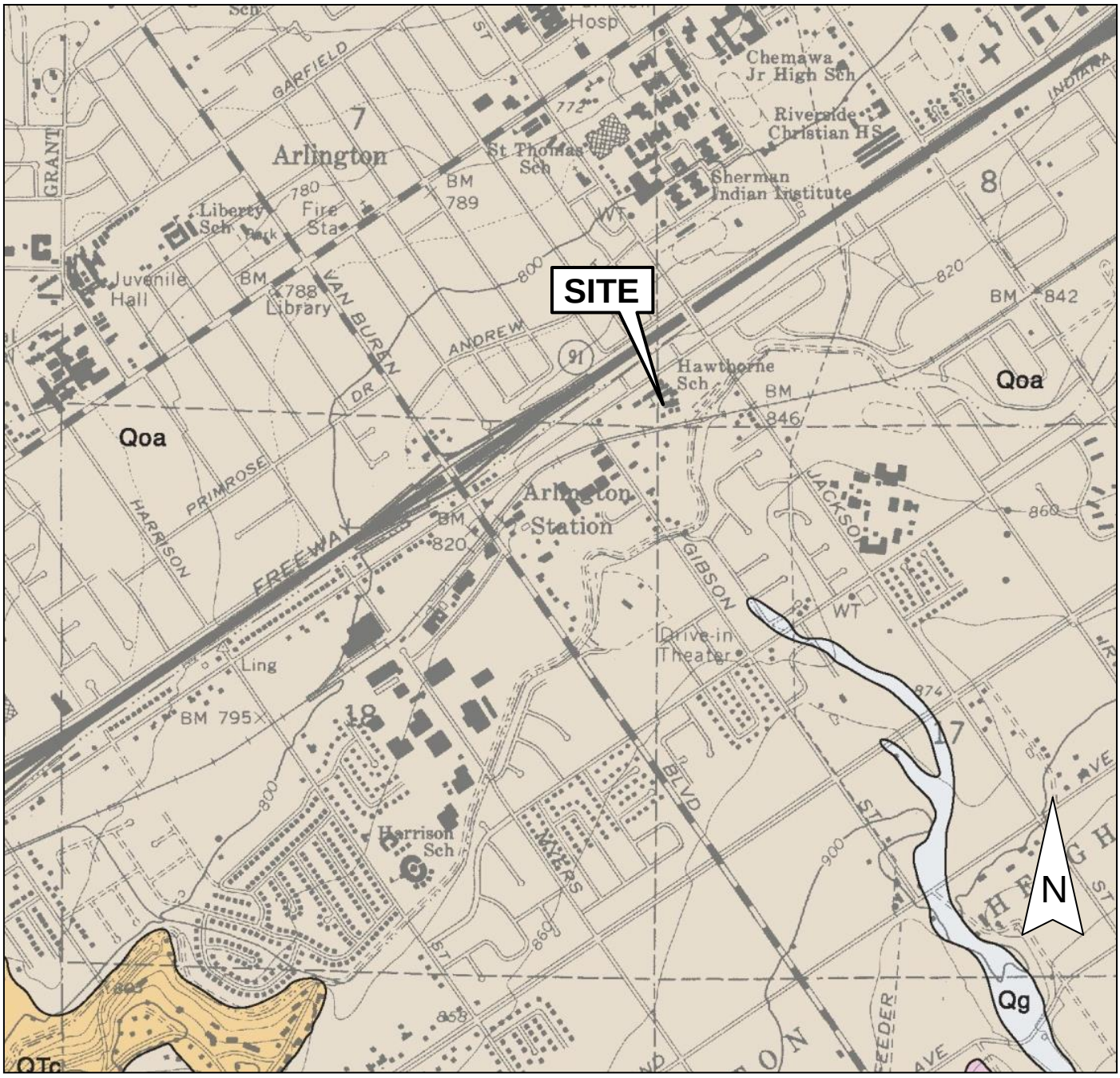
0 600 1200 1800 2400 3000 ft

0 200 400 600 800 1000 m

1" = 2,083.3 ft

Data Zoom 13-0

REGIONAL GEOLOGY MAP



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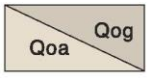
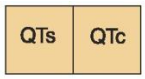


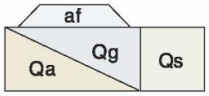
OLDER SURFICIAL SEDIMENTS
Weakly indurated dissected alluvial fan deposits derived from local terrains of plutonic rocks

Qoa *Alluvial fan deposits of sand, minor gravel, tan to light reddish brown, top surfaces slope slightly from sounce areas and dissected by stream channels from source areas*

Qog *High remnants of elevated older alluvial gravel, including coarse boulder gravel*



UNNAMED SEDIMENTARY DEPOSITS



SURFICIAL DEPOSITS
Unindurated, undissected

From: "Dibblee, T.W., and Minch, J.A., 2004, Geologic map of the Riverside West/south 1/2 of Fontana quadrangles, San Bernardino and Riverside County, California: Dibblee Geological Foundation, Dibblee Foundation Map DF-128, scale 1:24,000"

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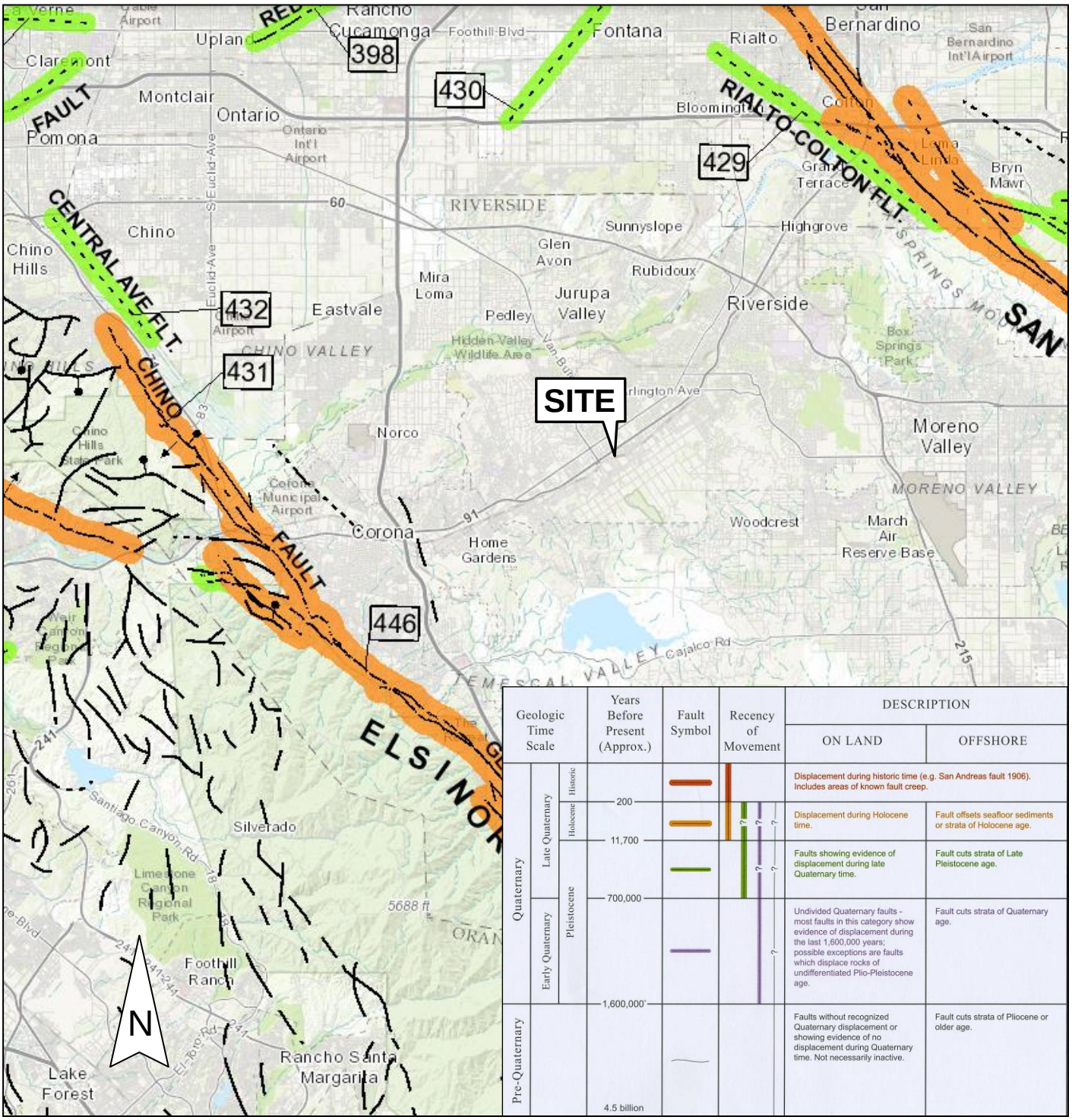
DATE: January 19, 2017

FIGURE 2

REGIONAL FAULT MAP



From: "Fault Activity Map of California," compiled by Charles W. Jennings and William A. Bryant, California Geological Survey, Map No. 6, California Geologic Data Map Series, 2010

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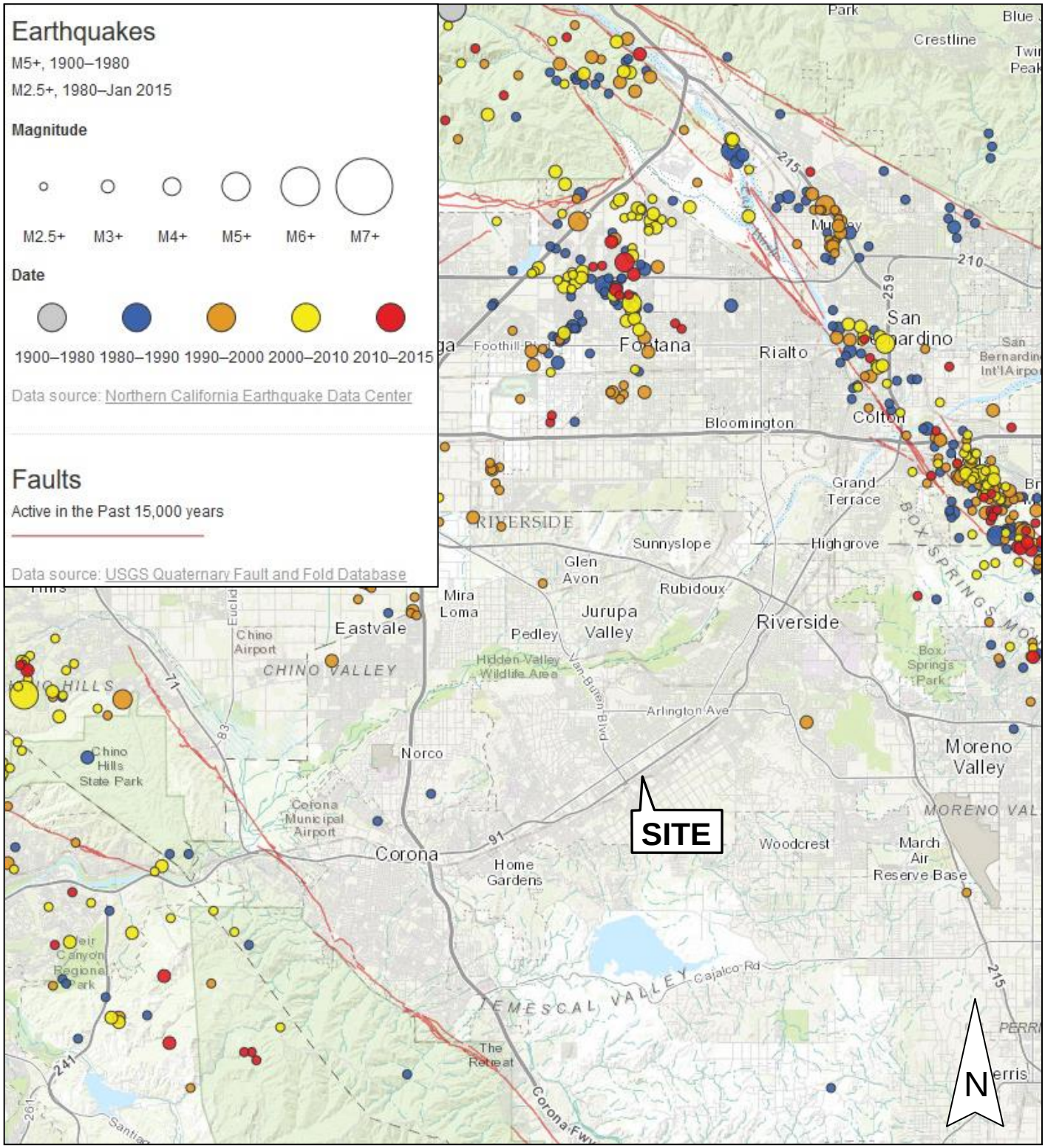
FIGURE 3

GROUND SHAKING MAP



From: USGS, Earthquake Hazards Program, Faults and Earthquake Probability Maps

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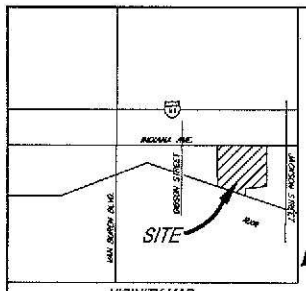
DATE: January 19, 2017

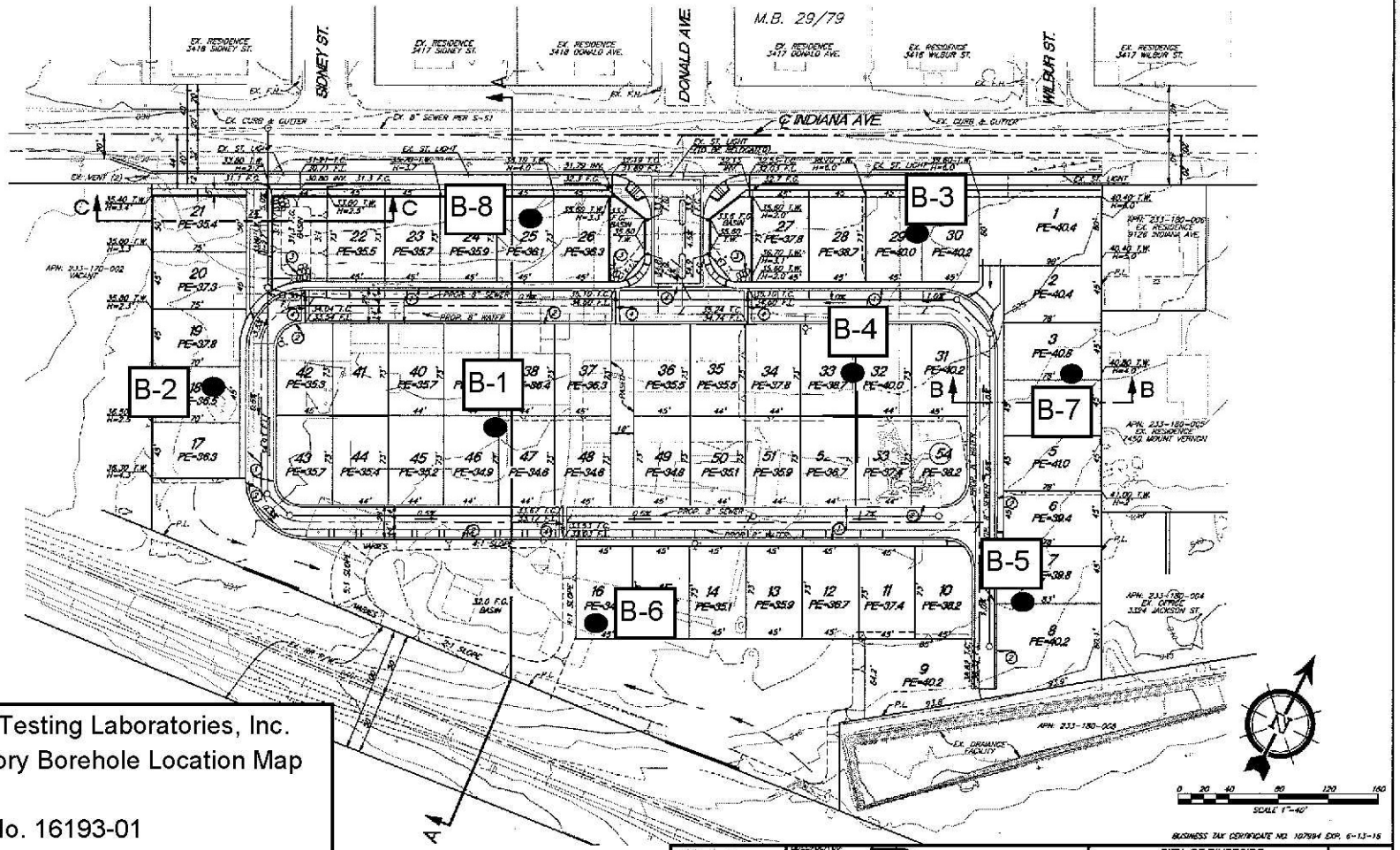
FIGURE 4

IN THE CITY RIVERSIDE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA.

TENTATIVE TRACT MAP NO.37032
9170 INDIANA AVENUE
54 LOT PLANNED RESIDENTIAL DEVELOPMENT
CITY OF RIVERSIDE, CA
AUGUST 2016



VICINITY MAP
NOT TO SCALE
THOMAS GUIDE PAGE: 715 GRID: A6



OWNER/APPLICANT
STEVEN WALKER COMMUNITIES, INC.
7191 INDIANA AVE., STE. 300
RIVERSIDE, CA 92504
951-274-3678

ENGINEER
SDH & ASSOCIATES, INC
5225 CANYON CREST DRIVE #1439
RIVERSIDE, CA. 92507
VOICE: (951) 683-3931
FAX: (951) 785-2314

ASSESSOR'S PARCEL NO.
233-180-007-6
233-170-001-9

PROJECT INFO
AREA OF SITE = 6.85 AC.
NUMBER OF UNITS = 54
LOT AREA = 198,935 S.F.
STREET AREA = 49,697 S.F.
COMMON OPEN SPACE = 52,252 S.F.

GENERAL PLAN DESIGNATION
EXISTING - BUSINESS PARK (B/OP)
PROPOSED - RESIDENTIAL (MHDR)

ZONING
EXISTING - RP-PUBLIC FACILITIES
PROPOSED - R-1-7200

SCHOOL DISTRICT
RIVERSIDE UNIFIED SCHOOL DISTRICT

UTILITY PURVEYORS
WATER.....CITY OF RIVERSIDE
GAS.....SO. CALIF. GAS
ELECTRICAL.....CITY OF RIVERSIDE
TELEPHONE.....PACIFIC BELL
SEWER.....CITY OF RIVERSIDE
CABLE.....CHARTER COMM.

LEGAL DESCRIPTION
A PORTION OF LOT 1 IN BLOCK 30 OF THE LANDS OF THE RIVERSIDE LAND AND IRRIGATION COMPANY, AS SHOWN BY MAP ON FILE IN BOOK 1 OF MAPS, AT PAGE 70, RECORDS OF SAN BERNARDINO COUNTY.

SOURCE OF TOPO
FIELD SURVEY BY RALSTON SURVEY SEPT. 2015
AERIAL PHOTOGRAMMETRY BY INLAND AERIAL SEPT. 2015

CONSTRUCTION NOTES
1. CONSTRUCT 3" OVER 5" BASE PAVING
2. CONSTRUCT 6" CURB & GUTTER
3. CONSTRUCT 6"-12" DIA RIP RAP
4. CONSTRUCT CROSS GUTTER
5. CONSTRUCT RETAINING WALL (5' MAX)

LEGEND
T.S. - TOP OF BERM
F.G. - FINISHED GRADE
F.L. - FLOW LINE
H.P. - HIGH POINT
EXIST. - EXISTING
P.E. - PAD ELEVATION
G.B. - GRADE BREAK

TRACT BOUNDARY
CENTERLINE
CURB AND GUTTER
1280 EXISTING CONTOUR LINE
LOT LINE
SLOPE

LOT INFO

LOT	AREA (S.F.)
1	5,890
2	3,510
3	3,510
4	3,510
5	3,510
6	3,510
7	3,735
8	5,551
9	4,809
10	3,272
11	3,285
12	3,285
13	3,285
14	3,285
15	3,285
16	3,285
17	3,150
18	3,150
19	3,150
20	3,175
21	3,750
22	3,285
23	3,285
24	3,285
25	3,285
26	3,285
27	3,285
28	3,285
29	3,285
30	3,170
31	3,199
32	3,212
33	3,212
34	3,212
35	3,212
36	3,285
37	3,285
38	3,212
39	3,212
40	3,212
41	3,212
42	3,199
43	3,199
44	3,212
45	3,212
46	3,212
47	3,212
48	3,285
49	3,285
50	3,212
51	3,212
52	3,212
53	3,212
54	3,199

GeoMat Testing Laboratories, Inc.
Exploratory Borehole Location Map
Plate 1
Project No. 16193-01
January 23, 2017

BUSINESS TAX CERTIFICATE NO. 107594 EXP. 6-13-16

SEAL: REGISTERED PROFESSIONAL ENGINEER — ROBERT E. VAN FRANKEN — No. 61,035 — Exp. 9-30-17 — CIVIL — STATE OF CALIFORNIA

PREPARED BY: SDH ASSOCIATES INC. — 5225 CANYON CREST DRIVE #1439, Riverside, California 92507 — TEL (951) 683-3931 / FAX (951) 785-2314

BENCHMARK

SCALE 1"=40'

DATE FEBRUARY 2016

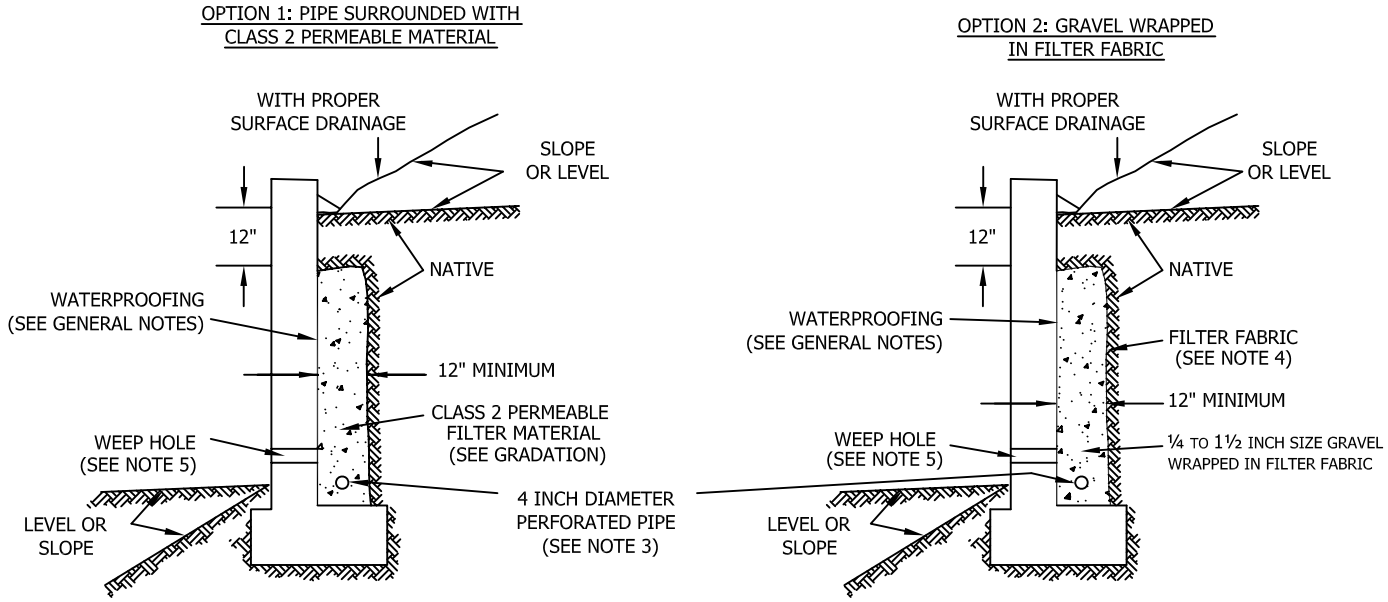
CITY OF RIVERSIDE

TTM 37032

9170 INDIANA AVENUE

1 OF 2 SHEETS

SUBDRAIN OPTIONS AND BACKFILL WHEN NATIVE MATERIAL HAS EXPANSION INDEX OF ≤50



Class 2 Filter Permeable Material Gradation
Per Caltrans Specifications

Sieve Size	Percent Passing
1"	100
3/4"	90-100
3/8"	40-100
No. 4	25-40
No. 8	18-33
No. 30	5-15
No. 50	0-7
No. 200	0-3

GENERAL NOTES:

* Waterproofing should be provided where moisture nuisance problem through the wall is undesirable.
* Water proofing of the walls is not under purview of the geotechnical engineer
* All drains should have a gradient of 1 percent minimum
*Outlet portion of the subdrain should have a 4-inch diameter solid pipe discharged into a suitable disposal area designed by the project engineer. The subdrain pipe should be accessible for maintenance (rodding)
*Other subdrain backfill options are subject to the review by the geotechnical engineer and modification of design parameters.

Notes:
1) Sand should have a sand equivalent of 30 or greater and may be densified by water jetting.
2) 1 Cu. ft. per ft. of 1/4- to 1 1/2-inch size gravel wrapped in filter fabric
3) Pipe type should be ASTM D1527 Acrylonitrile Butadiene Styrene (ABS) SDR35 or ASTM D1785 Polyvinyl Chloride plastic (PVC), Schedule 40, Armco A2000 PVC, or approved equivalent. Pipe should be installed with perforations down. Perforations should be 3/8 inch in diameter placed at the ends of a 120-degree arc in two rows at 3-inch on center (staggered)
4) Filter fabric should be Mirafi 140NC or approved equivalent.
5) Weephole should be 3-inch minimum diameter and provided at 10-foot maximum intervals. If exposure is permitted, weepholes should be located 12 inches above finished grade. If exposure is not permitted such as for a wall adjacent to a sidewalk/curb, a pipe under the sidewalk to be discharged through the curb face or equivalent should be provided. For a basement-type wall, a proper subdrain outlet system should be provided.
6) Retaining wall plans should be reviewed and approved by the geotechnical engineer.
7) Walls over six feet in height are subject to a special review by the geotechnical engineer and modifications to the above requirements.

RETAINING WALL BACKFILL AND SUBDRAIN DETAIL

WHEN NATIVE MATERIAL HAS EXPANSION INDEX OF ≤50

Plate 2

Appendix A

REFERENCES

Dibblee, T.W., and Minch, J.A., 2004, Geologic map of the Riverside West/south 1/2 of Fontana Quadrangles, San Bernardino and Riverside County, California: Dibblee Geological Foundation, Dibblee Foundation Map DF-128, scale 1:24,000

City of Riverside, General Plan, Safety Element.

State of California, Department of Water Resources, Water Data Library.

USGS, National Water Information System

USGS, Groundwater Watch, California Active Water Level Network.

Steve Mains, Hydrologist, Cooperative Well Measuring Program.

USGS, Contour Map Showing Minimum Depth to Ground Water, Upper Santa Ana River Valley, California, 1973-1979, Scott E. Carson and Jonathan C. Matti, 1985.

California Geological Survey, Map No. 6, Fault Activity Map of California, Compiled by Charles W. Jennings and William A. Bryant, California Geologic Data Map Series, 2010

Bay Area Earthquake Alliance, California Map of Earthquake Magnitudes and Faults Compiled from the Northern California Earthquake Data Center and USGS Quaternary Fault and Fold Database.

State of California, Department of Conservation, CGS Information Warehouse: Regulatory Maps

USGS, Earthquake Hazards Program, U.S. Seismic Design Maps

Department of the Navy, Design Manual 7.01, Soil Mechanics, September 1986.

Department of the Navy, Design Manual 7.02, Foundation and Earth Structures, September 1986.

Department of the Army, US Army Corps of Engineers, Engineering and Design, Bearing Capacity of Soils, EM 1110-1-1905.

ASCE, Journal of Geotechnical Engineering, Vol 118, 1987, "Evaluation of Settlements in Sand Due to Earthquake Shaking.", by K. Tokimatsu and H.B. Seed, p. 871, 876.

Foundation Design, D. Cudoto, Second Edition, 2000.

Principals of Foundation Design, Braja Das.

Foundation Analysis and Design, Ed. 5 by Joseph E. Bowles.

Robert Day, Geotechnical Engineer's Portable Handbook.

Robert Day, Geotechnical Foundation Handbook.

Appendix B

GENERAL NOTES

DRILLING NOTES

WATER LEVEL MEASUREMENTS

Water levels indicated on the boring logs are levels measured in the borings at the times indicated. In permeable materials, the indicated levels may reflect the location of groundwater. In low permeability soils, the accurate determination of groundwater levels is not possible with only short-term observations.

WATER LEVEL OBSERVATION DESIGNATION

W.D.	While Drilling
A.B.	After Boring
B.C.R.	Before Casing Removal
A.C.R.	After Casing Removal
24 hr.	Water level taken approximately 24 hrs. after boring completion

DRILLING AND SAMPLING SYMBOLS

AS	Auger Sample
CS	Continuous Sampler
DB	Diamond Bit -NX unless otherwise noted
HA	Hand Auger
HS	Hollow Stem Auger
PA	Power Auger
RB	Rock Bit
SS*	Split-Barrel
ST	Shelby Tube - 2" (51mm) unless otherwise noted
WB	Wash Bore
CR	Calfornia Ring Sampler 3" O.D., Lined with 2.5"X1" Rings

*The Standard Penetration Test is conducted in conjunction with the split-barrel sampling procedure. The "N" value corresponds to the number of blows required to drive the last 1 foot (0.3m) of an 18 in. (0.46m) long, 2 in. (51mm) O.D. split-barrel sampler with a 140 lb. (63.5 kg) hammer falling a distance of 30 in. (0.76m). The Standard Penetration Test is carried out according to ASTM D-1586. (See "N" Value below.)

SOIL PROPERTIES & DESCRIPTIONS

TEXTURE

PARTICLE	SIZE	
Clay	< 0.002 mm	(< 0.002 mm)
Silt	< #200 Sieve	(0.075 mm)
Sand	#4 to #200 Sieve	(4.75 to 0.075 mm)
Gravel	3 in. to #4 Sieve	(75 mm to 4.75 mm)
Cobbles	12 in. to 3 in.	(300 mm to 75 mm)
Boulders	> 12 in.	(300 mm)

COMPOSITION

SAND & GRAVEL

Description	% by Dry Weight
trace	< 15
with	15 - 29
modifer	> 30

FINES

Description	% by Dry Weight
trace	< 5
with	5 - 12
modifier	> 12

Soil descriptions are based on the Unified Soil Classification System (USCS) as outlined in ASTM Designations D-2487 and D-2488. The USCS group symbol shown on the boring logs correspond to the group names listed below. The description includes soil constituents, consistency, relative density, color and other appropriate descriptive terms. Geologic description of bedrock, when encountered, also is shown in the description column.

GROUP SYMBOL	GROUP NAME	GROUP SYMBOL	GROUP NAME
GW	Well Graded Gravel	CL	Lean Clay
GP	Poorly Graded Gravel	ML	Silt
GM	Silty Gravel	OL	Organic Clay or Silt
GC	Clayey Gravel	CH	Fat Clay
SW	Well Graded Sand	MH	Elastic Silt
SP	Poorly Graded Sand	OH	Organic Clay or Silt
SM	Silty Sand	PT	Peat
SC	Clayey Sand	CL-CH	Lean to Fat Clay

COHESIVE SOILS

CONSISTENCY	UNCONFINED COMPRESSIVE STRENGTH (Qu) (psf)	(kPa)
Very Soft	< 500	(< 24)
Soft	500 - 1000	(24 - 48)
Medium	1001 - 2000	(48 - 96)
Stiff	2001 - 4000	(96 - 192)
Very Stiff	4001 - 8000	(192 - 383)
Hard	> 8001	(> 383)

PLASTICITY Description	Liquid Limit (%)
Lean	< 45%
Lean to Fat	45 to 49%
Fat	≥ 50%

Cohessive Soils Consistenacy	"N" value
Very Soft	<2
Soft	2-4
Medium	4-8
Stiff (Firm)	8-15
Very Stiff (Very Firm)	15-30
Hard	>30

COHESIONLESS SOILS

RELATIVE DENSITY	"N" VALUE*
Very Loose	0 - 3
Loose	4 - 9
Medium Dense	10 - 29
Dense	30 - 49
Very Dense	≥ 50

BEDROCK PROPERTIES & DESCRIPTIONS

ROCK QUALITY DESIGNATION (RQD**)

DESCRIPTION OF ROCK QUALITY	RQD (%)
Very Poor	0 - 25
Poor	25 - 50
Fair	50 - 75
Good	75 - 90
Excellent	90 - 100

**RQD is defined as the total length of sound core pieces, 4 inches (102mm) or greater in length, expressed as a percentage of the total length cored. RQD provides an indication of the integrity of the rock mass and relative extent of seams and bedding planes.

DEGREE OF WEATHERING

Slightly Weathered	Slight decomposition of parent material in joints and seams.
Weathered	Well-developed and decomposed joints and seams.
Highly Weathered	Rock highly decomposed, may be extremely broken.

SOLUTION AND VOID CONDITIONS

Solid	Contains no voids.
Vuggy	Containing small pits or cavities < 1/2" (13mm).
Porous	Containing numerous voids which may be interconnected.
Cavernous	Containing cavities, sometimes quite large.

When classification of rock materials has been estimated from disturbed samples, core samples and petrographic analysis may reveal other rock types.

HARDNESS & DEGREE OF CEMENTATION

LIMESTONE

Hard	Difficult to scratch with knife.
Moderately Hard	Can scratch with knife but not with fingernail.
Soft	Can be scratched with fingernail.

SHALE

Hard	Can scratch with knife but not with fingernail.
Moderately Hard	Can be scratched with fingernail.
Soft	Can be molded easily with fingers.

SANDSTONE

Well Cemented	Capable of scratching a knife blade.
Cemented	Can be scratched with knife.
Poorly Cemented	Can be broken apart easily with fingers.

BEDDING CHARACTERISTICS

TERM	THICKNESS (inches)	THICKNESS (mm)
Very Thick Bedded	> 36	> 915
Thick Bedded	12 - 36	305 - 915
Medium Bedded	4 - 12	102 - 305
Thin Bedded	1 - 4	25 - 102
Very Thin Bedded	0.4 - 1	10 - 25
Laminated	0.1 - 0.4	2.5 - 10
Thinly Laminated	< 0.1	< 2.5

Bedding Planes	Planes dividing the individual layers, beds or strata of rocks.
Joint	Fracture in rock, generally more or less vertical or transverse to the bedding.
Seam	Applies to bedding plane with an unspecified degree of weathering.

geomat	Project Name: Hawthorne Heights Project, Riverside, CA Project No.: 16193-01	Boring No.: **B-1**	Page 1 of 2

Boring Location:	See Plate 1	Drilling Co.	GeoMat	Logged By:	AM
Drilling Date(s):	1/14/2017	Drill Rig:	CME 45	Groundwater Depth:	-- ft
Drilling Method:	Hollow Stem Auger			Depth to Bedrock:	-- ft
Hammer Weight/Drop:	140 lbs./30-inches	Hammer Type:	Automatic	Total Depth:	50 ft

Sampler Type: Auger Cuttings (C) California Ring (R) Split Spoon (S)

DEPTH (feet)	SAMPLES Sample Type	SAMPLES Sample	BLOWCOUNTS 0 - 6"	BLOWCOUNTS 6" - 12"	BLOWCOUNTS 12" - 18"	SPT "N" Value	USGS	MATERIAL DESCRIPTION	LABORATORY TEST DATA Moisture Content (%)	Dry Density (pcf)	Fines (%)	Liquid Limit	Plastic Limit	Plast. Index
1							SM	**SILTY SAND (SM)**						
2								medium brown silty fine grained sand						
3								becoming coarse to fine grained silty sand						
4														
5	R	☒	8	16	21	24		medium dense	7	107				
6														
7														
8														
9														
10	S	▒	5	6	7	13		medium dense	3		29			
11														
12														
13														
14														
15							SPSM	**SAND WITH SILT**						
16	R	☒	15	20	23	28		gray poorly-graded sand with silt	3	114				
17								medium dense						
18														
19														
20	S	▒	5	6	7	13	SWSM	gray well-graded sand with silt	4		12			
21								medium dense						
22														
23														
24														
25	S	▒	5	7	8	15	SM	**SILTY SAND (SM)**	5		27			
26								medium brown silty fine grained sand						
27								medium dense						
28														
29														
30	S	▒	7	7	11	18		medium dense						
31														
32														
33														
34														

The stratification lines represent the approximate boundary lines between soil and rock types. In-situ, the transition may be gradual.

geomat	Project Name: Hawthorne Heights Project, Riverside, CA Project No.: 16193-01	Boring No.: **B-1**	Page 2 of 2

Boring Location:	See Plate 1	Drilling Co.	GeoMat	Logged By:	AM
Drilling Date(s):	1/14/2017	Drill Rig:	CME 45	Groundwater Depth:	-- ft
Drilling Method:	Hollow Stem Auger			Depth to Bedrock:	-- ft
Hammer Weight/Drop:	140 lbs./30-inches	Hammer Type:	Automatic	Total Depth:	50 ft

Sampler Type: Auger Cuttings (C) California Ring (R) Split Spoon (S)

DEPTH (feet)	SAMPLES Sample Type	SAMPLES Sample	BLOWCOUNTS 0 - 6"	BLOWCOUNTS 6" - 12"	BLOWCOUNTS 12" - 18"	SPT "N" Value	USGS	MATERIAL DESCRIPTION	LABORATORY TEST DATA Moisture Content (%)	Dry Density (pcf)	Fines (%)	Liquid Limit	Plastic Limit	Plast. Index
36	S		10	12	15	27	SPSM	**SAND WITH SILT (SP-SM)** gray poorly-graded sand with silt medium dense	2		5			
37														
38														
39														
40														
41	S		10	13	15	28	SM	**SILTY SAND (SM)** gray-brown silty sand medium dense	6		27			
42														
43														
44														
45														
46	S		9	11	13	24	ML	**SANDY SILT (ML)** gray sandy silt, moist very firm	13		60			
47														
48														
49														
50	S		7	13	15	28		very firm						
51														
52								TD = 50'						
53														
54														
55														
56														
57														
58														
59														
60														
61														
62														
63														
64														
65														
66														
67														
68														
69														

The stratification lines represent the approximate boundary lines between soil and rock types. In-situ, the transition may be gradual.

geomat	Project Name: Hawthorne Heights Project, Riverside, CA Project No.: 16193-01	Boring No.: **B-2**	Page 1 of 1

Boring Location:	See Plate 1	Drilling Co.	GeoMat	Logged By:	AM
Drilling Date(s):	1/19/2017	Drill Rig:	--	Groundwater Depth:	-- ft
Drilling Method:	Manual with Dames and Moore			Depth to Bedrock:	-- ft
Hammer Weight/Drop:	35 lbs./36-inches	Hammer Type:	Automatic	Total Depth:	15 ft

Sampler Type: Auger Cuttings (C) ☒ California Ring (R) Split Spoon (S)

DEPTH (feet)	SAMPLES Sample Type	SAMPLES Sample	BLOWCOUNTS 0 - 6"	BLOWCOUNTS 6" - 12"	BLOWCOUNTS 12" - 18"	SPT "N" Value	USGS	MATERIAL DESCRIPTION	LABORATORY TEST DATA Moisture Content (%)	Dry Density (pcf)	Fines (%)	Liquid Limit	Plastic Limit	Plast. Index
1							SM	**SILTY SAND (SM)**						
2								medium brown silty fine grained sand						
3														
4														
5	R	☒				27		medium dense	4	100				
6								becoming coarse to fine grained silty sand						
7														
8														
9														
10														
11														
12							SP	**SAND WITH SILT (SP)**						
13	R	☒				13		poorly-graded sand	2	110	2			
14								medium dense, dry						
15														
16								TD = 15'						
17														
18														
19														
20														
21														
22														
23														
24														
25														
26														
27														
28														
29														
30														
31														
32														
33														
34														

The stratification lines represent the approximate boundary lines between soil and rock types. In-situ, the transition may be gradual.

geomat	Project Name: Hawthorne Heights Project, Riverside, CA Project No.: 16193-01	Boring No.: **B-3**	Page 1 of 1

Boring Location:	See Plate 1	Drilling Co.	GeoMat	Logged By:	AM
Drilling Date(s):	1/18/2017	Drill Rig:	--	Groundwater Depth:	-- ft
Drilling Method:	Manual with Dames and Moore			Depth to Bedrock:	-- ft
Hammer Weight/Drop:	35 lbs./36-inches	Hammer Type:	Automatic	Total Depth:	6 ft

Sampler Type: Auger Cuttings (C) California Ring (R) Split Spoon (S)

DEPTH (feet)	SAMPLES: Sample Type	SAMPLES: Sample	BLOWCOUNTS: 0 - 6"	BLOWCOUNTS: 6" - 12"	BLOWCOUNTS: 12" - 18"	SPT "N" Value	USGS	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Moisture Content (%)	Dry Density (pcf)	Fines (%)	Liquid Limit	Plastic Limit	Plast. Index
								FILL (WOODCHIPS)						
1														
2							SM	**SILTY SAND (SM)**						
3								medium brown silty fine grained sand						
4														
5								becoming coarse to fine grained silty sand						
6	R	☒				23		medium dense	5	102				
7														
8								TD = 6'						
9														
10														
11														
12														
13														
14														
15														
16														
17														
18														
19														
20														
21														
22														
23														
24														
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26														
27														
28														
29														
30														
31														
32														
33														
34														

The stratification lines represent the approximate boundary lines between soil and rock types. In-situ, the transition may be gradual.

geomat	Project Name: Hawthorne Heights Project, Riverside, CA Project No.: 16193-01	Boring No.: **B-4**	Page 1 of 1

Boring Location:	See Plate 1	Drilling Co.	GeoMat	Logged By:	AM
Drilling Date(s):	1/18/2017	Drill Rig:	--	Groundwater Depth:	-- ft
Drilling Method:	Manual with Dames and Moore			Depth to Bedrock:	-- ft
Hammer Weight/Drop:	35 lbs./36-inches	Hammer Type:	Automatic	Total Depth:	12' ft

Sampler Type: Auger Cuttings (C) | California Ring (R) | Split Spoon (S)

DEPTH (feet)	SAMPLES: Sample Type	SAMPLES: Sample	BLOWCOUNTS: 0 - 6"	BLOWCOUNTS: 6" - 12"	BLOWCOUNTS: 12" - 18"	SPT "N" Value	USGS	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Moisture Content (%)	Dry Density (pcf)	Fines (%)	Liquid Limit	Plastic Limit	Plast. Index
1							SM	**SILTY SAND (SM)**						
2								medium brown silty fine grained sand						
3														
4								becoming coarse to fine grained silty sand						
5														
6														
7	R	☒				22		medium dense						
8								sample disturbed						
9														
10														
11														
12	R	☒				18		medium dense	6	107				
13														
14								TD = 12'						
15														
16														
17														
18														
19														
20														
21														
22														
23														
24														
25														
26														
27														
28														
29														
30														
31														
32														
33														
34														

The stratification lines represent the approximate boundary lines between soil and rock types. In-situ, the transition may be gradual.

geomat	Project Name: Hawthorne Heights Project, Riverside, CA Project No.: 16193-01	Boring No.: **B-5**	Page 1 of 1

Boring Location:	See Plate 1	Drilling Co.	GeoMat	Logged By:	AM
Drilling Date(s):	1/18/2017	Drill Rig:	--	Groundwater Depth:	-- ft
Drilling Method:	Manual with Dames and Moore			Depth to Bedrock:	-- ft
Hammer Weight/Drop:	35 lbs./36-inches	Hammer Type:	Automatic	Total Depth:	13' ft

Sampler Type: Auger Cuttings (C) ☒ California Ring (R) Split Spoon (S)

DEPTH (feet)	SAMPLES Sample Type	SAMPLES Sample	BLOWCOUNTS 0 - 6"	BLOWCOUNTS 6" - 12"	BLOWCOUNTS 12" - 18"	SPT "N" Value	USGS	MATERIAL DESCRIPTION	LABORATORY TEST DATA Moisture Content (%)	Dry Density (pcf)	Fines (%)	Liquid Limit	Plastic Limit	Plast. Index
1							SM	**SILTY SAND (SM)**						
2								medium brown silty fine grained sand						
3														
4								becoming coarse to fine grained silty sand						
5	R	☒				28		medium dense	5	108				
6														
7														
8														
9														
10														
11														
12														
13	R	☒				20		**SAND WITH SILT (SP-SM)**	3	109				
14								poorly-graded sand with silt						
15								medium dense						
16														
17								TD = 13'						
18														
19														
20														
21														
22														
23														
24														
25														
26														
27														
28														
29														
30														
31														
32														
33														
34														

The stratification lines represent the approximate boundary lines between soil and rock types. In-situ, the transition may be gradual.

geomat	Project Name: Hawthorne Heights Project, Riverside, CA Project No.: 16193-01	Boring No.: **B-6**	Page 1 of 1

Boring Location:	See Plate 1	Drilling Co.	GeoMat	Logged By:	AM
Drilling Date(s):	1/21/2017	Drill Rig:	CME 45	Groundwater Depth:	-- ft
Drilling Method:	Hollow Stem Auger			Depth to Bedrock:	-- ft
Hammer Weight/Drop:	140 lbs./30-inches	Hammer Type:	Automatic	Total Depth:	15' ft

Sampler Type: Auger Cuttings (C) California Ring (R) Split Spoon (S)

DEPTH (feet)	SAMPLES Sample Type	SAMPLES Sample	BLOWCOUNTS 0 - 6"	BLOWCOUNTS 6" - 12"	BLOWCOUNTS 12" - 18"	SPT "N" Value	USGS	MATERIAL DESCRIPTION	LABORATORY TEST DATA Moisture Content (%)	Dry Density (pcf)	Fines (%)	Liquid Limit	Plastic Limit	Plast. Index
1							SM	**SILTY SAND (SM)**						
2								medium brown silty fine grained sand						
3								becoming more coarse grained						
4														
5	S		2	3	4	7		loose						
6														
7														
8							SPSM	**SAND WITH SILT (SP-SM)**						
9								brown poorly-graded sand with silt						
10								dry						
11	S		8	11	12	23	SM	**SILTY SAND (SM)**						
12								medium brown silty fine grained sand						
13								medium dense						
14														
15	S		7	9	10	19		medium dense						
16														
17								TD = 15'						
18														
19														
20														
21														
22														
23														
24														
25														
26														
27														
28														
29														
30														
31														
32														
33														
34														

The stratification lines represent the approximate boundary lines between soil and rock types. In-situ, the transition may be gradual.

geomat	Project Name: Hawthorne Heights Project, Riverside, CA Project No.: 16193-01	Boring No.: **B-7**	Page 1 of 1

Boring Location:	See Plate 1	Drilling Co.	GeoMat	Logged By:	AM
Drilling Date(s):	1/21/2017	Drill Rig:	CME 45	Groundwater Depth:	-- ft
Drilling Method:	Hollow Stem Auger			Depth to Bedrock:	-- ft
Hammer Weight/Drop:	140 lbs./30-inches	Hammer Type:	Automatic	Total Depth:	15' ft

Sampler Type: Auger Cuttings (C) California Ring (R) Split Spoon (S)

DEPTH (feet)	SAMPLES Sample Type	SAMPLES Sample	BLOWCOUNTS 0 - 6"	BLOWCOUNTS 6" - 12"	BLOWCOUNTS 12" - 18"	SPT "N" Value	USGS	MATERIAL DESCRIPTION	LABORATORY TEST DATA Moisture Content (%)	Dry Density (pcf)	Fines (%)	Liquid Limit	Plastic Limit	Plast. Index
1							SM	**SILTY SAND (SM)**						
2								medium brown silty fine grained sand						
3														
4								becoming more coarse grained						
5	S		9	11	11	22		medium dense						
6														
7														
8														
9														
10	S		8	7	8	15		medium dense						
11														
12							SPSM	**SAND WITH SILT (SP-SM)**						
13								brown poorly-graded sand with silt						
14								dry						
15	S		5	6	7	13	SM	**SILTY SAND (SM)**						
16								medium brown silty fine grained sand						
17														
18								TD = 15'						
19														
20														
21														
22														
23														
24														
25														
26														
27														
28														
29														
30														
31														
32														
33														
34														

The stratification lines represent the approximate boundary lines between soil and rock types. In-situ, the transition may be gradual.

BORHOLE LOG — BH-8

Sheet	1 OF 1		
Date	10/24/2015		
Project No.	16193-01	Drilling Co.	GeoMat
Project	Steven Walker Homes - Hawthorne Heights	Sampler	Cal Mod. And SPT
Client	Steven Walker Homes	Method	Hollow Stem
Location	APN 233-170-001 and 233-180-007, Riverside, California	Hammer Type	140 lb
Coodinate		Surface Elev.	
Notes		Total Depth	15'

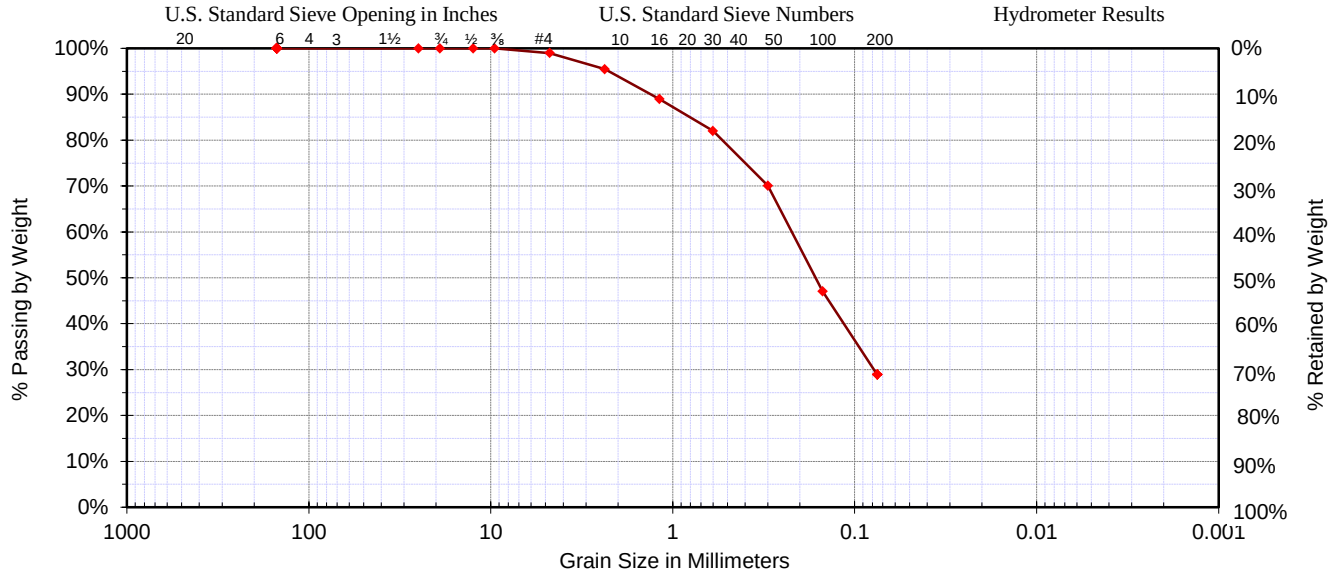
Type/Symbol	Casing	Split Spoon	Ring Sampler	Cutting	Date	Time	Water Depth (ft)	Casing Size (in)	Casing Depth (ft)	Hole Depth (ft)	Symbol
I.D.		S	R	C							
O.D.					10/24/2015		None				
Length											
Hammer Wt.											
Hammer Fall											

Depth Below Surface (ft)	Elevation (ft)	Graphic	Soil Sample Type	Number	Symbol	Depth	Blows 0-152.4 mm	152.4-304.8 mm	304.8-457.2 mm	N-Value	N60	(N1)60	VISUAL MATERIAL CLASSIFICATION AND REMARKS	Moisture (%)	Dry Density (pcf)	Test
0													**SILTY SAND (SM)**			
1													medium brown silty sand, moist			
2																
3																
4																
5			R				4	5	7	8			loose	8	124	
6													becoming more coarse grained			
7																
8													**WELL-GRADED SAND (SW)**			
9													gray-brown sand with silt, dry			
10			R				5	8	11	12			medium dense	2	111	
11													% Passing No. 200 Sieve = 3			
12																
13																
14													**SILTY SAND (SM)**			
15			S				8	10	10	20			medium brown silty sand, moist	6		
16													medium dense			
17													% Passing No. 200 Sieve = 21			
18																
19																
20																
21																
22																
23																
24																

The stratification lines represent the approximate boundary lines between soil and rock types. In-situ, the transition may be gradual.

Appendix C

LABORATORY TEST RESULTS



Date :	01/14/17	D_{10} =	0.03	**Classification**	% Gravel
Sample #:		D_{30} =	0.08	SM, Silty Sand	1.04%
Sample ID:	B1 @ 10'	D_{60} =	0.23		% Sand
Source:	SPT	C_C =	1.04	**Specifications**	70.08%
Project:	APNs 233-180-007 & 233-170-001	C_U =	9.02	custom specs 1	% Silt & Clay
Location:	Riverside, California	Liquid Limit=	n/a		28.88%
Boring #:	B1	Plastic Limit=	n/a	Fineness Modulus	Sample Moisture
Depth:	10'	Plasticity Index=	n/a	1.18	**3.4%**

Coarse Section Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min	**Fines Section** Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
6.00"	150.00		100.0%			#4	4.750	99.0%	99.0%		
4.00"	100.00		100.0%			#8	2.360	95.5%	95.5%		
3.00"	75.00		100.0%			#10	2.000		93.5%		
2.50"	63.00		100.0%			#16	1.180	88.9%	88.9%		
2.00"	50.00		100.0%			#20	0.850		85.0%		
1.75"	45.00		100.0%			#30	0.600	82.0%	82.0%		
1.50"	37.50		100.0%			#40	0.425		75.0%		
1.25"	31.50		100.0%			#50	0.300	70.1%	70.1%		
1.00"	25.00	100.0%	100.0%			#60	0.250		62.4%		
7/8"	22.40		100.0%			#80	0.180		51.7%		
3/4"	19.00	100.0%	100.0%			#100	0.150	47.1%	47.1%		
5/8"	16.00		100.0%			#140	0.106		36.4%		
1/2"	12.50	100.0%	100.0%			#170	0.090		32.5%		
3/8"	9.50	100.0%	100.0%			#200	0.075	28.9%	28.9%		
1/4"	6.30		99.3%			#270	0.053				
#4	4.75	99.0%	99.0%								

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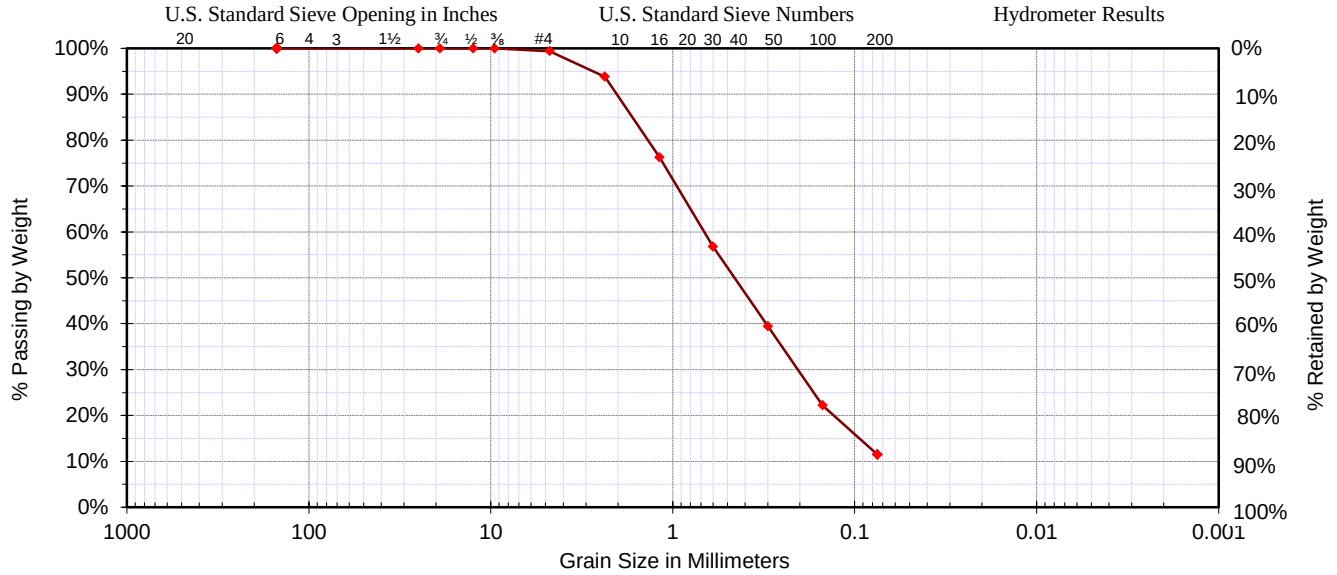
LABORATORY TEST RESULTS



Date :	01/14/17	D_{10} =	0.07	**Classification**	% Gravel
Sample #:		D_{30} =	0.22	SW-SM, Well-graded Sand with Silt	0.62%
Sample ID:	B1 @ 20'	D_{60} =	0.70		% Sand
Source:	SPT	C_C =	1.05	**Specifications**	87.89%
Project:	APNs 233-180-007 & 233-170-001	C_U =	10.65	custom specs 1	% Silt & Clay
Location:	Riverside, California	Liquid Limit=	n/a		11.48%
Boring #:	B1	Plastic Limit=	n/a	Fineness Modulus	Sample Moisture
Depth:	20'	Plasticity Index=	n/a	2.12	**3.8%**

Coarse Section Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min	**Fines Section** Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
6.00"	150.00		100.0%			#4	4.750	99.4%	99.4%		
4.00"	100.00		100.0%			#8	2.360	93.8%	93.8%		
3.00"	75.00		100.0%			#10	2.000		88.5%		
2.50"	63.00		100.0%			#16	1.180	76.3%	76.3%		
2.00"	50.00		100.0%			#20	0.850		65.2%		
1.75"	45.00		100.0%			#30	0.600	56.8%	56.8%		
1.50"	37.50		100.0%			#40	0.425		46.7%		
1.25"	31.50		100.0%			#50	0.300	39.5%	39.5%		
1.00"	25.00	100.0%	100.0%			#60	0.250		33.7%		
7/8"	22.40		100.0%			#80	0.180		25.6%		
3/4"	19.00	100.0%	100.0%			#100	0.150	22.2%	22.2%		
5/8"	16.00		100.0%			#140	0.106		15.9%		
1/2"	12.50	100.0%	100.0%			#170	0.090		13.6%		
3/8"	9.50	100.0%	100.0%			#200	0.075	11.5%	11.5%		
1/4"	6.30		99.6%			#270	0.053				
#4	4.75	99.4%	99.4%								

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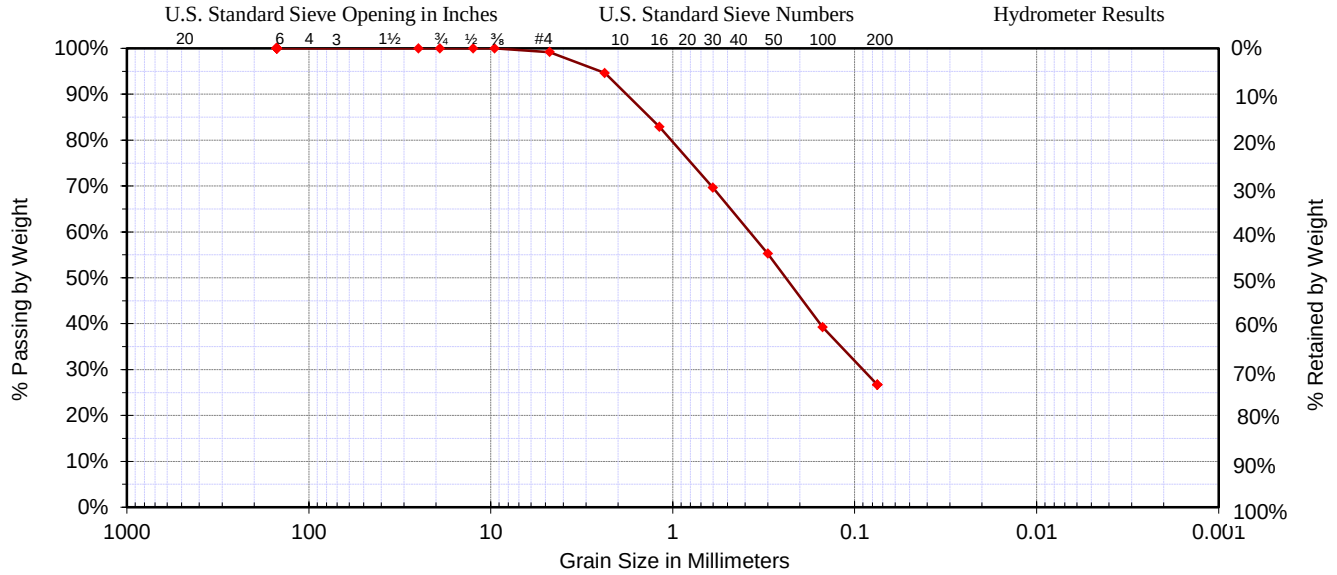
LABORATORY TEST RESULTS



Date :	01/14/17	D_{10} =	0.03	**Classification**	% Gravel
Sample #:		D_{30} =	0.09	SM, Silty Sand	0.82%
Sample ID:	B1 @ 25'	D_{60} =	0.40		% Sand
Source:	SPT	C_C =	0.80	**Specifications**	72.48%
Project:	APNs 233-180-007 & 233-170-001	C_U =	14.21	custom specs 1	% Silt & Clay
Location:	Riverside, California	Liquid Limit=	n/a		26.71%
Boring #:	B1	Plastic Limit=	n/a	Fineness Modulus	Sample Moisture
Depth:	25'	Plasticity Index=	n/a	1.59	**5.3%**

Coarse Section Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min	**Fines Section** Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
6.00"	150.00		100.0%			#4	4.750	99.2%	99.2%		
4.00"	100.00		100.0%			#8	2.360	94.6%	94.6%		
3.00"	75.00		100.0%			#10	2.000		91.0%		
2.50"	63.00		100.0%			#16	1.180	82.9%	82.9%		
2.00"	50.00		100.0%			#20	0.850		75.3%		
1.75"	45.00		100.0%			#30	0.600	69.6%	69.6%		
1.50"	37.50		100.0%			#40	0.425		61.2%		
1.25"	31.50		100.0%			#50	0.300	55.2%	55.2%		
1.00"	25.00	100.0%	100.0%			#60	0.250		49.9%		
7/8"	22.40		100.0%			#80	0.180		42.4%		
3/4"	19.00	100.0%	100.0%			#100	0.150	39.2%	39.2%		
5/8"	16.00		100.0%			#140	0.106		31.9%		
1/2"	12.50	100.0%	100.0%			#170	0.090		29.2%		
3/8"	9.50	100.0%	100.0%			#200	0.075	26.7%	26.7%		
1/4"	6.30		99.5%			#270	0.053				
#4	4.75	99.2%	99.2%								

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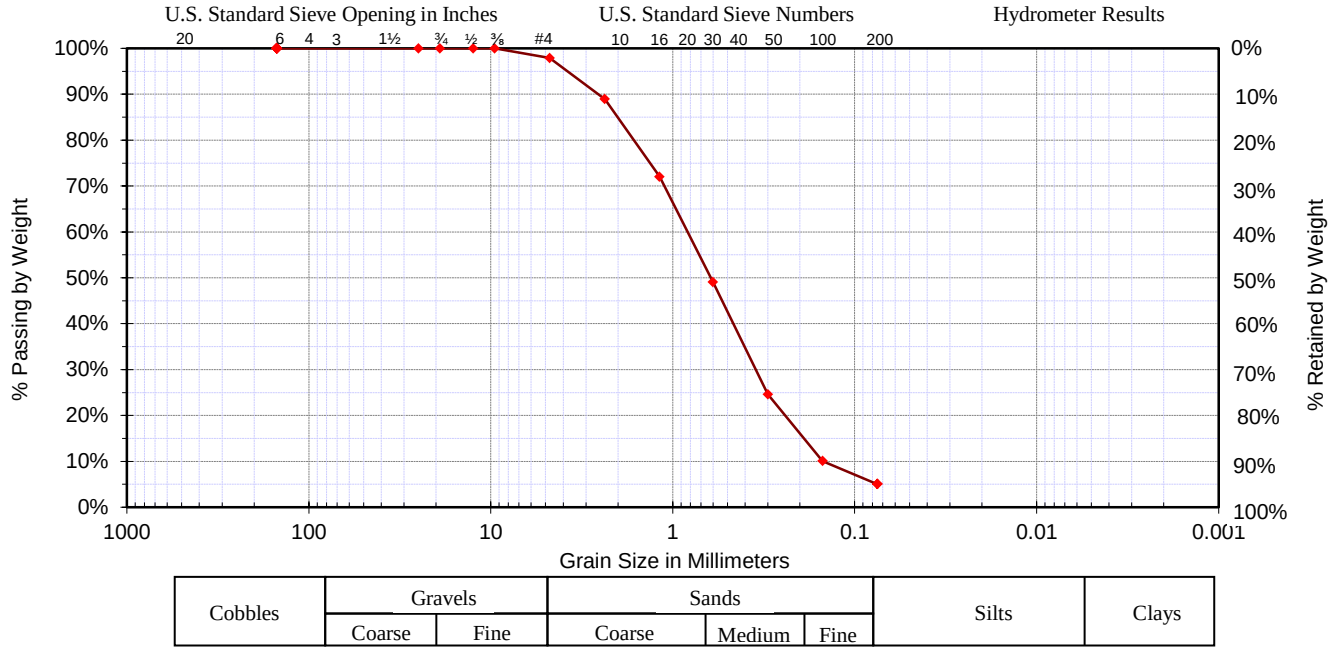
LABORATORY TEST RESULTS



Date :	01/14/17	D_{10} =	0.15	**Classification**	% Gravel
Sample #:		D_{30} =	0.37	SP-SM, Poorly graded Sand with Silt	2.13%
Sample ID:	B1 @ 35'	D_{60} =	0.88		% Sand
Source:	SPT	C_C =	1.03	**Specifications**	92.85%
Project:	APNs 233-180-007 & 233-170-001	C_U =	5.87	custom specs 1	% Silt & Clay
Location:	Riverside, California	Liquid Limit=	n/a		5.03%
Boring #:	B1	Plastic Limit=	n/a	Fineness Modulus	Sample Moisture
Depth:	35'	Plasticity Index=	n/a	2.57	**2.2%**

Coarse Section Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min	**Fines Section** Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
6.00"	150.00		100.0%			#4	4.750	97.9%	97.9%		
4.00"	100.00		100.0%			#8	2.360	88.9%	88.9%		
3.00"	75.00		100.0%			#10	2.000		83.8%		
2.50"	63.00		100.0%			#16	1.180	72.0%	72.0%		
2.00"	50.00		100.0%			#20	0.850		58.9%		
1.75"	45.00		100.0%			#30	0.600	49.0%	49.0%		
1.50"	37.50		100.0%			#40	0.425		34.8%		
1.25"	31.50		100.0%			#50	0.300	24.6%	24.6%		
1.00"	25.00	100.0%	100.0%			#60	0.250		19.8%		
7/8"	22.40		100.0%			#80	0.180		13.0%		
3/4"	19.00	100.0%	100.0%			#100	0.150	10.1%	10.1%		
5/8"	16.00		100.0%			#140	0.106		7.1%		
1/2"	12.50	100.0%	100.0%			#170	0.090		6.0%		
3/8"	9.50	100.0%	100.0%			#200	0.075	5.0%	5.0%		
1/4"	6.30		98.6%			#270	0.053				
#4	4.75	97.9%	97.9%								

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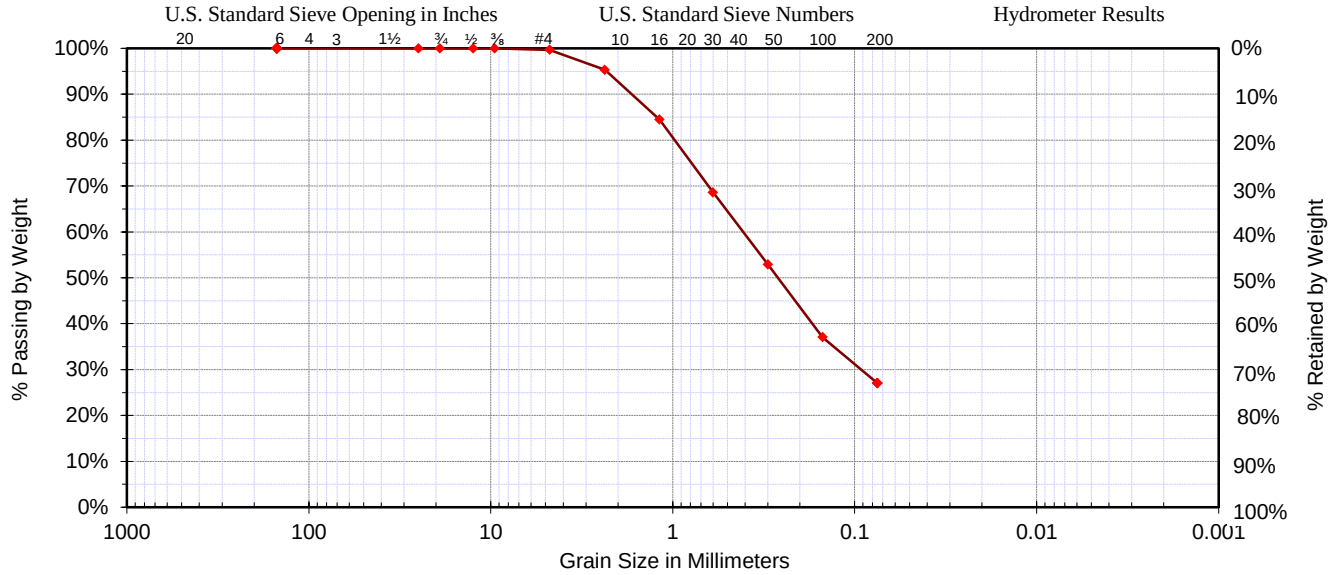
LABORATORY TEST RESULTS



Date :	01/14/17	D_{10} =	0.03	**Classification**	% Gravel
Sample #:		D_{30} =	0.10	SM, Silty Sand	0.33%
Sample ID:	B1 @ 40'	D_{60} =	0.44		% Sand
Source:	SPT	C_C =	0.78	**Specifications**	72.62%
Project:	APNs 233-180-007 & 233-170-001	C_U =	15.70	custom specs 1	% Silt & Clay
Location:	Riverside, California	Liquid Limit=	n/a		27.05%
Boring #:	B1	Plastic Limit=	n/a	Fineness Modulus	Sample Moisture
Depth:	40'	Plasticity Index=	n/a	1.62	**6.3%**

Coarse Section Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min	**Fines Section** Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
6.00"	150.00		100.0%			#4	4.750	99.7%	99.7%		
4.00"	100.00		100.0%			#8	2.360	95.3%	95.3%		
3.00"	75.00		100.0%			#10	2.000		92.0%		
2.50"	63.00		100.0%			#16	1.180	84.5%	84.5%		
2.00"	50.00		100.0%			#20	0.850		75.5%		
1.75"	45.00		100.0%			#30	0.600	68.6%	68.6%		
1.50"	37.50		100.0%			#40	0.425		59.5%		
1.25"	31.50		100.0%			#50	0.300	52.9%	52.9%		
1.00"	25.00	100.0%	100.0%			#60	0.250		47.6%		
7/8"	22.40		100.0%			#80	0.180		40.2%		
3/4"	19.00	100.0%	100.0%			#100	0.150	37.1%	37.1%		
5/8"	16.00		100.0%			#140	0.106		31.2%		
1/2"	12.50	100.0%	100.0%			#170	0.090		29.0%		
3/8"	9.50	100.0%	100.0%			#200	0.075	27.0%	27.0%		
1/4"	6.30		99.8%			#270	0.053				
#4	4.75	99.7%	99.7%								

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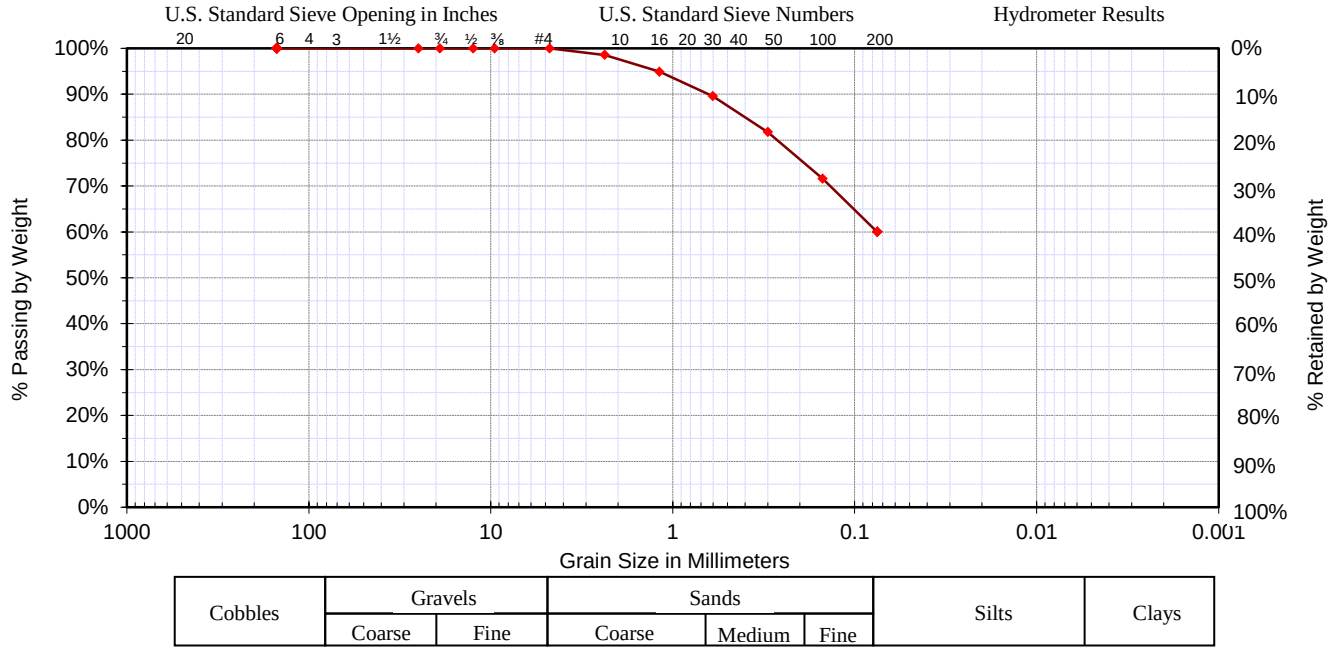
LABORATORY TEST RESULTS



Date :	01/14/17	D_{10} =	0.01	**Classification**	% Gravel
Sample #:		D_{30} =	0.04	ML, Sandy Silt	0.00%
Sample ID:	B1 @ 45'	D_{60} =	0.08		% Sand
Source:	SPT	C_C =	1.50	**Specifications**	40.00%
Project:	APNs 233-180-007 & 233-170-001	C_U =	6.00	custom specs 1	% Silt & Clay
Location:	Riverside, California	Liquid Limit=	n/a		60.00%
Boring #:	B1	Plastic Limit=	n/a	Fineness Modulus	Sample Moisture
Depth:	45'	Plasticity Index=	n/a	0.64	**13.4%**

Coarse Section Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min	**Fines Section** Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
6.00"	150.00		100.0%			#4	4.750	100.0%	100.0%		
4.00"	100.00		100.0%			#8	2.360	98.6%	98.6%		
3.00"	75.00		100.0%			#10	2.000		97.4%		
2.50"	63.00		100.0%			#16	1.180	94.9%	94.9%		
2.00"	50.00		100.0%			#20	0.850		91.9%		
1.75"	45.00		100.0%			#30	0.600	89.6%	89.6%		
1.50"	37.50		100.0%			#40	0.425		85.0%		
1.25"	31.50		100.0%			#50	0.300	81.7%	81.7%		
1.00"	25.00	100.0%	100.0%			#60	0.250		78.4%		
7/8"	22.40		100.0%			#80	0.180		73.6%		
3/4"	19.00	100.0%	100.0%			#100	0.150	71.6%	71.6%		
5/8"	16.00		100.0%			#140	0.106		64.8%		
1/2"	12.50	100.0%	100.0%			#170	0.090		62.3%		
3/8"	9.50	100.0%	100.0%			#200	0.075	60.0%	60.0%		
1/4"	6.30		100.0%			#270	0.053				
#4	4.75	100.0%	100.0%								

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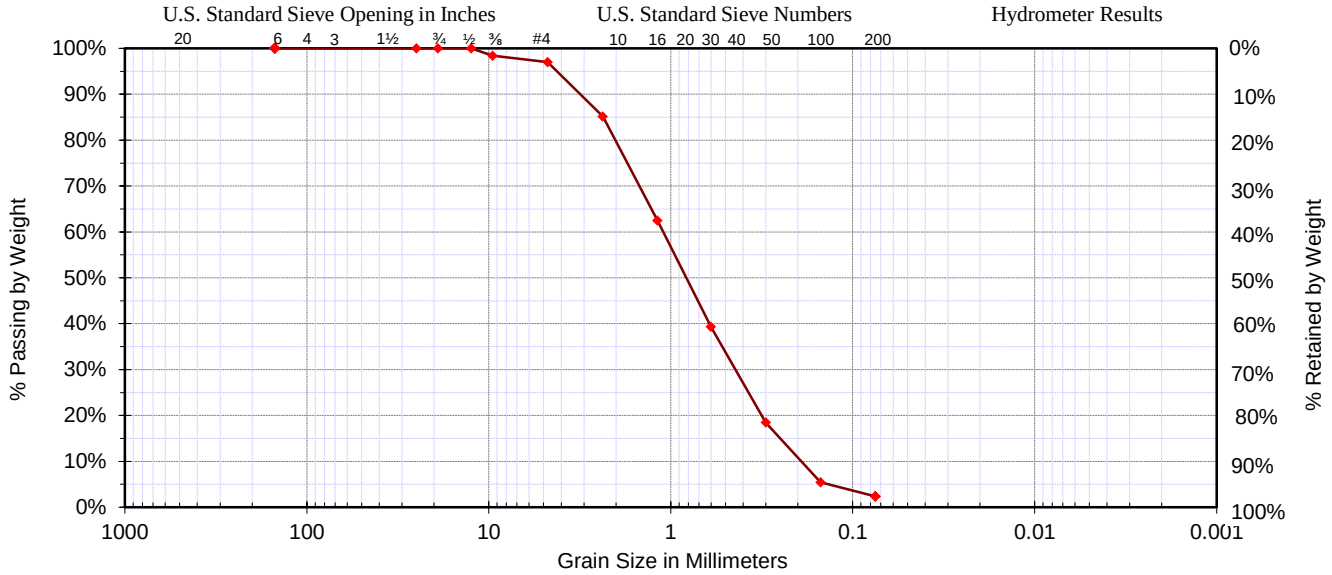
LABORATORY TEST RESULTS



Cobbles	Gravels		Sands			Silts	Clays
	Coarse	Fine	Coarse	Medium	Fine		

Date :	01/19/17	D_{10} =	0.20	**Classification**	% Gravel
Sample #:		D_{30} =	0.47	SP, Poorly graded Sand	3.00%
Sample ID:	B2 @ 12'	D_{60} =	1.12		% Sand
Source:	Ring	C_C =	0.96	**Specifications**	94.64%
Project:	APNs 233-180-007 & 233-170-001	C_U =	5.52	custom specs 1	% Silt & Clay
Location:	Riverside, California	Liquid Limit=	n/a		2.35%
Boring #:	B2	Plastic Limit=	n/a	Fineness Modulus	Sample Moisture
Depth:	12'	Plasticity Index=	n/a	2.94	**2.1%**

Coarse Section Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min	**Fines Section** Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
6.00"	150.00		100.0%			#4	4.750	97.0%	97.0%		
4.00"	100.00		100.0%			#8	2.360	85.1%	85.1%		
3.00"	75.00		100.0%			#10	2.000		78.2%		
2.50"	63.00		100.0%			#16	1.180	62.4%	62.4%		
2.00"	50.00		100.0%			#20	0.850		49.3%		
1.75"	45.00		100.0%			#30	0.600	39.3%	39.3%		
1.50"	37.50		100.0%			#40	0.425		27.1%		
1.25"	31.50		100.0%			#50	0.300	18.4%	18.4%		
1.00"	25.00	100.0%	100.0%			#60	0.250		14.1%		
7/8"	22.40		100.0%			#80	0.180		8.0%		
3/4"	19.00	100.0%	100.0%			#100	0.150	5.4%	5.4%		
5/8"	16.00		100.0%			#140	0.106		3.6%		
1/2"	12.50	100.0%	100.0%			#170	0.090		3.0%		
3/8"	9.50	98.4%	98.4%			#200	0.075	2.4%	2.4%		
1/4"	6.30		97.4%			#270	0.053				
#4	4.75	97.0%	97.0%								

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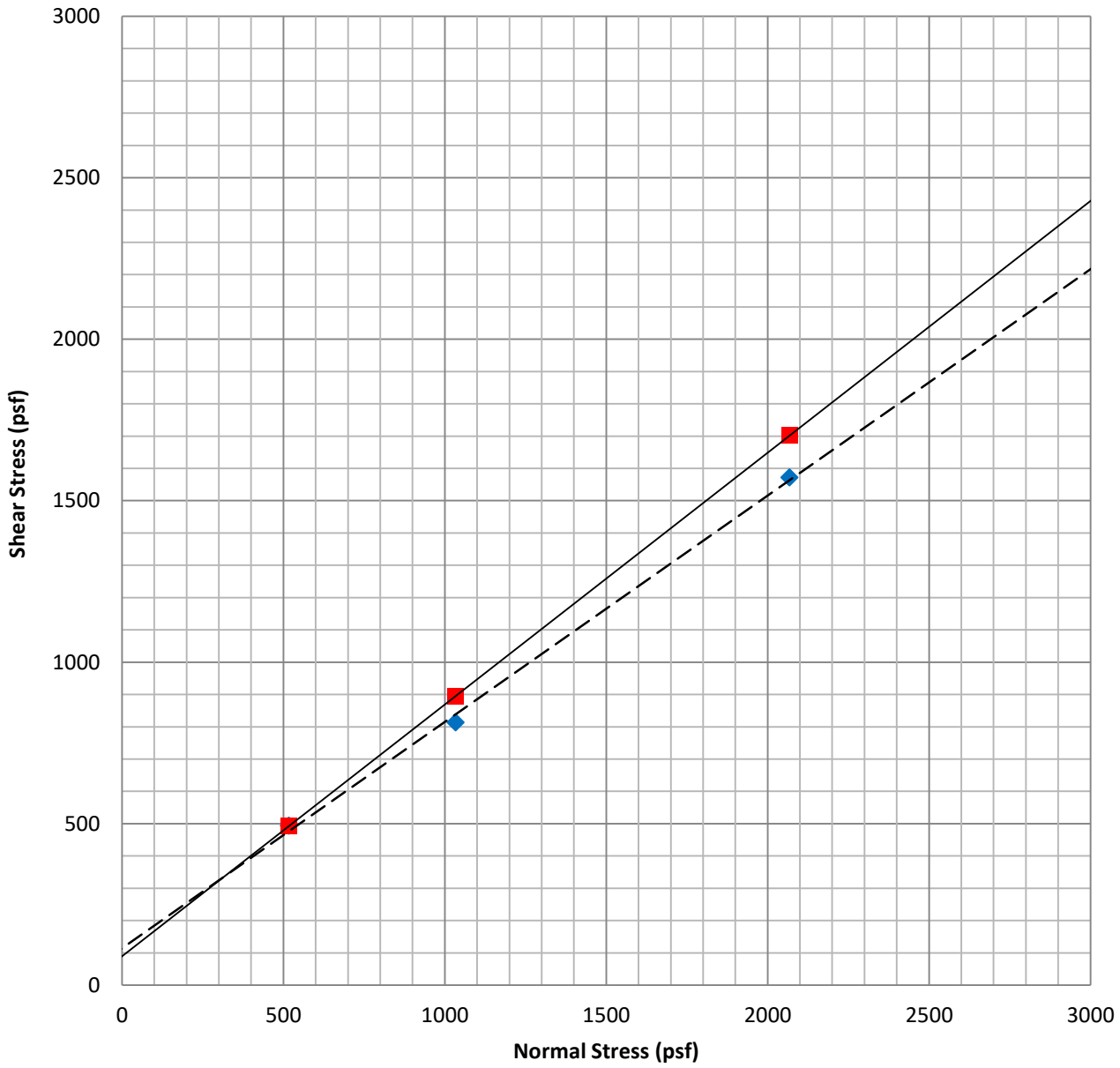
DIRECT SHEAR TEST RESULTS

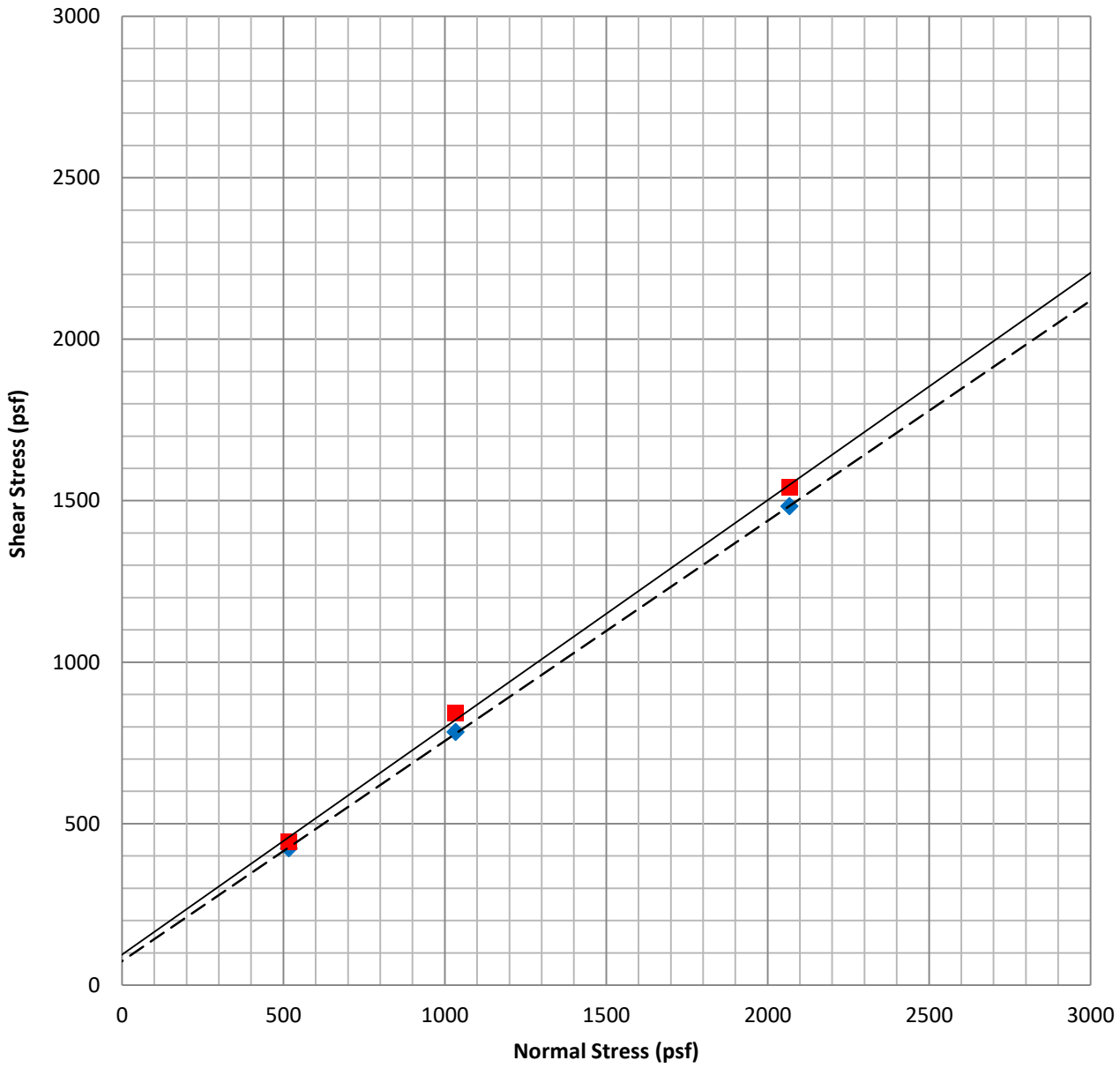


Sample	Symbol	Description	Soil Type [USCS]	Shear Strength	Friction Angle, ϕ [degrees]	Cohesion, c [psf]
B1 @ 5'	—■—	Medium Brown	SM	Peak	37.9	89
B1 @ 5'	– –◆– –	Medium Brown	SM	Ultimate	35.0	114

Sample Moisture [%]	Saturated Moisture [%]	Dry Unit Weight [pcf]
6.6	19.8	107.1
ASTM D-3080		

geomat

DIRECT SHEAR TEST RESULTS



Sample	Symbol	Description	Soil Type [USCS]	Shear Strength	Friction Angle, ϕ [degrees]	Cohesion, c [psf]
B2 @ 5'	—■—	Brown Silty Sine Sand	SM	Peak	35.1	94
B2 @ 5'	– –◆– –	Brown Silty Sine Sand	SM	Ultimate	34.3	74

Sample Moisture [%]	Saturated Moisture [%]	Dry Unit Weight [pcf]
7.3	24.3	97.0
ASTM D-3080		

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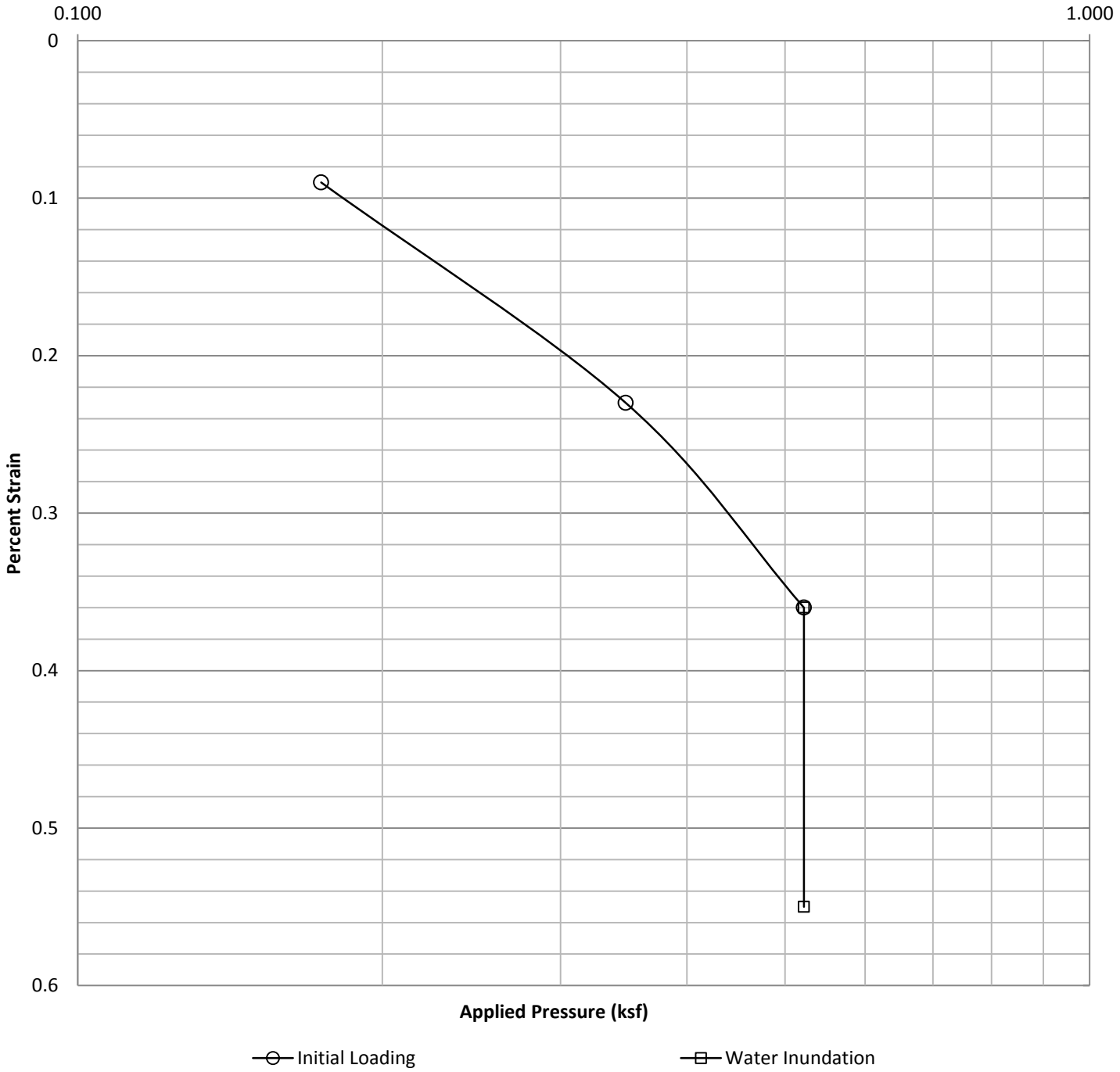
CONSOLIDATION TEST REPORT



Sampler Type:	California Ring Sampler			Condition:	Before Test			After Test		
Diameter(in):	2.41	Height(in):	1.0	Water Content:	w_0	3.5	%	w_f	23.2	%
Overburden Pressure, P_0	0.275	tsf		Void Ratio:	e_0	0.637		e_f	0.628	
Preconsol. Pressure, P_c	--	ksf		Saturation:	S_0	14.4	%	S_f	100.0	%
LL: --	PL: --	PI: --		Dry Density:	γ_d	99.0	pcf	γ_d	99.0	pcf
% Collapse:	0.19 %			Specific Gravity, G_S		2.6		(Assumed)		
Sample Location:	B2 @ 5'			Collapse Test				geomat		
Soil Classification:	SM									

GeoMat Testing Laboratories, Inc.

Soil Engineering, Environmental Engineering, Materials Testing, Geology

SOLUBLE SULFATEAND CHLORIDE TEST RESULTS

Project Name	Hawthorne Heights Project, Riverside, CA	**Test Date**	1/18/2017
Project No.	16193-01	**Date Sampled**	1/14/2017
Project Location	Hawthorne Heights Project, Riverside, CA	**Sampled By**	MN
Location in Structure	B1 @ 0-3'	**Sample Type**	Bulk
Sampled Classification	SM	**Tested By**	AM

TESTING INFORMATION

Sample weight before drying _____
Sample weight after drying _____
Sample Weight Passing No. 10 Sieve _____
Moisture _____

Location	Mixing Ratio	Dilution Factor	Sulfate Reading (ppm)	Sulfate Content (ppm)	Sulfate Content (%)
B1	3	1	<50	<150	<0.015
			Average		

Chloride Reading (ppm)	Chloride Content (ppm)	Chloride Content (%)
Average		

pH	
Average	

ACI 318-05 Table 4.3.1 Requirements for Concrete Exposed to Sulfate-Containing Solutions

Sulfate Exposure	Water-Soluble Sulfate (SO_4) In Soil, % by Mass	Sulfate (SO_4) In Water ppm	Cement Type	Maximum w/cm by Mass	Minimum Design Compressive Strength fc, MPa (psi)
Negligible	< 0.10	< 150	No Special Type	--	--
Moderate (see water)	0.10 to 0.20	150 to 1500	II IP(MS), IS(MS), P(MS), I(PM)(MS), I(SM)(MS)	0.50	28 (4000)
Severe	0.20 to 2.00	1500 to 10,000	V	0.45	31 (4500)
Very Severe	> 2.00	>10,000	V + pozz	0.45	31 (4500)

Caltrans classifies a site as corrosive to structural concrete as an area where soil and/or water contains >500pp chloride, >2000ppm sulfate, or has a pH <5.5. A minimum resistivity of less than 1000 ohm-cm indicates the potential for corrosive environment requiring testing for the above criteria.

The 2007 CBC Section 1904A references ACI 318 for material selection and mix design for reinforced concrete dependant on the onsite corrosion potential, soluble chloride content, and soluble sulfate content in soil

Comments: Sec 4.3 of ACI 318 (2005) Soil environment is detrimental to concrete if it has soluble sulfate >1000ppm and/or pH<5.5. Soil environment is corrosive to reinforcement and steel pipes if Chloride ion >500ppm or pH <4.0.

The information in this form is not intended for corrosion engineering design. If corrosion is critical, a corrosion specialist should be contacted to provide further recommendations.

Signature _____ Date _____

Print Name _____ Title _____

9980 Indiana Avenue ● Suite 14 ● Riverside ● California ● 92503 ● Phone (951) 688-5400 ● Fax (951) 688-5200
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Appendix D

USGS Design Maps Detailed Report

ASCE 7-10 Standard (33.91714°N, 117.43535°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 = 1.500 g

From Figure 22-2 [2] S_1 = 0.600 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 ≥ 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 = 1.500 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 = 0.600 g, F_v = 1.500

Equation (11.4–1): $S_{MS} = F_a S_S = 1.000 \times 1.500 = 1.500$ g

Equation (11.4–2): $S_{M1} = F_v S_1 = 1.500 \times 0.600 = 0.900$ g

Section 11.4.4 — Design Spectral Acceleration Parameters

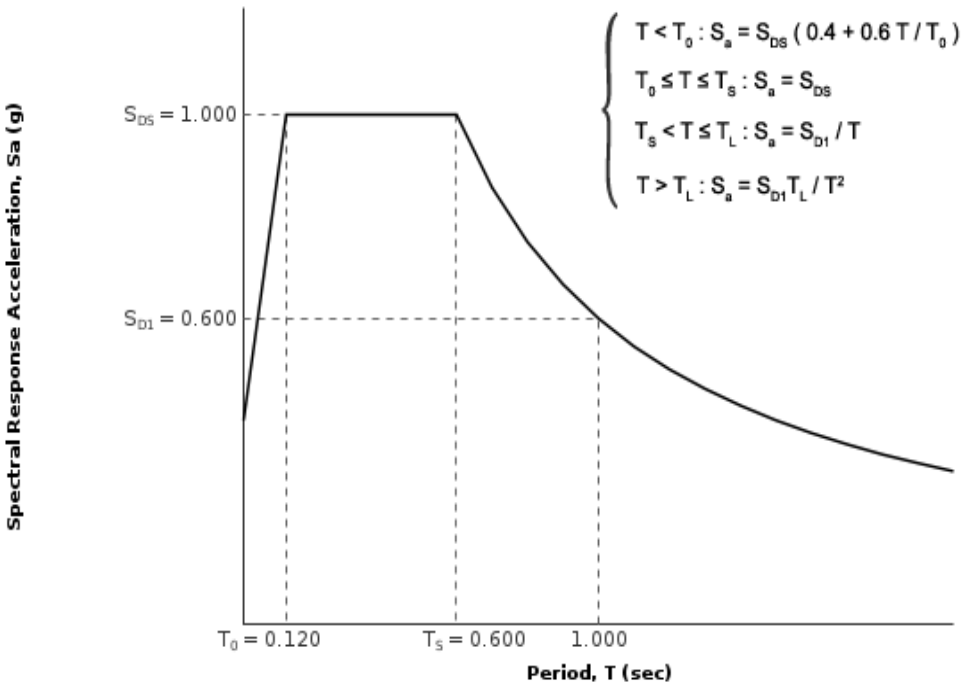
Equation (11.4–3): $S_{DS} = ⅔\ S_{MS} = ⅔ \times 1.500 = 1.000$ g

Equation (11.4–4): $S_{D1} = ⅔\ S_{M1} = ⅔ \times 0.900 = 0.600$ g

Section 11.4.5 — Design Response Spectrum

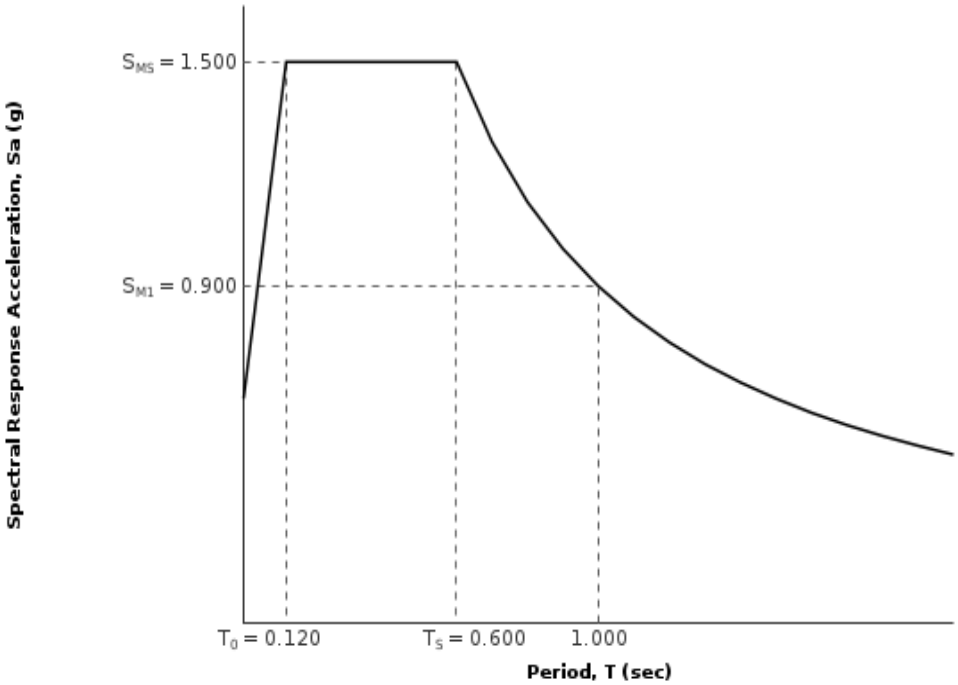
From Figure 22-12 [3] $T_L = 8$ seconds

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 = 0.500

Equation (11.8–1): $PGA_M = F_{PGA}PGA = 1.000 \times 0.500 = 0.5$ 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 = 0.500 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} = 1.100

From Figure 22-18 [6] C_{R1} = 1.072

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} = 1.000 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} = 0.600 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*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-1.pdf
2. *Figure 22-2*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-2.pdf
3. *Figure 22-12*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-12.pdf
4. *Figure 22-7*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-7.pdf
5. *Figure 22-17*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-17.pdf
6. *Figure 22-18*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-18.pdf

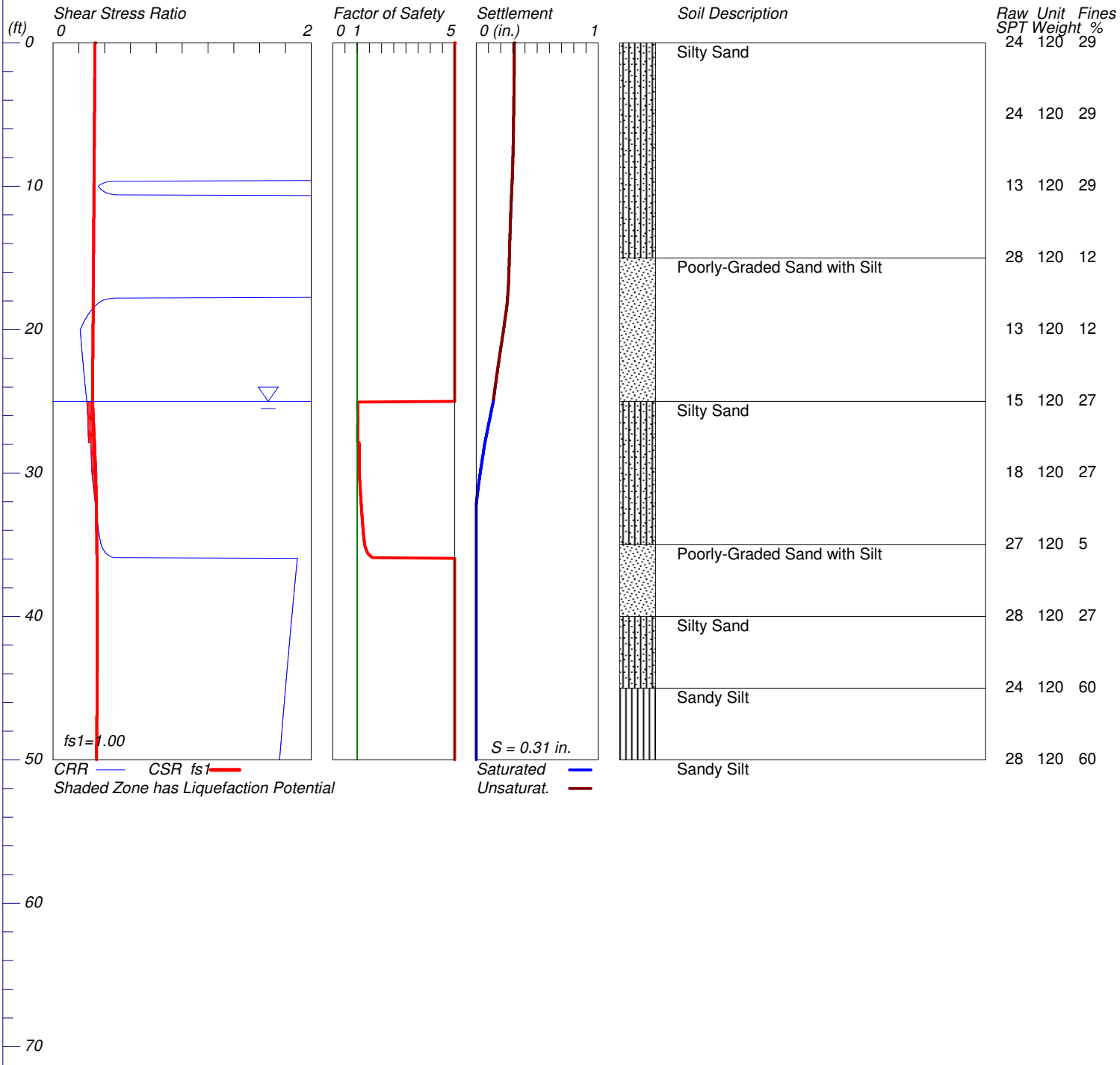
Appendix E

LIQUEFACTION ANALYSIS

Hawthorne Heights

Hole No.=B-1 Water Depth=25 ft

Magnitude=7
Acceleration=0.5g



LiquefyPro CivilTech Software USA www.civiltech.com

GeoMat Testing Laboratories, Inc.

LIQUEFACTION ANALYSIS CALCULATION SUMMARY SHEET

Title: Hawthorne Heights
Subtitle: 16193-01

Input Data:

Surface Elev.=
Hole No.=B-1
Depth of Hole=50.0 ft
Water Table during Earthquake= 25.0 ft
Water Table during In-Situ Testing= 50.0 ft
Max. Acceleration=0.5 g
Earthquake Magnitude=7.0

1. SPT or BPT Calculation.
2. Settlement Analysis Method: Tokimatsu / Seed
3. Fines Correction for Liquefaction: Stark/Olson et al.*
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1.25
7. Borehole Diameter, Cb= 1.05
8. Sampling Method, Cs= 1.2
9. User request factor of safety (apply to CSR) , User= 1.0
   Plot one CSR curve (fs1=User)
10. Use Curve Smoothing: Yes*

* Recommended Options

In-Situ Test Data:

Depth ft	SPT	gamma pcf	Fines %
0.0	24.0	120.0	29.0
5.0	24.0	120.0	29.0
10.0	13.0	120.0	29.0
15.0	28.0	120.0	12.0
20.0	13.0	120.0	12.0
25.0	15.0	120.0	27.0
30.0	18.0	120.0	27.0
35.0	27.0	120.0	5.0
40.0	28.0	120.0	27.0
45.0	24.0	120.0	60.0
50.0	28.0	120.0	60.0

Output Results:

Settlement of Saturated Sands=0.14 in.
Settlement of Unsaturated Sands=0.17 in.
Total Settlement of Saturated and Unsaturated Sands=0.31 in.
Differential Settlement=0.156 to 0.206 in.

Depth ft	CRRv	CSRm	F.S.	S_sat. in.	in.	S_dry in.	S_all
0.00	2.00	0.32	5.00	0.14	0.17	0.31	
1.00	2.00	0.32	5.00	0.14	0.17	0.31	
2.00	2.00	0.32	5.00	0.14	0.17	0.31	
3.00	2.00	0.32	5.00	0.14	0.17	0.31	
4.00	2.00	0.32	5.00	0.14	0.17	0.31	
5.00	2.00	0.32	5.00	0.14	0.17	0.31	
6.00	2.00	0.32	5.00	0.14	0.17	0.31	
7.00	2.00	0.32	5.00	0.14	0.16	0.30	
8.00	2.00	0.32	5.00	0.14	0.16	0.30	
9.00	2.00	0.32	5.00	0.14	0.16	0.30	
10.00	0.35	0.32	5.00	0.14	0.15	0.29	
11.00	2.00	0.32	5.00	0.14	0.15	0.29	
12.00	2.00	0.32	5.00	0.14	0.14	0.28	
13.00	2.00	0.32	5.00	0.14	0.14	0.28	
14.00	2.00	0.31	5.00	0.14	0.14	0.27	
15.00	2.00	0.31	5.00	0.14	0.13	0.27	
16.00	2.00	0.31	5.00	0.14	0.13	0.27	
17.00	2.00	0.31	5.00	0.14	0.12	0.26	
18.00	0.38	0.31	5.00	0.14	0.12	0.25	
19.00	0.27	0.31	5.00	0.14	0.10	0.24	
20.00	0.21	0.31	5.00	0.14	0.09	0.22	
21.00	0.22	0.31	5.00	0.14	0.07	0.21	
22.00	0.23	0.31	5.00	0.14	0.05	0.19	
23.00	0.24	0.31	5.00	0.14	0.03	0.17	
24.00	0.25	0.31	5.00	0.14	0.02	0.16	
25.00	0.26	0.31	5.00	0.14	0.00	0.14	
26.00	0.27	0.31	1.03	0.12	0.00	0.12	
27.00	0.27	0.32	1.02	0.09	0.00	0.09	
28.00	0.29	0.32	1.08	0.07	0.00	0.07	
29.00	0.30	0.33	1.08	0.05	0.00	0.05	
30.00	0.30	0.33	1.09	0.03	0.00	0.03	
31.00	0.31	0.33	1.12	0.02	0.00	0.02	
32.00	0.33	0.33	1.16	0.00	0.00	0.00	
33.00	0.34	0.34	1.20	0.00	0.00	0.00	
34.00	0.35	0.34	1.25	0.00	0.00	0.00	
35.00	0.37	0.34	1.31	0.00	0.00	0.00	
36.00	1.89	0.34	5.00	0.00	0.00	0.00	
37.00	1.88	0.34	5.00	0.00	0.00	0.00	
38.00	1.87	0.34	5.00	0.00	0.00	0.00	
39.00	1.86	0.34	5.00	0.00	0.00	0.00	
40.00	1.85	0.34	5.00	0.00	0.00	0.00	
41.00	1.84	0.34	5.00	0.00	0.00	0.00	
42.00	1.83	0.34	5.00	0.00	0.00	0.00	
43.00	1.82	0.34	5.00	0.00	0.00	0.00	
44.00	1.81	0.34	5.00	0.00	0.00	0.00	
45.00	1.80	0.34	5.00	0.00	0.00	0.00	
46.00	1.79	0.34	5.00	0.00	0.00	0.00	
47.00	1.78	0.34	5.00	0.00	0.00	0.00	
48.00	1.77	0.34	5.00	0.00	0.00	0.00	
49.00	1.76	0.34	5.00	0.00	0.00	0.00	
50.00	1.75	0.34	5.00	0.00	0.00	0.00	

* F.S.<1, Liquefaction Potential Zone
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

Depth = ft, Stress or Pressure = tsf (atm), Unit Weight = pcf, Settlement = in.

CRRv	Cyclic resistance ratio from soils
CSRm	Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S.	Factor of Safety against liquefaction, F.S.=CRRv/CSRm
S_sat	Settlement from saturated sands
S_dry	Settlement from Unsaturated Sands
S_all	Total Settlement from Saturated and Unsaturated Sands
NoLiq	No-Liquefy Soils

LIQUEFACTION ANALYSIS CALCULATION DETAIL SHEET

Title: Hawthorne Heights
Subtitle: 16193-01

Input Data:

Surface Elev.=
Hole No.=B-1
Depth of Hole=50.0 ft
Water Table during Earthquake= 25.0 ft
Water Table during In-Situ Testing= 50.0 ft
Max. Acceleration=0.5 g
Earthquake Magnitude=7.0

1. SPT or BPT Calculation.
2. Settlement Analysis Method: Tokimatsu / Seed
3. Fines Correction for Liquefaction: Stark/Olson et al.*
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1.25
7. Borehole Diameter, Cb= 1.05
8. Sampling Method, Cs= 1.2
9. User request factor of safety (apply to CSR) , User= 1.0
   Plot one CSR curve (fs1=User)
10. Use Curve Smoothing: Yes*

* Recommended Options

In-Situ Test Data:

Depth ft	SPT	Gamma pcf	Fines %
0.0	24.0	120.0	29.0
5.0	24.0	120.0	29.0
10.0	13.0	120.0	29.0
15.0	28.0	120.0	12.0
20.0	13.0	120.0	12.0
25.0	15.0	120.0	27.0
30.0	18.0	120.0	27.0
35.0	27.0	120.0	5.0
40.0	28.0	120.0	27.0
45.0	24.0	120.0	60.0
50.0	28.0	120.0	60.0

Output Results:

Calculation segment, dz=0.050 ft
User defined Print Interval, dp=1.00 ft

CSR Calculation:

Depth ft	gamma pcf	sigma tsf	gamma' pcf	sigma' tsf	rd	CSR	fs1	CSRfs *fs1
0.00	120.0	0.000	120.0	0.000	1.00	0.32	1.0	0.32
1.00	120.0	0.060	120.0	0.060	1.00	0.32	1.0	0.32
2.00	120.0	0.120	120.0	0.120	1.00	0.32	1.0	0.32
3.00	120.0	0.180	120.0	0.180	0.99	0.32	1.0	0.32
4.00	120.0	0.240	120.0	0.240	0.99	0.32	1.0	0.32
5.00	120.0	0.300	120.0	0.300	0.99	0.32	1.0	0.32
6.00	120.0	0.360	120.0	0.360	0.99	0.32	1.0	0.32
7.00	120.0	0.420	120.0	0.420	0.98	0.32	1.0	0.32
8.00	120.0	0.480	120.0	0.480	0.98	0.32	1.0	0.32
9.00	120.0	0.540	120.0	0.540	0.98	0.32	1.0	0.32
10.00	120.0	0.600	120.0	0.600	0.98	0.32	1.0	0.32
11.00	120.0	0.660	120.0	0.660	0.97	0.32	1.0	0.32
12.00	120.0	0.720	120.0	0.720	0.97	0.32	1.0	0.32
13.00	120.0	0.780	120.0	0.780	0.97	0.32	1.0	0.32
14.00	120.0	0.840	120.0	0.840	0.97	0.31	1.0	0.31
15.00	120.0	0.900	120.0	0.900	0.97	0.31	1.0	0.31
16.00	120.0	0.960	120.0	0.960	0.96	0.31	1.0	0.31
17.00	120.0	1.020	120.0	1.020	0.96	0.31	1.0	0.31
18.00	120.0	1.080	120.0	1.080	0.96	0.31	1.0	0.31
19.00	120.0	1.140	120.0	1.140	0.96	0.31	1.0	0.31
20.00	120.0	1.200	120.0	1.200	0.95	0.31	1.0	0.31
21.00	120.0	1.260	120.0	1.260	0.95	0.31	1.0	0.31
22.00	120.0	1.320	120.0	1.320	0.95	0.31	1.0	0.31
23.00	120.0	1.380	120.0	1.380	0.95	0.31	1.0	0.31
24.00	120.0	1.440	120.0	1.440	0.94	0.31	1.0	0.31
25.00	120.0	1.500	120.0	1.500	0.94	0.31	1.0	0.31
26.00	120.0	1.560	57.6	1.530	0.94	0.31	1.0	0.31
27.00	120.0	1.620	57.6	1.559	0.94	0.32	1.0	0.32
28.00	120.0	1.680	57.6	1.588	0.93	0.32	1.0	0.32
29.00	120.0	1.740	57.6	1.617	0.93	0.33	1.0	0.33
30.00	120.0	1.800	57.6	1.646	0.93	0.33	1.0	0.33
31.00	120.0	1.860	57.6	1.674	0.92	0.33	1.0	0.33
32.00	120.0	1.920	57.6	1.703	0.91	0.33	1.0	0.33
33.00	120.0	1.980	57.6	1.732	0.91	0.34	1.0	0.34
34.00	120.0	2.040	57.6	1.761	0.90	0.34	1.0	0.34
35.00	120.0	2.100	57.6	1.790	0.89	0.34	1.0	0.34
36.00	120.0	2.160	57.6	1.818	0.88	0.34	1.0	0.34
37.00	120.0	2.220	57.6	1.847	0.87	0.34	1.0	0.34
38.00	120.0	2.280	57.6	1.876	0.86	0.34	1.0	0.34
39.00	120.0	2.340	57.6	1.905	0.86	0.34	1.0	0.34
40.00	120.0	2.400	57.6	1.934	0.85	0.34	1.0	0.34
41.00	120.0	2.460	57.6	1.962	0.84	0.34	1.0	0.34
42.00	120.0	2.520	57.6	1.991	0.83	0.34	1.0	0.34
43.00	120.0	2.580	57.6	2.020	0.82	0.34	1.0	0.34
44.00	120.0	2.640	57.6	2.049	0.82	0.34	1.0	0.34
45.00	120.0	2.700	57.6	2.078	0.81	0.34	1.0	0.34
46.00	120.0	2.760	57.6	2.106	0.80	0.34	1.0	0.34
47.00	120.0	2.820	57.6	2.135	0.79	0.34	1.0	0.34
48.00	120.0	2.880	57.6	2.164	0.78	0.34	1.0	0.34
49.00	120.0	2.940	57.6	2.193	0.78	0.34	1.0	0.34
50.00	120.0	3.000	57.6	2.222	0.77	0.34	1.0	0.34

CSR is based on water table at 25.0 during earthquake

CRR Calculation from SPT or BPT data:

Depth ft	SPT	Cebs	Cr	sigma' tsf	Cn	(N1)60	Fines %	d(N1)60	(N1)60f	CRR7.5
0.00	24.00	1.58	0.75	0.000	1.70	48.20	29.00	5.76	53.96	2.00
1.00	24.00	1.58	0.75	0.060	1.70	48.20	29.00	5.76	53.96	2.00
2.00	24.00	1.58	0.75	0.120	1.70	48.20	29.00	5.76	53.96	2.00
3.00	24.00	1.58	0.75	0.180	1.70	48.20	29.00	5.76	53.96	2.00
4.00	24.00	1.58	0.75	0.240	1.70	48.20	29.00	5.76	53.96	2.00
5.00	24.00	1.58	0.75	0.300	1.70	48.19	29.00	5.76	53.96	2.00
6.00	21.80	1.58	0.75	0.360	1.67	42.92	29.00	5.76	48.68	2.00
7.00	19.60	1.58	0.75	0.420	1.54	35.72	29.00	5.76	41.48	2.00
8.00	17.40	1.58	0.75	0.480	1.44	29.67	29.00	5.76	35.43	2.00
9.00	15.20	1.58	0.85	0.540	1.36	27.69	29.00	5.76	33.45	2.00
10.00	13.00	1.58	0.85	0.600	1.29	22.47	29.00	5.76	28.23	0.35
11.00	16.00	1.58	0.85	0.660	1.23	26.37	25.60	4.94	31.31	2.00
12.00	19.00	1.58	0.85	0.720	1.18	29.98	22.20	4.13	34.10	2.00
13.00	22.00	1.58	0.85	0.780	1.13	33.35	18.80	3.31	36.66	2.00
14.00	25.00	1.58	0.85	0.840	1.09	36.52	15.40	2.50	39.01	2.00
15.00	28.00	1.58	0.95	0.900	1.05	44.16	12.00	1.68	45.84	2.00
16.00	25.00	1.58	0.95	0.960	1.02	38.18	12.00	1.68	39.86	2.00
17.00	22.00	1.58	0.95	1.020	0.99	32.59	12.00	1.68	34.27	2.00
18.00	19.00	1.58	0.95	1.080	0.96	27.36	12.00	1.68	29.04	0.38
19.00	16.00	1.58	0.95	1.140	0.94	22.42	12.00	1.68	24.10	0.27
20.00	13.00	1.58	0.95	1.200	0.91	17.76	12.00	1.68	19.44	0.21
21.00	13.40	1.58	0.95	1.260	0.89	17.86	15.00	2.40	20.26	0.22
22.00	13.80	1.58	0.95	1.320	0.87	17.97	18.00	3.12	21.09	0.23
23.00	14.20	1.58	0.95	1.380	0.85	18.09	21.00	3.84	21.93	0.24
24.00	14.60	1.58	0.95	1.440	0.83	18.20	24.00	4.56	22.76	0.25
25.00	15.00	1.58	0.95	1.500	0.82	18.33	27.00	5.28	23.61	0.26
26.00	15.60	1.58	0.95	1.560	0.80	18.69	27.00	5.28	23.97	0.27
27.00	16.20	1.58	0.95	1.620	0.79	19.04	27.00	5.28	24.32	0.27
28.00	16.80	1.58	1.00	1.680	0.77	20.41	27.00	5.28	25.69	0.29
29.00	17.40	1.58	1.00	1.740	0.76	20.78	27.00	5.28	26.06	0.30
30.00	18.00	1.58	1.00	1.800	0.75	21.13	27.00	5.28	26.41	0.31
31.00	19.80	1.58	1.00	1.860	0.73	22.87	22.60	4.22	27.09	0.32
32.00	21.60	1.58	1.00	1.920	0.72	24.55	18.20	3.17	27.72	0.34
33.00	23.40	1.58	1.00	1.980	0.71	26.19	13.80	2.11	28.30	0.35
34.00	25.20	1.58	1.00	2.040	0.70	27.79	9.40	1.06	28.84	0.37
35.00	27.00	1.58	1.00	2.100	0.69	29.34	5.00	0.00	29.34	0.39
36.00	27.20	1.58	1.00	2.160	0.68	29.15	9.40	1.06	30.20	2.00
37.00	27.40	1.58	1.00	2.220	0.67	28.96	13.80	2.11	31.08	2.00
38.00	27.60	1.58	1.00	2.280	0.66	28.79	18.20	3.17	31.96	2.00
39.00	27.80	1.58	1.00	2.340	0.65	28.62	22.60	4.22	32.85	2.00
40.00	28.00	1.58	1.00	2.400	0.65	28.47	27.00	5.28	33.75	2.00
41.00	27.20	1.58	1.00	2.460	0.64	27.31	33.60	6.86	34.18	2.00
42.00	26.40	1.58	1.00	2.520	0.63	26.19	40.20	7.20	33.39	2.00
43.00	25.60	1.58	1.00	2.580	0.62	25.10	46.80	7.20	32.30	2.00
44.00	24.80	1.58	1.00	2.640	0.62	24.04	53.40	7.20	31.24	2.00
45.00	24.00	1.58	1.00	2.700	0.61	23.00	60.00	7.20	30.20	2.00
46.00	24.80	1.58	1.00	2.760	0.60	23.51	60.00	7.20	30.71	2.00
47.00	25.60	1.58	1.00	2.820	0.60	24.01	60.00	7.20	31.21	2.00
48.00	26.40	1.58	1.00	2.880	0.59	24.50	60.00	7.20	31.70	2.00
49.00	27.20	1.58	1.00	2.940	0.58	24.98	60.00	7.20	32.18	2.00
50.00	28.00	1.58	1.00	3.000	0.58	25.46	60.00	7.20	32.66	2.00

CRR is based on water table at 50.0 during In-Situ Testing

Factor of Safety, - Earthquake Magnitude= 7.0:

Depth ft	sigC' tsf	CRR7.5 tsf	Ksigma	CRRv tsf	CSRfs tsf	MSF	CSRm tsf	F.S. CRRv/CSRm
0.00	0.00	2.00	1.00	2.00	0.32	1.19	0.27	5.00
1.00	0.04	2.00	1.00	2.00	0.32	1.19	0.27	5.00
2.00	0.08	2.00	1.00	2.00	0.32	1.19	0.27	5.00
3.00	0.12	2.00	1.00	2.00	0.32	1.19	0.27	5.00
4.00	0.16	2.00	1.00	2.00	0.32	1.19	0.27	5.00
5.00	0.20	2.00	1.00	2.00	0.32	1.19	0.27	5.00
6.00	0.23	2.00	1.00	2.00	0.32	1.19	0.27	5.00
7.00	0.27	2.00	1.00	2.00	0.32	1.19	0.27	5.00
8.00	0.31	2.00	1.00	2.00	0.32	1.19	0.27	5.00
9.00	0.35	2.00	1.00	2.00	0.32	1.19	0.27	5.00
10.00	0.39	0.35	1.00	0.35	0.32	1.19	0.27	5.00
11.00	0.43	2.00	1.00	2.00	0.32	1.19	0.27	5.00
12.00	0.47	2.00	1.00	2.00	0.32	1.19	0.26	5.00
13.00	0.51	2.00	1.00	2.00	0.32	1.19	0.26	5.00
14.00	0.55	2.00	1.00	2.00	0.31	1.19	0.26	5.00
15.00	0.59	2.00	1.00	2.00	0.31	1.19	0.26	5.00
16.00	0.62	2.00	1.00	2.00	0.31	1.19	0.26	5.00
17.00	0.66	2.00	1.00	2.00	0.31	1.19	0.26	5.00
18.00	0.70	0.38	1.00	0.38	0.31	1.19	0.26	5.00
19.00	0.74	0.27	1.00	0.27	0.31	1.19	0.26	5.00
20.00	0.78	0.21	1.00	0.21	0.31	1.19	0.26	5.00
21.00	0.82	0.22	1.00	0.22	0.31	1.19	0.26	5.00
22.00	0.86	0.23	1.00	0.23	0.31	1.19	0.26	5.00
23.00	0.90	0.24	1.00	0.24	0.31	1.19	0.26	5.00
24.00	0.94	0.25	1.00	0.25	0.31	1.19	0.26	5.00
25.00	0.98	0.26	1.00	0.26	0.31	1.19	0.26	5.00
26.00	1.01	0.27	1.00	0.27	0.31	1.19	0.26	1.03
27.00	1.05	0.27	1.00	0.27	0.32	1.19	0.27	1.02
28.00	1.09	0.29	0.99	0.29	0.32	1.19	0.27	1.08
29.00	1.13	0.30	0.99	0.30	0.33	1.19	0.27	1.08
30.00	1.17	0.31	0.98	0.30	0.33	1.19	0.28	1.09
31.00	1.21	0.32	0.97	0.31	0.33	1.19	0.28	1.12
32.00	1.25	0.34	0.97	0.33	0.33	1.19	0.28	1.16
33.00	1.29	0.35	0.96	0.34	0.34	1.19	0.28	1.20
34.00	1.33	0.37	0.96	0.35	0.34	1.19	0.28	1.25
35.00	1.37	0.39	0.95	0.37	0.34	1.19	0.28	1.31
36.00	1.40	2.00	0.95	1.89	0.34	1.19	0.29	5.00
37.00	1.44	2.00	0.94	1.88	0.34	1.19	0.29	5.00
38.00	1.48	2.00	0.94	1.87	0.34	1.19	0.29	5.00
39.00	1.52	2.00	0.93	1.86	0.34	1.19	0.29	5.00
40.00	1.56	2.00	0.92	1.85	0.34	1.19	0.29	5.00
41.00	1.60	2.00	0.92	1.84	0.34	1.19	0.29	5.00
42.00	1.64	2.00	0.91	1.83	0.34	1.19	0.29	5.00
43.00	1.68	2.00	0.91	1.82	0.34	1.19	0.29	5.00
44.00	1.72	2.00	0.91	1.81	0.34	1.19	0.29	5.00
45.00	1.76	2.00	0.90	1.80	0.34	1.19	0.29	5.00
46.00	1.79	2.00	0.90	1.79	0.34	1.19	0.29	5.00
47.00	1.83	2.00	0.89	1.78	0.34	1.19	0.28	5.00
48.00	1.87	2.00	0.89	1.77	0.34	1.19	0.28	5.00
49.00	1.91	2.00	0.88	1.76	0.34	1.19	0.28	5.00
50.00	1.95	2.00	0.88	1.75	0.34	1.19	0.28	5.00

* F.S.<1: Liquefaction Potential Zone. (If above water table: F.S.=5)
^ No-liquefiable Soils.
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

CPT convert to SPT for Settlement Analysis:
Fines Correction for Settlement Analysis:

Depth ft	Ic	qc/N60	qc1 tsf	(N1)60	Fines %	d(N1)60	(N1)60s
0.00	-	-	-	53.96	29.0	0.00	53.96
1.00	-	-	-	53.96	29.0	0.00	53.96
2.00	-	-	-	53.96	29.0	0.00	53.96
3.00	-	-	-	53.96	29.0	0.00	53.96
4.00	-	-	-	53.96	29.0	0.00	53.96
5.00	-	-	-	53.96	29.0	0.00	53.96
6.00	-	-	-	48.68	29.0	0.00	48.68
7.00	-	-	-	41.48	29.0	0.00	41.48
8.00	-	-	-	35.43	29.0	0.00	35.43
9.00	-	-	-	33.45	29.0	0.00	33.45
10.00	-	-	-	28.23	29.0	0.00	28.23
11.00	-	-	-	31.31	25.6	0.00	31.31
12.00	-	-	-	34.10	22.2	0.00	34.10
13.00	-	-	-	36.66	18.8	0.00	36.66
14.00	-	-	-	39.01	15.4	0.00	39.01
15.00	-	-	-	45.84	12.0	0.00	45.84
16.00	-	-	-	39.86	12.0	0.00	39.86
17.00	-	-	-	34.27	12.0	0.00	34.27
18.00	-	-	-	29.04	12.0	0.00	29.04
19.00	-	-	-	24.10	12.0	0.00	24.10
20.00	-	-	-	19.44	12.0	0.00	19.44
21.00	-	-	-	20.26	15.0	0.00	20.26
22.00	-	-	-	21.09	18.0	0.00	21.09
23.00	-	-	-	21.93	21.0	0.00	21.93
24.00	-	-	-	22.76	24.0	0.00	22.76
25.00	-	-	-	23.61	27.0	0.00	23.61
26.00	-	-	-	23.97	27.0	0.00	23.97
27.00	-	-	-	24.32	27.0	0.00	24.32
28.00	-	-	-	25.69	27.0	0.00	25.69
29.00	-	-	-	26.06	27.0	0.00	26.06
30.00	-	-	-	26.41	27.0	0.00	26.41
31.00	-	-	-	27.09	22.6	0.00	27.09
32.00	-	-	-	27.72	18.2	0.00	27.72
33.00	-	-	-	28.30	13.8	0.00	28.30
34.00	-	-	-	28.84	9.4	0.00	28.84
35.00	-	-	-	29.34	5.0	0.00	29.34
36.00	-	-	-	30.20	9.4	0.00	30.20
37.00	-	-	-	31.08	13.8	0.00	31.08
38.00	-	-	-	31.96	18.2	0.00	31.96
39.00	-	-	-	32.85	22.6	0.00	32.85
40.00	-	-	-	33.75	27.0	0.00	33.75
41.00	-	-	-	34.18	33.6	0.00	34.18
42.00	-	-	-	33.39	40.2	0.00	33.39
43.00	-	-	-	32.30	46.8	0.00	32.30
44.00	-	-	-	31.24	53.4	0.00	31.24
45.00	-	-	-	30.20	60.0	0.00	30.20
46.00	-	-	-	30.71	60.0	0.00	30.71
47.00	-	-	-	31.21	60.0	0.00	31.21
48.00	-	-	-	31.70	60.0	0.00	31.70
49.00	-	-	-	32.18	60.0	0.00	32.18
50.00	-	-	-	32.66	60.0	0.00	32.66

(N1)60s has been fines corrected in liquefaction analysis, therefore d(N1)60=0.
Fines=NoLiq means the soils are not liquefiable.

Settlement of Saturated Sands:
Settlement Analysis Method: Tokimatsu / Seed

Depth ft	CSRm	F.S.	Fines %	(N1)60s	Dr %	ec %	dsz in.	dsp in.	S in.
49.95	0.28	5.00	60.0	32.64	96.35	0.000	0.0E0	0.000	0.000
49.00	0.28	5.00	60.0	32.18	95.22	0.000	0.0E0	0.000	0.000
48.00	0.28	5.00	60.0	31.70	94.03	0.000	0.0E0	0.000	0.000
47.00	0.28	5.00	60.0	31.21	92.86	0.000	0.0E0	0.000	0.000
46.00	0.29	5.00	60.0	30.71	91.69	0.000	0.0E0	0.000	0.000
45.00	0.29	5.00	60.0	30.20	90.52	0.000	0.0E0	0.000	0.000
44.00	0.29	5.00	53.4	31.24	92.93	0.000	0.0E0	0.000	0.000
43.00	0.29	5.00	46.8	32.30	95.51	0.000	0.0E0	0.000	0.000
42.00	0.29	5.00	40.2	33.39	98.29	0.000	0.0E0	0.000	0.000
41.00	0.29	5.00	33.6	34.18	100.00	0.000	0.0E0	0.000	0.000
40.00	0.29	5.00	27.0	33.75	99.21	0.000	0.0E0	0.000	0.000
39.00	0.29	5.00	22.6	32.85	96.88	0.000	0.0E0	0.000	0.000
38.00	0.29	5.00	18.2	31.96	94.66	0.000	0.0E0	0.000	0.000
37.00	0.29	5.00	13.8	31.08	92.54	0.000	0.0E0	0.000	0.000
36.00	0.29	5.00	9.4	30.20	90.52	0.000	0.0E0	0.000	0.000
35.00	0.28	1.31	5.0	29.34	88.60	0.000	0.0E0	0.000	0.000
34.00	0.28	1.25	9.4	28.84	87.51	0.000	0.0E0	0.000	0.000
33.00	0.28	1.20	13.8	28.30	86.35	0.000	0.0E0	0.000	0.000
32.00	0.28	1.16	18.2	27.72	85.13	0.104	6.2E-4	0.002	0.002
31.00	0.28	1.12	22.6	27.09	83.83	0.125	7.5E-4	0.014	0.016
30.00	0.28	1.09	27.0	26.41	82.47	0.148	8.9E-4	0.016	0.033
29.00	0.27	1.08	27.0	26.06	81.77	0.151	9.1E-4	0.018	0.051
28.00	0.27	1.08	27.0	25.69	81.06	0.155	9.3E-4	0.018	0.069
27.00	0.27	1.02	27.0	24.32	78.44	0.198	1.2E-3	0.023	0.092
26.00	0.26	1.03	27.0	23.97	77.77	0.199	1.2E-3	0.024	0.116
25.05	0.26	1.02	27.0	23.62	77.12	0.201	1.2E-3	0.023	0.139

Settlement of Saturated Sands=0.139 in.
qc1 and (N1)60 is after fines correction in liquefaction analysis
dsz is per each segment, dz=0.05 ft
dsp is per each print interval, dp=1.00 ft
S is cumulated settlement at this depth

Settlement of Unsaturated Sands:

Depth ft	sigma' tsf	sigC' tsf	(N1)60s	CSRfs	Gmax tsf	g*Ge/Gm	g_eff	ec7.5 %	Cec	ec %	dsz in.	dsp in.	S in.
25.00	1.50	0.98	23.61	0.31	1265.4	3.6E-4	0.0881	0.0699	0.93	0.0650	7.80E-4	0.001	0.001
24.00	1.44	0.94	22.76	0.31	1225.0	3.6E-4	0.0869	0.0723	0.93	0.0672	8.06E-4	0.016	0.017
23.00	1.38	0.90	21.93	0.31	1184.3	3.6E-4	0.0856	0.0748	0.93	0.0695	8.34E-4	0.016	0.033
22.00	1.32	0.86	21.09	0.31	1143.4	3.6E-4	0.0843	0.0774	0.93	0.0719	8.63E-4	0.017	0.050
21.00	1.26	0.82	20.26	0.31	1102.3	3.5E-4	0.0828	0.0802	0.93	0.0745	8.94E-4	0.018	0.068
20.00	1.20	0.78	19.44	0.31	1060.9	3.5E-4	0.0813	0.0831	0.93	0.0771	9.26E-4	0.018	0.086
19.00	1.14	0.74	24.10	0.31	1110.8	3.2E-4	0.1078	0.0832	0.93	0.0773	9.28E-4	0.016	0.102
18.00	1.08	0.70	29.04	0.31	1150.4	2.9E-4	0.0808	0.0483	0.93	0.0449	5.38E-4	0.014	0.116
17.00	1.02	0.66	34.27	0.31	1181.4	2.7E-4	0.0638	0.0290	0.93	0.0269	3.23E-4	0.008	0.124
16.00	0.96	0.62	39.86	0.31	1205.3	2.5E-4	0.0521	0.0166	0.93	0.0154	1.85E-4	0.005	0.129
15.00	0.90	0.59	45.84	0.31	1222.6	2.3E-4	0.0438	0.0138	0.93	0.0129	1.54E-4	0.003	0.133
14.00	0.84	0.55	39.01	0.31	1119.4	2.4E-4	0.0459	0.0155	0.93	0.0144	1.73E-4	0.003	0.136
13.00	0.78	0.51	36.66	0.32	1056.6	2.3E-4	0.0445	0.0176	0.93	0.0163	1.96E-4	0.004	0.140
12.00	0.72	0.47	34.10	0.32	991.0	2.3E-4	0.0432	0.0198	0.93	0.0184	2.21E-4	0.004	0.144
11.00	0.66	0.43	31.31	0.32	922.2	2.3E-4	0.0421	0.0224	0.93	0.0208	2.50E-4	0.005	0.149
10.00	0.60	0.39	28.23	0.32	849.4	2.2E-4	0.0412	0.0256	0.93	0.0238	2.86E-4	0.005	0.154
9.00	0.54	0.35	33.45	0.32	852.7	2.0E-4	0.0336	0.0160	0.93	0.0148	1.78E-4	0.005	0.158
8.00	0.48	0.31	35.43	0.32	819.5	1.9E-4	0.0359	0.0153	0.93	0.0142	1.70E-4	0.004	0.162
7.00	0.42	0.27	41.48	0.32	807.9	1.7E-4	0.0304	0.0096	0.93	0.0089	1.07E-4	0.003	0.165
6.00	0.36	0.23	48.68	0.32	788.9	1.5E-4	0.0256	0.0081	0.93	0.0075	9.04E-5	0.002	0.167
5.00	0.30	0.20	53.96	0.32	745.3	1.3E-4	0.0219	0.0069	0.93	0.0064	7.73E-5	0.002	0.168
4.00	0.24	0.16	53.96	0.32	666.6	1.2E-4	0.0192	0.0061	0.93	0.0056	6.75E-5	0.001	0.170
3.00	0.18	0.12	53.96	0.32	577.3	1.0E-4	0.0202	0.0064	0.93	0.0059	7.10E-5	0.002	0.171
2.00	0.12	0.08	53.96	0.32	471.4	8.2E-5	0.0146	0.0046	0.93	0.0043	5.16E-5	0.001	0.172
1.00	0.06	0.04	53.96	0.32	333.3	5.8E-5	0.0089	0.0028	0.93	0.0026	3.14E-5	0.001	0.173
0.00	0.00	0.00	53.96	0.32	4.3	7.6E-7	0.0010	0.0003	0.93	0.0003	3.58E-6	0.000	0.174

Settlement of Unsaturated Sands=0.174 in.
dsz is per each segment, dz=0.05 ft
dsp is per each print interval, dp=1.00 ft
S is cumulated settlement at this depth

Total Settlement of Saturated and Unsaturated Sands=0.312 in.
Differential Settlement=0.156 to 0.206 in.

Depth = ft, Stress or Pressure = tsf (atm), Unit Weight = pcf, Settlement = in.

SPT	Field data from Standard Penetration Test (SPT)
BPT	Field data from Becker Penetration Test (BPT)
qc	Field data from Cone Penetration Test (CPT)
fs	Friction from CPT testing
gamma	Total unit weight of soil
gamma'	Effective unit weight of soil
Fines	Fines content [%]
D50	Mean grain size
Dr	Relative Density
sigma	Total vertical stress [tsf]
sigma'	Effective vertical stress [tsf]
sigC'	Effective confining pressure [tsf]
rd	Stress reduction coefficient
CRR7.5	Cyclic resistance ratio (M=7.5)
Ksigma	Overburden stress correction factor for CRR7.5
CRRv	CRR after overburden stress correction, CRRv=CRR7.5 * Ksigma
F.S.	Calculated factor of safety against liquefaction F.S.=CRRv/CSRm
User	User request factor of safety, which may apply to CSR
fs1	First CSR curve in graphic defined in #9 of Advanced page
fs2	2nd CSR curve in graphic defined in #9 of Advanced page
CSR	Cyclic stress ratio induced by earthquake
CSRfs	CSRfs=CSR*fs1, fs1=1 or User, defined in #9 of Advanced page
MSF	Magnitude scaling factor for CSR
CSRm	After magnitude scaling correction CSRm=CSRfs/MSF
Cebs	Energy Ratio, Borehole Dia., and Sampling Method Corrections
Cr	Rod Length Corrections
Cn	Overburden Pressure Correction
(N1)60	SPT after corrections, (N1)60=SPT * Cr * Cn * Cebs
d(N1)60	Fines correction of SPT
(N1)60f	(N1)60 after fines corrections, (N1)60f=(N1)60 + d(N1)60
Cq	Overburden stress correction factor
qc1	CPT after Overburden stress correction
dqc1	Fines correction of CPT
qc1f	CPT after Fines and Overburden correction, qc1f=qc1 + dqc1
qc1n	CPT after normalization in Robertson's method
Kc	Fine correction factor in Robertson's Method
qc1f	CPT after Fines correction in Robertson's Method
Ic	Soil type index in Suzuki's and Robertson's Methods
(N1)60s	(N1)60 after settlement fines corrections
ec	Volumetric strain for saturated sands
dz	Calculation segment, dz=0.050 ft
dsz	Settlement in each segment, dz
dp	User defined print interval
dsp	Settlement in each print interval, dp
Gmax	Shear Modulus at low strain
g_eff	gamma_eff, Effective shear Strain
g*Ge/Gm	gamma_eff * G_eff/G_max, Strain-modulus ratio
ec7.5	Volumetric Strain for magnitude=7.5
Cec	Magnitude correction factor for any magnitude
ec	Volumetric strain for unsaturated sands, ec=Cec * ec7.5
NoLiq	No-Liquefy Soils

References:

1. NCEER Workshop on Evaluation of Liquefaction Resistance of Soils. Youd, T.L., and Idriss, I.M., eds., Technical Report NCEER 97-0022.

SP117. Southern California Earthquake Center. Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Liquefaction in California. University of Southern California. March 1999.

2. RECENT ADVANCES IN SOIL LIQUEFACTION ENGINEERING AND SEISMIC SITE RESPONSE EVALUATION, Paper No. SPL-2, PROCEEDINGS: Fourth International Conference on Recent Advances in Geotechnical Earthquake Engineering and Soil Dynamics, San Diego, CA, March 2001.

3. RECENT ADVANCES IN SOIL LIQUEFACTION ENGINEERING: A UNIFIED AND CONSISTENT FRAMEWORK, Earthquake Engineering Research Center, Report No. EERC 2003-06 by R.B Seed and etc. April 2003.

Appendix F

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GENERAL

The guidelines contained herein and the standard details attached hereto represent this firm's standard recommendation for grading and other associated operations on construction projects. These guidelines should be considered a portion of the project specifications.
All plates attached hereto shall be considered as part of these guidelines.
The Contractor should not vary from these guidelines without prior recommendation by the Geotechnical Consultant and the approval of the Client or his authorized representative. Recommendation by the Geotechnical Consultant and/or Client should not be considered to preclude requirements for the approval by the controlling agency prior to the execution of any changes.
These Standard Grading Guidelines and Standard Details may be modified and/or superseded by recommendations contained in the text of the preliminary Geotechnical Report and/or subsequent reports.
If disputes arise out of the interpretation of these grading guidelines or standard details, the Geotechnical Consultant shall provide the governing interpretation.

DEFINITION OF TERMS

ALLUVIUM
Unconsolidated soil deposits resulting from flow of water, including sediments deposited in river beds, canyons, flood plains, lakes, fans and estuaries.
AS-GRADED (AS-BUILT): The surface and subsurface conditions at completion of grading.
BACKCUT: A temporary construction slope at the rear of earth retaining structures such as buttresses, shear keys, stabilization fills or retaining walls.
BACKDRAIN: Generally a pipe and gravel or similar drainage system placed behind earth retaining structures such buttresses, stabilization fills, and retaining walls.
BEDROCK: Relatively undisturbed formational rock, more or less solid, either at the surface or beneath superficial deposits of soil.
BENCH: A relatively level step and near vertical rise excavated into sloping ground on which fill is to be placed.
BORROW (Import): Any fill material hauled to the project site from off-site areas.
BUTTRESS FILL::A fill mass, the configuration of which is designed by engineering calculations to retain slope conditions containing adverse geologic features. A buttress is generally specified by minimum key width and depth and by maximum backcut angle. A buttress normally contains a back-drainage system.
CIVIL ENGINEER: The Registered Civil Engineer or consulting firm responsible for preparation of the grading plans, surveying and verifying as-graded topographic conditions.
CLIENT: The Developer or his authorized representative who is chiefly in charge of the project. He shall have the responsibility of reviewing the findings and recommendations made by the Geotechnical Consultant and shall authorize the Contractor and/or other consultants to perform work and/or provide services.
COLLUVIUM: Generally loose deposits usually found near the base of slopes and brought there chiefly by gravity through slow continuous downhill creep (also see Slope Wash).
COMPACTION : Densification of man-placed fill by mechanical means.
CONTRACTOR – A person or company under contract or otherwise retained by the Client to perform demolition, grading and other site improvements.
DEBRIS: All products of clearing, grubbing, demolition, and contaminated soil materials unsuitable for reuse as compacted fill, and/or any other material so designated by the Geotechnical Consultant.
ENGINEERING GEOLOGIST: A Geologist holding a valid certificate of registration in the specialty of Engineering Geology.
ENGINEERED FILL: A fill of which the Geotechnical Consultant or his representative, during grading, has made sufficient tests to enable him to conclude that the fill has been placed in substantial compliance with the recommendations of the Geotechnical Consultant and the governing agency requirements.
EROSION: The wearing away of ground surface as a result of the movement of wind, water, and/or ice.
EXCAVATION: The mechanical removal of earth materials.
EXISTING GRADE: The ground surface configuration prior to grading.
FILL: Any deposits of soil, rock, soil-rock blends or other similar materials placed by man.
FINISH GRADE: The ground surface configuration at which time the surface elevations conform to the approved plan.

GEOFABRIC: Any engineering textile utilized in geotechnical applications including subgrade stabilization and filtering.
GEOLOGIST: A representative of the Geotechnical Consultant educated and trained in the field of geology.
GEOTECHNICAL CONSULTANT: The Geotechnical Engineering and Engineering Geology consulting firm retained to provide technical services for the project. For the purpose of these specifications, observations by the Geotechnical Consultant include observations by the Soil Engineer, Geotechnical Engineer, Engineering Geologist and those performed by persons employed by and responsible to the Geotechnical Consultants.
GEOTECHNICAL ENGINEER: A licensed Geotechnical Engineer or Civil Engineer who applies scientific methods, engineering principles and professional experience to the acquisition, interpretation and use of knowledge of materials of the earth's crust for the evaluation of engineering problems. Geotechnical Engineering encompasses many of the engineering aspects of soil mechanics, rock mechanics, geology, geophysics, hydrology and related sciences.
GRADING: Any operation consisting of excavation, filling or combinations thereof and associated operations.
LANDSIDE DEBRIS: Material, generally porous and of low density, produced from instability of natural or man-made slopes.
MAXIMUM DENSITY: Standard laboratory test for maximum dry unit weight. Unless otherwise specified, the maximum dry unity weight shall be determined in accordance with ASTM Method of Test D 1557-91.
OPTIMUM MOISTURE – Soil moisture content at the test maximum density.
RELATIVE COMPACTION: The degree of compaction (expressed as a percentage) of dry unit weight of a material as compared to the maximum dry unit weight of the material.
ROUGH GRADE: The ground surface configuration at which time the surface elevations approximately conform to the approved plan.
SITE: The particular parcel of land where grading is being performed.
SHEAR KEY: Similar to buttress, however, it is generally constructed by excavating a slot within a natural slope, in order to stabilize the upper portion of the slope without grading encroaching into the lower portion of the slope.
SLOPE: An inclined ground surface, the steepness of which is generally specified as a ration of horizontal:vertical (e.g., 2:1)
SLOPE WASH: Soil and/or rock material that has been transported down a slope by action of gravity assisted by runoff water not confined by channels (also see Colluvium).
SOIL: Naturally occurring deposits of sand, silt, clay, etc., or combinations thereof.
SOIL ENGINEER: Licensed Geotechnical Engineer or Civil Engineer experienced in soil mechanics (also see Geotechnical Engineer).
STABILIZATION FILL: A fill mass, the configuration of which is typically related to slope height and specified by the standards of practice for enhancing the stability of locally adverse conditions. A stabilization fill is normally specified by minimum key width and depth and by maximum backcut angle. A stabilization fill may or may not have a backdrainage system specified.
SUBDRAIN: Generally a pipe and gravel or similar drainage system placed beneath a fill in the alignment of canyons or formed drainage channels.
SLOUGH: Loose, non-compacted fill material generated during grading operations.
TAILINGS: Non-engineered fill which accumulates on or adjacent to equipment haul-roads.
TERRACE: Relatively level step constructed in the face of a graded slope surface for drainage control and maintenance purposes.
TOPSOIL: The presumable fertile upper zone of soil, which is usually darker in color and loose.
WINDROW: A string of large rocks buried within engineered fill in accordance with guidelines set forth by the Geotechnical Consultant.

OBLIGATIONS OF PARTIES

The Geotechnical Consultant should provide observation and testing services and should make evaluations in order to advise the Client on Geotechnical matters. The Geotechnical Consultant should report his findings and recommendations to the Client or his authorized representative.
The client should be chiefly responsible for all aspects of the project. He or his authorized representative has the responsibility of reviewing the findings and recommendations of the Geotechnical Consultant. He shall authorize or cause to have authorized the Contractor and/or other consultants to perform work and/or provide services.

During grading the Client or his authorized representative should remain on-site or should remain reasonably accessible to all concerned parties in order to make decisions necessary to maintain the flow of the project.
The Contractor should be responsible for the safety of the project and satisfactory completion of all grading and other associated operations on construction projects, including but not limited to, earthwork in accordance with the project plans, specifications and controlling agency requirements. During grading, the Contractor or his authorized representative should remain on-site. Overnight and on days off, the Contractor should remain accessible.

SITE PREPARATION

The Client, prior to any site preparation or grading, should arrange and attend a meeting among the Grading Contractor, the Design Engineer, the Geotechnical Consultant, representatives of the appropriate governing authorities as well as any other concerned parties. All parties should be given at least 48 hours notice.
Clearing and grubbing should consist of the removal of vegetation such as brush, grass, woods, stumps, trees, roots of trees and otherwise deleterious natural materials from the areas to be graded. Clearing and grubbing should extend to the outside of all proposed excavation and fill areas.
Demolition should include removal of buildings, structures, foundations, reservoirs, utilities (including underground pipelines, septic tanks, leach fields, seepage pits, cisterns, mining shafts, tunnels, etc.) and man-made surface and subsurface improvements from the areas to be graded. Demolition of utilities should include proper capping and/or re-routing pipelines at the project perimeter and cutoff and capping of wells in accordance with the requirements of the governing authorities and the recommendations of the Geotechnical Consultant at the time of the demolition.
Trees, plants or man-made improvements not planned to be removed or demolished should be protected by the Contractor from damage or injury.
Debris generated during clearing, grubbing and/or demolition operations should be wasted from areas to be graded and disposed off-site. Clearing, grubbing and demolition operations should be performed under the observation of the Geotechnical Consultant.
The Client or Contractor should obtain the required approvals for the controlling authorities for the project prior, during and/or after demolition, site preparation and removals, etc. The appropriate approvals should be obtained prior to proceeding with grading operations.

SITE PROTECTION

Protection of the site during the period of grading should be the responsibility of the Contractor. Unless other provisions are made in writing and agreed upon among the concerned parties, completion of a portion of the project should not be considered to preclude that portion or adjacent areas from the requirements for site protection until such time as the entire project is complete as identified by the Geotechnical Consultant, the Client and the regulating agencies.
The Contractor should be responsible for the stability of all temporary excavations. Recommendations by the Geotechnical Consultant pertaining to temporary excavations (e.g., backcuts) are made in consideration of stability of the completed project and therefore, should not be considered to preclude the responsibilities of the Contractor. Recommendations by the Geotechnical Consultant should not be considered to preclude more restrictive requirements by the regulating agencies.
Precautions should be taken during the performance of site clearing, excavations and grading to protect the work site from flooding, ponding, or inundation by poor or improper surface drainage. Temporary provisions should be made during the rainy season to adequately direct surface drainage away from and off the work site. Where low areas can not be avoided, pumps should be kept on hand to continually remove water during periods of rainfall.
During periods of rainfall, plastic sheeting should be kept reasonably accessible to prevent unprotected slopes from becoming saturated. Where necessary during periods of rainfall, the Contractor should install check-dams de-silting basins, rip-rap, sandbags or other devices or methods necessary to control erosion and provide safe conditions.
During periods of rainfall, the Geotechnical Consultant should be kept informed by the Contractor as to the nature of remedial or preventative work being performed (e.g., pumping, placement of sandbags or plastic sheeting, other labor, dozing, etc.).

Following periods of rainfall, the Contractor should contact the Geotechnical Consultant and arrange a walk-over of the site in order to visually assess rain related damage. The Geotechnical Consultant may also recommend excavations and testing in order to aid in his assessments. At the request of the Geotechnical Consultant, the Contractor shall make excavations in order to evaluate the extent of rain related damage.
Rain-related damage should be considered to include, but may not be limited to, erosion, silting, saturation, swelling, structural distress and other adverse conditions identified by the Geotechnical Consultant. Soil adversely affected should be classified as Unsuitable Materials and should be subject to overexcavation and replaced with compacted fill or other remedial grading as recommended by the Geotechnical Consultant.
Relatively level areas, where saturated soils and/or erosion gullies exist to depths greater then 1 foot, should be overexcavated to unaffected, competent material. Where less than 1 foot in depth, unsuitable materials may be processed in-place to achieve near optimum moisture conditions, then thoroughly recompacted in accordance with the applicable specifications. If the desired results are not achieved, the affected materials should be overexcavated then replaced in accordance with the applicable specifications.
In slope areas, where saturated soil and/or erosion gullies exist to depths of greater than 1 foot, should be over-excavated to unaffected, competent material. Where affected materials exist to depths of 1 foot or less below proposed finished grade, remedial grading by moisture conditioning in-place, followed by thorough recompaction in accordance with the applicable grading guidelines herein may be attempted. If the desired results are not achieved, all affected materials should be overexcavated and replaced as compacted fill in accordance with the slope repair recommendations herein. As field conditions dictate, other slope repair procedures may be recommended by the Geotechnical Consultant.

EXCAVATIONS

UNSUITABLE MATERIALS:
Materials which are unsuitable should be excavated under observation and recommendations of the Geotechnical Consultant. Unsuitable materials include, but may not be limited to dry, loose, soft, wet, organic compressible natural soils and fractured, weathered, soft, bedrock and nonengineered or otherwise deleterious fill materials.
Materials identified by the Geotechnical Consultant as unsatisfactory due to its moisture conditions should be overexcavated, watered or dried, as needed, and thoroughly blended to uniform near optimum moisture condition (per Moisture guidelines presented herein) prior to placement as compacted fill.

CUT SLOPES:
Unless otherwise recommended by the Geotechnical Consultant and approved by the regulating agencies, permanent cut slopes should not be steeper than 2:1 (horizontal:vertical).
If excavations for cut slopes expose loose, cohesionless, significantly fractured or otherwise suitable material, overexcavation and replacement of the unsuitable materials with a compacted stabilization fill should be accomplished as recommended by the Geotechnical Consultant. Unless otherwise specified by the Geotechnical Consultant, stabilization fill construction should conform to the requirements of the Standard Details.
The Geotechnical Consultant should review cut slopes during excavation. The Geotechnical Consultant should be notified by the contractor prior to beginning slope excavations.
If during the course of grading, adverse or potentially adverse geotechnical conditions are encountered which were not anticipated in the preliminary report, the Geotechnical Consultant should explore, analyze and make recommendations to treat these problems.
When cuts slopes are made in the direction of the prevailing drainage, a non-erodible diversion swale (brow ditch) should be provided at the top-of-cut.

PAD AREAS:
All lot pad areas, including side yard terraces, above stabilization fills or buttresses should be over-excavated to provide for a minimum of 3-feet (refer to Standard Details) of compacted fill over the entire pad area. Pad areas with both fill and cut materials exposed and pad areas containing both very shallow (less than 3-feet) and deeper fill should be over- thickness (refer to Standard Details).
Cut areas exposing significantly varying material types should also be overexcavated to provide for at least a 3-foot thick compacted fill blanket. Geotechnical conditions may require greater depth of overexcavation. The actual depth should be delineated by the Geotechnical Consultant during grading.

For pad areas created above cut or natural slopes, positive drainage should be established away from the top-of-slope. This may be accomplished utilizing a berm and/or an appropriate pad gradient. A gradient in soil areas away from the top-of-slope of 2 percent or greater is recommended.

COMPACTED FILL

All fill materials should be compacted as specified below or by other methods specifically recommended by the Geotechnical Consultant. Unless otherwise specified, the minimum degree of compaction (relative compaction) should be 90 percent of the laboratory maximum density.

PLACEMENT

Prior to placement of compacted fill, the Contractor should request a review by the Geotechnical Consultant of the exposed ground surface. Unless otherwise recommended, the exposed ground surface should then be scarified (6-inches minimum), watered or dried as needed, thoroughly blended to achieve near optimum moisture conditions, then thoroughly compacted to a minimum of 90 percent of the maximum density. The review by the Geotechnical Consultants should not be considered to preclude requirements of inspection and approval by the governing agency.

Compacted fill should be placed in thin horizontal lifts not exceeding 8-inches in loose thickness prior to compaction. Each lift should be watered or dried as needed, thoroughly blended to achieve near optimum moisture conditions then thoroughly compacted by mechanical methods to a minimum of 90 percent of laboratory maximum dry density. Each lift should be treated in a like manner until the desired finished grades are achieved.

The Contractor should have suitable and sufficient mechanical compaction equipment and watering apparatus on the job site to handle the amount of fill being placed in consideration of moisture retention properties of the materials. If necessary, excavation equipment should be “shut down” temporarily in order to permit proper compaction of fills. Earth moving equipment should only be considered a supplement and not substituted for conventional compaction equipment.

When placing fill in horizontal lifts adjacent to areas sloping steeper than 5:1 (horizontal:vertical), horizontal keys and vertical benches should be excavated into the adjacent slope area. Keying and benching should be sufficient to provide at least 6-foot wide benches and minimum of 4-feet of vertical bench height within the firm natural ground, firm bedrock or engineered compacted fill. No compacted fill should be placed in an area subsequent to keying and benching until the area has been reviewed by the Geotechnical Consultant. Material generated by the benching operation should be moved sufficiently away from the bench area to allow for the recommended review of the horizontal bench prior to placement of fill. Typical keying and benching details have been included within the accompanying Standard Details.

Within a single fill area where grading procedures dictate two or more separate fills, temporary slopes (false slopes) may be created. When placing fill adjacent to a false slope, benching should be conducted in the same manner as above described. At least a 3-foot vertical bench should be established within the firm core of adjacent approved compacted fill prior to placement of additional fill. Benching should proceed in at least 3-foot vertical increments until the desired finished grades are achieved.

Fill should be tested for compliance with the recommended relative compaction and moisture conditions. Field density testing should conform to ASTM Method of Testing D 1556-64, D 2922-78 and/or D2937-71. Tests should be provided for about every 2 vertical feet or 1,000 cubic yards of fill placed. Actual test intervals may vary as field conditions dictate. Fill found not to be in conformance with the grading recommendations should be removed or otherwise handled as recommended by the Geotechnical Consultant.

The Contractor should assist the Geotechnical Consultant and/or his representative by digging test pits for removal determinations and/or for testing compacted fill.

As recommended by the Geotechnical Consultant, the Contractor should “shutdown” or remove any grading equipment from an area being tested.

The Geotechnical Consultant should maintain a plan with estimated locations of field tests. Unless the client provides for actual surveying of test locations, by the Geotechnical Consultant should only be considered rough estimates and should not be utilized for the purpose of preparing cross sections showing test locations or in any case for the purpose of after-the-fact evaluating of the sequence of fill placement.

MOISTURE

For field testing purposes, “near optimum” moisture will vary with material type and other factors including compaction procedures. “Near optimum” may be specifically recommended in Preliminary Investigation Reports and/or may be evaluated during grading.

Prior to placement of additional compacted fill following an overnight or other grading delay, the exposed surface of previously compacted fill should be processed by scarification, watered or dried as needed, thoroughly blended to near-optimum moisture conditions, then recompacted to a minimum of 90 percent of laboratory maximum dry density. Where wet or other dry or other unsuitable materials exist to depths of greater than one foot, the unsuitable materials should be overexcavated.

Following a period of flooding, rainfall or overwatering by other means, no additional fill should be placed until damage assessments have been made and remedial grading performed as described herein.

FILL MATERIAL

Excavated on-site materials which are acceptable to the Geotechnical Consultant may be utilized as compacted fill, provided trash, vegetation and other deleterious materials are removed prior to placement.

Where import materials are required for use on-site, the Geotechnical Consultant should be notified at least 72 hours in advance of importing, in order to sample and test materials from proposed borrow sites. No import materials should be delivered for use on-site without prior sampling and testing by Geotechnical Consultant.

Where oversized rock or similar irreducible material is generated during grading, it is recommended, where practical, to waste such material off-site or on-site in areas designated as “nonstructural rock disposal areas”. Rock placed in disposal areas should be placed with sufficient fines to fill voids. The rock should be compacted in lifts to an unyielding condition. The disposal area should be covered with at least 3-feet of compacted fill, which is free of oversized material. The upper 3-feet should be placed in accordance with the guidelines for compacted fill herein.

Rocks 3 inches in maximum dimension and smaller may be utilized within the compacted fill, provided they are placed in such a manner that nesting of the rock in avoided. Fill should be placed and thoroughly compacted over and around all rock. The amount of rock should not exceed 40 percent by dry weight passing the $^{3}/_{4}$-inch sieve size. The 3-inch and 40 percent recommendations herein may vary as field conditions dictate.

During the course of grading operations, rocks or similar irreducible materials greater than 3-inch maximum dimension (oversized material) may be generated. These rocks should not be placed within the compacted fill unless placed as recommended by the Geotechnical Consultant.

Where rocks or similar irreducible materials of greater that 3-inches but less than 4-feet of maximum dimension are generated during grading, or otherwise desired to be placed within an engineered fill, special handling in accordance with the accompanying Standard Details is recommended. Rocks greater than 4 feet should be broken down or disposed off-site. Rocks up to 4-feet maximum dimension should be placed below the upper 10-feet of any fill and should not be closer than 20-feet to any slope face. These recommendations could vary as locations of improvements dictate. Where practical, oversized material should not be placed below areas where structures of deep utilities are proposes.

Oversized material should be placed in windrows on a clean, overexcavated or unyielding compacted fill or firm natural ground surface. Select native or imported granular soil (S.E. 30 or higher) should be placed and thoroughly flooded over and around all windrowed rock, such that voids are filled. Windrows of oversized material should be staggered so that successive strata of oversized material are not in the same vertical plane.

It may be possible to dispose of individual larger rock as field conditions dictate and as recommended by the Geotechnical Consultant at time of placement.

Material that is considered unsuitable by the Geotechnical Consultant should not be utilized in the compacted fill.

During grading operations, placing and mixing the materials from the cut and/or borrow areas may result in soil mixtures which possess unique physical properties. Testing may be required of samples obtained directly from the fill areas in order to verify conformance with the specifications. Processing of these additional samples may take two or more working days. The Contractor may elect to move the operation to other areas within the project, or may continue placing compacted fill pending laboratory and field test results. Should he elect the second alternative, fill placed is done so at the Contractor’s risk.

Any fill placed in areas not previously reviewed and evaluated by the Geotechnical Consultant, and/or in other areas, without prior notification to the Geotechnical Consultant may require removal and recompaction at the Contractor's expense. Determination of overexcavations should be made upon review of field conditions by the Geotechnical Consultant.

FILL SLOPES

Unless otherwise recommended by the Geotechnical Consultant and approved by the regulating agencies, permanent fill slopes should not be steeper than 2:1 (horizontal to vertical).

Except as specifically recommended otherwise or as otherwise provided for in these grading guidelines (Reference Fill Materials), compacted fill slopes should be overbuilt and cut back to grade, exposing the firm, compacted fill inner core. The actual amount of overbuilding may vary as field conditions dictate. If the desired results are not achieved, the existing slopes should be overexcavated and reconstructed under the guidelines of the Geotechnical Consultant. The degree of overbuilding shall be increased until the desired compacted slope surface condition is achieved. Care should be taken by the Contractor to provide thorough mechanical compaction to the outer edge of the overbuilt slope surface.

Although no construction procedure produces a slope free from risk of future movement, overfilling and cutting back of slope to a compacted inner core is, given no other constraints, the most desirable procedure. Other constraints, however, must often be considered. These constraints may include property line situations, access, the critical nature of the development, and cost. Where such constraints are identified, slope face compaction may be attempted by conventional construction procedures including backrolling techniques upon specific recommendations by the Geotechnical Consultant.

As a second best alternative for slopes of 2:1 (horizontal to vertical) or flatter, slope construction may be attempted as outlined herein. Fill placement should proceed in thin lifts, (i.e., 6 to 8 inch loose thickness). Each lift should be moisture conditioned and thoroughly compacted. The desired moisture condition should be maintained and/or reestablished, where necessary, during the period between successive lifts. Selected lifts should be tested to ascertain that desired compaction is being achieved. Care should be taken to extend compactive effort to the outer edge of the slope. Each lift should extend horizontally to the desired finished slope surface or more as needed to ultimately establish desired grades. Grade during construction should not be allowed to roll off at the edge of the slope. It may be helpful to elevate slightly the outer edge of the slope. Slough resulting from the placement of individual lifts should not be allowed to drift down over previous lifts. At intervals not exceeding 4-feet in vertical slope height or the capability of available equipment, whichever is less, fill slopes should be thoroughly backrolled utilizing a conventional sheepsfoot-type roller. Care should be taken to maintain the desired moisture conditions and/or reestablishing same as needed prior to backrolling. Upon achieving final grade, the slopes should again be moisture conditioned and thoroughly backrolled. The use of a side-boom roller will probably be necessary and vibratory methods are strongly recommended. Without delay, so as to avoid (if possible) further moisture conditioning, the slopes should then be grid-rolled to achieve a relatively smooth surface and uniformly compact condition.

In order to monitor slope construction procedures, moisture and density tests will be taken at regular intervals. Failure to achieve the desired results will likely result in a recommendation by the Geotechnical Consultant to overexcavate the slope surfaces followed by reconstruction of the slopes utilizing overfilling and cutting back procedures and/or further attempt at the conventional backrolling approach. Other recommendations may also be provided which would be commensurate with field conditions.

Where placement of fill above a natural slope or above a cut slope is proposed, the fill slope configuration as presented in the accompanying standard Details should be adopted.

For pad areas above fill slopes, positive drainage should be established away from the top-of-slope. This may be accomplished utilizing a berm and pad gradients of at least 2-percent in soil area.

OFF-SITE FILL

Off-site fill should be treated in the same manner as recommended in these specifications for site preparation, excavation, drains, compaction, etc.

Off-site canyon fill should be placed in preparation for future additional fill, as shown in the accompanying Standard Details.

Off-site fill subdrains temporarily terminated (up canyon) should be surveyed for future relocation and connection.

DRAINAGE

Canyon sub-drain systems specified by the Geotechnical Consultant should be installed in accordance with the Standard Details.
Typical sub-drains for compacted fill buttresses, slope stabilization or sidehill masses, should be installed in accordance with the specifications of the accompanying Standard Details.
Roof, pad and slope drainage should be directed away from slopes and areas of structures to suitable disposal areas via non-erodible devices (i.e., gutters, downspouts, concrete swales).
For drainage over soil areas immediately away from structures (i.e., within 4-feet), a minimum of 4 percent gradient should be maintained. Pad drainage of at least 2 percent should be maintained over soil areas. Pad drainage may be reduced to at least 1 percent for projects where no slopes exist, either natural or man-made, or greater than 10-feet in height and where no slopes are planned, either natural or man-made, steeper than 2:1 (horizontal to vertical slope ratio).
Drainage patterns established at the time of fine grading should be maintained throughout the life of the project. Property owners should be made aware that altering drainage patterns can be detrimental to slope stability and foundation performance.

STAKING

In all fill areas, the fill should be compacted prior to the placement of the stakes. This particularly is important on fill slopes. Slope stakes should not be placed until the slope is thoroughly compacted (backrolled). If stakes must be placed prior to the completion of compaction procedures, it must be recognized that they will be removed and/or demolished at such time as compaction procedures resume.
In order to allow for remedial grading operations, which could include overexcavations or slope stabilization, appropriate staking offsets should be provided. For finished slope and stabilization backcut areas, we recommend at least 10-feet setback from proposed toes and tops-of-cut.

SLOPE MAINTENANCE LANDSCAPE PLANTS

In order to enhance superficial slope stability, slope planting should be accomplished at the completion of grading. Slope planting should consist of deep-rooting vegetation requiring little watering. Plants native to the Southern California area and plants relative to native plants are generally desirable. Plants native to other semiarid and arid areas may also be appropriate. A Landscape Architect would be the best party to consult regarding actual types of plants and planting configuration.

IRRIGATION

Irrigation pipes should be anchored to slope faces, not placed in trenches excavated into slope faces.
Slope irrigation should be minimized. If automatic timing devices are utilized on irrigation systems, provisions should be made for interrupting normal irrigation during periods of rainfall.
Though not a requirement, consideration should be give to the installation of near-surface moisture monitoring control devices. Such devices can aid in the maintenance of relatively uniform and reasonably constant moisture conditions.
Property owners should be made aware that overwatering of slopes is detrimental to slope stability.

MAINTENANCE

Periodic inspections of landscaped slope areas should be planned and appropriate measures should be taken to control weeds and enhance growth of the landscape plants. Some areas may require occasional replanting and/or reseeding.
Terrace drains and downdrains should be periodically inspected and maintained free of debris. Damage to drainage improvements should be repaired immediately.
Property owners should be made aware that burrowing animals can be detrimental to slope stability. A preventative program should be established to control burrowing animals.
As a precautionary measure, plastic sheeting should be readily available, or kept on hand, to protect all slope areas from saturation by periods of heavy or prolonged rainfall. This measure is strongly recommended, beginning with the period of time prior to landscape planting.

REPAIRS

If slope failures occur, the Geotechnical Consultant should be contacted for a field review of site conditions and development of recommendations for evaluation and repair.

If slope failure occurs as a result of exposure to periods of heavy rainfall, the failure areas and currently unaffected areas should be covered with plastic sheeting to protect against additional saturation.

In the accompanying Standard Details, appropriate repair procedures are illustrated for superficial slope failures (i.e., occurring typically within the outer 1 foot to 3 feet of a slope face).

TRENCH BACKFILL

Utility trench backfill should, unless otherwise recommended, be compacted by mechanical means. Unless otherwise recommended, the degree of compaction should be a minimum of 95 percent of the laboratory maximum density.

Approved granular material (sand equivalent greater than 30) should be used to bed and backfill utilities to a depth of at least 1 foot over the pipe. This backfill should be uniformly watered, compacted and/or wheel-rolled from the surface to a firm condition for pipe support.

The remainder of the backfill shall be typical on-site soil or imported soil which should be placed in lifts not exceeding 8 inches in thickness, watered or aerated to at least 3 percent above the optimum moisture content, and mechanically compacted to at least 95 percent of maximum dry density (based on ASTM D1557).

Backfill of exterior and interior trenches extending below a 1:1 projection from the outer edge of foundations should be mechanically compacted to a minimum of 95 percent of the laboratory maximum density.

Within slab areas, but outside the influence of foundations, trenches up to 1 foot wide and 2 feet deep may be backfilled with sand and consolidated by uniformly watering or by mechanical means. If on-site materials are utilized, they should be wheel-rolled, tamped or otherwise compacted to a firm condition. For minor interior trenches, density testing may be deleted or spot testing may be elected if deemed necessary, based on review of back-fill operations during construction.

If utility contractors indicate that it is undesirable to use compaction equipment in close proximity to a buried conduit, the Contractor may elect the utilization of light weight compaction equipment and/or shading of the conduit with clean, granular material, which should be thoroughly jetted in-place above the conduit, prior to initiating mechanical compaction procedures. Other methods of utility trench compaction may also be appropriate, upon review by the Geotechnical Consultant at the time of construction.

In cases where clean granular materials are proposed for use in lieu of native materials or where flooding or jetting is proposed, the procedures should be considered subject to review by the Geotechnical Consultant.

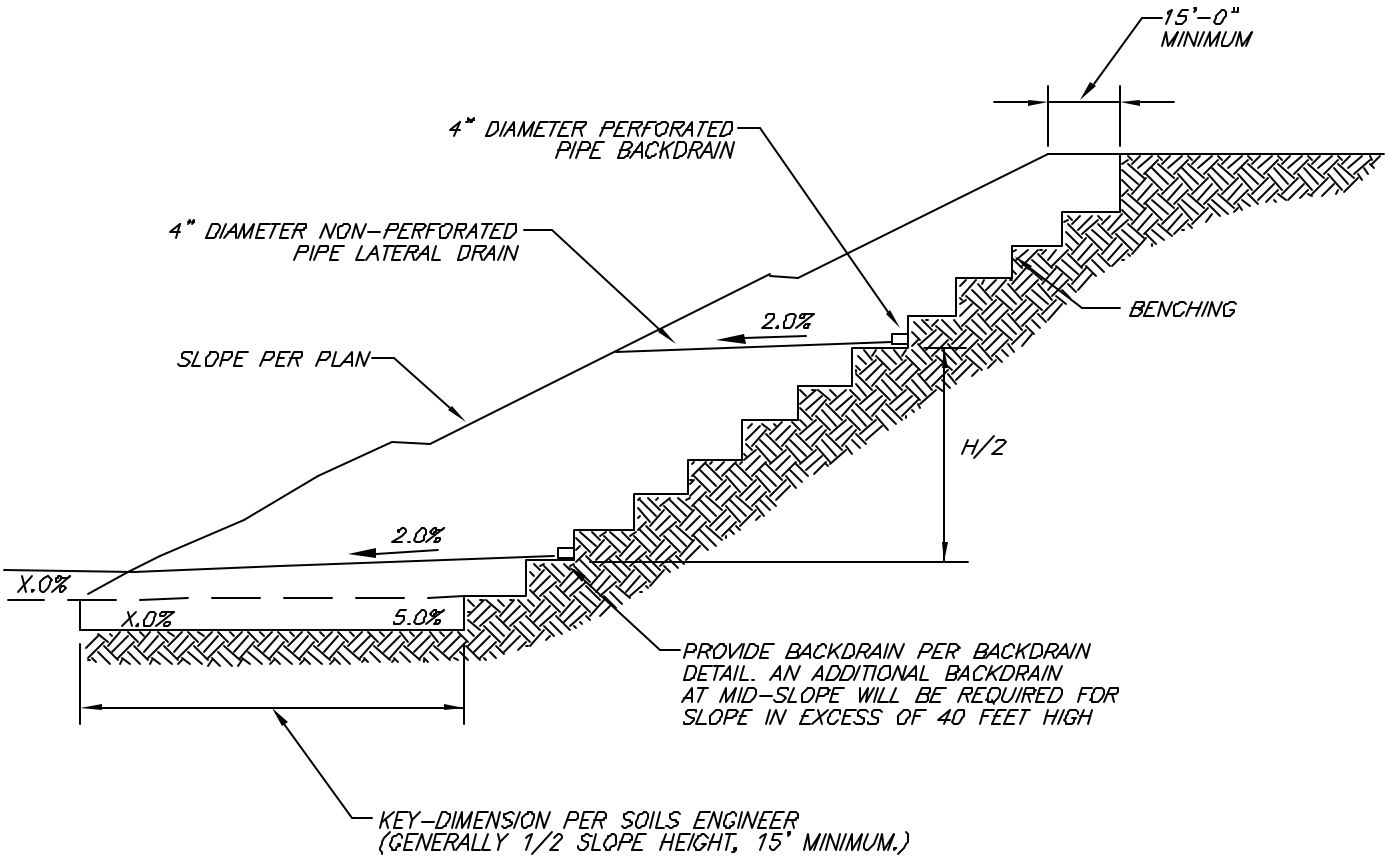
Clean Granular backfill and/or bedding are not recommended in slope areas unless provisions are made for a drainage system to mitigate the potential build-up of seepage forces.

STATUS OF GRADING

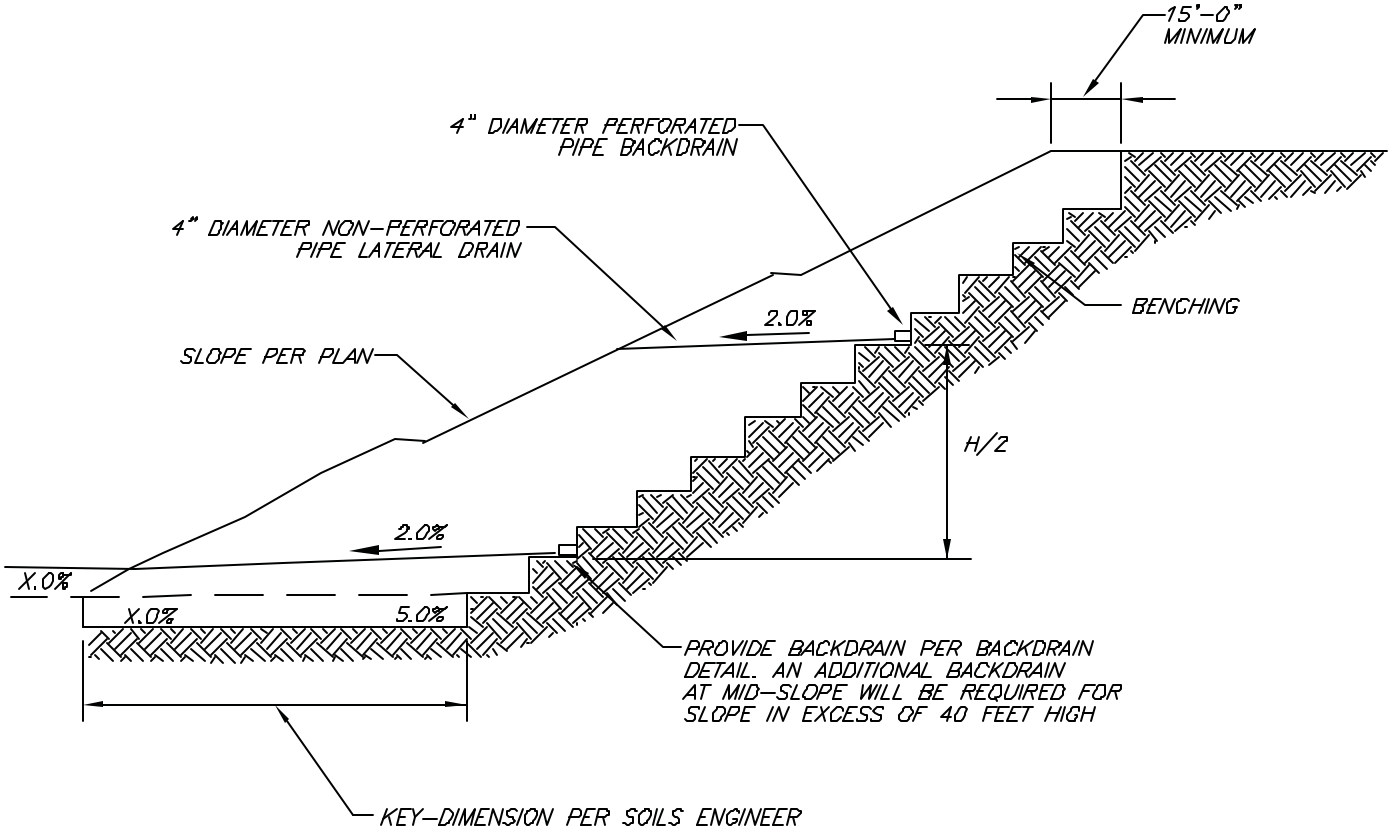
Prior to proceeding with any grading operation, the Geotechnical Consultant should be notified at least two working days in advance in order to schedule the necessary observation and testing services.

Prior to any significant expansion of cut back in the grading operation, the Geotechnical Consultant should be provided with adequate notice (i.e., two days) in order to make appropriate adjustments in observation and testing services.

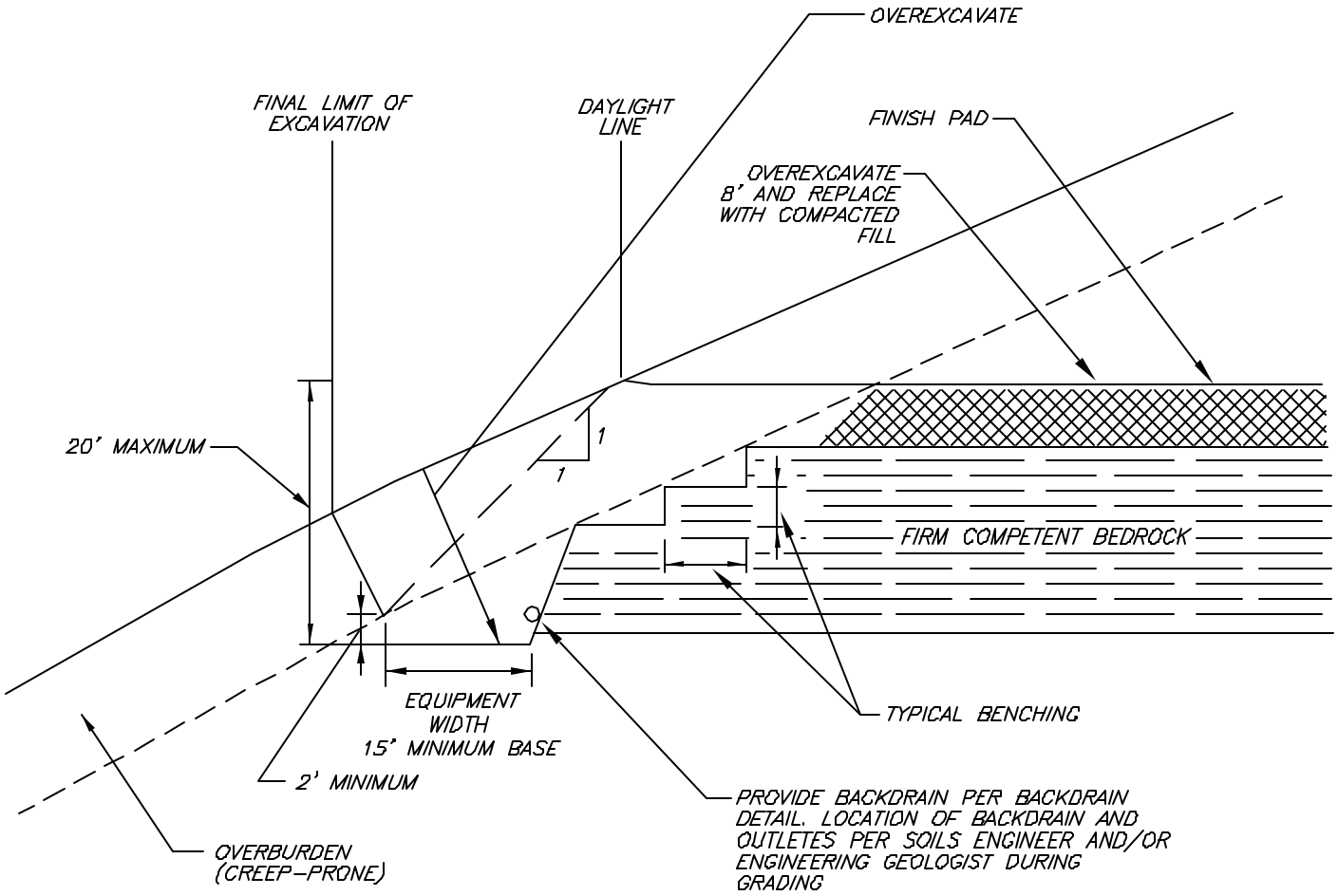
Following completion of grading operations and/or between phases of a grading operation, the Geotechnical Consultant should be provided with at least two working days notice in advance of commencement of additional grading operations.



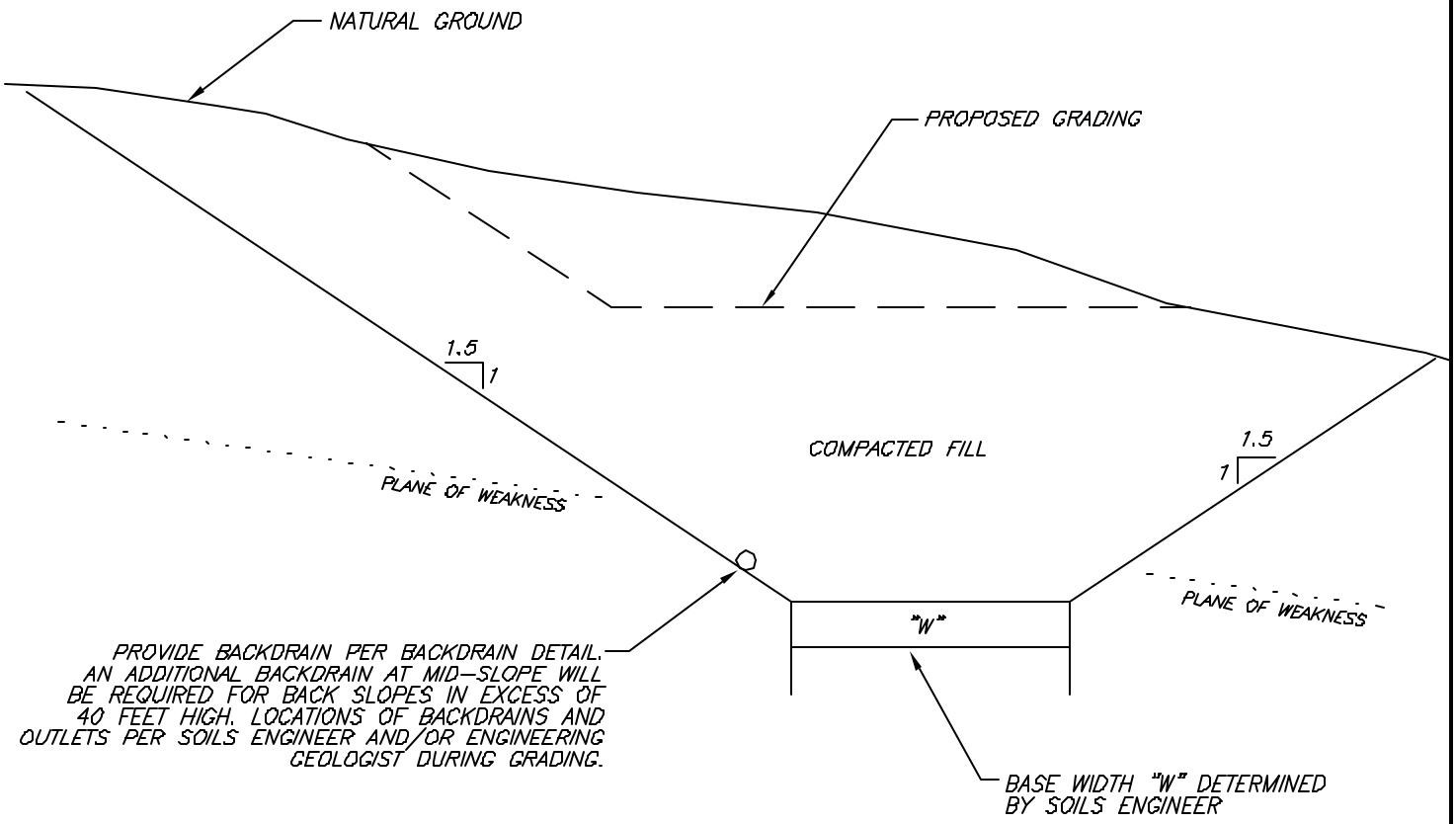
TYPICAL STABILIZATION FILL DETAIL



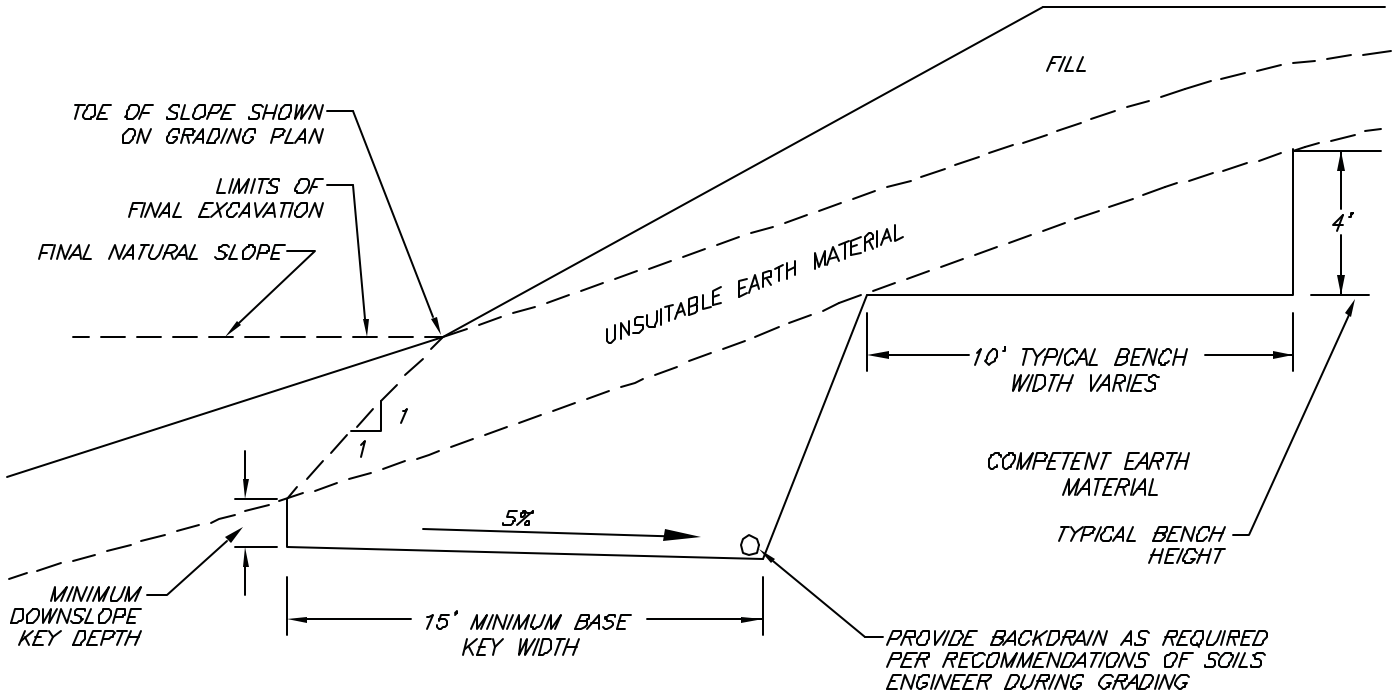
TYPICAL BUTTRESS FILL DETAIL



DAYLIGHT SHEAR KEY DETAIL

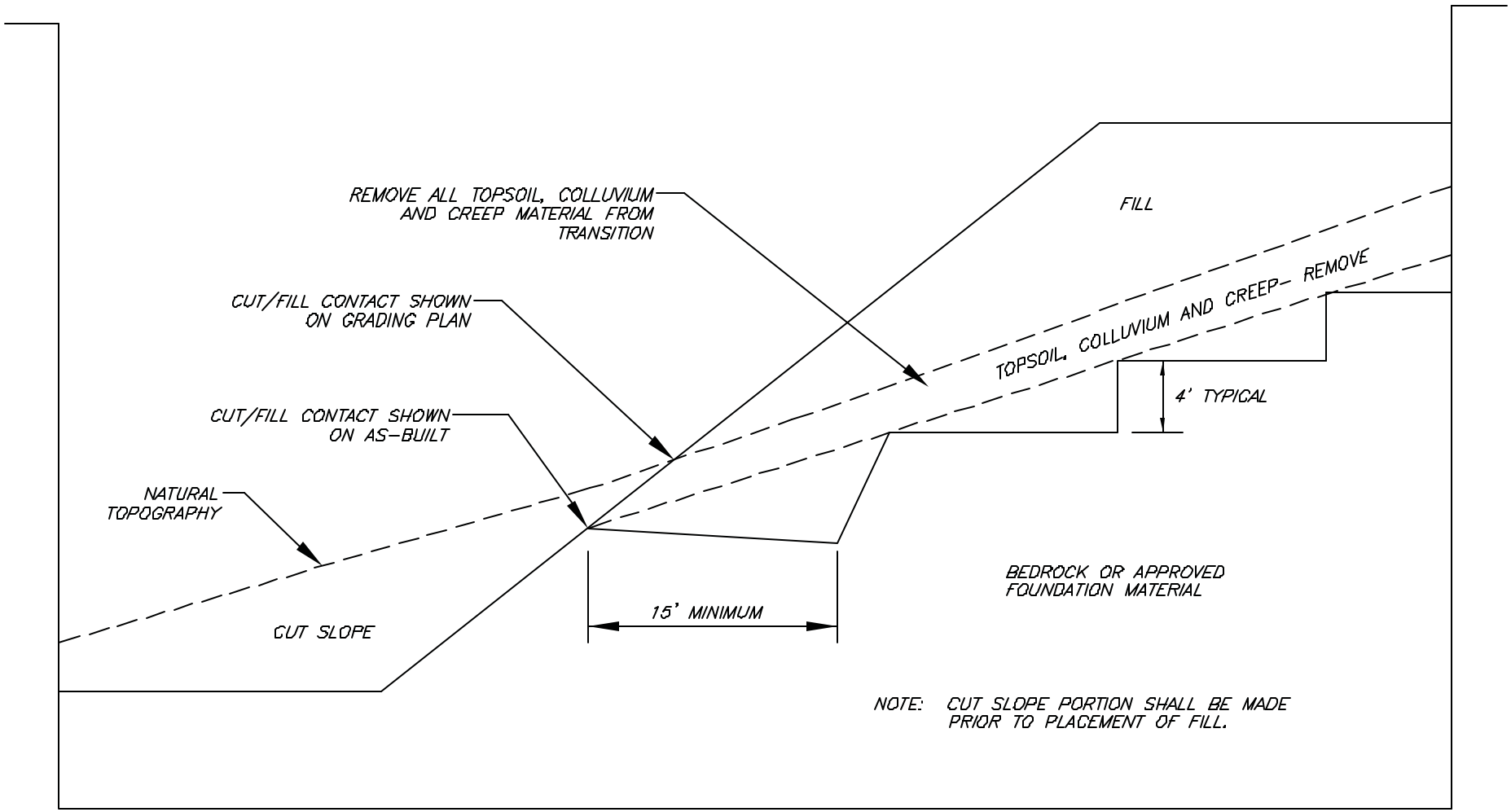


TYPICAL SHEAR KEY DETAIL

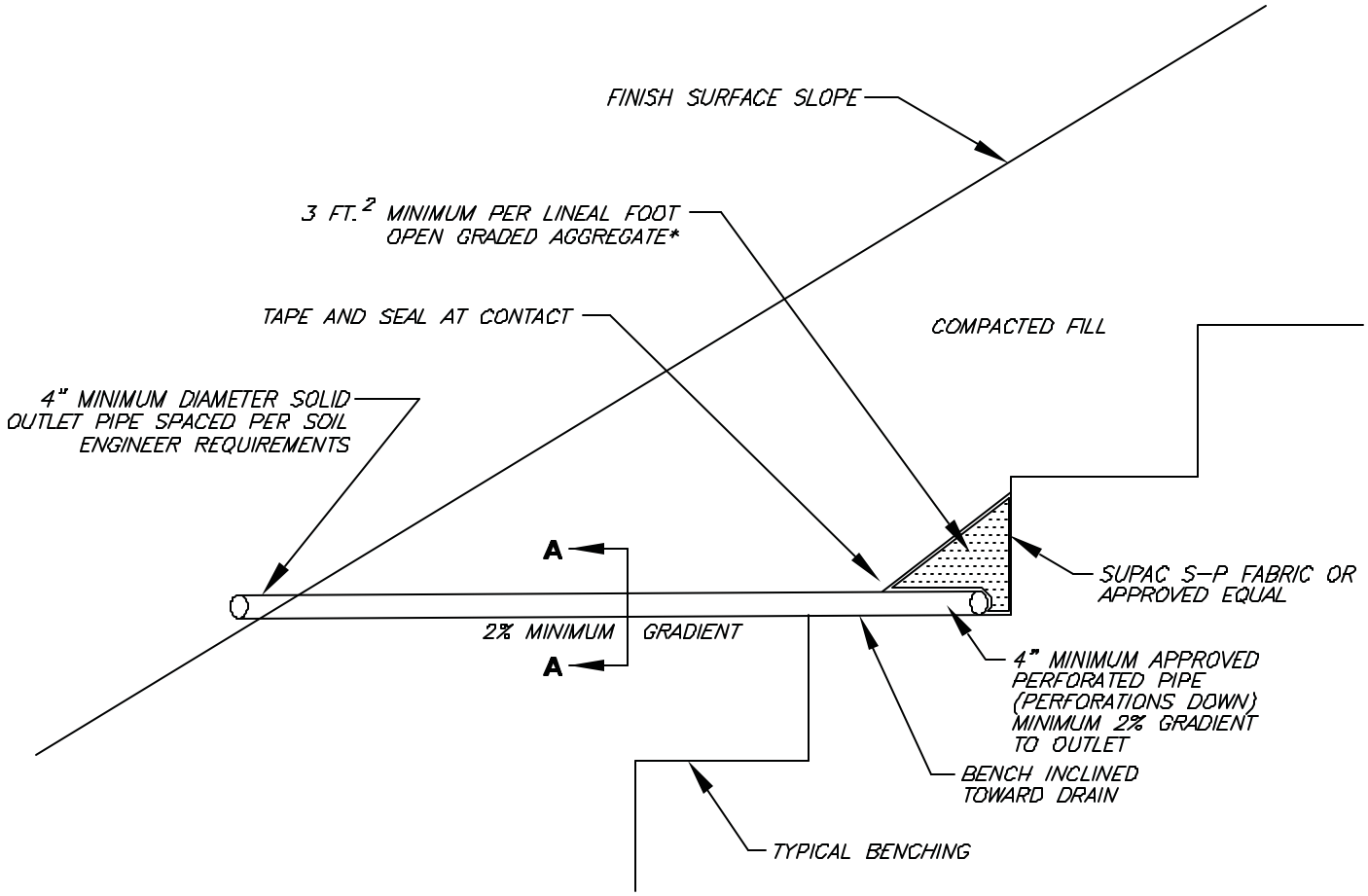


WHERE NATURAL SLOPE IS 5:1 OR LESS, BENCHING IS NOT NECESSARY, HOWEVER, FILL IS NOT TO BE PLACED ON COMPRESSIBLE OR UNSUITABLE MATERIAL.

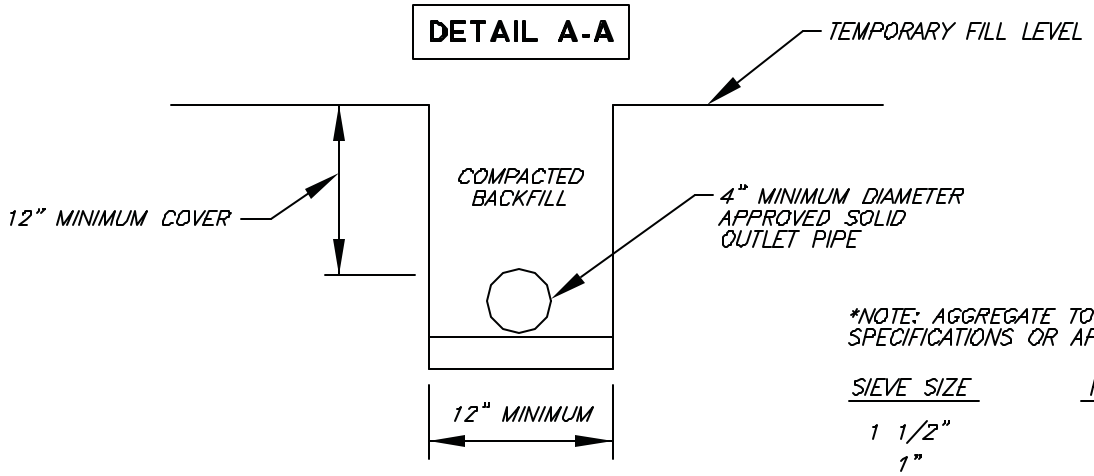
FILL SLOPE ABOVE NATURAL GROUND DETAIL



FILL SLOPE ABOVE CUT SLOPE DETAIL



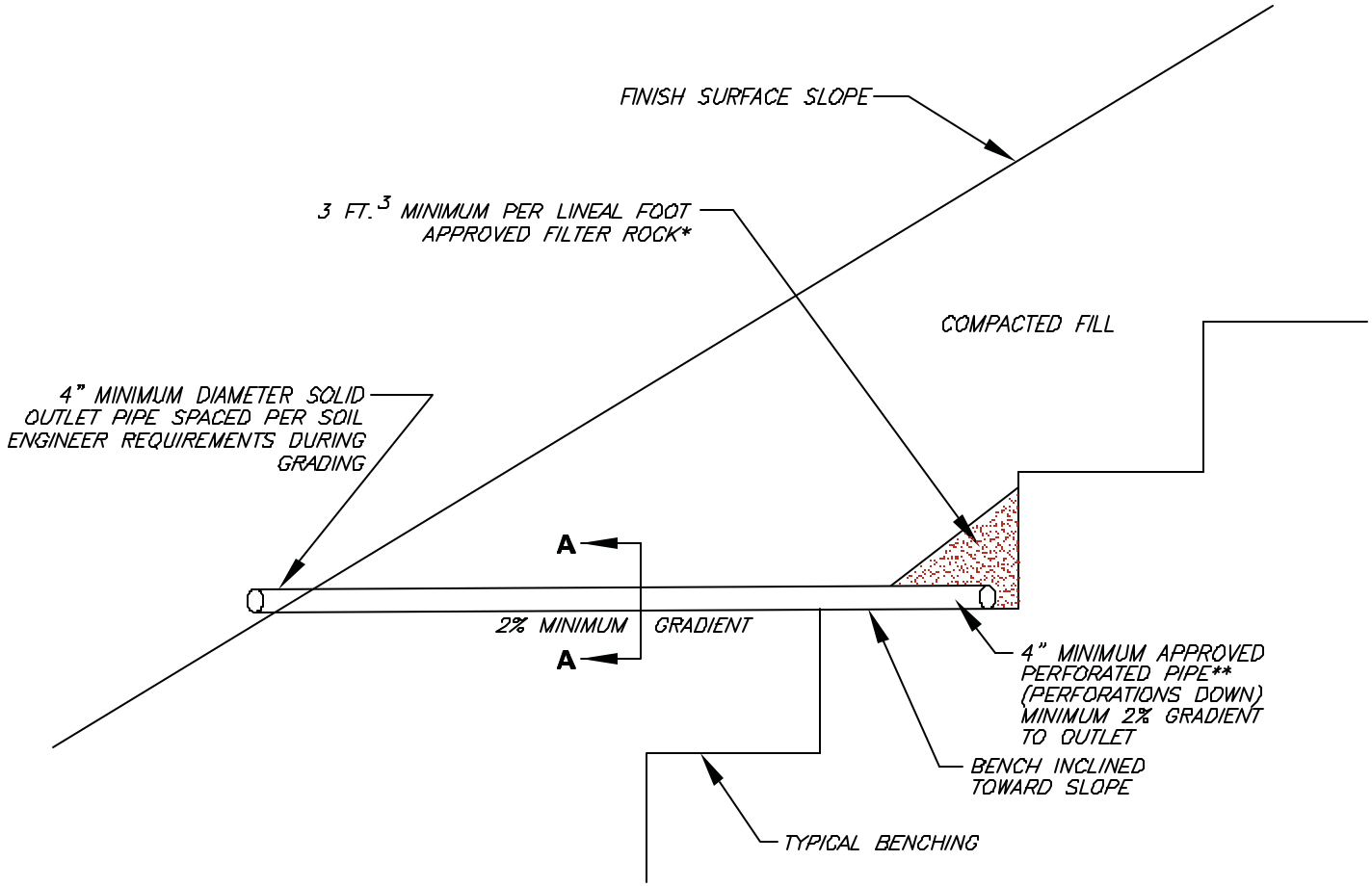
DETAIL A-A



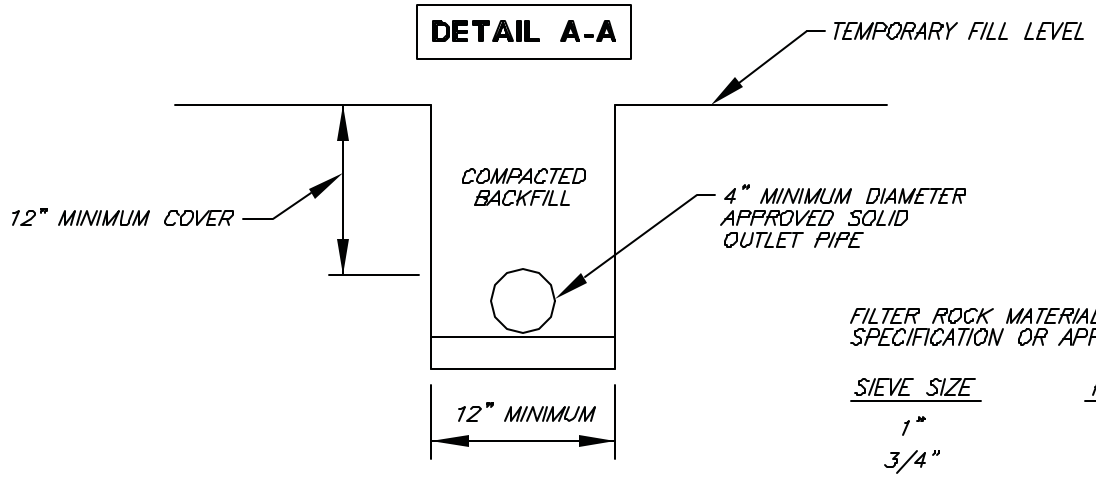
*NOTE: AGGREGATE TO MEET FOLLOWING SPECIFICATIONS OR APPROVED EQUAL:

SIEVE SIZE	PERCENTAGE PASSING
1 1/2"	100
1"	5-40
3/4"	0-17
3/8"	0-7
NO. 200	0-3

BACKDRAIN DETAIL (GEOFABRIC)



DETAIL A-A



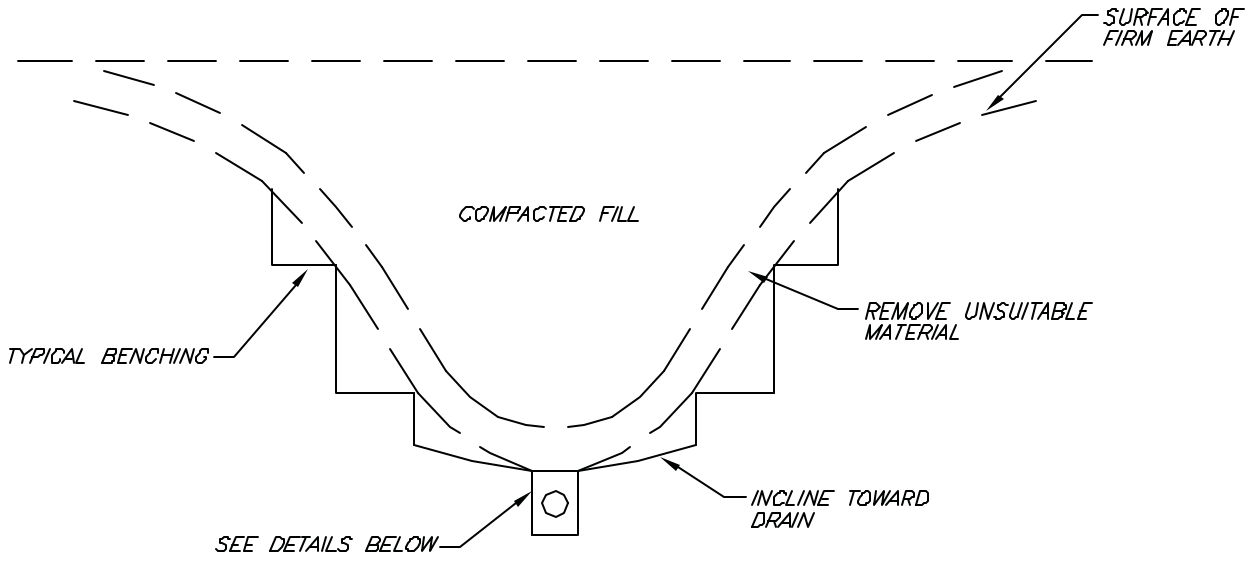
FILTER ROCK MATERIAL TO MEET FOLLOWING SPECIFICATION OR APPROVED EQUAL:

SIEVE SIZE	PERCENTAGE
1"	100
3/4"	90–100
3/8"	40–100
NO. 4	25–40
NO. 30	5–15
NO. 50	0–7
NO. 200	0–3

**APPROVED PIPE TYPE:

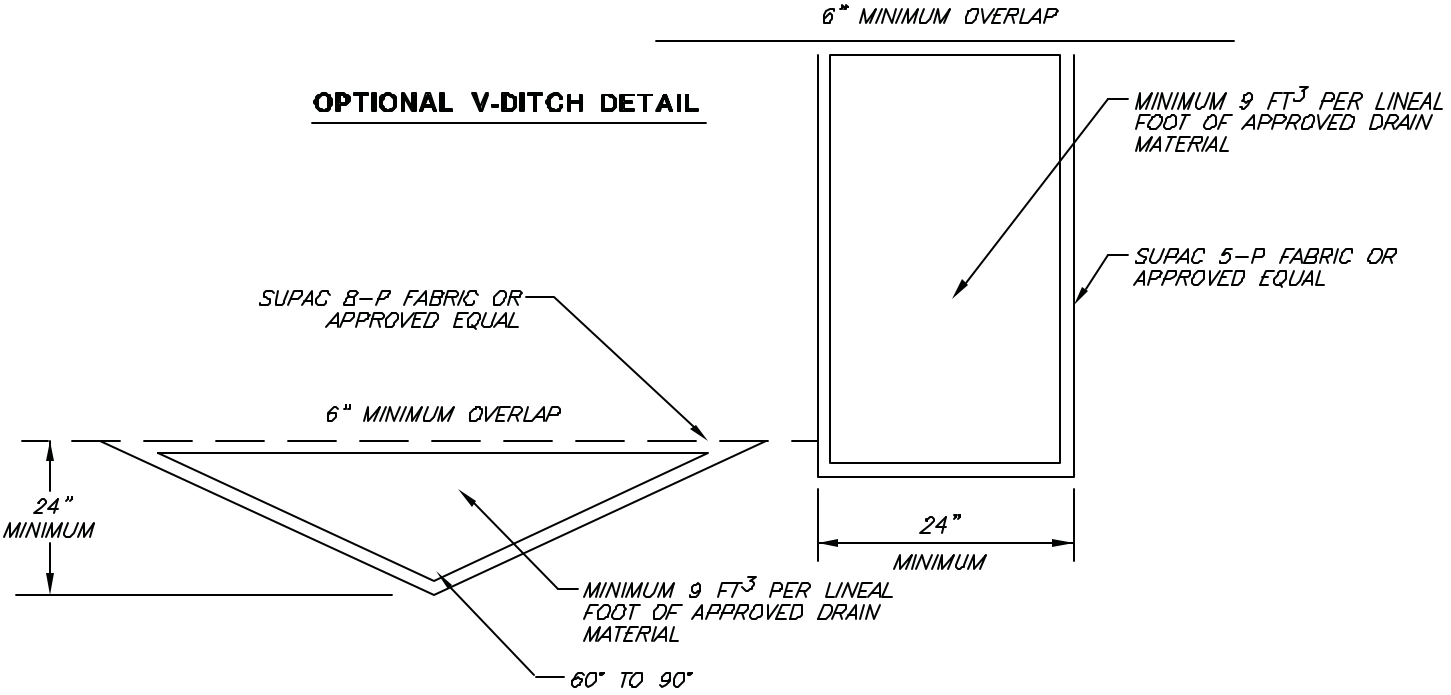
SCHEDULE 40 POLYVINYL CHLORIDE (P.V.C.) OR APPROVED EQUAL. MINIMUM CRUSH STRENGTH 1000 PSI.

TYPICAL BACKDRAIN DETAIL



TRENCH DETAIL

OPTIONAL V-DITCH DETAIL



DRAIN MATERIAL TO MEET FOLLOWING SPECIFICATION OR APPROVED EQUAL:

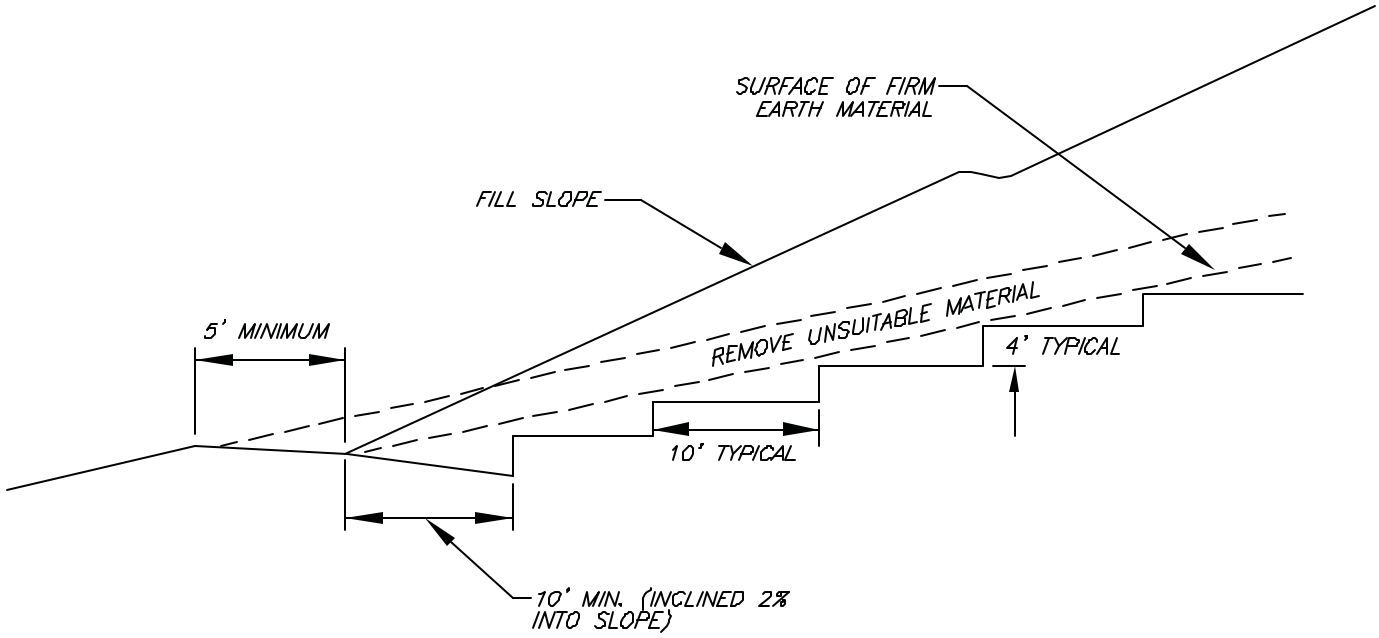
SIEVE SIZE	PERCENTAGE PASSING
1-1/2"	88-100
1"	5-40
3/4"	0-17
3/8"	0-7
NO.:200	0-3

ADD MINIMUM 4" DIAMETER APPROVED PERFORATED PIPE WHEN GRADIENT IS LESS THAN 2%

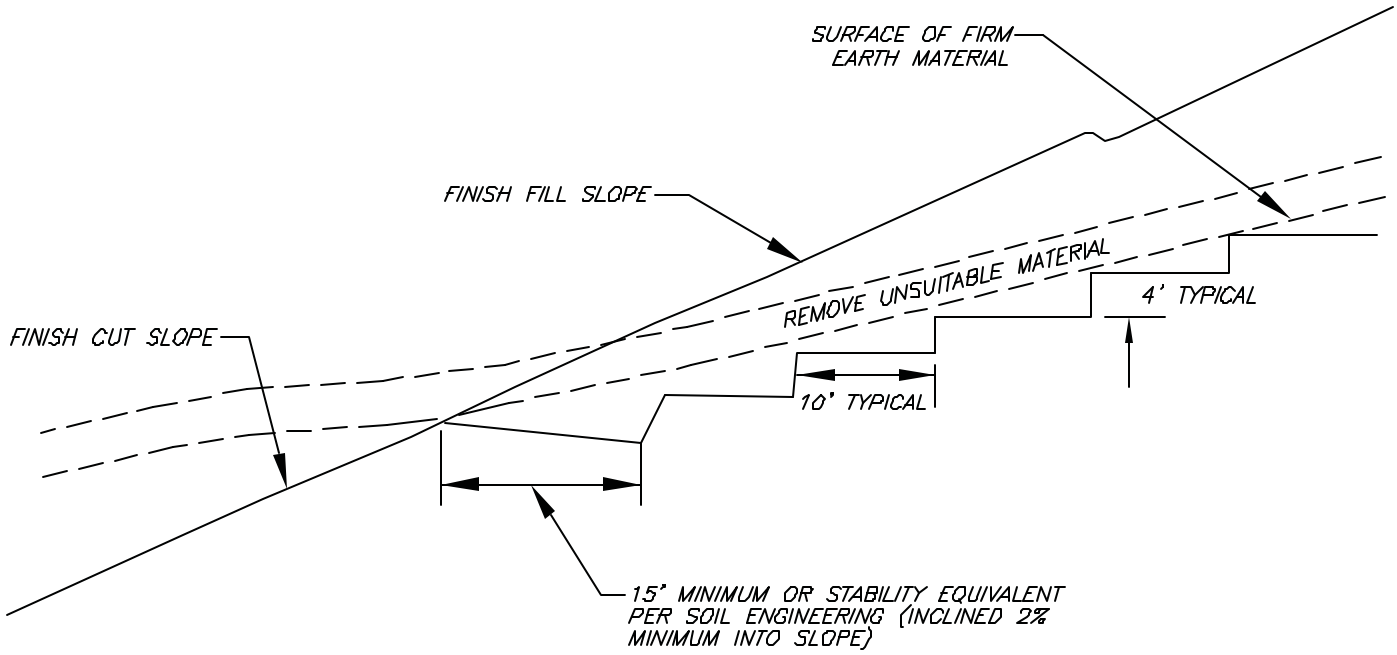
APPROVED PIPE TO BE SCHEDULE 40 POLY-VINYL-CHLORIDE (P.V.C.) OR APPROVED EQUAL. MINIMUM CRUSH STRENGTH 1000 psi.

GEOFABRIC SUBDRAIN DETAIL

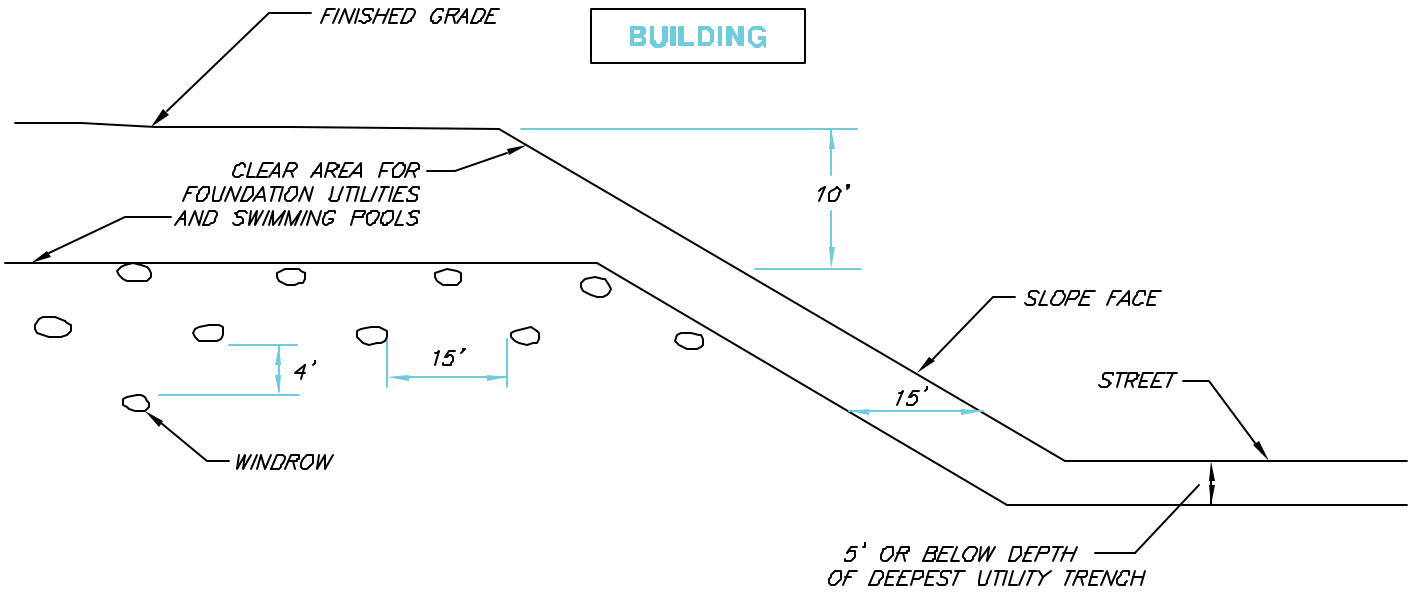
BENCHING FILL OVER NATURAL



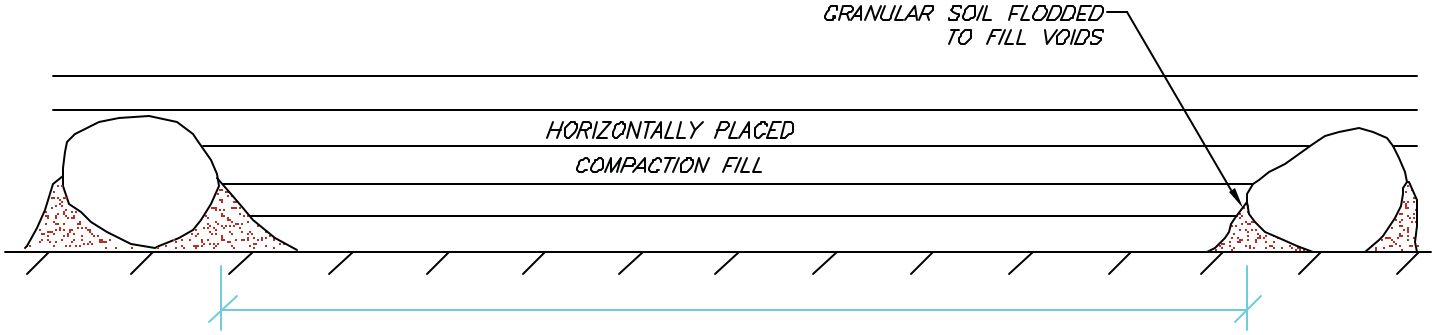
BENCHING FILL OVER CUT



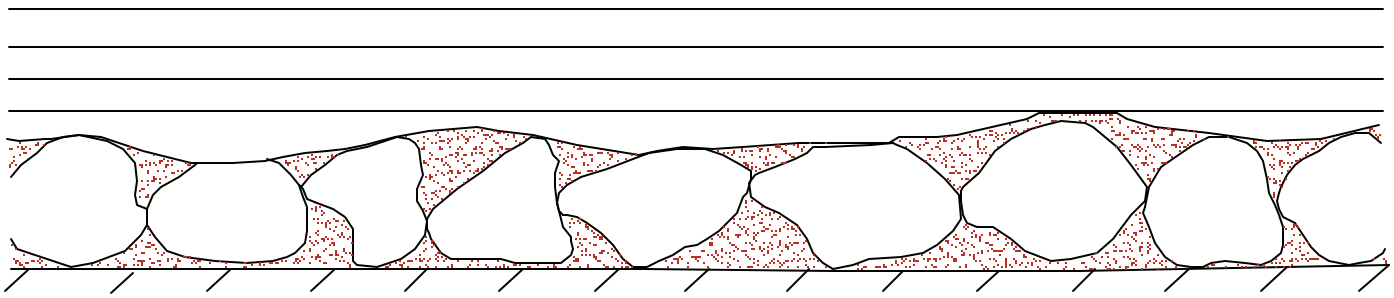
BENCHING FOR COMPACTED FILL DETAIL



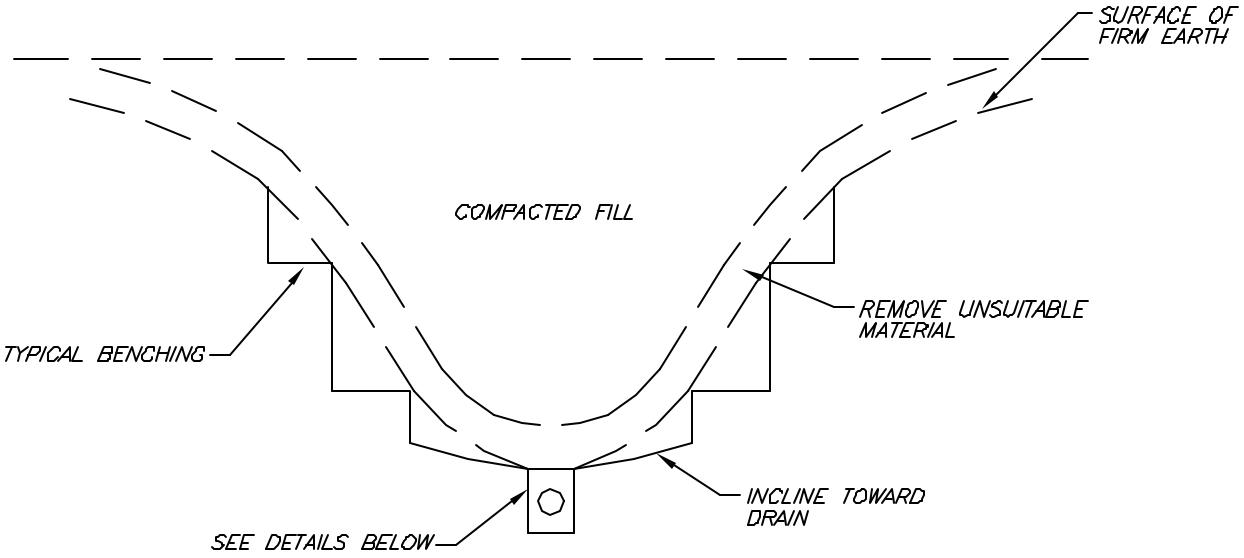
TYPICAL WINDROW DETAIL (EDGE VIEW)



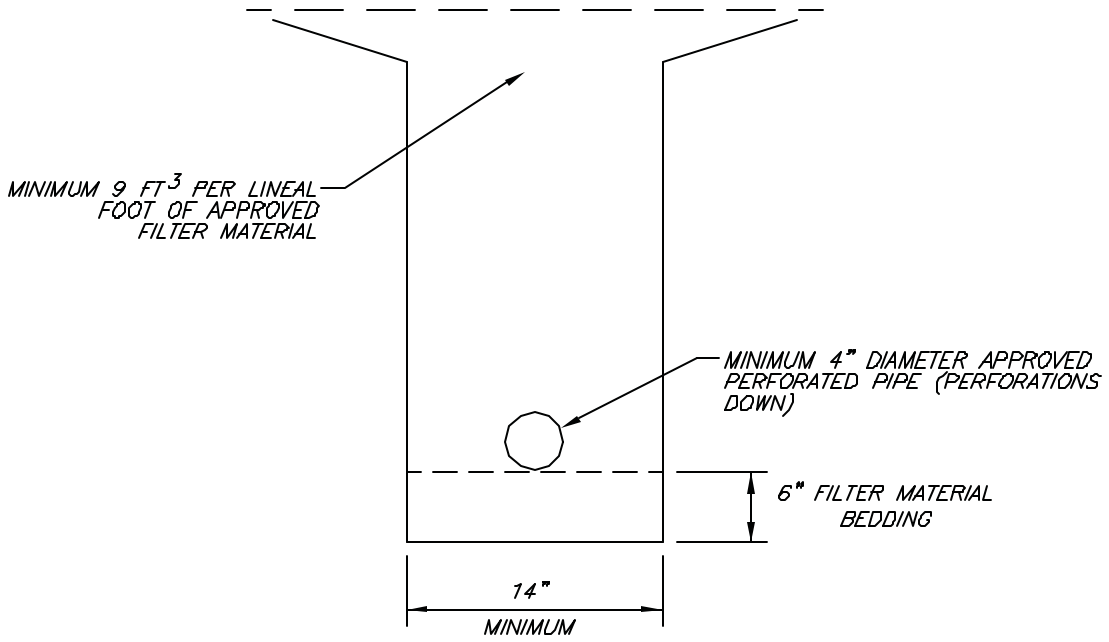
PROFILE VIEW



ROCK DISPOSAL DETAIL



TRENCH DETAIL



FILTER MATERIAL TO MEET FOLLOWING SPECIFICATION OR APPROVED EQUAL:

SIEVE SIZE	PERCENTAGE
1"	100
3/4"	90–100
3/8"	40–100
NO. 4	25–40
NO. 30	5–15
NO. 50	0–7
NO. 200	0–3

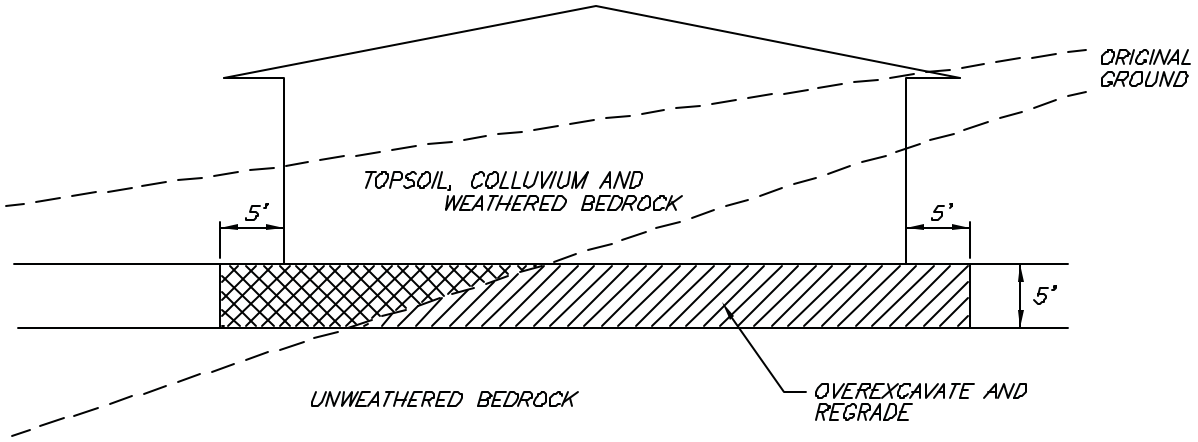
APPROVED PIPE TO BE SCHEDULE 40 POLY-VINYL-CHLORIDE (P.V.C.) OR APPROVED EQUAL. MINIMUM CRUSH STRENGTH 1000 psi.

PIPE DIAMETER TO MEET THE FOLLOWING CRITERIA. SUBJECT TO FIELD REVIEW BASED ON ACTUAL GEOTECHNICAL CONDITIONS ENCOUNTERED DURING GRADING.

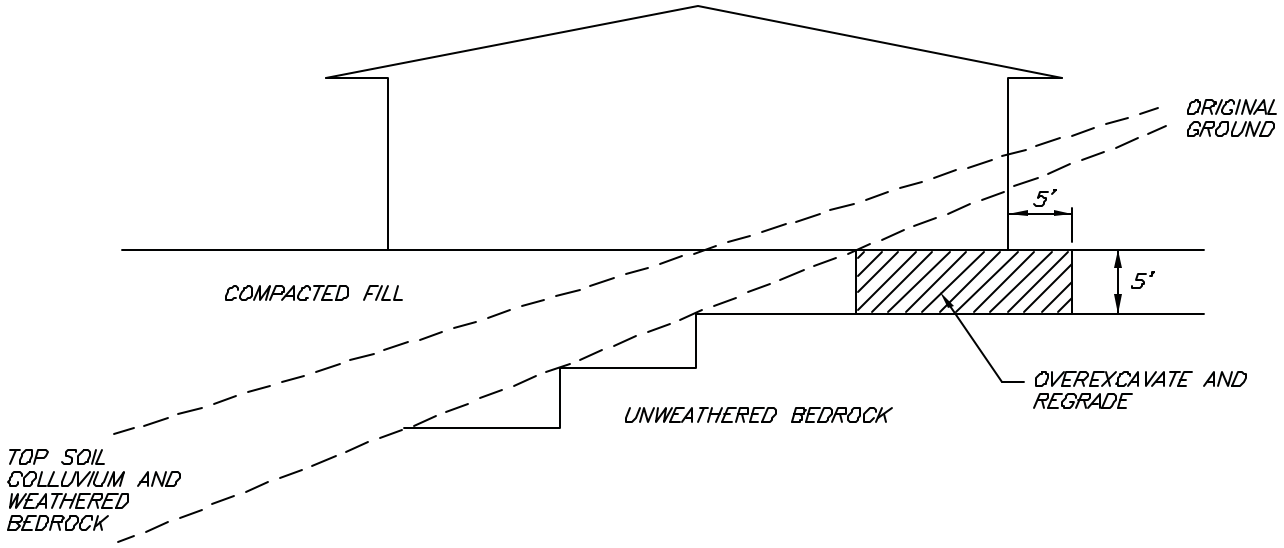
LENGTH OF RUN	PIPE DIAMETER
UPPER 500'	4"
NEXT 1000'	6"
> 1500'	8"

TYPICAL CANYON SUBDRAIN DETAIL

CUT LOT



CUT/FILL LOT (TRANSITION)



TRANSITION LOT DETAIL

Appendix F1:
Phase I Environmental Site Assessment

PHASE 1 ENVIRONMENTAL SITE ASSESSMENT

6.85-acre Hawthorne Residential Development (APN's 233-170-001 & 233-180-007) located at the southwest corner of Indiana Avenue and Jackson Street in the City of Riverside, Riverside County, California

Prepared for:

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SECTION 1: Executive Summary

LSA Associates, Inc. (LSA) has prepared a Phase I Environmental Site Assessment (ESA) for the Hawthorne Residential Development (APN's 233-170-001 and 233-180-007) in the City of Riverside in western Riverside County. This ESA report was prepared in conformance with the American Society for Testing and Materials (ASTM) E1527-13 Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process and Federal Code 40 CFR Part 312 Standards and Practices for All Appropriate Inquiries.

The subject property consists of approximately 6.85 acres and is located south of Indiana Avenue and west of Jackson Street in the City of Riverside, Riverside County, approximately 0.05 mile south of State Route (SR) 91. The subject property is developed with the former Hawthorne Elementary School which was part of the Riverside Unified School District (public) and served kindergarten through 6th grades. The school was closed in 2008 and thereafter, the students and the programs were relocated to a different site (2700 Irving Street). Historically the site was used and surrounded by orchards (until at least 1948), but currently is abutted to the north, and east by single-family residential uses and to the south by the Burlington Northern and Santa Fe (BNSF) railroad tracks. A City of Riverside Utility Department electrical substation and storage yard and single-family residences are located just south of the railroad tracks. Vacant, undeveloped land is located west of the site. The site slopes gently down to the northwest at 0.7 percent from an elevation of 842 feet along the southeastern boundary to 832 feet along the northwestern boundary. The permeable surfaces are 80 to 90 percent covered with low lying vegetation. Scattered along the western and southern portions of the property are domestic refuse such as plastic, textiles, and metal scraps as well as broken and powdered asphalt. No onsite indicators of hazardous materials were observed during the visual reconnaissance on December 27, 2016. The site is located adjacent to an active railroad line that has been in service since before 1901.

This ESA provides evidence that recognized environmental conditions may currently exist relative to the subject property. A review of historical aerial photographs and historical contamination characterization studies determined hazardous materials were not previously used, stored, and/or disposed of on the site. There were no indications of wells or underground or above-ground storage tanks, and a review of state and local registries did not indicate the presence of any underground or above ground storage tanks on the subject property. A review of government agency databases indicates: 1) the site is not referenced as using, generating, storing, or disposing of hazardous materials; 2) no underground storage tanks have been permitted for the site; and 3) no unauthorized releases of petroleum hydrocarbons have been reported for the site. There were several offsite facilities listed in the governmental databases as being associated with hazardous materials, but there is no indication that any of these facilities would contribute to hazardous conditions on the subject

property.

No information was available on groundwater quality, but LSA understands municipal water supplies would be utilized by future development on this site.

No person knowledgeable about the site was found during preparation of this report, but data from other sources was sufficient to make conclusions about site conditions.

Based on available information, LSA concludes there is a low to moderate probability for the site to contain any Recognized Environmental Conditions (REC), Controlled Recognized Environmental Conditions (CREC), Historical Recognized Environmental Conditions (HREC), or conditions that would threaten public health or safety. However, the site and surrounding area supported agriculture in the past, and the site is adjacent to an active railroad line. Therefore, LSA recommends surficial soil testing for agricultural pesticides, herbicides, and broad spectrum hydrocarbons as part of Phase II work to determine if any contamination from past agricultural or railroad activities exists on the site (refer to Section 6 of the report). LSA also recommends testing for Asbestos-Containing Materials (ACMs) and lead-based paint (LBP) prior to demolition of the existing school buildings on the site (refer to Section 6 of the report).

SECTION 2: Introduction

2.1 Purpose and Scope

The purpose of this Phase I ESA is to identify, to the extent feasible, and pursuant to the processes prescribed herein, recognized environmental conditions in connection with the property.

> *ASTM E 1527 Section 1.1.1 Recognized Environmental Conditions - The term recognized environmental conditions means the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to any 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.*

This report was prepared generally in accordance with the standards and procedures outlined in American Society for Testing and Materials (ASTM) E 1527-13, as applicable. The following principles are integral to the practice: 1) That performance of this ESA is intended to reduce, but not eliminate, uncertainty regarding the potential for recognized environmental conditions in connection with the property; 2) That the level of inquiry into past ownership and use is not exhaustive, and is balanced between the competing goals of limiting costs and time, and the reduction of uncertainty about unknown conditions; and, 3) the appropriate level of inquiry is guided by the type of property,

the expertise and risk tolerance of the user, and the information developed as part of this study.

This written Phase I ESA report has three components: 1) records review; 2) site reconnaissance; and 3) interviews with current owners, persons knowledgeable with the property or local environmental conditions, and local government officials.

2.1.1 Special Terms and Conditions

This report was prepared for the use by BP Riverside Partners, LLC and their agents. The results of this study may be used at the discretion of BP Riverside Partners, LLC as necessary relative to this property, subject to the limitations identified herein. Any opinions or recommendations presented, apply to site conditions existing when services were performed. The author is unable to report on or accurately predict events that may change the site conditions after the described services have been performed. The author assumes no responsibility for conditions the author was not authorized to investigate, or conditions not generally recognized as environmentally unacceptable when services were performed.

Environmental conditions may exist at the site that cannot be identified by visual observation. Where the scope of services was limited to observations made during site reconnaissance, interviews, review of available reports and literature or any combination, any conclusions or recommendation are necessarily based, in part, on information supplied by others. The accuracy or sufficiency of reporting information may not have been independently reviewed.

The author has assumed the legal capacity of all legal persons, the genuineness of all signatures, the authenticity of all documents submitted to author as originals, the conforming to original documents of all documents submitted to author as certified photo static copies, or facsimiles, and the authenticity of all the originals. In examination of the documents, it was assumed that all parties had the power, governmental or otherwise, to enter into and perform all obligations under such documents, have further assumed the due authorization by all requisite action, governmental or otherwise, of the execution and delivery by all parties of such documents against all parties in accordance with the terms thereof. Unless otherwise stated, the author did not make independent investigation or inquiry into the accuracy or completeness of the comments and information supplied. The author is not responsible for any potential impact of changes to applicable environmental standards, practices or regulations following performance of services, on the conclusions or recommendations of the study. Services hereunder were performed consistent with our agreement and understanding with, and solely for the use of BP Riverside Partners, LLC and their agents. Opinions and recommendations are intended for the client, purpose, site, location, time period, and project parameters indicated. The author is not responsible for subsequent separation, detachment, or partial use of this document. Any reliance on this report by a third party shall be at such party's sole risk.

2.1.2 Limitations and Exceptions of Assessment

A visual site reconnaissance was conducted to check for visible indications of previously disposed hazardous waste, surface contamination or underground storage tanks, as well as a visual survey of nearby properties. This Phase I ESA addresses only the observed surface features. Boreholes were not drilled for the purpose of obtaining subsurface samples, nor were surface samples gathered for analysis which is standard for Phase I reports in accordance with Section 6.4 of ASTM E 1527-13. In addition, the author was unable to contact any persons knowledgeable about the site, but information from other sources was available of which to draw conclusions about previous uses on the site. LSA was not provided with a soils or geotech constraints report for this site to prepare this report.

2.1.3 Limiting Scope and Methodology

Records Review: The following standard databases and records review search distances were used for this assessment, as measured from the center of the property which is allowed under ASTM E 1527-13: EPA and State Government Records, 1-mile search distance for National Priorities List (NPL), Resource Conservation and Recovery Act (RCRA), CORRACTS, and State NPL equivalents; 0.5-mile search distance for RCRA, Treatment Storage and Disposal (TSD), CERCLIS, Solid Waste Landfills (SWL), and Leaking Underground Storage Tank (LUST); and 0.5-mile minimum search distance for NFRAP, RCRA Violators, Emergency Response Notification System (ERNS), Toxic Release Inventory Database (TRIS), hazardous spills since 1990, Registered Underground/Aboveground Storage Tanks (RUST/AST), Riverside County Disclosure Facility List (Riverside HZH), etc. Review of available documents, including maps, aerial photos, applicable information, governmental lists of hazardous waste sites and underground tanks, and other records referenced in Appendix B were obtained and/or reviewed to assist in the identification of recognized environmental conditions in connection with the site.

Data Gaps: LSA was not able to interview anyone knowledgeable about the subject property through the Riverside Unified School District or Kingsfield Development Corporation, the current property owner.

2.2 All Appropriate Inquiry (AAI)

The Brownfield Amendments to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) was enacted by Congress in 2002 directing the EPA to establish federal regulations for conducting Phase I ESAs. Compliance with these guidelines enables property owners to assume the concept of “innocent landowner, contiguous property owner, or bona fide prospective purchaser” and avoid litigation in cases where hazardous material releases were discovered on property during their tenure of ownership, provided they could prove they did not cause the

contamination. A function of this Phase I ESA is to gather sufficient information to develop an independent professional opinion about the environmental condition of the subject property and any potential environmental contamination that may affect the purchaser's claim to an "innocent land owner" defense following the acquisition of the property.

For a Phase I ESA to comply with the EPA's AAI Rule, a set of conditions must be satisfied during the course of the assessment and report generation; these conditions are mandatory for the document to be compliant and protect the landowner. This Phase I Environmental Site Assessment has been performed to comply with 40 Code of Federal Regulations (CFR) 312 (AAI Rule). The signature at the end of this document verifies the investigation associated with the completion of this assessment is in accordance with the EPA's AAI Rule place in effect as of November 2006.

2.3 CREC/HREC and Vapor Migration

The most recent updates to ASTM 1527-13 include a requirement to evaluate "Controlled Recognized Environmental Conditions"(CREC) and "Historical Recognized Environmental Conditions "(HREC). In addition, ASTM E2600-10 (as outlined in the most recent updates to ASTM 1527-13) requires a Phase 1 document to provide a "Vapor Migration Assessment" from onsite or offsite activities that might result in Recognized Vapor Environmental Condition (VEC) on the subject property (see Section 5.7). The governmental database report prepared for this Phase I did not identify any vapor sources adjacent to or immediately up-gradient of the subject property. However, vapor wells were installed at the intersection of Indiana Avenue and Van Buren Boulevard, at the Thrifty Oil gas station located at 3399 Van Buren Boulevard. The site is approximately 0.4 mile southwest from the subject property and is also located down gradient. Therefore, the site is considered to have negligible risk from vapor migration.

Section 3: Site Description

3.1 Location and Legal Description

The subject property consists of approximately 6.85 acres along the south side of Indiana Avenue between Gibson Street and Jackson Street, as depicted on the U.S. Geological Survey (USGS) 7.5-minute *Riverside West, California* quadrangle in unsectioned portion of Township 3 South, Range 5 West (Figures 1 and 2 in Appendix A). Entry to the property is from Indiana Avenue near the northwest corner of the site. The site consists of Riverside County Assessor's Parcel Numbers (APNs) 233-170-001 and 233-180-007.

3.1.1 Site and Vicinity Characteristics

Prior to 1948, the site and the surrounding land uses have been used for agricultural purposes. The site is currently abutted to the north and east by residential uses and to the south by active BNSF railroad tracks. A City of Riverside Utilities electrical substation, storage yard, and single-family residences are located to the south of the railroad tracks. Adjacent west of the subject property is vacant undeveloped land. The site is currently developed with the former Hawthorne Elementary School which was vacated in 2008. This former school includes eight (8) buildings (totaling approximately 23,295 square feet), several shade structures, playground equipment, many large trees, asphalt basketball courts, and several acres of vacant and overgrown areas. The site also includes foundations which previously accommodated portable classroom buildings, which have since been removed.

3.2 Physical Setting

3.2.1 Topography

The site is located within the United States Geological Survey (USGS) *Riverside West* 7.5-minute Quadrangle (1980). The property slopes gently down to the northwest from an elevation of 842 feet elevation above mean sea level (amsl) along the southeastern side of the site down to 832 feet amsl along the northwestern side of the site (0.7 percent slope to the northwest). The subject property is located just over 200 feet south of the SR-91 and 3.5 miles southeast of the Santa Ana River in the City of Riverside in western Riverside County.

3.2.2 Geology and Soils

The study area is within the north central Peninsular Ranges Geomorphic Province of California. This geomorphic province is characterized by a series of mountain ranges separated by northwest trending valleys, sub-parallel to branching faults from the San Andreas Fault. The Peninsular Ranges Province extends 900 miles from the Transverse Ranges to the north and southward to the tip of Baja California. The property is southwest of the San Jacinto Fault Zone and west of the Box Springs Mountains, also known as the El Sobrante Hills. The natural topography of the area is characterized as valley lowland intersected by rolling hills and surrounded by mountain ranges.

The site is underlain by Hanford coarse sandy loam (HcC) with 2 to 8 percent slope. The Hanford coarse sandy loam is well drained and the permeability is moderately rapid. The runoff is slow to moderate and the hazard of erosion is slow to moderate. Water holding capacity for the Hanford coarse sandy loam is 5.0 to 7.5 inches and is used for irrigated alfalfa, potatoes and citrus, as classified by the United States Department of Agriculture and the National Resources Conservation Services, “soil survey of western Riverside area.”

3.2.3 Hydrology

The surrounding foothill area comprises a series of rolling hills and valleys that drain north toward the Santa Ana River, approximately 3 miles to the north and northwest. The site is part of the Inland Santa Ana Basin. Underneath the surface area of this drainage basin, which takes excess rain water out of the valley, are several large groundwater sub-basins which capture water in aquifers underground. Recent geohydrologic data available from the Cooperative Well Program[1] indicate groundwater is found at depths less than 50 feet below ground surface (bgs) in the general area of the subject property. In addition, the State Department of Water Resources shows the shallowest groundwater in the general area was 29.6 feet (elevation 754.5) below ground surface in well 339251N1174342W001 as of November 2015 (Geomat 2015). The USGS Groundwater Watch website (http://groundwaterwatch.usgs.gov/countymap) was searched for groundwater records; none found.

Other than the Santa Ana River itself, the inland Santa Ana Basin in general is a water-scarce area with no perennial streams most years and with draught conditions a common occurrence in recent years. The Santa Ana River is located approximately 3 miles north of the project site and flows primarily during the winter months, with an occasional narrow flow during infrequent wet summers.

3.2.4 Interviews Regarding Specialized Knowledge or Experience

No persons with or known to the Riverside Unified School District or Kingsfield Development Corporation that were knowledgeable about the site were available for interviews.

3.2.5 Current Uses of the Property

The subject property is developed with the former Hawthorne Elementary School, which includes eight buildings, several shade structures, playground equipment, many large trees, asphalt basketball courts, and several vacant and overgrown areas. The area also includes a long parking lot and bus turnouts, as well as covered walkways. The site also contained several electrical transformers, one above ground and one in a subterranean vault, both in the north-central portion of the site.

3.2.6 Past Uses of the Property

The Hawthorne Elementary School has occupied the site since 1966. Historically, the property was generally flat and was occupied and surrounded by agriculture. In 1966 the surrounding lands to the north and east were developed into residential housing while the subject property was developed into an elementary school (Appendix C).

3.2.7 Current and Past Uses of Adjoining Properties

The project vicinity contains residential neighborhoods to the north and east of the project site with a

[1] Operated by Watermains, an inter-agency cooperative effort in Riverside County

railroad easement immediately to the south. Until around 1948, the adjoining areas were used for agriculture, which gave way to residential housing tracts that were built at that time and currently exist around the subject property (Appendix C). There are railroad tracks to the south of the project with Indiana Avenue running east-west along the northern boundary of the site.

3.3 Descriptions of Structures, Roads, Other Improvements on the Site

The subject property is currently developed with a fully improved school which includes; shaded eating area, playground equipment, sports soccer field, basketball courts and handball courts. The site has approximately 8 buildings, which have now been abandoned and rundown. A parking lot and bus turnout is located on the northwestern portion of the site.

Throughout the site there is landscaping and playfields, with overgrown weeds and mounds of dirt, which have not been maintained since the school was closed in 2008. There are also several overgrown trees located throughout the site. The facilities and the landscaping have not been maintained since the school was closed in 2008.

Section 4: Environmental Records Review

The purpose of the records review is to obtain and evaluate records that will help identify recognized environmental conditions in connection with this property. ASTM E 1927-13 establishes Standard Environmental Record Sources and specifies an approximate minimum search distance for each of the standard records. A detailed records search was conducted for this site using a maximum 1-mile search, as measured from the center of the property, for the record sources listed in Appendix B.

4.1 Standard Environmental Record Sources

A computerized database search of the standard environmental record lists based on EPA, state, and local agency databases was made by Environmental Risk Information Service, Ltd. (ERIS) on December 19, 2016 (see Appendix B). A description of each database/list, together with a summary of search results and agency data release dates is provided below. Use of this information is subject to the limitation described in Section 2.0.

4.1.1 Federal CERCLIS List

The NPL is the EPA's database of uncontrolled or abandoned hazardous waste sites identified for priority remedial actions under the Superfund Program (Comprehensive Environmental Response, Compensation and Liability Act of 1980 or CERCLIS). A site must meet or surpass a predetermined hazard ranking system score, be chosen as a state's top priority site, or meet three specific criteria set jointly by the US Department of Health and Human Services and the US EPA in order to become an

NPL site. A review of the EPA NPL database (last updated November 11, 2016) indicated there are no federal NPL sites located within 1 mile of the subject property.

4.1.2 EPA CERCLIS List

The CERCLIS List is a compilation by the EPA of sites that the EPA has investigated or is currently investigating for a release or threatened release of hazardous substances pursuant to the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA or the Superfund Act). A review of the EPA CERCLIS database (last updated November 15, 2016) indicated that there are no sites within 0.50 mile of the subject property.

4.1.3 EPA RCRA Permitted Treatment, Storage and Disposal Facilities (TSDF)

The EPA's RCRA Program identifies and tracks hazardous waste from the point of generation to the point of disposal. The “RCRA Facilities” database is a compilation by the EPA reporting generation, storage, transportation, treatment or disposal of hazardous waste. RCRA TSDs are facilities, which treat, store and/or dispose of hazardous waste. A review of the EPA RCRA database (last updated October 31, 2016) indicated that there are no RCRA TSDF sites within 0.50 mile of the subject property.

4.1.4 US EPA RCRA Corrective Actions

The EPA maintains this database of the RCRA facilities, which are undergoing "corrective action". A "corrective action order" is issued pursuant to RCRA Section 3008(h) when there has been a release of hazardous waste or constituents into the environment from a RCRA facility. Corrective actions may be required beyond the facility's boundary and can be required regardless of when the release occurred, even if it predates RCRA. A review of the US EPA CORRACTS database (last updated October 31, 2016) indicated that there are no RCRA Corrective Action facility site within 0.5 to 1.0 mile of the subject property.

4.1.5 EPA RCRA Generators

RCRA facilities database is a compilation by the EPA reporting generation, storage, transportation, treatment or disposal of hazardous waste. RCRA Large Generators are facilities, which generate at least 1,000 kilogram (kg)/month of non-acutely hazardous waste, or 1 kg/month of acutely hazardous waste. RCRA SQGs are facilities, which generate less than 1,000 kg/month of non-acutely hazardous waste. A review of the EPA RCRAIS list database (last updated October 31, 2016) indicated that there are one RCRA non generators and one RCRA_SQG sites within 0.25 mile of the subject property.

4.1.6 EPA ERNS List

The ERNS is a national database used to collect information on reported releases of oil and hazardous substances. The database contains information from spill reports made to federal authorities including

the EPA, the U.S. Coast Guard, the National Response Center and the Department of Transportation. A review of EPA ERNS database (last updated October 5, 2016) indicated that no such spills have occurred on the subject property.

4.1.7 CORTESE/CAL Sites

The California Abandoned Site Program Information System was integrated into the CAL SITES database in 1991. California's Environmental Protection Agency (Cal EPA) Department of Toxic Substances Control (DTSC) maintains an inventory of facilities subject to investigations concerning likely or threatened releases of hazardous substances from those facilities. Sites with an Annual Work Plan (AWP) and Preliminary Endangerment Assessment (PEA) are also included in this database query.

Pursuant to Government Code Section 65962.5, the Hazardous Waste and Substances Sites List has been compiled by California's EPA Hazardous Materials Data Management Program. The DTSC compiles information from subsets of the following databases to make up the CORTESE list:

A review of these databases (last updated August 25, 2016) indicated that there are no CORTESE sites within 1 mile of the subject property.

4.1.8 Solid Waste Disposal Site Listings

California's Integrated Waste Management Board maintains an inventory of the solid waste facilities in the state. A review of the California Solid Waste Information System (SWIS) and Solid Waste Landfill (SWL) database showed Active, Closed and Inactive Landfills. SWF records typically contain an inventory of solid waste disposal facilities or landfills. These may be active or inactive facilities or open dumps that failed to meet RCRA Section 4004 criteria for solid waste landfills or disposal sites (last updated October 04, 2016). There are no SWF sites within 0.5 mile of the subject property.

4.1.9 Hazardous Materials Permits

This is a database compiled of handlers and generators of hazardous waste which is maintained by the State DTSC and is included in their "ENVIROSTOR" webpage. The database (last updated August 22, 2016) indicated that there is one ENVIROSTOR sites within approximately 1 mile of the subject property. The site is the AHLSWEDE Fertilizer Company at 9758 Magnolia Avenue which required an evaluation with no further action required.

4.1.10 Registered Underground/Aboveground Storage Tanks

The California State Water Resources Control Board maintains databases for underground and aboveground storage tanks. A search of the Registered Underground Storage Tanks (RUST, last updated November 1, 2016) and Aboveground Storage Tank (AST, last updated August 31, 2009) Registrations Databases indicates there are no sites within 0.25 mile of the subject property. In

addition, a review of the Permitted Underground Storage Tank (UST) in GeoTracker list last updated November 1, 2016, as provided by ERIS (Appendix B), revealed no sites with 0.25 mile of the subject property containing underground storage tanks.

4.1.11 Leaking Underground Storage Tank Listing

The State Water Resources Control Board used to maintain the Leaking Underground Storage Tank (LUST) database which revealed four (4) sites between 0.25 and 0.5 mile of the subject property and are as follows:

1. Thrifty Oil #341 ARCO #9711 located approximately 0.38 mile southwest at 3399 Van Buren Boulevard.
2. Brookhurst Mill located approximately 0.39 mile southwest at 3315 Van Buren Boulevard.
3. Texaco Service Station located approximately 0.4 mile west at 3483 Van Buren Boulevard.
4. UNOCAL #5714 located approximately 0.42 mile southwest at 9501 Indiana Avenue.
5. Chevron #94702 located approximately 0.42 mile west at 3476 Van Buren Boulevard.

4.1.12 State and Tribal Leaking Storage Tank List

The State and Tribal Leaking Storage Tank List identifies seven in the LUST region 8, California and seven in the LUST Riverside County, California summary.

4.1.13 Historical Hazardous Substance Storage Information Database

The Historical Hazardous Substance Storage (HHSS) database contains information collected in the 1980s from facilities that stored hazardous substances. The information was originally collected on paper forms, was later transferred to microfiche, and recently indexed as a searchable database. The HHSS database is based upon self-reported information submitted by facilities which has not been independently verified. It is unlikely that every facility responded to the survey, and the database should not be expected to be a complete inventory of all facilities that were operating at that time. This database is maintained by the California State Water Resources Control Board's GeoTracker. A review of the HHSS (last updated November 4, 2016), as provided by ERIS (Appendix B), revealed no sites within 0.25 mile of the subject propertycontained historical underground storage tanks (HIST UST).

4.1.14 Toxic Release Inventory Database

Section 313 of the Emergency Planning and Community Right-to-Know Act (also known as SARA Title III) of 1986 requires the EPA to establish an inventory of toxic chemical emissions from certain facilities (Toxic Release Inventory System or TRIS). Facilities subject to this reporting are required to complete a Toxic Chemical Release Form (Form R) for specified chemicals. The TRIS database (last

updated September 14, 2016) indicated no such sites on the subject property.

4.1.15 Riverside County Disclosure Facility List

The Riverside County Disclosure Facility List (Riverside HZH) is a list of facilities disclosed to Riverside County Department of Environmental Health (DEH). This list (last updated November 4, 2016) made available by Riverside County DEH which has been designated as the Certified Unified Program Agency (CUPA) for the County. A business is required to establish and submit a Business Plan if the facility handles hazardous material equal to or greater than 55 gallons, 500 pounds or 200 cubic feet at any time during the year. A review of the Riverside HZH list reveals no sites within 0.125 mile of the subject property.

4.1.16 State Response List

The State Response List (last updated November 3, 2016) maintains identified confirmed release sites where the Department of Toxic Substances Control (DTSC) is involved in remediation either in a lead or oversight capacity. These confirmed release sites are generally high-priority and high potential risk.

4.1.17 EnviroStor Hazardous Waste Facilities (HWP)

A list of hazardous waste facilities including permitted, post-closure and historical facilities found in the Department of Toxic Substances Control (DTSC) EnviroStor database. This database indicates there are no HWP facilities.

4.1.18 Riverside County Underground Storage Tanks

A list of Leaking Underground Storage Tank (LUST) sites in Riverside County and is made available by Riverside County Department of Environmental Health. The Hazardous Materials Management Branch (HMMB) regulates and oversees the inspections of construction, repairs, upgrades, system operation and removal of UST systems.

4.1.17 Summary of Governmental Database Information

There are thirty-five (35) separate potential sources of contamination in the vicinity of the subject propertyas shown in Table A. The only site in the vicinity of the subject property that has active hazmat concerns is D-11/D-12 located at 9337 Douglas Drive approximately 0.2 mile southwest of the subject property. This is the site of DC Power Mercury which was listed through the CERCLIS process for having to remediate past onsite mercury contamination, but it is not on the NPL list, it is cross gradient, and is therefore not considered a significant threat or hazard to the subject property.

Table A: Report Findings of Subject Site and Surrounding Properties

Map Ref	Database(s)	Company/ Site Name	Address	Direction from Site[1]	Distance (Miles)	Status
A1-A3	HAZNET - CA	RUSD Hawthorne Elementary School	9174 Indiana Avenue, Riverside CA	On Site	0.0	1990's generated small amounts of hazmat lab chemicals, some ACMs, PCBs, all disposed in landfills, NO ACTION-CLOSED
B4	HAZNET – CA	Keith & Cassandra Sears	9108 Indiana Avenue	Northeast (Lower)	0.1	2004, organic solids handled, actions CLOSED
B5	HAZNET – CA	Indiana Avenue Project	9077 Indiana Avenue	Northeast (Lower)	0.1	2009, ACMs disposed of, actions CLOSED
C6-C7	HAZNET – CA	Vaccher Properties/ Hud Intown Properties	3198 Jackson Street	ESE (Higher)	0.1	1998 household hazmat dumped, 2001 ACMs disposed, all actions CLOSED
D8 – D9	HAZNET – CA	Pro Mop/ Pro-Mold	9330 Douglas Drive	SSW (Higher)	0.18	1997-98 cleaner fluids and organic wastes disposed, actions CLOSED
D10	RCRA_NONGEN	Bourns Medical Systs Inc.	9335 Douglas Drive	Southwest (Higher)	0.19	1980's waste handler, all actions CLOSED
D11-D12	CERCLIS, SEMS_8R_Active Sites	DC Power Mercury	9337 Douglas Drive	Southwest (Higher)	0.19	2013, mercury waste disposal, No NPL but CERCLIS remediation listed as ACTIVE
E13	HAZNET – CA	AQUATEMP Inc.	9330 Narnia Drive	Southwest (Lower)	0.19	1995 organic solids disposal, actions CLOSED
E14	HAZNET –CA	1X HUD	3490 Everest	WNW (Lower)	0.21	2013, waste recycler, NO ACTIONS
E15	HAZNET –CA	NU-CAL Pipeline Corp	9342 Narnia Drive	Southwest (Lower)	0.21	2014, waste storage and handling, NO ACTIONS
E16	HAZNET – CA	Printing Plus	9348 Narnia Drive	Southwest (Lower)	0.22	1995-2004, photo chemical waste handling, NO ACTIONS
E17	RCRA_NONGEN	HAZ MAT Inc.	9359 Narnia Drive	Southwest (Lower)	0.23	2004, hazmat contractor, NO ACTIONS
E18	HAZNET – CA	Expressions Screen Print	9365 Narnia Drive	Southwest (Lower)	0.24	2001, organic waste disposal, NO ACTIONS
E19	HAZNET – CA	Frome Realty Fund Alpha, LLC	3280 Call Drive	Southwest (Lower)	0.24	2014, solvent incineration, NO ACTIONS
E20-E21	RCRA_SQG	Sherwin-Williams CO	3280 Call Drive	Southwest (Lower)	0.24	1996, small paint waste generator, NO ACTION
F22-F23	FRS, LUST Reg 8 – CA, LUST_Riverside County - CA	Thrifty Oil #341 ARCO #9711	3399 Van Buren Boulevard	WSW (Lower)	0.38	1998+, soil and groundwater contamination from leaking fuel tanks, over time site was fully remediated, 2015 CLOSURE – NO FURTHER ACTION

Map Ref	Database(s)	Company/ Site Name	Address	Direction from Site[1]	Distance (Miles)	Status
F24-F25	Corrective Action_Riverside County - CA	Brookhurst Mill	3315 Van Buren Boulevard	WSW (Lower)	0.39	1994, tank removal soil contamination, 2003 CLOSURE - NO FURTHER ACTION
G26	LUST Reg 8 – CA, LUST_Riverside County – CA	Texaco Service Station	3483 Van Buren Boulevard	West (Lower)	0.40	2003, leaking fuel tank remediation, 2006, NO ACTION
F27-F30	LUST Reg 8 – CA, LUST_Riverside County – CA	UNOCAL #5714	9501 Indiana Avenue	WSW (Lower)	0.42	1993, leaking fuel tank remediation, NO FURTHER ACTION
G31-G34	Corrective Action_Riverside County – CA	Chevron #9-4702	3476 Van Buren Boulevard	West	0.42	1995, leaking fuel tank remediation, NO FURTHER ACTION
35	Digital Obstacle	N/R	33 54 47.14N, 117 25 39.9W	ESE (Lower)	0.50	2010, no database info, NO ACTION

[1] facility in relation to subject property and groundwater gradient (i.e., higher, lower)

4.2 Additional Record Sources

Additional environmental record sources were checked to supplement standard federal and State record sources, as defined by ASTM E 1527-13.

4.2.2 Riverside County Environmental Health Dept., Hazardous Materials Division

The Riverside County Environmental Health Department, Hazardous Materials Division, maintains a list of underground tank cleanup sites and emergency response activity within the County. The agency was contacted as part of Phase 1 ESA work on the 6.85-acre Hawthorne property. The County responded on January 5, 2017 that there were no records in their files of any incidents or accidents involving hazardous materials on the 6.85-acre Hawthorne property (formerly the Hawthorne Elementary School) (Appendix C).

4.2.3 Regional Water Quality Control Board

Data from the files of the Regional Water Quality Control Board – Santa Ana Region indicates that there are no potential sites of contamination on or in the general area of the subject property.

4.3 Previous Environmental Information

A soil infiltration report was prepared by GeoMat Laboratories Inc. in 2015. No previous Phase I ESA report or other environmental information was available.

4.4 Historical Use Information

4.4.1 Aerial Photographs and Topographic Maps

Current and historic aerial photographs were reviewed of the site from the years 2014, 2010, 2005, 2002, 1994, 1990, 1985, 1980, 1974, 1966, and 1948 (Appendix C), as summarize in Table B.

Table B: Historic Aerial Maps

Photo Year	Level of Improvements on Subject Property and Surrounding Land
1948	Planted orchards appear on the site as well as to the north, northeast, and southwest of the subject property (i.e., ordered groves of trees planted in rows) while vacant land is located to the northwest, east, and south of the subject property. A row of homes appears just west of the property as well. A rail line is located along the southern boundary of the subject property.
1966	The subject property appears to have been developed with the Hawthorne Elementary School. Adjacent north and east have been developed with single-family residences with the rail line directly south. West of the subject property is undeveloped vacant land.
1974	Conditions appear similar to 1966.
1980	Conditions appear similar to 1966. However, single-family residences are being developed south of the railroad tracks and southeast of the subject property (north of railroad tracks).
1985	Conditions appear similar to 1980.
1990	Conditions appear similar to 1980.
1994	Conditions appear similar to 1980.
2002	Conditions appear similar to 1980.
2005	Conditions appear similar to 1980 with denser single-family residences located south of the railroad tracks.
2010	Conditions appear similar to 2005.
2014	Conditions appear similar to 2005.

Source: ERIS, Historic Aerial Report (completed December 22, 2016) (Appendix C).

Current and historic topographical maps of the project site from the years 2015, 2012, 1967, 1953, 1942, and 1901 were reviewed (Appendix C), as summarized in Table C.

Table C: Historic Topo Maps

Topo Year	Level of Improvements on Subject Property and Surrounding Land
1901	The subject property and surrounding area were called Arlington Place with railroad tracks running just south of the subject property. The Riverside canal runs just southeast of the subject property as well. There are two residences east of the property across Jackson Street with no residences located onsite.
1942	Agricultural is located east across Jackson Street. There are four residences located adjacent to the east and three residences located adjacent to the west of the subject property. The railroad tracks is still located south of the subject property as well as the Riverside canal.
1953	Conditions appear similar to 1942 with agriculture located north of the subject property. A water conveyance feature is located just south of the subject property. The SR-91 freeway is located north of the site.
1967	Conditions appear similar to 1953 with residences adjacent north of the project site.
2012	Conditions appear similar to 1967.
2015	Conditions appear similar to 1967.

Source: Topographic Map Research Results, Hawthorne Property, December 19, 2016 (Appendix C).

Current and Previous Ownership

The site consists of the Riverside County Assessor's Parcel Numbers 233-170-001, and 233-180-007. The site is currently owned by Central Metal Inc. No other records of past ownership of this property were readily available.

4.4.2 Sanborn Maps

The only Sanborn insurance map service website listing for the property is the Hawthorne Elementary School which was built in the 1960's and closed in 2008. Prior to that, the site was listed as "unmapped property" and there is no record of any buildings or improvements that required insurance prior to that time within the Sanborn service database which dates to before 1900 in Southern California.

4.4.3 Building Permits and City Directory Records

City Directories were searched for building addresses (e.g., local utility companies, etc.) onsite, the only records that were found were for the now-closed Hawthorne Elementary School built and operated until 2008 by the Riverside Unified School District.

4.5 Analysis of Impact on Recognized Environmental Conditions

Information obtained from standard environmental and additional record sources, interviews with affected agencies, historical information obtained from aerial photos and topographic maps, and analysis of physical setting sources indicated that no recognized environmental conditions exist on this site. Available evidence indicates that development of the subject property would not be affected by recognized environmental conditions and would not represent a public health risk or hazard.

Section 5: Site Reconnaissance

Site photographs taken during the visual reconnaissance are shown in Appendix A. The methodology used during the visual reconnaissance consisted of pedestrian survey. The site is gently sloping and is 80 to 90 percent covered by low vegetation with low visibility to the surface of the property. LSA staff conducted a site survey on Tuesday, December 27, 2016. The site survey began at the northwest corner and terminated at the southeast corner of the site. The weather was partly clear, dry, with an air temperature of 69° F. The site slopes gently down to the northwest from the railroad tracks toward Indiana Avenue, then draining offsite to the west. Low lying vegetation covers approximately 80 to 90 percent of the permeable surfaces of the site. Scattered along the western and southern portions of the property is domestic refuse such as plastic, textiles, and metal scraps. Scattered along the southeastern portion of the site are wood shavings. A large electrical substation owned by the City is

located south of the existing railroad tracks which is just south of the subject property. A sign indicating a fiber optical cable is visually marked along the southern portion of the site, adjacent to the railroad tracks. A playground with a pallet of sand bags is located east within the project site. No signs of hazardous materials, solid waste containers, etc. were observed. The only observed underground utilities are located at the northwestern and southwestern corners of the site which likely served the former Hawthorne Elementary School. There are also aboveground electrical utility boxes located in the west-central and north-central portions of the subject property.

5.1 Hazardous Substances In Connection With Identified Uses

The subject site contains no visible evidence of containing any hazardous materials or past incidents involving hazardous materials.

5.2 Hazardous and Unidentified Substance Containers

No large containers (e.g., 55-gallon drums, boxes, etc.) were observed during the site reconnaissance, and there was only a minor amount of windblown trash and domestic refuse dumping along the western margin of the site.

5.3 Storage Tanks

No storage tanks or structures were observed on-site during the visual reconnaissance survey.

5.4 Indications of Polychlorinated Biphenyls (PCBs)

During the site reconnaissance, two (2) pole-mounted transformers were observed on utility poles within the public right-of-way along the south side of Indiana Avenue adjacent to the northern boundary of the subject property. Older pole-mounted electrical transformers contained PCB until 1977. Although it is not certain if the observed pole-mounted transformers contain PCBs, no indications of PCB leakage or contamination were observed on the subject property.

5.5 Indications of Solid Waste Disposal

During the site survey, various amounts of windblown domestic trash were visible on the west, northwest, and southern portions of the site. There were also remnants of broken and powdered asphalt on the eastern central portion of the site and pallets with sand bags were also present. No evidence of ongoing disposal of residential or commercial waste was observed on-site.

5.6 Physical Setting Analysis

Prior to the construction of the school, the site and the surrounding lands were historically used for citrus orchards (until at least 1948) and is currently developed with single family residences to the

east, west, and north by residential development. Historical aerial photos show residences west of the site as far back as 1948. The site is abutted by an active railroad line to the south. Precipitation that falls on the site would typically infiltrate into the subsurface, and flow north towards the Santa Ana River approximately 3 miles to the north. No physical conditions observed or documented on or in the area of the site represent significant environmental conditions.

5.7 Other Conditions of Concern

The most recent updates to ASTM 1527-13 include a requirement to evaluate "Controlled Recognized Environmental Conditions" (CREC) and "Historical Recognized Environmental Conditions" (HREC). According to the new definitions for these terms, there is no identified contamination on or adjacent to the subject property that would constitute either CREC or HREC conditions. In addition, ASTM E2600-10 (as outlined in the most recent updates to ASTM 1527-13) requires a Phase 1 document to provide a "Vapor Migration Assessment" from onsite or offsite activities that might result in Recognized Vapor Environmental Condition (VEC) on the subject property. According to the governmental database search, the subject property and immediate surrounding area contain no uses or facilities that would produce hazardous vapor conditions (Appendix C) such as gas stations, dry cleaning facilities, etc. Therefore, it is unlikely the subject property would be subject to vapor migration conditions from the potential identified offsite sources. There were no other conditions of concern related to the subject property.

5.8 Analysis of Impact on Recognized Environmental Conditions

According to available information, the subject property does not currently contain any recognized environmental conditions (REC, CREC, or HREC), nor is it subject to vapor migration from any onsite or offsite sources.

Section 6: Findings and Conclusions

This Phase I ESA has provided evidence that recognized environmental conditions may currently exist relative to the subject property. A review of historical aerial photographs and historical contamination characterization studies determined that hazardous materials were not previously used, stored, and/or disposed of on the site. The property is developed with what was previously known as the Hawthorne Elementary School but was closed in 2008. There were no indications of wells or underground or above-ground storage tanks onsite, and a review of state and local registries did not indicate the presence of any underground or above ground storage tanks on the subject property.

A review of government agency databases indicates: 1) the site is not referenced as using, generating, storing, or disposing of hazardous materials; 2) no underground storage tanks have been permitted for

the site, and 3) no unauthorized releases of petroleum hydrocarbons have been reported for the site. There were several offsite facilities listed in the governmental databases as being associated with hazardous materials, but there is no indication that any of these facilities would contribute to hazardous conditions on the subject property. No information was available on groundwater quality, but LSA understands municipal water supplies would be utilized by future development on this site.

Based on available information, LSA concludes there is a low to moderate probability for the site to contain any RECs, CRECs, HRECs, or conditions that would threaten public health or safety. However, due to the railroad tracks abutting the site to the south, past uses of agriculture on the subject property, and the current closed school buildings onsite, LSA prepared a Phase II Hazmat Sampling and Testing for the subject property. The Phase II investigation included the following:

1. EPA Method 8015B (carbon chain analysis – adjacent to the railroad line);
2. EPA Method 8081A (organochlorine pesticides – general across the site);
3. EPA Method 8151B (chlorinated herbicides – general across the site);
4. EPA Test for Arsenic (as former agricultural pesticide – general across the site);
5. Asbestos-Containing Materials (ACMs) in the former school buildings; and
6. Lead-Based Paint (LBP) in the former school buildings.

The Phase II Hazmat Sampling and Testing concluded none of the sampled locations showed elevated levels of any of the tested species (i.e., above established standards or recommended cation levels for residential properties). Therefore, no soil remediation activities are required or recommended as part of demolition, clearing/grubbing, or grading relative to the subject property.

The Phase II Hazmat Sampling and Testing indicated ACMs and LBP are present in at least some of the former school buildings and therefore recommends representative LBP sampling and testing prior to demolition of the existing school buildings on the site. The following mitigation measure shall be incorporated:

Prior to demolition of the existing buildings, an asbestos and lead-based paint survey shall be conducted by a California Occupational Safety and Health Administration-certified asbestos and lead-based paint consultant and/or certified site surveillance technician. A report documenting material types, conditions, and general quantities shall be provided in the report, along with photos of positive materials and diagrams. Demolition plans and contract specifications shall incorporate any abatement procedures for the removal of material containing asbestos and/or lead-based paint. All abatement work shall be done in accordance with federal, state, and local regulations, and at the approval of the City of Riverside Planning Division.

Section 7: Closure

This Phase I ESA was conducted in substantial conformance with ASTM E 1527-13 as well as applicable local regulations. Conclusions and recommendations were formulated using that degree of care normally exercised by environmental professionals practicing in this, or in similar localities. No other warranty is expressed or implied. To the extent that professional judgment has been exercised based upon third party information, should additional information become available within 180 days of this study, this firm will reconsider the applicability of the new information to the overall conclusions, and update this report as necessary. Because environmental conditions and regulations change regularly, we do not recommend reliance of information presented herein, without update, beyond 180 days of the date of this report.

Section 8: Qualifications of Environmental Professional

Mr. Norton has been conducting assessments for hazardous materials for 35 years in Southern California. Until July 2012, Mr. Norton was a Class I Registered Environmental Assessor (R.E.A.) with the State of California (#06827). Mr. Norton was certified in June of 1997 and performed Phase I ESAs for dozens of private properties and hundreds of telecommunication sites throughout Southern California as an REA. In July 2012, the State Department of Toxic Substances Control (DTSC) suspended the REA program. However, Mr. Norton's qualifications are still sufficient to continue preparing Phase 1 ESA reports as an "Environmental Professional" as allowed under ASTM 1527 guidelines.

I have developed and performed the all-appropriate inquiries in conformance with the standards and practices set forth in 40 CFR part 312.

I declare that, to the best of my professional knowledge and belief, I meet the definition of Environmental Professional as defined in § 312.10 of this part.

I have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. I have developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312."

Kent Norton, Senior Environmental Planner
Environmental Professional[2]

[2] Registered Environmental Property Assessor (REPA) and former California DTSC Registered Environmental Assessor #06827

Section 9: References

American Society of Testing and Materials (ASTM), 2013. "ASTM Standards on Environmental Site Assessments for Commercial Real Estate. ASTM E 1527-13 Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process."

Envirosite Corporation (EC). Government Records Report. "Hawthorne Property, 9174 Indiana Avenue, Riverside, CA." December 19, 2016.

Geomat Testing Laboratories, Inc. Basic Soil Infiltration Testing Report, Hawthorn Heights Site. October 27, 2015.

Google Earth. "Hawthorne Property, City of Riverside, Riverside County, California." 33°55'00.83" N 117°26'06.92" W. Image date: February 9, 2016. Accessed December 22, 2016.

Riverside County Environmental Health Department, Hazardous Materials Division, January 4, 2017. HAZMAT Records Research Request Results.

United States Department of Agriculture & Natural Resource Conservation Services, 1971. "Soil Survey of Western Riverside Area." Page 39.

Appendix A: Report Exhibits and Site Photographs

- Figure 1 – Site Location (USGS Map)
- Figure 2 - Aerial Photograph
- Figure 3 – Site Photographs

LSA

FIGURE 1

N

0 1000 2000
FEET

SOURCE: Bing Aerial, 2015.

Hawthorne Residential Development
Phase I Environmental Site Assessment

Regional and Project Location

I:\SWK1603\Reports\Phase1\fig1_RegLoc.mxd (12/20/2016)

LSA

Project Boundary

FIGURE 2

N

0 70 140
FEET

SOURCE: Google Earth, 2016.

Hawthorne Residential Development
Phase I Environmental Site Assessment

Site Location

I:\SWK1603\Reports\Phase1\fig2_Location.mxd (12/20/2016)

FIGURE 3: SITE PHOTOGRAPHIS – HAWTHORNE ELEM. SCHOOL SITE – CITY OF RIVERSIDE

Figure 3a: Looking north from southwestern portion of the site toward Indiana Avenue

Figure 3b: Looking northeast from southwestern corner across the western portion of the site

Figure 3c: Looking north across center of site (former school buildings)

Figure 3d: Looking northwest across eastern portion of the site

Figure 3e: Looking west along southern boundary of the site

Figure 3f: Looking south from northeast corner of site across eastern portion of the site

Appendix B: ERIS Database Report (on CD)

- Envirosite Corp. Database Search Results (2016)

Envirosite Corporation

Government Records Report | 2016

Order Number: 9081
Report Generated: 12/19/2016

Project Name: Hawthorne Property Phase I
Project Number:

9174 Indiana Ave
9174 Indiana Ave
Riverside, CA 92503

1175 Post Road East
Westport, CT 06880
Toll Free: 866-211-2028
www.envirositecorp.com

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2016

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A search of available environmental records was conducted by Envirosite Corporation. 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 from the evaluation of environmental risks associated with a parcel of real estate. Executive Summary does not include a summary of report findings related to the selected Map Layers, this information is contained in the Map Findings section as well as being displayed on appropriate maps.

SUBJECT PROPERTY INFORMATION:

ADDRESS:

9174 Indiana Ave
9174 Indiana Ave
Riverside, CA 92503

COORDINATES:

Latitude (North):	33.916810 - 33° 55' 0.5"
Longitude (West):	-117.435400 - -117° 26' 7.4"
Universal Transverse Mercator:	Zone 11N
UTM X (Meters):	459752.45
UTM Y (Meters):	3753017.43
Elevation:	827.756 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH SUBJECT PROPERTY:

Subject Property Map: 33117h4 RIVERSIDE WEST, CA
Most Recent Revision: 2012

MAP ID	SITE NAME	ADDRESS	DATABASE ACRONYMS	RELATIVE ELEVATION	DISTANCE DIRECTION
A1	RUSD HAWTHORNE ELEMENTARY SCHOOL	9174 INDIANA AVE	HAZNET - CA		SP
A2	HAWTHORNE ELEM SCH/RIVERSIDE USD	9174 INDIANA AVE	HAZNET - CA		SP
A3	HAWTHORNE ELEMENTARY SCHOOL	9174 INDIANA AVENUE	HAZNET - CA		SP
B4	KEITH & CASSANDRA SEARS	9108 INDIANA AVE	HAZNET - CA	Lower	NE / 0.112 mi.
B5	INDIANA AVENUE PROJECT	9077 INDIANA AVE	HAZNET - CA	Lower	NE / 0.166 mi.
C6	VACCHER PROPERTIES	3198 JACKSON ST	HAZNET - CA	Higher	E / 0.170 mi.
C7	HUD INTOWN PROPERTIES	3178 JACKSON ST	HAZNET - CA	Higher	ESE / 0.187 mi.
D8	PRO MOOP	9330 DOUGLAS DR	HAZNET - CA	Higher	SSW / 0.189 mi.
D9	PRO MOLD INC	9330 DOUGLAS DR	HAZNET - CA	Higher	SSW / 0.189 mi.
D10	BOURNS MEDICAL SYSTS INC	9335 DOUGLAS	RCRA_NONGEN	Higher	SW / 0.191 mi.
D11	DC POWER MERCURY	9337 DOUGLAS DRIVE	CERCLIS, SEMS_8R_ACTIVE SITES	Higher	SW / 0.193 mi.
D12	DC POWER	9337 DOUGLAS DR	HAZNET - CA	Higher	SW / 0.193 mi.
E13	AQUATEMP INC	9330 NARNIA DRIVE	HAZNET - CA	Lower	SW / 0.195 mi.
14	1X HUD	3490 EVEREST	HAZNET - CA	Lower	WNW / 0.213 mi.
E15	NU-CAL PIPELINE CORP	9342 NARNIA DR	HAZNET - CA	Lower	SW / 0.215 mi.
E16	PRINTING PLUS	9348 NARNIA DRIVE	HAZNET - CA	Lower	SW / 0.225 mi.
E17	HAZ MAT INC	9359 NARNIA DR	RCRA_NONGEN	Lower	SW / 0.237 mi.
E18	EXPRESSIONS SCREEN PRINT	9365 NARNIA DR	HAZNET - CA	Lower	SW / 0.241 mi.
E19	FROME REALTY FUND ALPHA,LLC	3280 CALL DR	HAZNET - CA	Lower	SW / 0.244 mi.
E20	SHERWIN-WILLIAMS CO THE	3280 CALL DR	RCRA_SQG	Lower	SW / 0.244 mi.
E21	SHERWIN-WILLIAMS CO THE	3280 CALL DR	HAZNET - CA	Lower	SW / 0.244 mi.
F22	THRIFTY OIL #341 ARCO #9711	3399 VAN BUREN BLVD	FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA	Lower	WSW / 0.386 mi.
F23	THRIFTY OIL #341 ARCO #9711	3399 VAN BUREN BLVD	CORRECTIVE ACTION_Riverside County - CA	Lower	WSW / 0.386 mi.
F24	BROOKHURST MILL	3315 VAN BUREN BLVD	CORRECTIVE ACTION_Riverside County - CA	Lower	WSW / 0.391 mi.
F25	BROOKHURST MILL	3315 VAN BUREN BLVD	LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA	Lower	WSW / 0.391 mi.
G26	TEXACO SERVICE STATION	3483 VAN BUREN BLVD	LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA	Lower	W / 0.405 mi.
F27	UNOCAL #5714	9501 INDIANA AVE	FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA	Lower	WSW / 0.422 mi.
F28	76 STATION 5693	9501 INDIANA AVENUE	FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA	Lower	WSW / 0.422 mi.
F29	76 STATION #5693	9501 INDIANA AVE	CORRECTIVE ACTION_Riverside County - CA	Lower	WSW / 0.422 mi.
F30	UNOCAL #5714	9501 INDIANA AVE	CORRECTIVE ACTION_Riverside County - CA	Lower	WSW / 0.422 mi.
G31	CHEVRON #9-4702	3476 VAN BUREN BLVD	CORRECTIVE ACTION_Riverside County - CA	Lower	W / 0.425 mi.
G32	CHEVRON #94702 (RAYS CHEVRON)	3476 VAN BUREN BLVD	FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA	Lower	W / 0.425 mi.
G33	CHEVRON #9-4702	3476 VAN BUREN BLVD	LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA	Lower	W / 0.425 mi.
G34	CHEVRON #9-4702 (RAY'S CHEVRON)	3476 VAN BUREN BLVD	CORRECTIVE ACTION_Riverside County - CA	Lower	W / 0.425 mi.
35	N/R	33 54 47.14N, 117 25 39.9...	DIGITAL OBSTACLE	Higher	ESE / 0.509 mi.
36	SHERMAN INDIAN HIGH SCHOOL	9010 MAGNOLIA AVE	CORRECTIVE ACTION_Riverside County - CA	Lower	NNW / 0.601 mi.
37	J & R FAST FUEL / FORMER QUALITY GA...	9407 MAGNOLIA AVE	CORRECTIVE ACTION_Riverside County - CA	Lower	WNW / 0.630 mi.

MAP ID	SITE NAME	ADDRESS	DATABASE ACRONYMS	RELATIVE ELEVATION	DISTANCE DIRECTION
38	MOBIL #18-HVR	9505 MAGNOLIA AVE	CORRECTIVE ACTION_Riverside County - CA	Lower	WNW / 0.701 mi.
39	N/R	33 55 10.60N, 117 25 24.6...	DIGITAL OBSTACLE	Higher	ENE / 0.711 mi.
40	N/R	33 55 33.61N, 117 25 41.8...	DIGITAL OBSTACLE	Lower	NE / 0.754 mi.
41	ARLINGTON AUTOMOTIVE	9611 MAGNOLIA AVE	CORRECTIVE ACTION_Riverside County - CA	Lower	W / 0.774 mi.
42	AHLSWEDE FERTILIZER COMPANY	9758 MAGNOLIA AV	BOND EXPENDITURE PLAN - CA, ENVIROSTOR - CA, PERCHLORATE 2 - CA	Lower	W / 0.902 mi.
43	N/R	33 55 19.20N, 117 25 09.8...	DIGITAL OBSTACLE	Higher	ENE / 0.987 mi.

SUBJECT PROPERTY SEARCH RESULTS:

The subject property was identified in the following records. For more information on this property, see Map Findings section on page 29.

SITE	DATABASE(S)	EPA ID
RUSD HAWTHORNE ELEMENTARY SCHOOL 9174 INDIANA AVE RIVERSIDE CA 92503	HAZNET - CA	CAC002578649
HAWTHORNE ELEM SCH/RIVERSIDE USD 9174 INDIANA AVE RIVERSIDE CA 92503	HAZNET - CA	CAC001463984
HAWTHORNE ELEMENTARY SCHOOL 9174 INDIANA AVENUE RIVERSIDE CA 92503	HAZNET - CA	CAL000113127

DATABASE(S) WITH NO MAPPED SITES:

No mapped sites were found in Envirosite Corporation's Search of available ("Reasonable ascertainable") government records either on the subject property or within the search radius around the subject property for the following databases:

STANDARD ENVIRONMENTAL RECORDS

FEDERAL RCRA NON-CORRACTS TSD FACILITIES LIST

ARCHIVED RCRA TSDF	Archived Resource Conservation and Recovery Act: Treatment Storage and Disposal Facilities
RCRA_TSDF	Resource Conservation and Recovery Act: Treatment Storage and Disposal Facilities

FEDERAL CERCLIS LIST

CERCLIS NFRAP	Comprehensive Environmental Response Compensation and Liability Act No Further Remedial Action Planned
FEDERAL FACILITY	Federal Facility sites
SEMS_8R_ARCHIVED SITES	Sites on SEMS Archived Site Inventory

FEDERAL RCRA CORRACTS FACILITIES LIST

CORRACTS	Hazardous Waste Corrective Action

FEDERAL DELISTED NPL SITE LIST

DELISTED NPL	Delisted National Priority List
DELISTED PROPOSED NPL	Delisted proposed National Priority List
SEMS_DELETED NPL	Sites Deleted from National Priorities List

FEDERAL ERNS LIST

ERNS	Emergency Response Notification System

FEDERAL INSTITUTIONAL CONTROLS / ENGINEERING CONTROLS REGISTRIES

FED E C	Engineering Controls
FED I C	Institutional Controls
FED-PUBLISHED INSTITUTIONAL CONTROLS	Published Institutional Controls

STANDARD ENVIRONMENTAL RECORDS *(cont.)*

FEDERAL INSTITUTIONAL CONTROLS / ENGINEERING CONTROLS REGISTRIES (cont.)

RCRA IC_EC	RCRA sites with Institutional and Engineering Controls

FEDERAL NPL SITE LIST

NPL	National Priority List
NPL EPA R1 GIS	GIS for EPA Region 1 NPL
NPL EPA R6 GIS	GIS for EPA Region 6 NPL
NPL EPA R8 GIS	GIS for EPA Region 8 NPL
NPL EPA R9 GIS	GIS for EPA Region 9 NPL
NPL LIENS	National Priority List Liens
PART NPL	Part National Priority List
PROPOSED NPL	Proposed National Priority List
SEMS_FINAL NPL	Sites included on the Final National Priorities List
SEMS_PROPOSED NPL	Sites Proposed to be Added to the National Priorities List

FEDERAL RCRA GENERATORS LIST

RCRA_CESQG	Resource Conservation and Recovery Act_Conditionally Exempt Small Quantity Generators
RCRA_FULL_DETAIL	Resource Conservation and Recovery Act_Full detail
RCRA_LQG	Resource Conservation and Recovery Act_ Large Quantity Generators

STATE AND TRIBAL REGISTERED STORAGE TANK LISTS

FEMA UST	FEMA Underground Storage Tanks
INDIAN UST R1	Underground Storage Tanks on Indian Land in EPA Region 1
INDIAN UST R10	Underground Storage Tanks on Indian Land in EPA Region 10
INDIAN UST R2	Underground Storage Tanks on Indian Land in EPA Region 2
INDIAN UST R4	Underground Storage Tanks on Indian Land in EPA Region 4
INDIAN UST R5	Underground Storage Tanks on Indian Land in EPA Region 5
INDIAN UST R6	Underground Storage Tanks on Indian Land in EPA Region 6
INDIAN UST R7	Underground Storage Tanks on Indian Land in EPA Region 7
INDIAN UST R8	Underground Storage Tanks on Indian Land in EPA Region 8
INDIAN UST R9	Underground Storage Tanks on Indian Land in EPA Region 9
AST - CA	Aboveground storage tanks
AST_CONTRA COSTA COUNTY - CA	Contra Costa County Aboveground Storage Tanks
AST_KERN COUNTY - CA	Kern County Aboveground Storage Tanks Facilites
AST_ORANGE COUNTY - CA	Orange County Aboveground Storage Tanks
AST_PLACER COUNTY - CA	Placer County Aboveground Storage Tanks
AST_YOLO COUNTY - CA	Yolo County Above Ground Storage Tanks
BP HW OUT_VENTURA COUNTY - CA	Ventura County Business Plan Hazardous Waste Producers and Operating Underground Tanks
BUSINESS INVENTORY_SAN MATEO COUNTY - CA	San Mateo County List of Underground Storage Tanks Hazardous Materials Business Plan and Hazardous Waste Generators
CLOSED UST_VENTURA COUNTY - CA	Ventura County Closed Underground Storage Tanks
CS_PLACER COUNTY - CA	Placer County Cleanup Sites
FID UST - CA	Facility Inventory Database
HIST UST - CA	Historical Underground Storage Tanks
LOP_SANTA CLARA COUNTY - CA	Santa Clara County Local Oversight Program
SITE LIST_CONTRA COSTA COUNTY - CA	Contra Costa County Sites List
UST - CA	Underground Storage Tanks
UST_ALAMEDA COUNTY - CA	Alameda County Underground Storage Tanks

STANDARD ENVIRONMENTAL RECORDS *(cont.)*

STATE AND TRIBAL REGISTERED STORAGE TANK LISTS (cont.)

UST_CITY OF LONG BEACH - CA	City of Long Beach Underground Storage Tanks
UST_CITY OF TORRANCE - CA	City of Torrance Underground Storage Tanks
UST_EL SEGUNDO CITY - CA	City of El Segundo Underground Storage Tanks
UST_KERN COUNTY - CA	Kern County Underground Storage Tanks
UST_MARIN COUNTY - CA	Marin County Underground Storage Tanks
UST_MENDOCINO COUNTY - CA	Mendocino County Underground Storage Tanks
UST_NAPA COUNTY - CA	Underground storage tank sites located in Napa county.
UST_ORANGE COUNTY - CA	Orange County Underground Storage Tanks
UST_PLACER COUNTY - CA	Placer County Underground Storage Tanks
UST_RIVERSIDE COUNTY - CA	Riverside County Underground Storage Tanks
UST_SAN FRANCISCO COUNTY - CA	San Francisco County Underground Storage Tanks
UST_SAN JOAQUIN COUNTY - CA	San Joaquin County Underground Storage Tanks
UST_SOLANO COUNTY - CA	Solano County Underground Storage Tanks
UST_SUTTER COUNTY - CA	Sutter County Underground Storage Tanks
UST_YOLO COUNTY - CA	Yolo County Underground Storage Tanks

RECORDS OF EMERGENCY RELEASE REPORTS

HMIRS (DOT)	Hazardous Materials Information Reporting Systems

STATE AND TRIBAL LEAKING STORAGE TANK LISTS

INDIAN LUST R1	Leaking Underground Storage Tanks on Indian Land in EPA Region 1
INDIAN LUST R10	Leaking Underground Storage Tanks on Indian Land in EPA Region 10
INDIAN LUST R2	Leaking Underground Storage Tanks on Indian Land in EPA Region 2
INDIAN LUST R4	Leaking Underground Storage Tanks on Indian Land in EPA Region 4
INDIAN LUST R5	Leaking Underground Storage Tanks on Indian Land in EPA Region 5
INDIAN LUST R6	Leaking Underground Storage Tanks on Indian Land in EPA Region 6
INDIAN LUST R7	Leaking Underground Storage Tanks on Indian Land in EPA Region 7
INDIAN LUST R8	Leaking Underground Storage Tanks on Indian Land in EPA Region 8
INDIAN LUST R9	Leaking Underground Storage Tanks on Indian Land in EPA Region 9
LUFT_ALAMEDA COUNTY - CA	Alameda County Leaking Underground Fuel Tanks
LUST ORANGE COUNTY - CA	Orange County Leaking Underground Storage Tanks
LUST REG 1 - CA	Region 1 Leaking Underground Storage Tanks
LUST REG 2 - CA	Region 2 Leaking Underground Storage Tanks
LUST REG 3 - CA	Region 3 Leaking Underground Storage Tanks
LUST REG 4 - CA	Region 4 Leaking Underground Storage Tanks
LUST REG 5 - CA	Region 5 Leaking Underground Storage Tanks
LUST REG 6 - CA	Region 6 Leaking Underground Storage Tanks
LUST REG 7 - CA	Region 7 Leaking Underground Storage Tanks
LUST REG 9 - CA	Region 9 Leaking Underground Storage Tanks
LUST_HAZMAT_YOLO COUNTY - CA	Yolo County Leaking Underground Storage tanks
LUST_KERN COUNTY - CA	Kern County leaking underground tank sites
LUST_SUTTER COUNTY - CA	Sutter County Leaking Underground Storage Tanks
LUST_SAN FRANCISCO COUNTY - CA	listing of leaking underground storage tanks
LUST_SAN MATEO COUNTY - CA	San Mateo County Leaking Underground Storage Tanks
LUST_SOLANO COUNTY - CA	Solano County Leaking Underground Storage Tanks
LUST_SONOMA COUNTY - CA	Sonoma County Leaking Underground Storage Tanks
LUST_VENTURA COUNTY - CA	Ventura County Leaking Underground Storage Tanks
SLIC REG 1 - CA	Spills Leaks Investigation & Cleanup Program
SLIC REG 2 - CA	Spills Leaks Investigation & Cleanup Program

STANDARD ENVIRONMENTAL RECORDS *(cont.)*

STATE AND TRIBAL LEAKING STORAGE TANK LISTS (cont.)

SLIC REG 3 - CA	Spills Leaks Investigation & Cleanup Program
SLIC REG 4 - CA	Spills Leaks Investigation & Cleanup Program
SLIC REG 5 - CA	Spills Leaks Investigation & Cleanup Program
SLIC REG 6 - CA	Spills Leaks Investigation & Cleanup Program
SLIC REG 7 - CA	Spills Leaks Investigation & Cleanup Program
SLIC REG 8 - CA	Spills Leaks Investigation & Cleanup Program
SLIC REG 9 - CA	Spills Leaks Investigation & Cleanup Program
SLIC_ALAMEDA COUNTY - CA	Alameda County Spills Leaks Investigation & Cleanup

LOCAL LISTS OF HAZARDOUS WASTE / CONTAMINATED SITES

TOXIC SITE_SACRAMENTO COUNTY - CA	Sacramento County Toxic Site Cleanup list

STATE AND TRIBAL LANDFILL AND/OR SOLID WASTE DISPOSAL SITE LISTS

LF_LOS ANGELES COUNTY - CA	City of Los Angeles Landfills
LF_SAN DIEGO COUNTY - CA	San Diego County Landfills
SWF/LF - CA	Solid Waste Information System
SWF_LOS ANGELES COUNTY - CA	Los Angeles County solid waste facilities
SWF_SAN DIEGO COUNTY - CA	San Diego County Solid Waste Facilities.

STATE- AND TRIBAL - EQUIVALENT NPL

RESPONSE - CA	State Response Sites

STATE- AND TRIBAL - EQUIVALENT CERCLIS

TOXIC PITS - CA	Toxic Pits Cleanup Act

STATE AND TRIBAL VOLUNTARY CLEANUP SITES

VCP - CA	Voluntary Cleanup Program sites

OTHER ASCERTAINABLE RECORDS

CORRECTIVE ACTIONS_2020	Wastes - Hazardous Waste - Corrective Action

ADDITIONAL ENVIRONMENTAL RECORDS

LOCAL LISTS OF LANDFILL / SOLID WASTE DISPOSAL SITES

DEBRIS REGION 9	Torres Martinez Reservation Illegal Dump Sites
INDIAN ODI R8	Open Dump Inventory
ODI	Open Dump Inventory
TRIBAL ODI	Indian Open Dump Inventory Sites
HAULERS - CA	Tire Haulers
SWRCY - CA	Recyclers

LOCAL LISTS OF HAZARDOUS WASTE / CONTAMINATED SITES

FED CDL	DOJ Clandestine Drug Labs
US HIST CDL	Historical Clandestine Drug Labs
CALARP_KERN COUNTY - CA	HazMat Chemical Facility List
CASE LIST_SAN DIEGO COUNTY - CA	San Diego County Environmental Case List
CDL - CA	Meth and Clandestine Drug Labs
CS_NAPA COUNTY - CA	Contaminated Sites
SCH - CA	School Property Evaluation Program

LOCAL BROWNFIELD LISTS

FED BROWNFIELDS	Federal Brownfields

ADDITIONAL ENVIRONMENTAL RECORDS *(cont.)*

LOCAL BROWNFIELD LISTS (cont.)

TRIBAL BROWNFIELDS	Tribal Brownfields

LOCAL LAND RECORDS

LIENS 2	CERCLA Lien Information
DEED - CA	Deeds
LIENS - CA	Liens

RECORDS OF EMERGENCY RELEASE REPORTS

INDUSTRIAL CLEANUP_ORANGE COUNTY - CA	Petroleum and non-petroleum industrial spills
LDS - CA	Land Disposal Sites
MCS - CA	Military Cleanup Sites
SML_LOS ANGELES COUNTY - CA	Los Angeles County Emergency Response session spills

OTHER ASCERTAINABLE RECORDS

AFS	Air Facility Systems
BRS	Biennial Reporting Systems
CDC HAZDAT	Hazardous Substance Release and Health Effects Information
COAL ASH DOE	Coal Ash: Department of Energy
COAL ASH EPA	Coal Ash: Environmental Protection Agency
COAL GAS	Coal Gas Plants
CONSENT (DECREES)	Superfund Consent Decree
DOD	Department of Defense
DOT OPS	Department of Transportation Office of Pipeline Safety
ECHO	EPA Enforcement and Compliance History Online
ENOI	Electronic Notice of Intent
FA HWF	Financial Assurance for Hazardous Waste Facilities
FEDLAND	Federal Lands
FRS	Facility Index Systems
FTTS	FIFRA/TSCA Tracking System
FTTS INSP	FIFRA/TSCA Tracking System: Inspections
FUDS	Formerly Used Defense Sites
ICIS	Integrated Compliance Information System
INDIAN RESERVATION	Indian Reservations
LEAD_SMELTER	Lead Smelter Sites
LUCIS	Land Use Control Information Systems
MINES	Mines
MLTS	Material Licensing Tracking Systems
NPL AOC	Remediation Sites
OSHA	Occupational Safety & Health Administration
PADS	PCB Activity Database Systems
PCB TRANSFORMER	Polychlorinated Biphenyls Transformers
RAATS	RCRA Administrative Action Tracking Systems
RADINFO	Radiation Information Systems
RMP	Risk Management Plans
ROD	Record of Decision
SCRD DRYCLEANERS	SCRD Drycleaners
SEMS_SMELTER	Sites on SEMS Potential Smelter Activity
SSTS	Section 7 Tracking Systems

ADDITIONAL ENVIRONMENTAL RECORDS *(cont.)*

OTHER ASCERTAINABLE RECORDS (cont.)

TOSCA-CHEMICAL	Toxic Substance Control Act: Chemicals
TOSCA-PLANT	Toxic Substance Control Act: Plants
TRIS	Toxic Release Inventory Systems
UMTRA	Uranium Mill Tailing Sites
AOC_SAN GABRIEL VALLEY - CA	San Gabriel Valley Superfund
CHMIRS - CA	California Hazardous Material Incident Report System
CORTESE - CA	The Hazardous Waste and Substances Sites List
CUPA_FRESNO COUNTY - CA	Fresno County Certified Unified Program Agency
DAYCARE - CA	Daycares
DRYCLEANERS - CA	Drycleaners
DRYCLEANERS_AMADOR COUNTY - CA	Amador County Drycleaners
DRYCLEANERS_ANTELOPE VALLEY - CA	Antelope Valley Drycleaners
DRYCLEANERS_BAY AREA - CA	Bay Area Drycleaners
DRYCLEANERS_BUTTE COUNTY - CA	Butte County Drycleaners
DRYCLEANERS_CALAVERAS COUNTY - CA	Calaveras County Drycleaners
DRYCLEANERS_COLUSA COUNTY - CA	Colusa County Drycleaners
DRYCLEANERS_EASTERN KERN COUNTY - CA	Eastern Kern County Drycleaners
DRYCLEANERS_EL DORADO COUNTY - CA	El Dorado County Drycleaners
DRYCLEANERS_FEATHER RIVER - CA	Feather River Drycleaners
DRYCLEANERS_GLENN COUNTY - CA	Glenn County Drycleaners
DRYCLEANERS_GREAT BASIN UNIFIED - CA	Great Basin Unified Drycleaners
DRYCLEANERS_IMPERIAL COUNTY - CA	Imperial County Drycleaners
DRYCLEANERS_LAKE COUNTY - CA	Lake County Drycleaners
DRYCLEANERS_LASSEN COUNTY - CA	Lassen County Drycleaners
DRYCLEANERS_MENDOCINO COUNTY - CA	Mendocino County Drycleaners
DRYCLEANERS_MOJAVE DESERT - CA	Mojave Desert Drycleaners
DRYCLEANERS_MONTEREY BAY - CA	Monterey Bay Drycleaners
DRYCLEANERS_NORTH COAST UNIFIED - CA	North Coast Unified Drycleaners
DRYCLEANERS_NORTHERN SIERRA - CA	Northern Sierra Drycleaners
DRYCLEANERS_NORTHERN SONOMA COUNTY - CA	Northern Sonoma County Drycleaners
DRYCLEANERS_PLACER COUNTY - CA	Placer County Drycleaners
DRYCLEANERS_SACRAMENTO COUNTY - CA	Sacramento County Drycleaners
DRYCLEANERS_SAN DIEGO COUNTY - CA	San Diego County Drycleaners
DRYCLEANERS_SAN JOAQUIN VALLEY - CA	San Joaquin Valley Drycleaners
DRYCLEANERS_SAN LUIS OBISPO - CA	San Luis Obispo Drycleaners
DRYCLEANERS_SANTA BARBARA COUNTY - CA	Santa Barbara Drycleaners
DRYCLEANERS_SHASTA COUNTY - CA	Shasta County Drycleaner
DRYCLEANERS_SISKIYOU COUNTY - CA	Siskiyou County Drycleaners

ADDITIONAL ENVIRONMENTAL RECORDS *(cont.)*

OTHER ASCERTAINABLE RECORDS (cont.)

DRYCLEANERS_SOUTH COAST - CA	South Coast Drycleaners
DRYCLEANERS_TEHAMA COUNTY - CA	Tehama County Drycleaners
DRYCLEANERS_TUOLUMNE COUNTY - CA	Tuolumne County Drycleaners
DRYCLEANERS_VENTURA COUNTY - CA	Ventura County Drycleaners
DRYCLEANERS_YOLO-SOLANO COUNTIES - CA	Yolo and Solano Counties Drycleaners
EMI - CA	Emissions Inventory Data
FA - CA	Financial Assurance
FA 2 - CA	Financial Assurance for Solid Waste Facilities
GCC_SANTA CLARA VALLEY - CA	Santa Clara Valley Groundwater Contamination Cleanups
HAZMAT INCIDENT_CONTRA COSTA COUNTY - CA	Contra Costa County Hazardous Materials Incident list
HAZMAT_CITY OF SAN JOSE - CA	City of San Jose Hazardous Material Facilities
HAZMAT_SACRAMENTO COUNTY - CA	Sacramento County Master Hazardous Materials Facility list
HAZMAT_SAN BERNARDINO COUNTY - CA	San Bernardino County Hazardous Material Permits
HAZMAT_SAN DIEGO COUNTY - CA	Hazardous Materials Management Division Database
HAZMAT_SANTA CLARA COUNTY - CA	Santa Clara County Hazardous Material Facilities
HAZWASTE_ORANGE COUNTY - CA	Orange County hazardous waste facilities
HIGH FIRE - CA	Fire Hazard Severity Zones
HIST CORTESE - CA	The Historical Hazardous Waste and Substances Sites List
HMS_LOS ANGELES COUNTY - CA	Los Angeles County Street Number List
HWM COMMERCIAL FACILITIES - CA	Hazardous Waste Management Commercial Facilities
HWP - CA	EnviroStor Permitted Facilities
HWT - CA	Hazardous Waste Transporters
MWMP - CA	Medical Waste Management Program
NFA - CA	No Further Action Sites
NFE - CA	Unconfirmed contaminated properties
PERCHLORATE 2 - CA	Perchlorate contaminted sites
PROPOSITION 65 - CA	Proposition 65 Records
RFR - CA	Regulated Facility Report
SITES INVENTORY_VENTURA COUNTY - CA	Ventura County Inventory of Closed Illegal Abandoned and Inactive Sites
SWAT - CA	SWAT Reports Summary Data
VCCP_VENTURA COUNTY - CA	Ventura County County Cleanup Program
WDS - CA	Waste Discharge System
WILDLANDS - CA	Preserves List
WIP - CA	Well Investigation Program

OTHER STATE DATABASE INFORMATION

OTHER

SEISMIC - CA	Seismic Hazards Zonation Program

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 equal to or higher than the subject property have been differentiated below from sites with an elevation lower than the subject property.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

STANDARD ENVIRONMENTAL RECORDS

FEDERAL CERCLIS LIST

CERCLIS: Comprehensive Environmental Response Compensation and Liability Act program sites reported to the Environmental Protection Agency and can be proposed for the NPL List

EQUAL/HIGHER ELEVATION	SITE ADDRESS	DIRECTION/DISTANCE	MAP ID	PAGE
DC POWER MERCURY	***9337 DOUGLAS DRIVE***	***SW / 0.193 mi.***	***D11***	***41***

SEMS_8R_ACTIVE SITES: The Active Site Inventory Report displays site and location information at active SEMS sites. An active site is one at which site assessment, removal, remedial, enforcement, cost recovery, or oversight activities are being planned or conducted. NPL sites include latitude and longitude information. For non-NPL sites, a brief site status is provided.

EQUAL/HIGHER ELEVATION	SITE ADDRESS	DIRECTION/DISTANCE	MAP ID	PAGE
DC POWER MERCURY	***9337 DOUGLAS DRIVE***	***SW / 0.193 mi.***	***D11***	***41***

FEDERAL RCRA GENERATORS LIST

RCRA_NONGEN: Resource Conservation and Recovery Act listing of licensed non-generators

EQUAL/HIGHER ELEVATION	SITE ADDRESS	DIRECTION/DISTANCE	MAP ID	PAGE
BOURNS MEDICAL SYSTS INC	9335 DOUGLAS	SW / 0.191 mi.	***D10***	***39***

LOWER ELEVATION	SITE ADDRESS	DIRECTION/DISTANCE	MAP ID	PAGE
HAZ MAT INC	9359 NARNIA DR	SW / 0.237 mi.	***E17***	***51***

RCRA_SQG: Resource Conservation and Recovery Act listing of licensed small quantity generators

LOWER ELEVATION	SITE ADDRESS	DIRECTION/DISTANCE	MAP ID	PAGE
SHERWIN-WILLIAMS CO THE	3280 CALL DR	SW / 0.244 mi.	***E20***	***54***

STATE AND TRIBAL LEAKING STORAGE TANK LISTS

LUST REG 8 - CA: Leaking underground storage tanks in Region 8: Orange Riverside San Bernardino counties.

LOWER ELEVATION	SITE ADDRESS	DIRECTION/DISTANCE	MAP ID	PAGE
THRIFTY OIL #341 ARCO #9711	***3399 VAN BUREN BLVD***	***WSW / 0.386 mi.***	***F22***	***58***
BROOKHURST MILL	***3315 VAN BUREN BLVD***	***WSW / 0.391 mi.***	***F25***	***83***
TEXACO SERVICE STATION	***3483 VAN BUREN BLVD***	***W / 0.405 mi.***	***G26***	***89***
UNOCAL #5714	***9501 INDIANA AVE***	***WSW / 0.422 mi.***	***F27***	***93***
76 STATION 5693	***9501 INDIANA AVENUE***	***WSW / 0.422 mi.***	***F28***	***101***

STANDARD ENVIRONMENTAL RECORDS *(cont.)*

STATE AND TRIBAL LEAKING STORAGE TANK LISTS (cont.)

LUST REG 8 - CA: Leaking underground storage tanks in Region 8: Orange Riverside San Bernardino counties.

LOWER ELEVATION	SITE ADDRESS	DIRECTION/DISTANCE	MAP ID	PAGE
CHEVRON #94702 (RAYS CHEVRON)	*3476 VAN BUREN BLVD*	*W / 0.425 mi.*	*G32*	*119*
CHEVRON #9-4702	*3476 VAN BUREN BLVD*	*W / 0.425 mi.*	*G33*	*124*

LUST_RIVERSIDE COUNTY - CA: Riverside county leaking underground storage tank sites

LOWER ELEVATION	SITE ADDRESS	DIRECTION/DISTANCE	MAP ID	PAGE
THRIFTY OIL #341 ARCO #9711	*3399 VAN BUREN BLVD*	*WSW / 0.386 mi.*	*F22*	*58*
BROOKHURST MILL	*3315 VAN BUREN BLVD*	*WSW / 0.391 mi.*	*F25*	*83*
TEXACO SERVICE STATION	*3483 VAN BUREN BLVD*	*W / 0.405 mi.*	*G26*	*89*
UNOCAL #5714	*9501 INDIANA AVE*	*WSW / 0.422 mi.*	*F27*	*93*
76 STATION 5693	*9501 INDIANA AVENUE*	*WSW / 0.422 mi.*	*F28*	*101*
CHEVRON #94702 (RAYS CHEVRON)	*3476 VAN BUREN BLVD*	*W / 0.425 mi.*	*G32*	*119*
CHEVRON #9-4702	*3476 VAN BUREN BLVD*	*W / 0.425 mi.*	*G33*	*124*

LOCAL LISTS OF HAZARDOUS WASTE / CONTAMINATED SITES

CORRECTIVE ACTION_RIVERSIDE COUNTY - CA: Riverside county corrective action sites list

LOWER ELEVATION	SITE ADDRESS	DIRECTION/DISTANCE	MAP ID	PAGE
THRIFTY OIL #341 ARCO #9711	3399 VAN BUREN BLVD	WSW / 0.386 mi.	*F23*	*82*
BROOKHURST MILL	3315 VAN BUREN BLVD	WSW / 0.391 mi.	*F24*	*83*
76 STATION #5693	9501 INDIANA AVE	WSW / 0.422 mi.	*F29*	*118*
UNOCAL #5714	9501 INDIANA AVE	WSW / 0.422 mi.	*F30*	*118*
CHEVRON #9-4702	3476 VAN BUREN BLVD	W / 0.425 mi.	*G31*	*119*
CHEVRON #9-4702 (RAY'S CHEVRON)	3476 VAN BUREN BLVD	W / 0.425 mi.	*G34*	*129*
SHERMAN INDIAN HIGH SCHOOL	9010 MAGNOLIA AVE	NNW / 0.601 mi.	*36*	*130*
J & R FAST FUEL / FORMER QUALITY GAS	9407 MAGNOLIA AVE	WNW / 0.630 mi.	*37*	*130*
MOBIL #18-HVR	9505 MAGNOLIA AVE	WNW / 0.701 mi.	*38*	*130*
ARLINGTON AUTOMOTIVE	9611 MAGNOLIA AVE	W / 0.774 mi.	*41*	*132*

ADDITIONAL ENVIRONMENTAL RECORDS

STATE- AND TRIBAL - EQUIVALENT CERCLIS

ENVIROSTOR - CA: Department of Toxic Substances Controls

LOWER ELEVATION	SITE ADDRESS	DIRECTION/DISTANCE	MAP ID	PAGE
AHLSWEDE FERTILIZER COMPANY	*9758 MAGNOLIA AV*	*W / 0.902 mi.*	*42*	*133*

ADDITIONAL ENVIRONMENTAL RECORDS *(cont.)*

OTHER ASCERTAINABLE RECORDS

DIGITAL OBSTACLE: The Digital Obstacle File describes all known obstacles of interest to aviation users in the U.S. with limited coverage of the Pacific the Caribbean Canada and Mexico. The obstacles are assigned unique numerical identifiers; accuracy codes and listed in order of ascending latitude within each state or area by FAA Region.

EQUAL/HIGHER ELEVATION	SITE ADDRESS	DIRECTION/DISTANCE	MAP ID	PAGE
N/R	33 54 47.14N, 117 25 39.90W	ESE / 0.509 mi.	*35*	*129*
N/R	33 55 10.60N, 117 25 24.60W	ENE / 0.711 mi.	*39*	*131*
N/R	33 55 19.20N, 117 25 09.80W	ENE / 0.987 mi.	*43*	*136*

LOWER ELEVATION	SITE ADDRESS	DIRECTION/DISTANCE	MAP ID	PAGE
N/R	33 55 33.61N, 117 25 41.85W	NE / 0.754 mi.	*40*	*132*

BOND EXPENDITURE PLAN - CA: Hazardous Substance Cleanup Bond Act of 1984 Article 7.5 of Health and Safety Code 25385 listing of orphan sites

LOWER ELEVATION	SITE ADDRESS	DIRECTION/DISTANCE	MAP ID	PAGE
AHLSWEDE FERTILIZER COMPANY	*9758 MAGNOLIA AV*	*W / 0.902 mi.*	*42*	*133*

HAZNET - CA: Listing of hazardous waste manifests from when hazardous waste is transported from generators to permitted recycling treatment storage or disposal facilities by registered hazardous waste transporters

EQUAL/HIGHER ELEVATION	SITE ADDRESS	DIRECTION/DISTANCE	MAP ID	PAGE
VACCHER PROPERTIES	3198 JACKSON ST	E / 0.170 mi.	*C6*	*35*
HUD INTOWN PROPERTIES	3178 JACKSON ST	ESE / 0.187 mi.	*C7*	*37*
PRO MOOP	9330 DOUGLAS DR	SSW / 0.189 mi.	*D8*	*37*
PRO MOLD INC	9330 DOUGLAS DR	SSW / 0.189 mi.	*D9*	*38*
DC POWER	9337 DOUGLAS DR	SW / 0.193 mi.	*D12*	*43*

LOWER ELEVATION	SITE ADDRESS	DIRECTION/DISTANCE	MAP ID	PAGE
KEITH & CASSANDRA SEARS	9108 INDIANA AVE	NE / 0.112 mi.	*B4*	*34*
INDIANA AVENUE PROJECT	9077 INDIANA AVE	NE / 0.166 mi.	*B5*	*34*
AQUATEMP INC	9330 NARNIA DRIVE	SW / 0.195 mi.	*E13*	*44*
1X HUD	3490 EVEREST	WNW / 0.213 mi.	*14*	*45*
NU-CAL PIPELINE CORP	9342 NARNIA DR	SW / 0.215 mi.	*E15*	*46*
PRINTING PLUS	9348 NARNIA DRIVE	SW / 0.225 mi.	*E16*	*48*
EXPRESSIONS SCREEN PRINT	9365 NARNIA DR	SW / 0.241 mi.	*E18*	*53*
FROME REALTY FUND ALPHA,LLC	3280 CALL DR	SW / 0.244 mi.	*E19*	*53*
SHERWIN-WILLIAMS CO THE	3280 CALL DR	SW / 0.244 mi.	*E21*	*56*

Following sites were unable to be mapped.

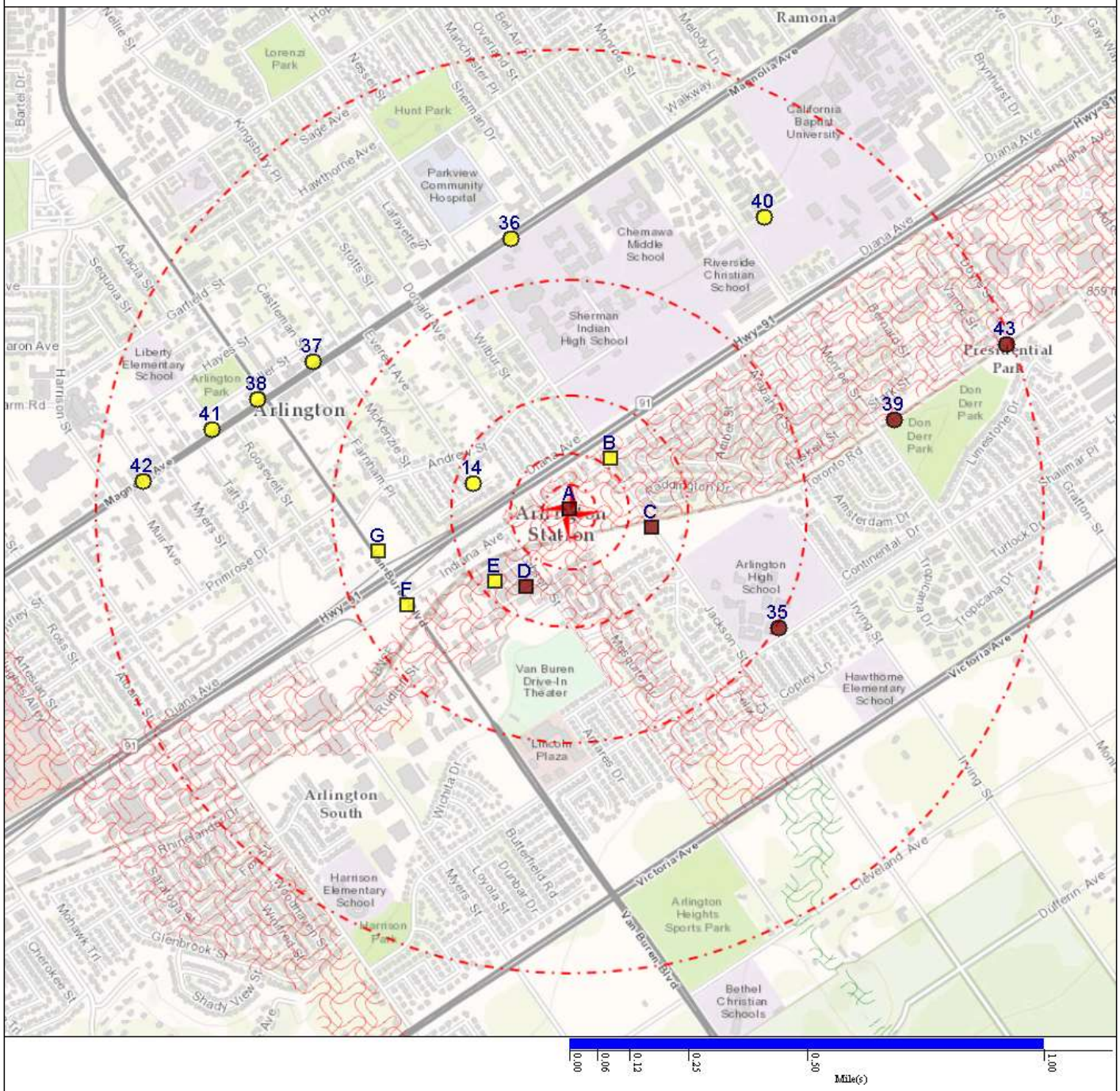
SITE NAME:	DATABASE(S):
1X CIGNA PROPERTY & CASUALTY INC.	HAZNET - CA

SITE NAME:	DATABASE(S):
1X CO OF RIVERSIDE HAZ MAT BRNCH	HAZNET - CA
1X RIVERSIDE UNIFIED SCHOOL DIST	HAZNET - CA
1X SPECIALIZED MOTOR SERVICE	HAZNET - CA
C & C TRANSPORTATION	HAZNET - CA
CALTRANS D-8/CONSTR/EA08-203204	HAZNET - CA
CITRUS ORCHARD	HIST UST - CA
CITY OF RIVERSIDE	HAZNET - CA
COUNTY OF RIVERSIDE	CORRECTIVE ACTION_Riverside County - CA
FOUR CORNERS PIPE LINE COMPANY	SLIC REG 8 - CA
HOME SAVINGS OF AMERICA	HAZNET - CA
JOHN ERWIN	HAZNET - CA
KEMPER REAL ESTATE MGMT	HAZNET - CA
LA SIERRA UNIVERSITY (FORMER LOMA LINDA)	CORRECTIVE ACTION_Riverside County - CA
LVW BROWN ESTATES INC	CORRECTIVE ACTION_Riverside County - CA
MCLANE FOOD SERVICE	CORRECTIVE ACTION_Riverside County - CA
REALTY DEALERS	HAZNET - CA
RIVERSIDE COUNTY EMERGENCY RESPONSE ESPERANZA FIRE	HAZNET - CA
RIVERSIDE COUNTY/CLANDESTINE DRUG LABS	HAZNET - CA
RIVERSIDE COUNTY/EMERG RESPONSE ONLY	HAZNET - CA
RIVERSIDE PLUME	SLIC REG 8 - CA
SCD LCC	HAZNET - CA
SOUTHERN CALIFORNIA EDISON - EL SOBRANTE SUB	HAZNET - CA
SUKUT EQUIPMENT INC	HAZNET - CA
TORNEY GENERAL HOSPITAL	BOND EXPENDITURE PLAN - CA, CORTESE - CA, ENVIROSTOR - CA
UCR - PARKING LOT 6	CORRECTIVE ACTION_Riverside County - CA
WEST RIVERSIDE SANITARY LANDFILL	ODI

PROPERTY PROXIMITY MAP

SUBJECT NAME: 9174 Indiana Ave
ADDRESS: 9174 Indiana Ave, Riverside, CA 92503
LAT/LONG: 33.916810 / -117.435400

PREPARED FOR: LSA Associates Inc
ORDER #: 9081
REPORT DATE: December 19, 2016



AREA MAP

SUBJECT NAME: 9174 Indiana Ave
ADDRESS: 9174 Indiana Ave, Riverside, CA 92503
LAT/LONG: 33.916810 / -117.435400

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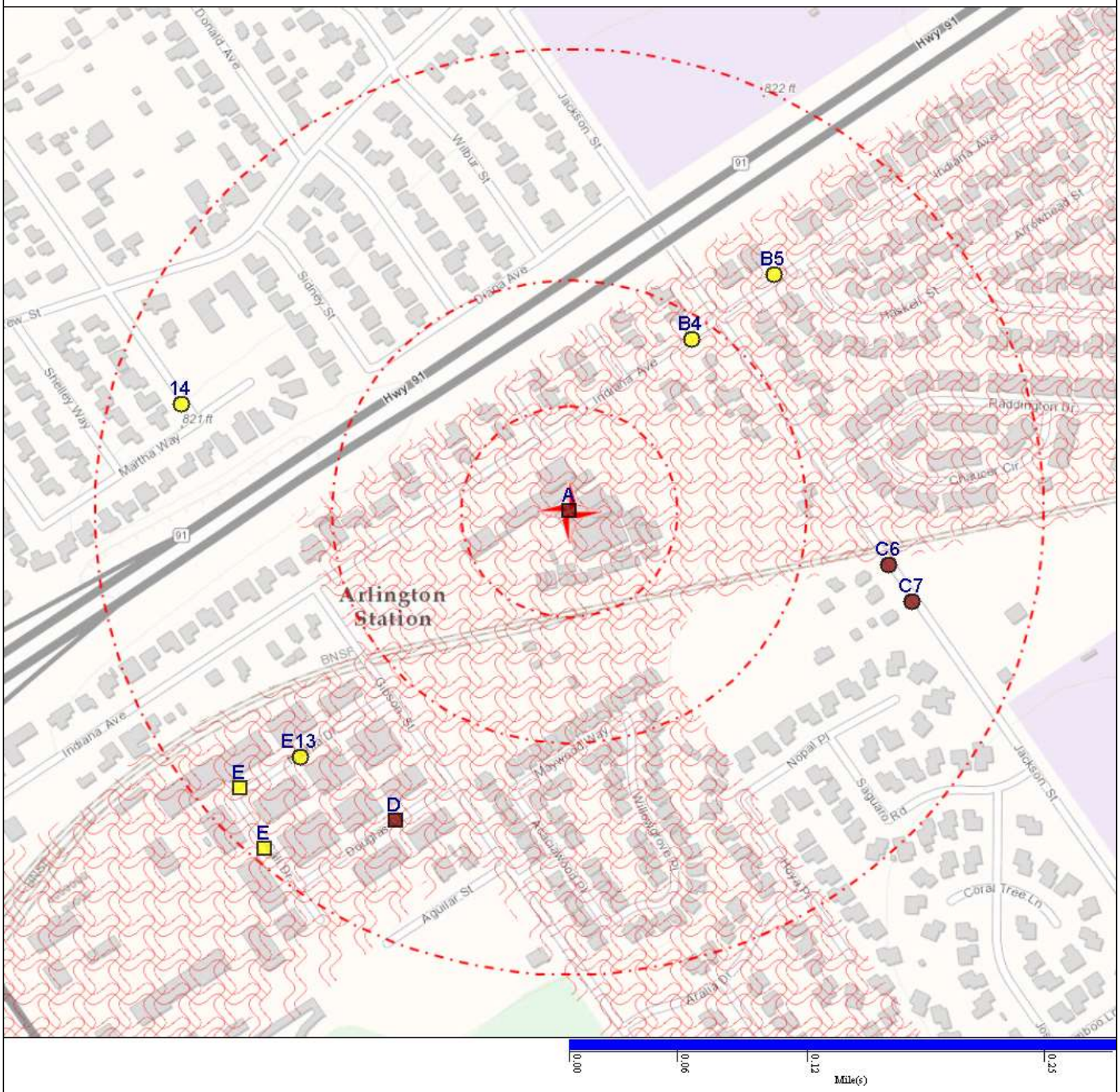

- Subject Property
- Fire Hazard Zone (No Data)
- Department of Defense (No Data)
- Indian Reservation (No Data)
- Equal/Higher Elevation
- CDC HAZDAT (No Data)
- DFIRM Floodzone 100
- Seismic (No Data)
- Lower Elevation
- Federal Lands (No Data)
- DFIRM Floodzone 500
- FEMA FloodZone 100
- National Priority List (No Data)
- FEMA FloodZone 500

Map Findings Summary does not include summary of Map Layers Data.

STANDARD ENVIRONMENTAL RECORDS

DATABASE	SUBJECT PROPERTY	SEARCH DISTANCE (MILES)	<1/8	1/8 - 1/4	1/4 - 1/2	1/2- 1	>1	TOTAL PLOTTED
FEDERAL RCRA NON-CORRACTS TSD FACILITIES LIST								
ARCHIVED RCRA TSDF		0.500	0	0	0	NR	NR	0
RCRA_TSDF		0.500	0	0	0	NR	NR	0
FEDERAL CERCLIS LIST								
CERCLIS		0.500	0	1	0	NR	NR	1
CERCLIS NFRAP		0.500	0	0	0	NR	NR	0
FEDERAL FACILITY		1.000	0	0	0	0	NR	0
SEMS_8R_ACTIVE SITES		0.500	0	1	0	NR	NR	1
SEMS_8R_ARCHIVED SITES		0.500	0	0	0	NR	NR	0
FEDERAL RCRA CORRACTS FACILITIES LIST								
CORRACTS		1.000	0	0	0	0	NR	0
FEDERAL DELISTED NPL SITE LIST								
DELISTED NPL		1.000	0	0	0	0	NR	0
DELISTED PROPOSED NPL		1.000	0	0	0	0	NR	0
SEMS_DELETED NPL		1.000	0	0	0	0	NR	0
FEDERAL ERNS LIST								
ERNS		SP	NR	NR	NR	NR	NR	0
FEDERAL INSTITUTIONAL CONTROLS / ENGINEERING CONTROLS REGISTRIES								
FED E C		0.500	0	0	0	NR	NR	0
FED I C		0.500	0	0	0	NR	NR	0
FED-PUBLISHED INSTITUTIONAL CONTROLS		0.500	0	0	0	NR	NR	0
RCRA IC_EC		0.250	0	0	NR	NR	NR	0
FEDERAL NPL SITE LIST								
NPL		1.000	0	0	0	0	NR	0

NPL EPA R1 GIS	1.000	0	0	0	0	NR	0
NPL EPA R6 GIS	1.000	0	0	0	0	NR	0
NPL EPA R8 GIS	1.000	0	0	0	0	NR	0
NPL EPA R9 GIS	1.000	0	0	0	0	NR	0
NPL LIENS	SP	NR	NR	NR	NR	NR	0
PART NPL	1.000	0	0	0	0	NR	0
PROPOSED NPL	1.000	0	0	0	0	NR	0
SEMS_FINAL NPL	1.000	0	0	0	0	NR	0
SEMS_PROPOSED NPL	1.000	0	0	0	0	NR	0
FEDERAL RCRA GENERATORS LIST							
RCRA_CESQG	0.250	0	0	NR	NR	NR	0
RCRA_FULL_DETAIL	0.250	0	0	NR	NR	NR	0
RCRA_LQG	0.250	0	0	NR	NR	NR	0
RCRA_NONGEN	0.250	0	2	NR	NR	NR	2
RCRA_SQG	0.250	0	1	NR	NR	NR	1
STATE AND TRIBAL REGISTERED STORAGE TANK LISTS							
FEMA UST	0.250	0	0	NR	NR	NR	0
INDIAN UST R1	0.250	0	0	NR	NR	NR	0
INDIAN UST R10	0.250	0	0	NR	NR	NR	0
INDIAN UST R2	0.250	0	0	NR	NR	NR	0
INDIAN UST R4	0.250	0	0	NR	NR	NR	0
INDIAN UST R5	0.250	0	0	NR	NR	NR	0
INDIAN UST R6	0.250	0	0	NR	NR	NR	0
INDIAN UST R7	0.250	0	0	NR	NR	NR	0
INDIAN UST R8	0.250	0	0	NR	NR	NR	0
INDIAN UST R9	0.250	0	0	NR	NR	NR	0
AST - CA	0.250	0	0	NR	NR	NR	0
AST_CONTRA COSTA COUNTY - CA	0.250	0	0	NR	NR	NR	0
AST_KERN COUNTY - CA	0.250	0	0	NR	NR	NR	0
AST_ORANGE COUNTY - CA	0.250	0	0	NR	NR	NR	0

AST_PLACER COUNTY - CA	0.250	0	0	NR	NR	NR	0
AST_YOLO COUNTY - CA	0.250	0	0	NR	NR	NR	0
BP HW OUT_VENTURA COUNTY - CA	0.250	0	0	NR	NR	NR	0
BUSINESS INVENTORY_SAN MATEO COUNTY - CA	0.250	0	0	NR	NR	NR	0
CLOSED UST_VENTURA COUNTY - CA	0.250	0	0	NR	NR	NR	0
CS_PLACER COUNTY - CA	1.000	0	0	0	0	NR	0
FID UST - CA	0.250	0	0	NR	NR	NR	0
HIST UST - CA	0.250	0	0	NR	NR	NR	0
LOP_SANTA CLARA COUNTY - CA	0.500	0	0	0	NR	NR	0
SITE LIST_CONTRA COSTA COUNTY - CA	0.250	0	0	NR	NR	NR	0
UST - CA	0.250	0	0	NR	NR	NR	0
UST_ALAMEDA COUNTY - CA	0.250	0	0	NR	NR	NR	0
UST_CITY OF LONG BEACH - CA	0.250	0	0	NR	NR	NR	0
UST_CITY OF TORRANCE - CA	0.250	0	0	NR	NR	NR	0
UST_EL SEGUNDO CITY - CA	0.250	0	0	NR	NR	NR	0
UST_KERN COUNTY - CA	0.250	0	0	NR	NR	NR	0
UST_MARIN COUNTY - CA	0.250	0	0	NR	NR	NR	0
UST_MENDOCINO COUNTY - CA	0.250	0	0	NR	NR	NR	0
UST_NAPA COUNTY - CA	0.250	0	0	NR	NR	NR	0
UST_ORANGE COUNTY - CA	0.250	0	0	NR	NR	NR	0
UST_PLACER COUNTY - CA	0.250	0	0	NR	NR	NR	0

UST_RIVERSIDE COUNTY - CA	0.250	0	0	NR	NR	NR	0
UST_SAN FRANCISCO COUNTY - CA	0.250	0	0	NR	NR	NR	0
UST_SAN JOAQUIN COUNTY - CA	0.250	0	0	NR	NR	NR	0
UST_SOLANO COUNTY - CA	0.250	0	0	NR	NR	NR	0
UST_SUTTER COUNTY - CA	0.250	0	0	NR	NR	NR	0
UST_YOLO COUNTY - CA	0.250	0	0	NR	NR	NR	0
RECORDS OF EMERGENCY RELEASE REPORTS							
HMIRS (DOT)	SP	NR	NR	NR	NR	NR	0
STATE AND TRIBAL LEAKING STORAGE TANK LISTS							
INDIAN LUST R1	0.500	0	0	0	NR	NR	0
INDIAN LUST R10	0.500	0	0	0	NR	NR	0
INDIAN LUST R2	0.500	0	0	0	NR	NR	0
INDIAN LUST R4	0.500	0	0	0	NR	NR	0
INDIAN LUST R5	0.500	0	0	0	NR	NR	0
INDIAN LUST R6	0.500	0	0	0	NR	NR	0
INDIAN LUST R7	0.500	0	0	0	NR	NR	0
INDIAN LUST R8	0.500	0	0	0	NR	NR	0
INDIAN LUST R9	0.500	0	0	0	NR	NR	0
LUFT_ALAMEDA COUNTY - CA	0.500	0	0	0	NR	NR	0
LUST ORANGE COUNTY - CA	0.500	0	0	0	NR	NR	0
LUST REG 1 - CA	0.500	0	0	0	NR	NR	0
LUST REG 2 - CA	0.500	0	0	0	NR	NR	0
LUST REG 3 - CA	0.500	0	0	0	NR	NR	0
LUST REG 4 - CA	0.500	0	0	0	NR	NR	0
LUST REG 5 - CA	0.500	0	0	0	NR	NR	0
LUST REG 6 - CA	0.500	0	0	0	NR	NR	0
LUST REG 7 - CA	0.500	0	0	0	NR	NR	0
LUST REG 8 - CA	0.500	0	0	7	NR	NR	7

LUST REG 9 - CA	0.500	0	0	0	NR	NR	0
LUST_HAZMAT_YOLO COUNTY - CA	0.500	0	0	0	NR	NR	0
LUST_KERN COUNTY - CA	0.500	0	0	0	NR	NR	0
LUST_RIVERSIDE COUNTY - CA	0.500	0	0	7	NR	NR	7
LUST_SUTTER COUNTY - CA	0.500	0	0	0	NR	NR	0
LUST_SAN FRANCISCO COUNTY - CA	0.500	0	0	0	NR	NR	0
LUST_SAN MATEO COUNTY - CA	0.500	0	0	0	NR	NR	0
LUST_SOLANO COUNTY - CA	0.500	0	0	0	NR	NR	0
LUST_SONOMA COUNTY - CA	0.500	0	0	0	NR	NR	0
LUST_VENTURA COUNTY - CA	0.500	0	0	0	NR	NR	0
SLIC REG 1 - CA	0.500	0	0	0	NR	NR	0
SLIC REG 2 - CA	0.500	0	0	0	NR	NR	0
SLIC REG 3 - CA	0.500	0	0	0	NR	NR	0
SLIC REG 4 - CA	0.500	0	0	0	NR	NR	0
SLIC REG 5 - CA	0.500	0	0	0	NR	NR	0
SLIC REG 6 - CA	0.500	0	0	0	NR	NR	0
SLIC REG 7 - CA	0.500	0	0	0	NR	NR	0
SLIC REG 8 - CA	0.500	0	0	0	NR	NR	0
SLIC REG 9 - CA	0.500	0	0	0	NR	NR	0
SLIC_ALAMEDA COUNTY - CA	0.500	0	0	0	NR	NR	0
LOCAL LISTS OF HAZARDOUS WASTE / CONTAMINATED SITES							
CORRECTIVE ACTION_RIVERSIDE COUNTY - CA	1.000	0	0	6	4	NR	10
TOXIC SITE_SACRAMENTO COUNTY - CA	1.000	0	0	0	0	NR	0
STATE AND TRIBAL LANDFILL AND/OR SOLID WASTE DISPOSAL SITE LISTS							

LF_LOS ANGELES COUNTY - CA	0.500	0	0	0	NR	NR	0
LF_SAN DIEGO COUNTY - CA	0.500	0	0	0	NR	NR	0
SWF/LF - CA	0.500	0	0	0	NR	NR	0
SWF_LOS ANGELES COUNTY - CA	0.500	0	0	0	NR	NR	0
SWF_SAN DIEGO COUNTY - CA	0.500	0	0	0	NR	NR	0
STATE- AND TRIBAL - EQUIVALENT NPL							
RESPONSE - CA	1.000	0	0	0	0	NR	0
STATE- AND TRIBAL - EQUIVALENT CERCLIS							
TOXIC PITS - CA	1.000	0	0	0	0	NR	0
STATE AND TRIBAL VOLUNTARY CLEANUP SITES							
VCP - CA	0.500	0	0	0	NR	NR	0
OTHER ASCERTAINABLE RECORDS							
CORRECTIVE ACTIONS_2020	0.500	0	0	0	NR	NR	0
ADDITIONAL ENVIRONMENTAL RECORDS							
LOCAL LISTS OF LANDFILL / SOLID WASTE DISPOSAL SITES							
DEBRIS REGION 9	0.500	0	0	0	NR	NR	0
INDIAN ODI R8	0.500	0	0	0	NR	NR	0
ODI	0.500	0	0	0	NR	NR	0
TRIBAL ODI	0.500	0	0	0	NR	NR	0
HAULERS - CA	0.500	0	0	0	NR	NR	0
SWRCY - CA	0.500	0	0	0	NR	NR	0
LOCAL LISTS OF HAZARDOUS WASTE / CONTAMINATED SITES							
FED CDL	SP	NR	NR	NR	NR	NR	0
US HIST CDL	SP	NR	NR	NR	NR	NR	0
CALARP_KERN COUNTY - CA	0.250	0	0	NR	NR	NR	0
CASE LIST_SAN DIEGO COUNTY - CA	0.500	0	0	0	NR	NR	0
CDL - CA	SP	NR	NR	NR	NR	NR	0
CS_NAPA COUNTY - CA	0.500	0	0	0	NR	NR	0

ADDITIONAL ENVIRONMENTAL RECORDS *(cont.)*

DATABASE	SUBJECT PROPERTY	SEARCH DISTANCE (MILES)	<1/8	1/8 - 1/4	1/4 - 1/2	1/2- 1	>1	TOTAL PLOTTED
SCH - CA		0.250	0	0	NR	NR	NR	0
LOCAL BROWNFIELD LISTS								
FED BROWNFIELDS		0.500	0	0	0	NR	NR	0
TRIBAL BROWNFIELDS		0.500	0	0	0	NR	NR	0
LOCAL LAND RECORDS								
LIENS 2		SP	NR	NR	NR	NR	NR	0
DEED - CA		0.500	0	0	0	NR	NR	0
LIENS - CA		SP	NR	NR	NR	NR	NR	0
STATE- AND TRIBAL - EQUIVALENT CERCLIS								
ENVIROSTOR - CA		1.000	0	0	0	1	NR	1
RECORDS OF EMERGENCY RELEASE REPORTS								
INDUSTRIAL CLEANUP_ORANGE COUNTY - CA		0.125	0	NR	NR	NR	NR	0
LDS - CA		SP	NR	NR	NR	NR	NR	0
MCS - CA		1.000	0	0	0	0	NR	0
SML_LOS ANGELES COUNTY - CA		0.125	0	NR	NR	NR	NR	0
OTHER ASCERTAINABLE RECORDS								
AFS		SP	NR	NR	NR	NR	NR	0
BRS		SP	NR	NR	NR	NR	NR	0
CDC HAZDAT		SP	NR	NR	NR	NR	NR	0
COAL ASH DOE		0.500	0	0	0	NR	NR	0
COAL ASH EPA		0.500	0	0	0	NR	NR	0
COAL GAS		1.000	0	0	0	0	NR	0
CONSENT (DECREES)		1.000	0	0	0	0	NR	0
DIGITAL OBSTACLE		1.000	0	0	0	4	NR	4
DOD		1.000	0	0	0	0	NR	0
DOT OPS		SP	NR	NR	NR	NR	NR	0
ECHO		SP	NR	NR	NR	NR	NR	0

ADDITIONAL ENVIRONMENTAL RECORDS *(cont.)*

DATABASE	SUBJECT PROPERTY	SEARCH DISTANCE (MILES)	<1/8	1/8 - 1/4	1/4 - 1/2	1/2- 1	>1	TOTAL PLOTTED
ENOI		SP	NR	NR	NR	NR	NR	0
FA HWF		SP	NR	NR	NR	NR	NR	0
FEDLAND		1.000	0	0	0	0	NR	0
FRS		SP	NR	NR	NR	NR	NR	0
FTTS		SP	NR	NR	NR	NR	NR	0
FTTS INSP		SP	NR	NR	NR	NR	NR	0
FUDS		1.000	0	0	0	0	NR	0
ICIS		SP	NR	NR	NR	NR	NR	0
INDIAN RESERVATION		1.000	0	0	0	0	NR	0
LEAD_SMELTER		SP	NR	NR	NR	NR	NR	0
LUCIS		0.500	0	0	0	NR	NR	0
MINES		0.250	0	0	NR	NR	NR	0
MLTS		SP	NR	NR	NR	NR	NR	0
NPL AOC		1.000	0	0	0	0	NR	0
OSHA		SP	NR	NR	NR	NR	NR	0
PADS		SP	NR	NR	NR	NR	NR	0
PCB TRANSFORMER		SP	NR	NR	NR	NR	NR	0
RAATS		SP	NR	NR	NR	NR	NR	0
RADINFO		SP	NR	NR	NR	NR	NR	0
RMP		0.500	0	0	0	NR	NR	0
ROD		1.000	0	0	0	0	NR	0
SCRD DRYCLEANERS		0.250	0	0	NR	NR	NR	0
SEMS_SMELTER		SP	NR	NR	NR	NR	NR	0
SSTS		SP	NR	NR	NR	NR	NR	0
TOSCA-CHEMICAL		SP	NR	NR	NR	NR	NR	0
TOSCA-PLANT		SP	NR	NR	NR	NR	NR	0
TRIS		SP	NR	NR	NR	NR	NR	0
UMTRA		0.500	0	0	0	NR	NR	0

AOC_SAN GABRIEL VALLEY - CA	0.500	0	0	0	NR	NR	0
BOND EXPENDITURE PLAN - CA	1.000	0	0	0	1	NR	1
CHMIRS - CA	SP	NR	NR	NR	NR	NR	0
CORTESE - CA	0.500	0	0	0	NR	NR	0
CUPA_FRESNO COUNTY - CA	0.250	0	0	NR	NR	NR	0
DAYCARE - CA	SP	NR	NR	NR	NR	NR	0
DRYCLEANERS - CA	0.250	0	0	NR	NR	NR	0
DRYCLEANERS_AMADOR COUNTY - CA	0.250	0	0	NR	NR	NR	0
DRYCLEANERS_ANTELOPE VALLEY - CA	0.250	0	0	NR	NR	NR	0
DRYCLEANERS_BAY AREA - CA	0.250	0	0	NR	NR	NR	0
DRYCLEANERS_BUTTE COUNTY - CA	0.250	0	0	NR	NR	NR	0
DRYCLEANERS_CALAVERAS COUNTY - CA	0.250	0	0	NR	NR	NR	0
DRYCLEANERS_COLUSA COUNTY - CA	0.250	0	0	NR	NR	NR	0
DRYCLEANERS_EASTERN KERN COUNTY - CA	0.250	0	0	NR	NR	NR	0
DRYCLEANERS_EL DORADO COUNTY - CA	0.250	0	0	NR	NR	NR	0
DRYCLEANERS_FEATHER RIVER - CA	0.250	0	0	NR	NR	NR	0
DRYCLEANERS_GLENN COUNTY - CA	0.250	0	0	NR	NR	NR	0
DRYCLEANERS_GREAT BASIN UNIFIED - CA	0.250	0	0	NR	NR	NR	0
DRYCLEANERS_IMPERIAL COUNTY - CA	0.250	0	0	NR	NR	NR	0
DRYCLEANERS_LAKE COUNTY - CA	0.250	0	0	NR	NR	NR	0
DRYCLEANERS_LASSEN COUNTY - CA	0.250	0	0	NR	NR	NR	0
DRYCLEANERS_MENDOCINO COUNTY - CA	0.250	0	0	NR	NR	NR	0

ADDITIONAL ENVIRONMENTAL RECORDS *(cont.)*

DATABASE	SUBJECT PROPERTY	SEARCH DISTANCE (MILES)	<1/8	1/8 - 1/4	1/4 - 1/2	1/2- 1	>1	TOTAL PLOTTED
DRYCLEANERS_MOJAVE DESERT - CA		0.250	0	0	NR	NR	NR	0
DRYCLEANERS_MONTEREY BAY - CA		0.250	0	0	NR	NR	NR	0
DRYCLEANERS_NORTH COAST UNIFIED - CA		0.250	0	0	NR	NR	NR	0
DRYCLEANERS_NORTHERN SIERRA - CA		0.250	0	0	NR	NR	NR	0
DRYCLEANERS_NORTHERN SONOMA COUNTY - CA		0.250	0	0	NR	NR	NR	0
DRYCLEANERS_PLACER COUNTY - CA		0.250	0	0	NR	NR	NR	0
DRYCLEANERS_SACRAMENTO COUNTY - CA		0.250	0	0	NR	NR	NR	0
DRYCLEANERS_SAN DIEGO COUNTY - CA		0.250	0	0	NR	NR	NR	0
DRYCLEANERS_SAN JOAQUIN VALLEY - CA		0.250	0	0	NR	NR	NR	0
DRYCLEANERS_SAN LUIS OBISPO - CA		0.250	0	0	NR	NR	NR	0
DRYCLEANERS_SANTA BARBARA COUNTY - CA		0.250	0	0	NR	NR	NR	0
DRYCLEANERS_SHASTA COUNTY - CA		0.250	0	0	NR	NR	NR	0
DRYCLEANERS_SISKIYOU COUNTY - CA		0.250	0	0	NR	NR	NR	0
DRYCLEANERS_SOUTH COAST - CA		0.250	0	0	NR	NR	NR	0
DRYCLEANERS_TEHAMA COUNTY - CA		0.250	0	0	NR	NR	NR	0
DRYCLEANERS_TUOLUMNE COUNTY - CA		0.250	0	0	NR	NR	NR	0
DRYCLEANERS_VENTURA COUNTY - CA		0.250	0	0	NR	NR	NR	0

DRYCLEANERS_YOLO -SOLANO COUNTIES - CA		0.250	0	0	NR	NR	NR	0
EMI - CA		SP	NR	NR	NR	NR	NR	0
FA - CA		SP	NR	NR	NR	NR	NR	0
FA 2 - CA		SP	NR	NR	NR	NR	NR	0
GCC_SANTA CLARA VALLEY - CA		0.500	0	0	0	NR	NR	0
HAZMAT INCIDENT_CONTRA COSTA COUNTY - CA		0.250	0	0	NR	NR	NR	0
HAZMAT_CITY OF SAN JOSE - CA		0.250	0	0	NR	NR	NR	0
HAZMAT_SACRAMENTO COUNTY - CA		0.250	0	0	NR	NR	NR	0
HAZMAT_SAN BERNARDINO COUNTY - CA		0.250	0	0	NR	NR	NR	0
HAZMAT_SAN DIEGO COUNTY - CA		0.250	0	0	NR	NR	NR	0
HAZMAT_SANTA CLARA COUNTY - CA		0.250	0	0	NR	NR	NR	0
HAZNET - CA	X	0.250	1	13	NR	NR	NR	14
HAZWASTE_ORANGE COUNTY - CA		0.500	0	0	0	NR	NR	0
HIGH FIRE - CA		1.000	0	0	0	0	NR	0
HIST CORTESE - CA		0.500	0	0	0	NR	NR	0
HMS_LOS ANGELES COUNTY - CA		0.250	0	0	NR	NR	NR	0
HWM COMMERCIAL FACILITIES - CA		0.250	0	0	NR	NR	NR	0
HWP - CA		1.000	0	0	0	0	NR	0
HWT - CA		0.250	0	0	NR	NR	NR	0
MWMP - CA		0.250	0	0	NR	NR	NR	0
NFA - CA		0.500	0	0	0	NR	NR	0
NFE - CA		0.500	0	0	0	NR	NR	0
PERCHLORATE 2 - CA		0.500	0	0	0	NR	NR	0
PROPOSITION 65 - CA		1.000	0	0	0	0	NR	0

ADDITIONAL ENVIRONMENTAL RECORDS *(cont.)*

DATABASE	SUBJECT PROPERTY	SEARCH DISTANCE (MILES)	<1/8	1/8 - 1/4	1/4 - 1/2	1/2- 1	>1	TOTAL PLOTTED
RFR - CA		SP	NR	NR	NR	NR	NR	0
SITES INVENTORY_VENTURA COUNTY - CA		1.000	0	0	0	0	NR	0
SWAT - CA		SP	NR	NR	NR	NR	NR	0
VCCP_VENTURA COUNTY - CA		0.500	0	0	0	NR	NR	0
WDS - CA		SP	NR	NR	NR	NR	NR	0
WILDLANDS - CA		1.000	0	0	0	0	NR	0
WIP - CA		0.250	0	0	NR	NR	NR	0

OTHER STATE DATABASE INFORMATION

OTHER

SEISMIC - CA	1.000	0	0	0	0	NR	0

NOTES:

SP - Subject Property

NR - Not Requested at this search distance

Sites may be listed in more than one database

Map Id: A1
Direction:
Distance:
Actual: Not Available
Elevation:
Relative:

Site Name: RUSD HAWTHORNE ELEMENTARY SCHOOL
9174 INDIANA AVE
RIVERSIDE, CA 92503

Database(s): [HAZNET - CA]

Envirosite ID: 30885686
EPA ID: CAC002578649

HAZNET - CA

Year :	2004
Contact Name :	RHONDA RITHMIRE
Facility Mailing Address :	3380 14TH ST, RIVERSIDE, CA 92501
Contact Phone :	9097887286

Waste Generator Summary 2004

Generator EPA ID :	CAC002578649
Generator County :	Riverside
TSDF EPA ID :	CAD008364432
TSDF Disposal County :	Los Angeles
State Waste :	Laboratory waste chemicals
Disposal Method :	Transfer station
Tons :	0.12

Generator EPA ID :	CAC002578649
Generator County :	Riverside
TSDF EPA ID :	CAD008364432
TSDF Disposal County :	Los Angeles
State Waste :	Laboratory waste chemicals
Disposal Method :	Treatment, tank
Tons :	0.19

Map Id: A2
Direction:
Distance:
Actual: Not Available
Elevation:
Relative:

Site Name: HAWTHORNE ELEM SCH/RIVERSIDE USD
9174 INDIANA AVE
RIVERSIDE, CA 92503

Database(s): [HAZNET - CA]

Envirosite ID: 30861421
EPA ID: CAC001463984

HAZNET - CA

Year :	1998
Contact Name :	KATHY SISCO/CONTR
Facility Mailing Address :	3070 WASHINGTON ST, RIVERSIDE, CA 925160000
Contact Phone :	9097817740

Map Id: A2
Direction:
Distance:
Actual: Not Available
Elevation:
Relative:

Site Name: HAWTHORNE ELEM SCH/RIVERSIDE USD
9174 INDIANA AVE
RIVERSIDE, CA 92503

Database(s): [HAZNET - CA] ***(Cont.)***

Envirosite ID: 30861421
EPA ID: CAC001463984

HAZNET - CA ***(Cont.)***

Waste Generator Summary 1999

Generator EPA ID :	CAC001463984
Generator County :	Riverside
TSDF EPA ID :	CAD009007626
TSDF Disposal County :	Los Angeles
State Waste :	Asbestos containing waste
Disposal Method :	Disposal, landfill
Tons :	36.2404

Waste Generator Summary 1998

Generator EPA ID :	CAC001463984
Generator County :	Riverside
TSDF EPA ID :	CAD009007626
TSDF Disposal County :	Los Angeles
State Waste :	Asbestos containing waste
Disposal Method :	Disposal, landfill
Tons :	3.7926

Map Id: A3
Direction:
Distance:
Actual: Not Available
Elevation:
Relative:

Site Name: HAWTHORNE ELEMENTARY SCHOOL
9174 INDIANA AVENUE
RIVERSIDE, CA 92503

Database(s): [HAZNET - CA]

Envirosite ID: 31037962
EPA ID: CAL000113127

HAZNET - CA

Year :	2004
Contact Name :	N/R
Facility Mailing Address :	PO BOX 800, RIVERSIDE, CA 925162800
Contact Phone :	9097887377

Year :	2003
Contact Name :	N/R
Facility Mailing Address :	PO BOX 800, RIVERSIDE, CA 925162800

Map Id: A3
Direction:
Distance:
Actual: Not Available
Elevation:
Relative:

Site Name: HAWTHORNE ELEMENTARY SCHOOL
9174 INDIANA AVENUE
RIVERSIDE, CA 92503

Database(s): [HAZNET - CA] ***(Cont.)***

Envirosite ID: 31037962
EPA ID: CAL000113127

HAZNET - CA ***(Cont.)***

Contact Phone :	9097887377

Year :	2002
Contact Name :	N/R
Facility Mailing Address :	PO BOX 800, RIVERSIDE, CA 925162800
Contact Phone :	9097887377

Year :	2001
Contact Name :	N/R
Facility Mailing Address :	PO BOX 800, RIVERSIDE, CA 925162800
Contact Phone :	9097887377

Year :	1993
Contact Name :	N/R
Facility Mailing Address :	PO BOX 800, RIVERSIDE, CA 925162800
Contact Phone :	9097887377

Waste Generator Summary 2004

Generator EPA ID :	CAL000113127
Generator County :	Riverside
TSDF EPA ID :	CAT080033681
TSDF Disposal County :	Los Angeles
State Waste :	Other organic solids
Disposal Method :	Disposal, landfill
Tons :	0.5

Waste Generator Summary 2003

Generator EPA ID :	CAL000113127
Generator County :	Riverside
TSDF EPA ID :	CAT080033681
TSDF Disposal County :	Los Angeles
State Waste :	Other organic solids
Disposal Method :	Disposal, landfill
Tons :	0.4

Waste Generator Summary 2002

Generator EPA ID :	CAL000113127

Map Id: A3
Direction:
Distance:
Actual: Not Available
Elevation:
Relative:

Site Name: HAWTHORNE ELEMENTARY SCHOOL
9174 INDIANA AVENUE
RIVERSIDE, CA 92503

Database(s): [HAZNET - CA] ***(Cont.)***

Envirosite ID: 31037962
EPA ID: CAL000113127

HAZNET - CA ***(Cont.)***

Generator County :	Riverside
TSDF EPA ID :	CAT080033681
TSDF Disposal County :	Los Angeles
State Waste :	Other organic solids
Disposal Method :	Disposal, landfill
Tons :	0.45

Waste Generator Summary 2001

Generator EPA ID :	CAL000113127
Generator County :	Riverside
TSDF EPA ID :	CAD099452708
TSDF Disposal County :	Los Angeles
State Waste :	Waste oil and mixed oil
Disposal Method :	Recycler
Tons :	0.114

Generator EPA ID :	CAL000113127
Generator County :	Riverside
TSDF EPA ID :	CAT080033681
TSDF Disposal County :	Los Angeles
State Waste :	Other organic solids
Disposal Method :	Disposal, landfill
Tons :	0.475

Waste Generator Summary 2000

Generator EPA ID :	CAL000113127
Generator County :	Riverside
TSDF EPA ID :	CAT080033681
TSDF Disposal County :	Los Angeles
State Waste :	Other organic solids
Disposal Method :	Disposal, landfill
Tons :	0.45

Waste Generator Summary 1999

Generator EPA ID :	CAL000113127
Generator County :	Riverside

Map Id: A3
Direction:
Distance:
Actual: Not Available
Elevation:
Relative:

Site Name: HAWTHORNE ELEMENTARY SCHOOL
9174 INDIANA AVENUE
RIVERSIDE, CA 92503

Database(s): [HAZNET - CA] ***(Cont.)***

Envirosite ID: 31037962
EPA ID: CAL000113127

HAZNET - CA ***(Cont.)***

TSDF EPA ID :	CAD000088252
TSDF Disposal County :	Los Angeles
State Waste :	Other organic solids
Disposal Method :	Transfer station
Tons :	0.15

Generator EPA ID :	CAL000113127
Generator County :	Riverside
TSDF EPA ID :	CAT080033681
TSDF Disposal County :	Los Angeles
State Waste :	Other organic solids
Disposal Method :	Disposal, landfill
Tons :	0.2

Generator EPA ID :	CAL000113127
Generator County :	Riverside
TSDF EPA ID :	CAT080033681
TSDF Disposal County :	Los Angeles
State Waste :	Other organic solids
Disposal Method :	Transfer station
Tons :	0.075

Waste Generator Summary 1993

Generator EPA ID :	CAL000113127
Generator County :	Riverside
TSDF EPA ID :	CAT000646117
TSDF Disposal County :	Kings
State Waste :	Liquids with polychloronated biphenyls >= 50 Mg./L
Disposal Method :	Disposal, landfill
Tons :	0.4408

Map Id: B4
Direction: NE
Distance: 0.112 mi.
Actual: 591.950 ft.
Elevation: 0.156 mi. / 823.491 ft.
Relative: Lower

Site Name: KEITH & CASSANDRA SEARS
9108 INDIANA AVE
RIVERSIDE, CA 92503

Database(s): [HAZNET - CA]

Envirosite ID: 30885999
EPA ID: CAC002576162

HAZNET - CA

Year :	2004
Contact Name :	KEITH & CASSANDRA SEARS
Facility Mailing Address :	9108 INDIANA AVE, RIVERSIDE, CA 92503
Contact Phone :	9093433452

Waste Generator Summary 2004

Generator EPA ID :	CAC002576162
Generator County :	Riverside
TSDF EPA ID :	CAT080033681
TSDF Disposal County :	Los Angeles
State Waste :	Other organic solids
Disposal Method :	Disposal, landfill
Tons :	0.05

Map Id: B5
Direction: NE
Distance: 0.166 mi.
Actual: 878.354 ft.
Elevation: 0.156 mi. / 822.835 ft.
Relative: Lower

Site Name: INDIANA AVENUE PROJECT
9077 INDIANA AVE
RIVERSIDE, CA 92522

Database(s): [HAZNET - CA]

Envirosite ID: 30939229
EPA ID: CAC002638712

HAZNET - CA

Year :	2009
Contact Name :	TOM BROOKS
Facility Mailing Address :	4250 BROCKTON AVE STE 200, RIVERSIDE, CA 92501
Contact Phone :	9513416511

Waste Generator Summary 2009

Generator EPA ID :	CAC002638712
Generator County :	Riverside
TSDF EPA ID :	AZC950823111
TSDF Disposal County :	Unknown
State Waste :	Asbestos containing waste

Map Id: B5
Direction: NE
Distance: 0.166 mi.
Actual: 878.354 ft.
Elevation: 0.156 mi. / 822.835 ft.
Relative: Lower

Site Name: INDIANA AVENUE PROJECT
9077 INDIANA AVE
RIVERSIDE, CA 92522

Database(s): [HAZNET - CA] ***(Cont.)***

Envirosite ID: 30939229
EPA ID: CAC002638712

HAZNET - CA ***(Cont.)***

Disposal Method :	LANDFILL OR SURFACE IMPOUNDMENT THAT WILL BE CLOSED AS LANDFILL(TO INCLUDE ON-SITE TREATMENT AND/OR STABILIZATION)
Tons :	2.4

Map Id: C6
Direction: E
Distance: 0.170 mi.
Actual: 898.307 ft.
Elevation: 0.16 mi. / 843.832 ft.
Relative: Higher

Site Name: VACCHER PROPERTIES
3198 JACKSON ST
RIVERSIDE, CA 92503

Database(s): [HAZNET - CA]

Envirosite ID: 19099743
EPA ID: CAC002676245

HAZNET - CA

Year :	2011
Contact Name :	ROBERT VACCHER
Facility Mailing Address :	3510 VAN BUREN BLVD, RIVERSIDE, CA 925034214
Contact Phone :	9518262195

Waste Generator Summary 2011

Generator EPA ID :	CAC002676245
Generator County :	Riverside
TSDF EPA ID :	CAD008364432
TSDF Disposal County :	Los Angeles
State Waste :	Off-specification, aged or surplus organics
Disposal Method :	FUEL BLENDING PRIOR TO ENERGY RECOVERY AT ANOTHER SITE
Tons :	0.15

Generator EPA ID :	CAC002676245
Generator County :	Riverside
TSDF EPA ID :	NVT330010000
TSDF Disposal County :	Unknown
State Waste :	Asbestos containing waste

Map Id: C6
Direction: E
Distance: 0.170 mi.
Actual: 898.307 ft.
Elevation: 0.16 mi. / 843.832 ft.
Relative: Higher

Site Name: VACCHER PROPERTIES
3198 JACKSON ST
RIVERSIDE, CA 92503

Database(s): [HAZNET - CA] ***(Cont.)***

Envirosite ID: 19099743
EPA ID: CAC002676245

HAZNET - CA ***(Cont.)***

Disposal Method :	LANDFILL OR SURFACE IMPOUNDMENT THAT WILL BE CLOSED AS LANDFILL(TO INCLUDE ON-SITE TREATMENT AND/OR STABILIZATION)
Tons :	0.075
Generator EPA ID :	CAC002676245
Generator County :	Riverside
TSDF EPA ID :	NVT330010000
TSDF Disposal County :	Unknown
State Waste :	Off-specification, aged or surplus organics
Disposal Method :	OTHER RECOVERY OF RECLAMATION FOR REUSE INCLUDING ACID REGENERATION, ORGANICS RECOVERY ECT
Tons :	0.0495
Generator EPA ID :	CAC002676245
Generator County :	Riverside
TSDF EPA ID :	NVT330010000
TSDF Disposal County :	Unknown
State Waste :	Other organic solids
Disposal Method :	LANDFILL OR SURFACE IMPOUNDMENT THAT WILL BE CLOSED AS LANDFILL(TO INCLUDE ON-SITE TREATMENT AND/OR STABILIZATION)
Tons :	0.35
Generator EPA ID :	CAC002676245
Generator County :	Riverside
TSDF EPA ID :	NVT330010000
TSDF Disposal County :	Unknown
State Waste :	Waste oil and mixed oil
Disposal Method :	OTHER RECOVERY OF RECLAMATION FOR REUSE INCLUDING ACID REGENERATION, ORGANICS RECOVERY ECT
Tons :	0.02

Map Id: C7
Direction: ESE
Distance: 0.187 mi.
Actual: 985.426 ft.
Elevation: 0.16 mi. / 845.144 ft.
Relative: Higher

Site Name: HUD INTOWN PROPERTIES
3178 JACKSON ST
RIVERSIDE, CA 92503

Database(s): [HAZNET - CA]

Envirosite ID: 30873580
EPA ID: CAC001498296

HAZNET - CA

Year :	1998
Contact Name :	JAIME CEBALLOS\ PROJ MGR
Facility Mailing Address :	6850 BROCKTON AVE # 215, RIVERSIDE, CA 925060000
Contact Phone :	9096256645

Waste Generator Summary 1998

Generator EPA ID :	CAC001498296
Generator County :	Riverside
TSDF EPA ID :	CAD028409019
TSDF Disposal County :	Los Angeles
State Waste :	Household waste
Disposal Method :	Transfer station
Tons :	0.04

Map Id: D8
Direction: SSW
Distance: 0.189 mi.
Actual: 1000.556 ft.
Elevation: 0.157 mi. / 828.412 ft.
Relative: Higher

Site Name: PRO MOOP
9330 DOUGLAS DR
RIVERSIDE, CA 92503

Database(s): [HAZNET - CA]

Envirosite ID: 31002951
EPA ID: CAD982325789

HAZNET - CA

Year :	1997
Contact Name :	UNDELIVERABLE PER SURVEY
Facility Mailing Address :	9330 DOUGLAS DR, RIVERSIDE, CA 925030000
Contact Phone :	N/R

Waste Generator Summary 1997

Generator EPA ID :	CAD982325789
Generator County :	Riverside
TSDF EPA ID :	CAT080013352
TSDF Disposal County :	Los Angeles
State Waste :	Aqueous solution with total organic residues less than 10 percent

Map Id: D8
Direction: SSW
Distance: 0.189 mi.
Actual: 1000.556 ft.
Elevation: 0.157 mi. / 828.412 ft.
Relative: Higher

Site Name: PRO MOOP
9330 DOUGLAS DR
RIVERSIDE, CA 92503

Database(s): [HAZNET - CA] ***(Cont.)***

Envirosite ID: 31002951
EPA ID: CAD982325789

HAZNET - CA ***(Cont.)***

Disposal Method :	Recycler
Tons :	0.462

Map Id: D9
Direction: SSW
Distance: 0.189 mi.
Actual: 1000.556 ft.
Elevation: 0.157 mi. / 828.412 ft.
Relative: Higher

Site Name: PRO MOLD INC
9330 DOUGLAS DR
RIVERSIDE, CA 92503

Database(s): [HAZNET - CA]

Envirosite ID: 30967205
EPA ID: CAL000058810

HAZNET - CA

Year :	1998
Contact Name :	INACTIVE DUP NUM IN BLK LOGBK
Facility Mailing Address :	9330 DOUGLAS DR, RIVERSIDE, CA 925030000
Contact Phone :	N/R

Waste Generator Summary 1999

Generator EPA ID :	CAL000058810
Generator County :	Riverside
TSDF EPA ID :	CAT000613893
TSDF Disposal County :	Los Angeles
State Waste :	Aqueous solution with total organic residues less than 10 percent
Disposal Method :	Transfer station
Tons :	0.0546

Generator EPA ID :	CAL000058810
Generator County :	Riverside
TSDF EPA ID :	CAT000613927
TSDF Disposal County :	San Bernardino
State Waste :	Aqueous solution with total organic residues less than 10 percent
Disposal Method :	Transfer station
Tons :	0.3192

Map Id: D9
Direction: SSW
Distance: 0.189 mi.
Actual: 1000.556 ft.
Elevation: 0.157 mi. / 828.412 ft.
Relative: Higher

Site Name: PRO MOLD INC
9330 DOUGLAS DR
RIVERSIDE, CA 92503

Database(s): [HAZNET - CA] ***(Cont.)***

Envirosite ID: 30967205
EPA ID: CAL000058810

HAZNET - CA ***(Cont.)***

Waste Generator Summary 1998

Generator EPA ID :	CAL000058810
Generator County :	Riverside
TSDF EPA ID :	CAT000613893
TSDF Disposal County :	Los Angeles
State Waste :	Aqueous solution with total organic residues less than 10 percent
Disposal Method :	Transfer station
Tons :	0.1386

Map Id: D10
Direction: SW
Distance: 0.191 mi.
Actual: 1008.183 ft.
Elevation: 0.157 mi. / 828.084 ft.
Relative: Higher

Site Name: BOURNS MEDICAL SYSTS INC
9335 DOUGLAS
RIVERSIDE, CA 92503

Database(s): [RCRA_NONGEN]

Envirosite ID: 14632830
EPA ID: CAD000072447

RCRA_NONGEN

Date form received by agency :	08/22/1980
Facility name :	BOURNS MEDICAL SYSTS INC
Facility address :	9335 DOUGLAS, RIVERSIDE CA 92503
EPA ID :	CAD000072447
Mailing address :	9335 DOUGLAS DR, RIVERSIDE CA 92503
Contact :	ENVIRONMENTAL MANAGER
Contact address :	9335 DOUGLAS, RIVERSIDE CA 92503
Contact country :	US
Contact telephone :	(714) 781-5708
Contact email :	N/R
EPA Region :	09
Land type :	Other land type
Source type :	Notification
Classification :	Not a generator, verified
Description :	Not a generator, verified

Owner/Operator Summary :

Owner Operator name :	BOURNS INC

Map Id: D10
Direction: SW
Distance: 0.191 mi.
Actual: 1008.183 ft.
Elevation: 0.157 mi. / 828.084 ft.
Relative: Higher

Site Name: BOURNS MEDICAL SYSTS INC
9335 DOUGLAS
RIVERSIDE, CA 92503

Database(s): [RCRA_NONGEN] ***(Cont.)***

Envirosite ID: 14632830
EPA ID: CAD000072447

RCRA_NONGEN ***(Cont.)***

Owner Operator address :	NOT REQUIRED, NOT REQUIRED ME 99999
Owner Operator country :	N/R
Owner Operator telephone :	(415) 555-1212
Legal status :	Private
Owner Operator Type :	Owner
Owner/Op start date :	N/R
Owner/Op end date :	N/R

Owner Operator name :	NOT REQUIRED
Owner Operator address :	NOT REQUIRED, NOT REQUIRED ME 99999
Owner Operator country :	N/R
Owner Operator telephone :	(415) 555-1212
Legal status :	Private
Owner Operator Type :	Operator
Owner/Op start date :	N/R
Owner/Op end date :	N/R

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
Used oil refiner :	No
Used oil fuel marketer to burner :	No
Used oil Specification marketer :	No
Used oil transfer facility :	No
Used oil transporter :	No

Facility has No violations / inspections reported.

Map Id: D11
Direction: SW
Distance: 0.193 mi.
Actual: 1016.492 ft.
Elevation: 0.157 mi. / 828.084 ft.
Relative: Higher

Site Name: DC POWER MERCURY
9337 DOUGLAS DRIVE
RIVERSIDE, CA 92503

Database(s): [CERCLIS, SEMS_8R_ACTIVE SITES]

Envirosite ID: 1337654
EPA ID: CAN000909576

CERCLIS

Site ID :	0909576
EPA ID :	CAN000909576
Facility County :	RIVERSIDE
Short Name :	DC POWER MERCURY
Congressional District :	N/R
IFMS ID :	N/R
SMSA Number :	N/R
USGC Hydro Unit :	N/R
Federal Facility :	N
DMNSN Number :	N/R
Site Orphan Flag :	N/R
RCRA ID :	N/R
USGS Quadrangle :	N/R
Site Init by Prog :	R
NFRAP Flag :	N/R
Parent ID :	N/R
RST Code :	N/R
EPA Region :	09
Classification :	N/R
Site Settings Code :	N/R
NPL Status :	Not on the NPL
DMNSN Unit Code :	N/R
RBRAC Code :	N/R
RResp Fed Agency Code :	N/R
Non NPL Status :	Removal Only Site (No Site Assessment Work Needed)
Non NPL Status Date :	08/26/2013
Site Fips Code :	06065
CC Concurrence Date :	N/R
CC Concurrence FY :	N/R
Alias EPA ID :	N/R
Site FUDS Flag :	N/R

CERCLIS Site Contact Name(s)

Contact ID :	9270721
Contact Name :	Robert Wise
Contact Tel. :	5624996312
Contact Title :	On-Scene Coordinator (OSC)
Contact Email :	N/R

Map Id: D11
Direction: SW
Distance: 0.193 mi.
Actual: 1016.492 ft.
Elevation: 0.157 mi. / 828.084 ft.
Relative: Higher

Site Name: DC POWER MERCURY
9337 DOUGLAS DRIVE
RIVERSIDE, CA 92503

Database(s): [CERCLIS, SEMS_8R_ACTIVE SITES] ***(Cont.)***

Envirosite ID: 1337654
EPA ID: CAN000909576

CERCLIS ***(Cont.)***

Alias Comments :	N/R
Site Description :	N/R

CERCLIS Assessment History

Action Code :	001
Action :	POTENTIALLY RESPONSIBLE PARTY EMERGENCY REMOVAL
Date Started :	08/26/2012
Date Completed :	08/29/2013
Priority Level :	1
Operational Unit :	00
Primary Responsibility :	Responsible Party
Planning Status :	Primary
Urgency Indicator :	Emergency
Action Anomaly :	N/R

SEMS_8R_ACTIVE SITES

Site ID :	0909576
Region :	09
Congressional District :	N/R
Federal Facility :	N
NPL Status :	Not on the NPL
Non NPL Status :	Removal Only Site (No Site Assessment Work Needed)
FIPS Code :	06065
Latitude :	N/R
Longitude :	N/R

Map Id: D12
Direction: SW
Distance: 0.193 mi.
Actual: 1016.492 ft.
Elevation: 0.157 mi. / 828.084 ft.
Relative: Higher

Site Name: DC POWER
9337 DOUGLAS DR
RIVERSIDE, CA 92503

Database(s): [HAZNET - CA]

Envirosite ID: 19165611
EPA ID: CAC002742023

HAZNET - CA

Year :	2013
Contact Name :	DAVID BAIRD
Facility Mailing Address :	9337 DOUGLAS DR, RIVERSIDE, CA 925035618
Contact Phone :	9515368122

Waste Generator Summary 2013

Generator EPA ID :	CAC002742023
Generator County :	Riverside
TSDF EPA ID :	NVT330010000
TSDF Disposal County :	Unknown
State Waste :	Liquids with mercury >= 20 Mg./L
Disposal Method :	LANDFILL OR SURFACE IMPOUNDMENT THAT WILL BE CLOSED AS LANDFILL(TO INCLUDE ON-SITE TREATMENT AND/OR STABILIZATION)
Tons :	0.1251

Generator EPA ID :	CAC002742023
Generator County :	Riverside
TSDF EPA ID :	NVT330010000
TSDF Disposal County :	Unknown
State Waste :	Other inorganic solid waste
Disposal Method :	LANDFILL OR SURFACE IMPOUNDMENT THAT WILL BE CLOSED AS LANDFILL(TO INCLUDE ON-SITE TREATMENT AND/OR STABILIZATION)
Tons :	8.853

Map Id: E13
Direction: SW
Distance: 0.195 mi.
Actual: 1028.352 ft.
Elevation: 0.156 mi. / 824.803 ft.
Relative: Lower

Site Name: AQUATEMP INC
9330 NARNIA DRIVE
RIVERSIDE, CA 92503

Database(s): [HAZNET - CA]

Envirosite ID: 31067775
EPA ID: CAL922936066

HAZNET - CA

Year :	1995
Contact Name :	MICHAEL CLAVELLI-PRESIDENT
Facility Mailing Address :	9330 NARNIA DR, RIVERSIDE, CA 925035635
Contact Phone :	7143548024

Year :	1994
Contact Name :	MICHAEL CLAVELLI-PRESIDENT
Facility Mailing Address :	9330 NARNIA DR, RIVERSIDE, CA 925035635
Contact Phone :	7143548024

Year :	1993
Contact Name :	MICHAEL CLAVELLI-PRESIDENT
Facility Mailing Address :	9330 NARNIA DR, RIVERSIDE, CA 925035635
Contact Phone :	7143548024

Waste Generator Summary 1995

Generator EPA ID :	CAL922936066
Generator County :	Riverside
TSDF EPA ID :	CAD000088252
TSDF Disposal County :	Los Angeles
State Waste :	Unspecified solvent mixture
Disposal Method :	Transfer station
Tons :	0.09

Waste Generator Summary 1994

Generator EPA ID :	CAL922936066
Generator County :	Riverside
TSDF EPA ID :	CAD000088252
TSDF Disposal County :	Los Angeles
State Waste :	Unspecified solvent mixture
Disposal Method :	Transfer station
Tons :	0.324

Waste Generator Summary 1993

Generator EPA ID :	CAL922936066
Generator County :	Riverside

Map Id: E13
Direction: SW
Distance: 0.195 mi.
Actual: 1028.352 ft.
Elevation: 0.156 mi. / 824.803 ft.
Relative: Lower

Site Name: AQUATEMP INC
9330 NARNIA DRIVE
RIVERSIDE, CA 92503

Database(s): [HAZNET - CA] ***(Cont.)***

Envirosite ID: 31067775
EPA ID: CAL922936066

HAZNET - CA ***(Cont.)***

TSDF EPA ID :	CAD000088252
TSDF Disposal County :	Los Angeles
State Waste :	Unspecified solvent mixture
Disposal Method :	Transfer station
Tons :	0.18

Generator EPA ID :	CAL922936066
Generator County :	Riverside
TSDF EPA ID :	CAD000088252
TSDF Disposal County :	Los Angeles
State Waste :	Waste oil and mixed oil
Disposal Method :	Transfer station
Tons :	0.095

Map Id: 14
Direction: WNW
Distance: 0.213 mi.
Actual: 1122.885 ft.
Elevation: 0.155 mi. / 816.601 ft.
Relative: Lower

Site Name: 1X HUD
3490 EVEREST
RIVERSIDE, CA 92501

Database(s): [HAZNET - CA]

Envirosite ID: 30833840
EPA ID: CAC000905112

HAZNET - CA

Year :	1994
Contact Name :	JIM KORDELL
Facility Mailing Address :	6850 BROCKTON, RIVERSIDE, CA 925010000
Contact Phone :	9092740143

Waste Generator Summary 1994

Generator EPA ID :	CAC000905112
Generator County :	Riverside
TSDF EPA ID :	CAT080011059
TSDF Disposal County :	Los Angeles
State Waste :	Aqueous solution with total organic residues less than 10 percent

Map Id: 14
Direction: WNW
Distance: 0.213 mi.
Actual: 1122.885 ft.
Elevation: 0.155 mi. / 816.601 ft.
Relative: Lower

Site Name: 1X HUD
3490 EVEREST
RIVERSIDE, CA 92501

Database(s): [HAZNET - CA] ***(Cont.)***

Envirosite ID: 30833840
EPA ID: CAC000905112

HAZNET - CA ***(Cont.)***

Disposal Method :	Recycler
Tons :	0.126

Map Id: E15
Direction: SW
Distance: 0.215 mi.
Actual: 1136.499 ft.
Elevation: 0.156 mi. / 824.803 ft.
Relative: Lower

Site Name: NU-CAL PIPELINE CORP
9342 NARNIA DR
RIVERSIDE, CA 92503

Database(s): [HAZNET - CA]

Envirosite ID: 19144742
EPA ID: CAL000372311

HAZNET - CA

Year :	2013
Contact Name :	MARK SCHMITZ
Facility Mailing Address :	9342 NARNIA DR, RIVERSIDE, CA 925030000
Contact Phone :	9513524887

Year :	2012
Contact Name :	MARK SCHMITZ
Facility Mailing Address :	9342 NARNIA DR, RIVERSIDE, CA 925030000
Contact Phone :	9513524887

Year :	N/R
Contact Name :	MARK SCHMITZ
Facility Mailing Address :	9342 NARNIA DR, RIVERSIDE, CA 925030000
Contact Phone :	9513524887

Waste Generator Summary 2014

Generator EPA ID :	CAL000372311
Generator County :	Riverside
TSDF EPA ID :	AZR000501510
TSDF Disposal County :	Unknown
State Waste :	Other inorganic solid waste
Disposal Method :	STORAGE, BULKING, AND/OR TRANSFER OFF SITE--NO TREATMENT/REOVERY (H010-H129) OR (H131-H135)

Map Id: E15
Direction: SW
Distance: 0.215 mi.
Actual: 1136.499 ft.
Elevation: 0.156 mi. / 824.803 ft.
Relative: Lower

Site Name: NU-CAL PIPELINE CORP
9342 NARNIA DR
RIVERSIDE, CA 92503

Database(s): [HAZNET - CA] ***(Cont.)***

Envirosite ID: 19144742
EPA ID: CAL000372311

HAZNET - CA ***(Cont.)***

Tons :	0.35

Waste Generator Summary 2013

Generator EPA ID :	CAL000372311
Generator County :	Riverside
TSDF EPA ID :	AZR000501510
TSDF Disposal County :	Unknown
State Waste :	Oil/water separation sludge
Disposal Method :	STORAGE, BULKING, AND/OR TRANSFER OFF SITE--NO TREATMENT/REOVERY (H010-H129) OR (H131-H135)
Tons :	0.1251

Waste Generator Summary 2012

Generator EPA ID :	CAL000372311
Generator County :	Riverside
TSDF EPA ID :	AZR000501510
TSDF Disposal County :	Unknown
State Waste :	Oil/water separation sludge
Disposal Method :	STORAGE, BULKING, AND/OR TRANSFER OFF SITE--NO TREATMENT/REOVERY (H010-H129) OR (H131-H135)
Tons :	0.1668

Map Id: E16
Direction: SW
Distance: 0.225 mi.
Actual: 1190.539 ft.
Elevation: 0.156 mi. / 824.475 ft.
Relative: Lower

Site Name: PRINTING PLUS
9348 NARNIA DRIVE
RIVERSIDE, CA 92503

Database(s): [HAZNET - CA]

Envirosite ID: 30998034
EPA ID: CAL000106406

HAZNET - CA

Year :	2004
Contact Name :	GRANT HAGEMAN
Facility Mailing Address :	9348 NARNIA DR, RIVERSIDE, CA 925030000
Contact Phone :	9093531717

Year :	2003
Contact Name :	GRANT HAGEMAN
Facility Mailing Address :	9348 NARNIA DR, RIVERSIDE, CA 925030000
Contact Phone :	9093531717

Year :	2002
Contact Name :	GRANT HAGEMAN
Facility Mailing Address :	9348 NARNIA DR, RIVERSIDE, CA 925030000
Contact Phone :	9093531717

Year :	2001
Contact Name :	GRANT HAGEMAN
Facility Mailing Address :	9348 NARNIA DR, RIVERSIDE, CA 925030000
Contact Phone :	9093531717

Year :	1998
Contact Name :	GRANT HAGEMAN
Facility Mailing Address :	9348 NARNIA DR, RIVERSIDE, CA 925030000
Contact Phone :	9093531717

Year :	1997
Contact Name :	GRANT HAGEMAN
Facility Mailing Address :	9348 NARNIA DR, RIVERSIDE, CA 925030000
Contact Phone :	9093531717

Year :	1996
Contact Name :	GRANT HAGEMAN
Facility Mailing Address :	9348 NARNIA DR, RIVERSIDE, CA 925030000
Contact Phone :	9093531717

Year :	1995
Contact Name :	GRANT HAGEMAN
Facility Mailing Address :	9348 NARNIA DR, RIVERSIDE, CA 925030000
Contact Phone :	9093531717

Map Id: E16
Direction: SW
Distance: 0.225 mi.
Actual: 1190.539 ft.
Elevation: 0.156 mi. / 824.475 ft.
Relative: Lower

Site Name: PRINTING PLUS
9348 NARNIA DRIVE
RIVERSIDE, CA 92503

Database(s): [HAZNET - CA] ***(Cont.)***

Envirosite ID: 30998034
EPA ID: CAL000106406

HAZNET - CA ***(Cont.)***

Waste Generator Summary 2004

Generator EPA ID :	CAL000106406
Generator County :	Riverside
TSDF EPA ID :	CAD981402522
TSDF Disposal County :	Kern
State Waste :	Photochemicals/photoprocessing waste
Disposal Method :	Recycler
Tons :	0.1251

Waste Generator Summary 2003

Generator EPA ID :	CAL000106406
Generator County :	Riverside
TSDF EPA ID :	CAD981402522
TSDF Disposal County :	Kern
State Waste :	Photochemicals/photoprocessing waste
Disposal Method :	Recycler
Tons :	0.1251

Waste Generator Summary 2002

Generator EPA ID :	CAL000106406
Generator County :	Riverside
TSDF EPA ID :	CAD981402522
TSDF Disposal County :	Kern
State Waste :	Photochemicals/photoprocessing waste
Disposal Method :	Recycler
Tons :	0.1251

Waste Generator Summary 2001

Generator EPA ID :	CAL000106406
Generator County :	Riverside
TSDF EPA ID :	CAD093459485
TSDF Disposal County :	Fresno
State Waste :	Photochemicals/photoprocessing waste
Disposal Method :	Recycler
Tons :	0.1251

Map Id: E16
Direction: SW
Distance: 0.225 mi.
Actual: 1190.539 ft.
Elevation: 0.156 mi. / 824.475 ft.
Relative: Lower

Site Name: PRINTING PLUS
9348 NARNIA DRIVE
RIVERSIDE, CA 92503

Database(s): [HAZNET - CA] ***(Cont.)***

Envirosite ID: 30998034
EPA ID: CAL000106406

HAZNET - CA ***(Cont.)***

Waste Generator Summary 2000

Generator EPA ID :	CAL000106406
Generator County :	Riverside
TSDF EPA ID :	CAD093459485
TSDF Disposal County :	Fresno
State Waste :	Photochemicals/photoprocessing waste
Disposal Method :	Recycler
Tons :	0.1251

Waste Generator Summary 1999

Generator EPA ID :	CAL000106406
Generator County :	Riverside
TSDF EPA ID :	CAT000613976
TSDF Disposal County :	Orange
State Waste :	Photochemicals/photoprocessing waste
Disposal Method :	Transfer station
Tons :	0.1251

Waste Generator Summary 1998

Generator EPA ID :	CAL000106406
Generator County :	Riverside
TSDF EPA ID :	CAT000613976
TSDF Disposal County :	Orange
State Waste :	Photochemicals/photoprocessing waste
Disposal Method :	Transfer station
Tons :	0.1251

Waste Generator Summary 1997

Generator EPA ID :	CAL000106406
Generator County :	Riverside
TSDF EPA ID :	CAT000613976
TSDF Disposal County :	Orange
State Waste :	Photochemicals/photoprocessing waste
Disposal Method :	Transfer station
Tons :	0.2293

Map Id: E16
Direction: SW
Distance: 0.225 mi.
Actual: 1190.539 ft.
Elevation: 0.156 mi. / 824.475 ft.
Relative: Lower

Site Name: PRINTING PLUS
9348 NARNIA DRIVE
RIVERSIDE, CA 92503

Database(s): [HAZNET - CA] ***(Cont.)***

Envirosite ID: 30998034
EPA ID: CAL000106406

HAZNET - CA ***(Cont.)***

Waste Generator Summary 1996

Generator EPA ID :	CAL000106406
Generator County :	Riverside
TSDF EPA ID :	CAT000613976
TSDF Disposal County :	Orange
State Waste :	Photochemicals/photoprocessing waste
Disposal Method :	Transfer station
Tons :	0.2293

Waste Generator Summary 1995

Generator EPA ID :	CAL000106406
Generator County :	Riverside
TSDF EPA ID :	CAT000613976
TSDF Disposal County :	Orange
State Waste :	Photochemicals/photoprocessing waste
Disposal Method :	Transfer station
Tons :	0.2293

Map Id: E17
Direction: SW
Distance: 0.237 mi.
Actual: 1249.762 ft.
Elevation: 0.156 mi. / 824.147 ft.
Relative: Lower

Site Name: HAZ MAT INC
9359 NARNIA DR
RIVERSIDE, CA 92503

Database(s): [RCRA_NONGEN]

Envirosite ID: 14639612
EPA ID: CAR000039263

RCRA_NONGEN

Date form received by agency :	05/01/1998
Facility name :	HAZ MAT INC
Facility address :	9359 NARNIA DR, RIVERSIDE CA 92503
EPA ID :	CAR000039263
Mailing address :	9359 NARNIA DR, RIVERSIDE CA 92503
Contact :	JOE SEPULVEDA
Contact address :	9359 NARNIA DR, RIVERSIDE CA 92503
Contact country :	US

Map Id: E17
Direction: SW
Distance: 0.237 mi.
Actual: 1249.762 ft.
Elevation: 0.156 mi. / 824.147 ft.
Relative: Lower

Site Name: HAZ MAT INC
9359 NARNIA DR
RIVERSIDE, CA 92503

Database(s): [RCRA_NONGEN] ***(Cont.)***

Envirosite ID: 14639612
EPA ID: CAR000039263

RCRA_NONGEN ***(Cont.)***

Contact telephone :	(909) 352-2646
Contact email :	N/R
EPA Region :	09
Land type :	Private
Source type :	Notification
Classification :	Not a generator, verified
Description :	Not a generator, verified

Owner/Operator Summary :

Owner Operator name :	MELTON AND DEBORAH HARREL
Owner Operator address :	100 PEACHTREE ST STE 450, ATLANTA GA 30303-1906
Owner Operator country :	N/R
Owner Operator telephone :	(404) 223-1870
Legal status :	Private
Owner Operator Type :	Owner
Owner/Op start date :	N/R
Owner/Op end date :	N/R

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 :	Yes
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
Used oil refiner :	No
Used oil fuel marketer to burner :	No
Used oil Specification marketer :	No
Used oil transfer facility :	No
Used oil transporter :	No

Facility has No violations / inspections reported.

Map Id: E18
Direction: SW
Distance: 0.241 mi.
Actual: 1272.425 ft.
Elevation: 0.156 mi. / 824.147 ft.
Relative: Lower

Site Name: EXPRESSIONS SCREEN PRINT
9365 NARNIA DR
RIVERSIDE, CA 92503

Database(s): [HAZNET - CA]

Envirosite ID: 31018746
EPA ID: CAL000191486

HAZNET - CA

Year :	2001
Contact Name :	ALAN BARNES
Facility Mailing Address :	9365 NARNIA DR, RIVERSIDE, CA 925030000
Contact Phone :	9093547520

Waste Generator Summary 2001

Generator EPA ID :	CAL000191486
Generator County :	Riverside
TSDF EPA ID :	CAT000613976
TSDF Disposal County :	Orange
State Waste :	Liquids with halogenated organic compounds >= 1,000 Mg./L
Disposal Method :	Transfer station
Tons :	0.396

Waste Generator Summary 2000

Generator EPA ID :	CAL000191486
Generator County :	Riverside
TSDF EPA ID :	CAT000613976
TSDF Disposal County :	Orange
State Waste :	Liquids with halogenated organic compounds >= 1,000 Mg./L
Disposal Method :	Transfer station
Tons :	0.0792

Map Id: E19
Direction: SW
Distance: 0.244 mi.
Actual: 1286.094 ft.
Elevation: 0.156 mi. / 825.787 ft.
Relative: Lower

Site Name: FROME REALTY FUND ALPHA,LLC
3280 CALL DR
RIVERSIDE, CA 92503

Database(s): [HAZNET - CA]

Envirosite ID: 321851975
EPA ID: CAC002759913

HAZNET - CA

Year :	N/R
Contact Name :	DEBBIE MATTESON

Map Id: E19
Direction: SW
Distance: 0.244 mi.
Actual: 1286.094 ft.
Elevation: 0.156 mi. / 825.787 ft.
Relative: Lower

Site Name: FROME REALTY FUND ALPHA,LLC
3280 CALL DR
RIVERSIDE, CA 92503

Database(s): [HAZNET - CA] ***(Cont.)***

Envirosite ID: 321851975
EPA ID: CAC002759913

HAZNET - CA ***(Cont.)***

Facility Mailing Address :	151 KALMUS DR STE F2, COSTA MESA, CA 926265965
Contact Phone :	7146411130

Waste Generator Summary 2014

Generator EPA ID :	CAC002759913
Generator County :	Riverside
TSDF EPA ID :	CAD044429835
TSDF Disposal County :	Los Angeles
State Waste :	Unspecified solvent mixture
Disposal Method :	STORAGE, BULKING, AND/OR TRANSFER OFF SITE--NO TREATMENT/REOVERY (H010-H129) OR (H131-H135)
Tons :	0.125

Generator EPA ID :	CAC002759913
Generator County :	Riverside
TSDF EPA ID :	NED981723513
TSDF Disposal County :	Unknown
State Waste :	Unspecified organic liquid mixture
Disposal Method :	INCINERATION--THERMAL DESTRUCTION OTHER THAN USE AS A FUEL
Tons :	0.1

Map Id: E20
Direction: SW
Distance: 0.244 mi.
Actual: 1286.094 ft.
Elevation: 0.156 mi. / 825.787 ft.
Relative: Lower

Site Name: SHERWIN-WILLIAMS CO THE
3280 CALL DR
RIVERSIDE, CA 92503

Database(s): [RCRA_SQG]

Envirosite ID: 14974394
EPA ID: CAD084973114

RCRA_SQG

Date form received by agency :	09/01/1996
Facility name :	SHERWIN-WILLIAMS CO THE
Facility address :	3280 CALL DR, RIVERSIDE CA 92503

Map Id: E20
Direction: SW
Distance: 0.244 mi.
Actual: 1286.094 ft.
Elevation: 0.156 mi. / 825.787 ft.
Relative: Lower

Site Name: SHERWIN-WILLIAMS CO THE
3280 CALL DR
RIVERSIDE, CA 92503

Database(s): [RCRA_SQG] ***(Cont.)***

Envirosite ID: 14974394
EPA ID: CAD084973114

RCRA_SQG ***(Cont.)***

EPA ID :	CAD084973114
Mailing address :	3280 CALL DR, RIVERSIDE CA 92503
Contact :	N/R
Contact address :	N/R
Contact country :	US
Contact telephone :	N/R
Contact email :	N/R
EPA Region :	09
Land type :	N/R
Source type :	Implementer
Classification :	Small Quantity Generator
Description :	Handlers that generate more than 100 and less than 1000 kilograms of hazardous waste during any calendar month and accumulate less than 6000 kg of hazardous waste at any time; or generate 100 kg or less of hazardous waste during any calendar month, and accumulate more than 1000 kg of hazardous waste at any time.

Owner/Operator Summary :

Owner Operator name :	THE SHERWIN WILLIAMS CO
Owner Operator address :	NOT REQUIRED, NOT REQUIRED ME 99999
Owner Operator country :	N/R
Owner Operator telephone :	4155551212
Legal status :	Private
Owner Operator Type :	Owner
Owner/Op start date :	N/R
Owner/Op end date :	N/R

Owner Operator name :	NOT REQUIRED
Owner Operator address :	NOT REQUIRED, NOT REQUIRED ME 99999
Owner Operator country :	N/R
Owner Operator telephone :	4155551212
Legal status :	Private
Owner Operator Type :	Operator
Owner/Op start date :	N/R
Owner/Op end date :	N/R

Handler Activities Summary :

U.S. importer of hazardous waste :	No

Map Id: E20
Direction: SW
Distance: 0.244 mi.
Actual: 1286.094 ft.
Elevation: 0.156 mi. / 825.787 ft.
Relative: Lower

Site Name: SHERWIN-WILLIAMS CO THE
3280 CALL DR
RIVERSIDE, CA 92503

Database(s): [RCRA_SQG] ***(Cont.)***

Envirosite ID: 14974394
EPA ID: CAD084973114

RCRA_SQG ***(Cont.)***

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
Used oil refiner :	No
Used oil fuel marketer to burner :	No
Used oil Specification marketer :	No
Used oil transfer facility :	No
Used oil transporter :	No

Facility has No violations / inspections reported.

Evaluation Action Summary :

Evaluation date :	08/28/1992
Evaluation :	COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation :	N/R
Date achieved compliance :	N/R
Evaluation lead agency :	State Contractor /Grantee

Map Id: E21
Direction: SW
Distance: 0.244 mi.
Actual: 1286.094 ft.
Elevation: 0.156 mi. / 825.787 ft.
Relative: Lower

Site Name: SHERWIN-WILLIAMS CO THE
3280 CALL DR
RIVERSIDE, CA 92503

Database(s): [HAZNET - CA]

Envirosite ID: 31090463
EPA ID: CAD084973114

HAZNET - CA

Year :	1994
Contact Name :	N/R
Facility Mailing Address :	3280 CALL DR, RIVERSIDE, CA 925030000

Map Id: E21
Direction: SW
Distance: 0.244 mi.
Actual: 1286.094 ft.
Elevation: 0.156 mi. / 825.787 ft.
Relative: Lower

Site Name: SHERWIN-WILLIAMS CO THE
3280 CALL DR
RIVERSIDE, CA 92503

Database(s): [HAZNET - CA] ***(Cont.)***

Envirosite ID: 31090463
EPA ID: CAD084973114

HAZNET - CA ***(Cont.)***

Contact Phone :	N/R
Year :	1993
Contact Name :	N/R
Facility Mailing Address :	3280 CALL DR, RIVERSIDE, CA 925030000
Contact Phone :	N/R

Waste Generator Summary 1994

Generator EPA ID :	CAD084973114
Generator County :	Riverside
TSDF EPA ID :	CAD008252405
TSDF Disposal County :	Los Angeles
State Waste :	Unspecified solvent mixture
Disposal Method :	Recycler
Tons :	0.0576

Waste Generator Summary 1993

Generator EPA ID :	CAD084973114
Generator County :	Riverside
TSDF EPA ID :	CAD008252405
TSDF Disposal County :	Los Angeles
State Waste :	Paint sludge
Disposal Method :	N/R
Tons :	0

Generator EPA ID :	CAD084973114
Generator County :	Riverside
TSDF EPA ID :	CAD008252405
TSDF Disposal County :	Los Angeles
State Waste :	Unspecified solvent mixture
Disposal Method :	N/R
Tons :	0.0576

Generator EPA ID :	CAD084973114
Generator County :	Riverside
TSDF EPA ID :	CAD008252405
TSDF Disposal County :	Los Angeles

Map Id: E21
Direction: SW
Distance: 0.244 mi.
Actual: 1286.094 ft.
Elevation: 0.156 mi. / 825.787 ft.
Relative: Lower

Site Name: SHERWIN-WILLIAMS CO THE
3280 CALL DR
RIVERSIDE, CA 92503

Database(s): [HAZNET - CA] ***(Cont.)***

Envirosite ID: 31090463
EPA ID: CAD084973114

HAZNET - CA ***(Cont.)***

State Waste :	Unspecified solvent mixture
Disposal Method :	Recycler
Tons :	0.2556

Map Id: F22
Direction: WSW
Distance: 0.386 mi.
Actual: 2038.244 ft.
Elevation: 0.154 mi. / 810.696 ft.
Relative: Lower

Site Name: THRIFTY OIL #341 ARCO #9711
3399 VAN BUREN BLVD
RIVERSIDE, CA 92503

Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA]

Envirosite ID: 9818383
EPA ID: N/R

FRS

Registry ID : 110065285863

The California Environmental Protection Agency (CalEPA) has recently implemented a new data warehouse system (nSite). This data warehouse combines and merges facility and site information from five different systems managed within CalEPA. The five systems are: California Environmental Reporting System (CERS), EnviroStor, GeoTracker, California Integrated Water Quality System (CIWQS), and Toxic Release Inventory (TRI).

LUST REG 8 - CA

Status Date :	02/24/2015
Status :	Completed - Case Closed
Begin Date :	07/01/1997
Global ID :	T0606500546

Site History :

Data prior to 2005 does not appear in GeoTracker. Consult agency file for all site data
Site History/Release Information: July and August 1997- A baseline subsurface investigation was conducted to assess conditions below the dispensers. Twelve soil samples were collected under the dispensers and six soil borings (TDD-1 through TDD-6) were drilled. Three of the borings (TDD-1, TDD-2 and TDD-6) were completed as groundwater (gw) monitoring wells as gw was encountered at approximately 50 ft bgs. Soil and gw sampling identified soil impacts in TDD-1 and TDD-6 and all six gw samples were impacted. Maximum soil concentrations were: 840

Map Id: F22
Direction: WSW
Distance: 0.386 mi.
Actual: 2038.244 ft.
Elevation: 0.154 mi. / 810.696 ft.
Relative: Lower

Site Name: THRIFTY OIL #341 ARCO #9711
3399 VAN BUREN BLVD
RIVERSIDE, CA 92503

Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9818383
EPA ID: N/R

LUST REG 8 - CA ***(Cont.)***

ppm TPHg (dispenser sample DS#9/10), 4.5 ppm benzene (B) (TDD-1@50 ft), and 19 ppm MTBE (dispenser sample DS#21/22). The highest gw concentrations were in TDD1: 43000 ppb TPHg, 8200 ppb B, 5000 ppb T, 670 ppb E, 7600 ppb X, and 2300 ppb MTBE. (Well TDD-6 was paved over in 1999 and was not able to be located) May 1998 - Three underground storage tanks (USTs) were removed and replaced with two double-walled 20,000-gal USTs. Soil samples were collected below the USTs and dispensers and from the stockpiled soil removed from the UST cavity and dispenser areas. Soil samples collected from former UST pit contained concentrations up to 7700 ppm TPHg, 6.5 ppm B, and 71 ppm MTBE. Soil samples collected below the dispensers contained up to 33000 ppm TPHg, 53 ppm B, and 84 ppm MTBE. A total of 415.47 tons of impacted soil was removed during the UST replacement activities. Site was placed into LOP on May 26, 1998. Assessment: February and March 1999 - Five soil borings (TOC-11 through TOC-15) were drilled and four of them (TOC-11 through TOC-14) were completed as gw monitoring wells. Soil sample results detected relatively low hydrocarbon concentrations, with the exception of boring TOC-14, near the former UST area, which contained up to 42000 ppm TPHg (TOC-14 at 25 ft), 17 ppm B (TOC-14 at 40 ft), and 35 ppm MTBE (TOC-14 at 25 ft). GW samples had TPHg concentrations ranging from 1000 ppb (TOC-12) to 16000 ppb (TOC- 14); benzene ranging from 0.84 ppb (TOC-12) to 1800 ppb (TOC-14); and MTBE concentrations ranging from 880 ppb (TOC-14) to 7800 ppb (TOC-13). January and February 2001 - Two off-site gw monitoring wells (TOC-17 and TOC-18) and one on-site gw monitoring well (TOC-19) were installed. All soil samples were below the detection limits (ND) for TPHg, B, and MTBE. GW from well TOC-18 and TOC-19 were ND for TPHg, B, and MTBE. GW from TOC-17 contained 96 ppb TPHg, ND B, and 8.4 ppb MTBE. October 2001 - Two vapor extraction wells (VW-1s,d and PZ-1) and one gw recovery well (RW-1) were installed. Dual-completed well VW-1 was screened 19.5-49.5 ft bg and 54-85 ft bg. PZ-1 was screened 21-41 ft bg. Maximum soil concentrations were: 22800 ppm TPHg (RW-1 at 30 ft), 95.4 ppm B (RW-1 at 45 ft bgs), and 65.5 ppm MTBE (RW-1 at 30 ft). A thickness of 1.16 ft Free Product (Liquid Phase Hydrocarbons (LPH)) was observed in RW-1. LPH removal using intermittent bailing was initiated. October 2002 - Two additional vapor wells (VW-2 and VW-3) and one gw recovery well (RW-2) were installed for planned remediation. LPH - Free Product Liquid Phase Hydrocarbons (LPH) / Free Product was observed in the wells as follows: TDD-1: Measureable LPH from 3/2001 to 11/2003 (max. thickness 1.15 ft) RW-1: Measureable LPH from 10/2001 to 1/2003 (max. thickness 1.75 ft) TOC-14: Measureable LPH from 3/2002 to 9/2002 (max. thickness 0.10 ft) Weekly overpurging was conducted on TDD-1 from May 2007 to Nov 2007. RW-1 was added to the weekly overpurging June 2007. LPH total recovered 53.6 gal Remediation May 1998 - Approximately 415 tons of impacted soil was removed during UST system replacement in 1998. The consultant estimated the 415 tons equivalent to removing 953 lbs of hydrocarbons. October 2001 - A 4-hr SVE pilot test was conducted using VW-1, TDD-1, PZ-1 and TOC-14. A total of 29.3 lb hydrocarbon vapors were removed during SVE operations. The SVE radius of influence (ROI) was calculated to be approximately 43 ft test. A gw extraction pilot test was conducted using RW-1 for extraction. Approximately 2250 gallons of gw was removed during the 500 min test and the gw extraction capture zone was calculated to be 76 feet. August 2006 to August 2009 - SVE was conducted using wells TDD-1, TDD-2, VW-1, VW-2, VW-3, PZ-1, TOC-11, TOC-12 and TOC-14 for extraction in

Map Id: F22
Direction: WSW
Distance: 0.386 mi.
Actual: 2038.244 ft.
Elevation: 0.154 mi. / 810.696 ft.
Relative: Lower

Site Name: THRIFTY OIL #341 ARCO #9711
3399 VAN BUREN BLVD
RIVERSIDE, CA 92503

Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9818383
EPA ID: N/R

LUST REG 8 - CA ***(Cont.)***

varying combinations. Approximately 232,352 cu ft of soil volume was treated based on the Radius of Influence (ROI) of 41 feet and screened interval from 15 to 55 ft bgs. Approximately 24,878 lbs of hydrocarbons were removed during the SVE operations. May 2007 to November 2007 - GW overpurging from wells TDD-1 and RW-1 was conducted as an interim remedial measure until the full-time gw remediation system was installed. A total of 4,590 gallons were removed during the overpurging activities. November 2007 to March 2009 - A Groundwater Pump and Treat system (GWPT) was operated on-site using wells RW-1, RW-2, VW-2 and TOC-12 for extraction. Approximately 742,257 gallons of gw was pumped, treated, and discharged to the sewer. Groundwater Monitoring: 1999 to 2013 - GW monitoring has been conducted at the site since 1999. The depth to gw was approximately 45 ft bgs in 1999, and has since fluctuated with an overall decrease to the current depth of approximately 60 ft bgs. With the drop in the water table, all of the site wells had gone dry by 2009, however, sampling up to that time showed an overall significant decline in dissolved hydrocarbon concentrations with relatively low to " Non Detect (ND)" concentrations for most constituents. The exception was well TOC-14, where TBA concentrations were highest in early 2007 at 2510 ppb TBA, then decreased to ND in December 2008 after several fluctuations prior to going dry. In September 2010, replacement well TOC-14R was installed downgradient of the former UST cavity between TOC-14 and RW-1. Since installation, TOC-14R has been sampled six times with gw concentrations at or below the detection limits for all constituents tested. Verification: Vapor verification - August 2009 - A 5-day rebound test was performed in August 2009. All nine vapor extraction wells (TDD-2, TOC-14, VW -1, VW -3, TOC-11, PZ-1, TDD-1, VW -2, and TOC-12) were evaluated for vapor concentration rebounding. The highest concentrations were detected in well TOC-14 at 8 hours of operation: 209 ppmv TPHg, ND B, 2.1 ppmv T, 8.3 ppmv E, 75 ppmv X and ND MTBE. Vapor samples from all other wells were at or below the detection limits. Soil verification - September 2010 - Three confirmation borings (CB-1, CB-2, CB-3) were drilled to 50-ft and boring CB-1 was completed as a gw monitoring well (TOC-14R). The well was installed as a replacement well near TOC-14 where elevated gw concentrations were present prior to it going dry. All of the samples from CB2 and CB3 were non-detect for all constituents tested, except for CB3 at 45 & 50 ft (0.122 ppm MTBE and 0.520 ppm MTBE). Samples collected from 35 to 50 ft in CB1(TOC-14R) had detections up to: 1040 ppm TPHg (CB1-40), ND B, 0.067J ppm T, 8.23 ppm E (CB1-40), 144 ppm X (CB1-40), ND MTBE, and ND < 8.8 ppm TBA. VOCs were also detected in CB1 from depths of 30 to 50 ft bg with the maximum concentrations of: 533 ppm 1,2,4-TMB, 18.2 ppm n-Butylbenzene, 43.3 ppm n-Propylbenzene, 150 ppm 1,3,5-TMB, 155 ppm Naphthalene, 6.33 sec-Butylbenzene, and 6.84 ppm Isopropylbenzene. Groundwater verification - Replacement well TOC-14R, the only well with water, has been sampled six times since installation in 2010. Except for the first sampling event in September 2010, with 284 ppb TPHg, 2.9J ppb E, and 38 ppb X, all gw samples from well TOC-14R have been non-detect for all constituents tested. Residual Mass in Soil: 350 lb TPHg, < 1lb B, 3 lb E, 4 lb X, < 1 lb MTBE, < 1 lb TBA Subsurface Soil types: Sand with laterally discontinuous interbedded lenses of clayey sand, silt, silty sand, and clayey silt to the total depth of investigation

Map Id: F22
Direction: WSW
Distance: 0.386 mi.
Actual: 2038.244 ft.
Elevation: 0.154 mi. / 810.696 ft.
Relative: Lower

Site Name: THRIFTY OIL #341 ARCO #9711
3399 VAN BUREN BLVD
RIVERSIDE, CA 92503

Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9818383
EPA ID: N/R

LUST REG 8 - CA ***(Cont.)***

(approx. 82 ft bgs) Site is operating gas station as of June 2014. NOTE: This closure summary does not include all of the data for this cleanup. It was prepared by the Riverside County DEH for the purpose of providing a brief summary of the cleanup case. The RCDEH site file and all environmental documents should be reviewed to obtain further details regarding this cleanup.

RB Case Number :	083303278T
Potential Media Affected :	Aquifer used for drinking water supply
Potential Contaminants of Concern :	Gasoline
Local Agency :	RIVERSIDE COUNTY LOP
Local Case Number :	980443
Lead Agency :	RIVERSIDE COUNTY LOP
File Location :	Local Agency
CUF Case :	YES
Caseworker :	AB
Case Type :	LUST Cleanup Site
How Discovered :	Site Assessment/Site Investigation
How Discovered Description :	N/R
Stop Method :	Close and Replace Tank
Stop Description :	N/R

Contacts Summary

Global ID :	T0606500546
Contact Name :	ANDREA BRIONES
Contact Type :	Local Agency Caseworker
Organization Name :	RIVERSIDE COUNTY LOP
Address :	3880 LEMON ST SUITE 200
City :	RIVERSIDE
Phone Number :	9519558982
Email :	abriones@rivcocha.org

Global ID :	T0606500546
Contact Name :	VALERIE JAHN-BULL
Contact Type :	Regional Board Caseworker
Organization Name :	SANTA ANA RWQCB (REGION 8)
Address :	3737 MAIN STREET, SUITE 500
City :	RIVERSIDE
Phone Number :	9517824903

Map Id: F22
Direction: WSW
Distance: 0.386 mi.
Actual: 2038.244 ft.
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Site Name: THRIFTY OIL #341 ARCO #9711
3399 VAN BUREN BLVD
RIVERSIDE, CA 92503

Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9818383
EPA ID: N/R

LUST REG 8 - CA ***(Cont.)***

Email : vjahn-bull@waterboards.ca.gov

Regulatory Activities

Date : 02/24/2015
Global ID : T0606500546
Action Type : ENFORCEMENT
Action : Closure/No Further Action Letter - #RCDEH Closure Docs

Date : 02/23/2015
Global ID : T0606500546
Action Type : ENFORCEMENT
Action : File review - #RCDEH SITE SUMMARY

Date : 11/13/2014
Global ID : T0606500546
Action Type : RESPONSE
Action : Well Destruction Report

Date : 09/29/2014
Global ID : T0606500546
Action Type : RESPONSE
Action : Verbal Communication

Date : 08/04/2014
Global ID : T0606500546
Action Type : RESPONSE
Action : Other Report / Document

Date : 07/14/2014
Global ID : T0606500546
Action Type : ENFORCEMENT
Action : Notification - Public Notice of Case Closure - #RCDEH#071414

Date : 07/14/2014
Global ID : T0606500546
Action Type : ENFORCEMENT
Action : Staff Letter - #RCDEH#071414

Map Id: F22
Direction: WSW
Distance: 0.386 mi.
Actual: 2038.244 ft.
Elevation: 0.154 mi. / 810.696 ft.
Relative: Lower

Site Name: THRIFTY OIL #341 ARCO #9711
3399 VAN BUREN BLVD
RIVERSIDE, CA 92503

Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9818383
EPA ID: N/R

LUST REG 8 - CA ***(Cont.)***

Date :	07/02/2014
Global ID :	T0606500546
Action Type :	ENFORCEMENT
Action :	LOP Case Closure Summary to RB - #RCDEH#070214

Date :	08/20/2013
Global ID :	T0606500546
Action Type :	RESPONSE
Action :	Other Report / Document

Date :	08/22/2012
Global ID :	T0606500546
Action Type :	RESPONSE
Action :	Other Workplan

Date :	08/09/2012
Global ID :	T0606500546
Action Type :	RESPONSE
Action :	Correspondence

Date :	07/15/2012
Global ID :	T0606500546
Action Type :	RESPONSE
Action :	Monitoring Report - Quarterly

Date :	06/21/2012
Global ID :	T0606500546
Action Type :	ENFORCEMENT
Action :	Staff Letter - #RCDEH062112

Date :	04/15/2012
Global ID :	T0606500546
Action Type :	RESPONSE
Action :	Monitoring Report - Quarterly

Date :	01/15/2012
Global ID :	T0606500546
Action Type :	RESPONSE

Map Id: F22
Direction: WSW
Distance: 0.386 mi.
Actual: 2038.244 ft.
Elevation: 0.154 mi. / 810.696 ft.
Relative: Lower

Site Name: THRIFTY OIL #341 ARCO #9711
3399 VAN BUREN BLVD
RIVERSIDE, CA 92503

Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9818383
EPA ID: N/R

LUST REG 8 - CA ***(Cont.)***

Action :	Monitoring Report - Quarterly
Date :	10/15/2011
Global ID :	T0606500546
Action Type :	RESPONSE
Action :	Monitoring Report - Quarterly
Date :	07/15/2011
Global ID :	T0606500546
Action Type :	RESPONSE
Action :	Monitoring Report - Quarterly
Date :	04/15/2011
Global ID :	T0606500546
Action Type :	RESPONSE
Action :	Monitoring Report - Quarterly
Date :	01/15/2011
Global ID :	T0606500546
Action Type :	RESPONSE
Action :	Monitoring Report - Quarterly
Date :	10/15/2010
Global ID :	T0606500546
Action Type :	RESPONSE
Action :	Monitoring Report - Quarterly
Date :	07/15/2010
Global ID :	T0606500546
Action Type :	RESPONSE
Action :	Monitoring Report - Quarterly
Date :	04/15/2010
Global ID :	T0606500546
Action Type :	RESPONSE
Action :	Monitoring Report - Quarterly
Date :	03/15/2010

Map Id: F22
Direction: WSW
Distance: 0.386 mi.
Actual: 2038.244 ft.
Elevation: 0.154 mi. / 810.696 ft.
Relative: Lower

Site Name: THRIFTY OIL #341 ARCO #9711
3399 VAN BUREN BLVD
RIVERSIDE, CA 92503

Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9818383
EPA ID: N/R

LUST REG 8 - CA ***(Cont.)***

Global ID : T0606500546
Action Type : RESPONSE
Action : Clean Up Fund - 5-Year Review Summary

Date : 01/15/2010
Global ID : T0606500546
Action Type : RESPONSE
Action : Monitoring Report - Quarterly

Date : 10/15/2009
Global ID : T0606500546
Action Type : RESPONSE
Action : Monitoring Report - Quarterly

Date : 10/15/2009
Global ID : T0606500546
Action Type : RESPONSE
Action : Other Report / Document

Date : 09/10/2009
Global ID : T0606500546
Action Type : RESPONSE
Action : Other Report / Document

Date : 08/13/2009
Global ID : T0606500546
Action Type : ENFORCEMENT
Action : Staff Letter - #RCDEH081309

Date : 07/31/2009
Global ID : T0606500546
Action Type : RESPONSE
Action : Other Report / Document

Date : 07/22/2009
Global ID : T0606500546
Action Type : RESPONSE
Action : Other Report / Document

Map Id: F22
Direction: WSW
Distance: 0.386 mi.
Actual: 2038.244 ft.
Elevation: 0.154 mi. / 810.696 ft.
Relative: Lower

Site Name: THRIFTY OIL #341 ARCO #9711
3399 VAN BUREN BLVD
RIVERSIDE, CA 92503

Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9818383
EPA ID: N/R

LUST REG 8 - CA ***(Cont.)***

Date :	07/15/2009
Global ID :	T0606500546
Action Type :	RESPONSE
Action :	Monitoring Report - Quarterly
Date :	06/19/2009
Global ID :	T0606500546
Action Type :	RESPONSE
Action :	Other Workplan
Date :	06/10/2009
Global ID :	T0606500546
Action Type :	ENFORCEMENT
Action :	Staff Letter - #RCDEH061009
Date :	06/02/2009
Global ID :	T0606500546
Action Type :	RESPONSE
Action :	Other Workplan
Date :	05/21/2009
Global ID :	T0606500546
Action Type :	RESPONSE
Action :	Other Report / Document
Date :	05/07/2009
Global ID :	T0606500546
Action Type :	ENFORCEMENT
Action :	Staff Letter - #RCDEH050709
Date :	04/15/2009
Global ID :	T0606500546
Action Type :	RESPONSE
Action :	Monitoring Report - Quarterly
Date :	02/17/2009
Global ID :	T0606500546
Action Type :	RESPONSE

Map Id: F22
Direction: WSW
Distance: 0.386 mi.
Actual: 2038.244 ft.
Elevation: 0.154 mi. / 810.696 ft.
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Site Name: THRIFTY OIL #341 ARCO #9711
3399 VAN BUREN BLVD
RIVERSIDE, CA 92503

Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9818383
EPA ID: N/R

LUST REG 8 - CA ***(Cont.)***

Action :	Clean Up Fund - 5-Year Review Summary
Date :	02/17/2009
Global ID :	T0606500546
Action Type :	RESPONSE
Action :	Monitoring Report - Other
Date :	01/15/2009
Global ID :	T0606500546
Action Type :	RESPONSE
Action :	Monitoring Report - Quarterly
Date :	12/15/2008
Global ID :	T0606500546
Action Type :	ENFORCEMENT
Action :	Staff Letter - #RCDEH121108
Date :	10/15/2008
Global ID :	T0606500546
Action Type :	RESPONSE
Action :	Monitoring Report - Quarterly
Date :	06/23/2008
Global ID :	T0606500546
Action Type :	RESPONSE
Action :	Clean Up Fund - 5-Year Review Summary
Date :	04/15/2008
Global ID :	T0606500546
Action Type :	RESPONSE
Action :	Monitoring Report - Quarterly
Date :	02/27/2008
Global ID :	T0606500546
Action Type :	ENFORCEMENT
Action :	Technical Correspondence / Assistance / Other - #RCDEH 022708

Map Id: F22
Direction: WSW
Distance: 0.386 mi.
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Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9818383
EPA ID: N/R

LUST REG 8 - CA ***(Cont.)***

Date :	01/15/2008
Global ID :	T0606500546
Action Type :	RESPONSE
Action :	Monitoring Report - Quarterly

Date :	11/19/2007
Global ID :	T0606500546
Action Type :	ENFORCEMENT
Action :	File review

Date :	11/01/2007
Global ID :	T0606500546
Action Type :	REMEDIATION
Action :	Pump & Treat (P & T) Groundwater

Date :	10/15/2007
Global ID :	T0606500546
Action Type :	RESPONSE
Action :	Monitoring Report - Quarterly

Date :	05/01/2007
Global ID :	T0606500546
Action Type :	REMEDIATION
Action :	Other (Use Description Field)

Date :	04/19/2007
Global ID :	T0606500546
Action Type :	ENFORCEMENT
Action :	Technical Correspondence / Assistance / Other - #041907

Date :	08/07/2006
Global ID :	T0606500546
Action Type :	REMEDIATION
Action :	Soil Vapor Extraction (SVE)

Date :	10/01/2001
Global ID :	T0606500546
Action Type :	REMEDIATION

Map Id: F22
Direction: WSW
Distance: 0.386 mi.
Actual: 2038.244 ft.
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3399 VAN BUREN BLVD
RIVERSIDE, CA 92503

Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9818383
EPA ID: N/R

LUST REG 8 - CA ***(Cont.)***

Action :	Other (Use Description Field)

Date :	03/01/2001
Global ID :	T0606500546
Action Type :	REMEDIATION
Action :	Free Product Removal

Date :	05/26/1998
Global ID :	T0606500546
Action Type :	Other
Action :	Leak Reported

Date :	05/13/1998
Global ID :	T0606500546
Action Type :	Other
Action :	Leak Stopped

Date :	05/01/1998
Global ID :	T0606500546
Action Type :	REMEDIATION
Action :	Excavation

Date :	12/02/1997
Global ID :	T0606500546
Action Type :	Other
Action :	Leak Discovery

Status History

Status Date :	02/24/2015
Global ID :	T0606500546
Status :	Completed - Case Closed

Status Date :	07/14/2014
Global ID :	T0606500546
Status :	Open - Eligible for Closure

Status Date :	12/20/2013

Map Id: F22
Direction: WSW
Distance: 0.386 mi.
Actual: 2038.244 ft.
Elevation: 0.154 mi. / 810.696 ft.
Relative: Lower

Site Name: THRIFTY OIL #341 ARCO #9711
3399 VAN BUREN BLVD
RIVERSIDE, CA 92503

Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9818383
EPA ID: N/R

LUST REG 8 - CA ***(Cont.)***

Global ID :	T0606500546
Status :	Open - Eligible for Closure
Status Date :	08/07/2006
Global ID :	T0606500546
Status :	Open - Remediation
Status Date :	05/26/1998
Global ID :	T0606500546
Status :	Open - Site Assessment
Status Date :	07/01/1997
Global ID :	T0606500546
Status :	Open - Case Begin Date
Status Date :	07/01/1997
Global ID :	T0606500546
Status :	Open - Site Assessment

LUST_RIVERSIDE COUNTY - CA

Status Date :	02/24/2015
Status :	COMPLETED - CASE CLOSED
Begin Date :	07/01/1997
Global ID :	T0606500546
Facility Type :	LUST CLEANUP SITE
RB Case Number :	083303278T
Potential Media of Concern :	Aquifer used for drinking water supply
Potential Contaminants of Concern :	Gasoline
Local Agency :	RIVERSIDE COUNTY LOP
Loc Case Number :	980443
Lead Agency :	RIVERSIDE COUNTY LOP
File Location :	Local Agency
CUF Case :	YES
Caseworker :	AB

Site History :

Data prior to 2005 does not appear in GeoTracker. Consult agency file for all site data
Site History/Release Information: July and August 1997- A baseline subsurface investigation was conducted to assess conditions below the dispensers. Twelve soil samples were collected

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Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9818383
EPA ID: N/R

LUST_RIVERSIDE COUNTY - CA ***(Cont.)***

under the dispensers and six soil borings (TDD-1 through TDD-6) were drilled. Three of the borings (TDD-1, TDD-2 and TDD-6) were completed as groundwater (gw) monitoring wells as gw was encountered at approximately 50 ft bgs. Soil and gw sampling identified soil impacts in TDD-1 and TDD-6 and all six gw samples were impacted. Maximum soil concentrations were: 840 ppm TPHg (dispenser sample DS#9/10), 4.5 ppm benzene (B) (TDD-1@50 ft), and 19 ppm MTBE (dispenser sample DS#21/22). The highest gw concentrations were in TDD1: 43000 ppb TPHg, 8200 ppb B, 5000 ppb T, 670 ppb E, 7600 ppb X, and 2300 ppb MTBE. (Well TDD-6 was paved over in 1999 and was not able to be located) May 1998 - Three underground storage tanks (USTs) were removed and replaced with two double-walled 20,000-gal USTs. Soil samples were collected below the USTs and dispensers and from the stockpiled soil removed from the UST cavity and dispenser areas. Soil samples collected from former UST pit contained concentrations up to 7700 ppm TPHg, 6.5 ppm B, and 71 ppm MTBE. Soil samples collected below the dispensers contained up to 33000 ppm TPHg, 53 ppm B, and 84 ppm MTBE. A total of 415.47 tons of impacted soil was removed during the UST replacement activities. Site was placed into LOP on May 26, 1998. Assessment: February and March 1999 - Five soil borings (TOC-11 through TOC-15) were drilled and four of them (TOC-11 through TOC-14) were completed as gw monitoring wells. Soil sample results detected relatively low hydrocarbon concentrations, with the exception of boring TOC-14, near the former UST area, which contained up to 42000 ppm TPHg (TOC-14 at 25 ft), 17 ppm B (TOC-14 at 40 ft), and 35 ppm MTBE (TOC-14 at 25 ft). GW samples had TPHg concentrations ranging from 1000 ppb (TOC-12) to 16000 ppb (TOC- 14); benzene ranging from 0.84 ppb (TOC-12) to 1800 ppb (TOC-14); and MTBE concentrations ranging from 880 ppb (TOC-14) to 7800 ppb (TOC-13). January and February 2001 - Two off-site gw monitoring wells (TOC-17 and TOC-18) and one on-site gw monitoring well (TOC-19) were installed. All soil samples were below the detection limits (ND) for TPHg, B, and MTBE. GW from well TOC-18 and TOC-19 were ND for TPHg, B, and MTBE. GW from TOC-17 contained 96 ppb TPHg, ND B, and 8.4 ppb MTBE. October 2001 - Two vapor extraction wells (VW-1s,d and PZ-1) and one gw recovery well (RW-1) were installed. Dual-completed well VW-1 was screened 19.5-49.5 ft bg and 54-85 ft bg. PZ-1 was screened 21-41 ft bg. Maximum soil concentrations were: 22800 ppm TPHg (RW-1 at 30 ft), 95.4 ppm B (RW-1 at 45 ft bgs), and 65.5 ppm MTBE (RW-1 at 30 ft). A thickness of 1.16 ft Free Product (Liquid Phase Hydrocarbons (LPH)) was observed in RW-1. LPH removal using intermittent bailing was initiated. October 2002 - Two additional vapor wells (VW-2 and VW-3) and one gw recovery well (RW-2) were installed for planned remediation. LPH - Free Product Liquid Phase Hydrocarbons (LPH) / Free Product was observed in the wells as follows: TDD-1: Measureable LPH from 3/2001 to 11/2003 (max. thickness 1.15 ft) RW-1: Measureable LPH from 10/2001 to 1/2003 (max. thickness 1.75 ft) TOC-14: Measureable LPH from 3/2002 to 9/2002 (max. thickness 0.10 ft) Weekly overpurging was conducted on TDD-1 from May 2007 to Nov 2007. RW-1 was added to the weekly overpurging June 2007. LPH total recovered 53.6 gal Remediation May 1998 - Approximately 415 tons of impacted soil was removed during UST system replacement in 1998. The consultant estimated the 415 tons equivalent to removing 953 lbs of hydrocarbons. October 2001 - A 4-hr SVE pilot test was conducted using VW-1, TDD-1, PZ-1 and TOC-14. A total of 29.3 lb hydrocarbon vapors were removed during SVE

Map Id: F22
Direction: WSW
Distance: 0.386 mi.
Actual: 2038.244 ft.
Elevation: 0.154 mi. / 810.696 ft.
Relative: Lower

Site Name: THRIFTY OIL #341 ARCO #9711
3399 VAN BUREN BLVD
RIVERSIDE, CA 92503

Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9818383
EPA ID: N/R

LUST_RIVERSIDE COUNTY - CA ***(Cont.)***

operations. The SVE radius of influence (ROI) was calculated to be approximately 43 ft test. A gw extraction pilot test was conducted using RW-1 for extraction. Approximately 2250 gallons of gw was removed during the 500 min test and the gw extraction capture zone was calculated to be 76 feet. August 2006 to August 2009 - SVE was conducted using wells TDD-1, TDD-2, VW-1, VW-2, VW-3, PZ-1, TOC-11, TOC-12 and TOC-14 for extraction in varying combinations. Approximately 232,352 cu ft of soil volume was treated based on the Radius of Influence (ROI) of 41 feet and screened interval from 15 to 55 ft bgs. Approximately 24,878 lbs of hydrocarbons were removed during the SVE operations. May 2007 to November 2007 - GW overpurging from wells TDD-1 and RW-1 was conducted as an interim remedial measure until the full-time gw remediation system was installed. A total of 4,590 gallons were removed during the overpurging activities. November 2007 to March 2009 - A Groundwater Pump and Treat system (GWPT) was operated on-site using wells RW-1, RW-2, VW-2 and TOC-12 for extraction. Approximately 742,257 gallons of gw was pumped, treated, and discharged to the sewer. Groundwater Monitoring: 1999 to 2013 - GW monitoring has been conducted at the site since 1999. The depth to gw was approximately 45 ft bgs in 1999, and has since fluctuated with an overall decrease to the current depth of approximately 60 ft bgs. With the drop in the water table, all of the site wells had gone dry by 2009, however, sampling up to that time showed an overall significant decline in dissolved hydrocarbon concentrations with relatively low to " Non Detect (ND)" concentrations for most constituents. The exception was well TOC-14, where TBA concentrations were highest in early 2007 at 2510 ppb TBA, then decreased to ND in December 2008 after several fluctuations prior to going dry. In September 2010, replacement well TOC-14R was installed downgradient of the former UST cavity between TOC-14 and RW-1. Since installation, TOC-14R has been sampled six times with gw concentrations at or below the detection limits for all constituents tested. Verification: Vapor verification - August 2009 - A 5-day rebound test was performed in August 2009. All nine vapor extraction wells (TDD-2, TOC-14, VW -1, VW -3, TOC-11, PZ-1, TDD-1, VW -2, and TOC-12) were evaluated for vapor concentration rebounding. The highest concentrations were detected in well TOC-14 at 8 hours of operation: 209 ppmv TPHg, ND B, 2.1 ppmv T, 8.3 ppmv E, 75 ppmv X and ND MTBE. Vapor samples from all other wells were at or below the detection limits. Soil verification - September 2010 - Three confirmation borings (CB-1, CB-2, CB-3) were drilled to 50-ft and boring CB-1 was completed as a gw monitoring well (TOC-14R). The well was installed as a replacement well near TOC-14 where elevated gw concentrations were present prior to it going dry. All of the samples from CB2 and CB3 were non-detect for all constituents tested, except for CB3 at 45 & 50 ft (0.122 ppm MTBE and 0.520 ppm MTBE). Samples collected from 35 to 50 ft in CB1(TOC-14R) had detections up to: 1040 ppm TPHg (CB1-40), ND B, 0.067J ppm T, 8.23 ppm E (CB1-40), 144 ppm X (CB1-40), ND MTBE, and ND < 8.8 ppm TBA. VOCs were also detected in CB1 from depths of 30 to 50 ft bg with the maximum concentrations of: 533 ppm 1,2,4-TMB, 18.2 ppm n-Butylbenzene, 43.3 ppm n-Propylbenzene, 150 ppm 1,3,5-TMB, 155 ppm Naphthalene, 6.33 sec-Butylbenzene, and 6.84 ppm Isopropylbenzene. Groundwater verification - Replacement well TOC-14R, the only well with water, has been sampled six times since

Map Id: F22
Direction: WSW
Distance: 0.386 mi.
Actual: 2038.244 ft.
Elevation: 0.154 mi. / 810.696 ft.
Relative: Lower

Site Name: THRIFTY OIL #341 ARCO #9711
3399 VAN BUREN BLVD
RIVERSIDE, CA 92503

Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9818383
EPA ID: N/R

LUST_RIVERSIDE COUNTY - CA ***(Cont.)***

installation in 2010. Except for the first sampling event in September 2010, with 284 ppb TPHg, 2.9J ppb E, and 38 ppb X, all gw samples from well TOC-14R have been non-detect for all constituents tested. Residual Mass in Soil: 350 lb TPHg, < 1lb B, 3 lb E, 4 lb X, < 1 lb MTBE, < 1 lb TBA Subsurface Soil types: Sand with laterally discontinuous interbedded lenses of clayey sand, silt, silty sand, and clayey silt to the total depth of investigation (approx. 82 ft bgs) Site is operating gas station as of June 2014. NOTE: This closure summary does not include all of the data for this cleanup. It was prepared by the Riverside County DEH for the purpose of providing a brief summary of the cleanup case. The RCDEH site file and all environmental documents should be reviewed to obtain further details regarding this cleanup.

Contacts Summary

Global ID :	T0606500546
Contact Name :	ANDREA BRIONES
Contact Type :	Local Agency Caseworker
Organization Name :	RIVERSIDE COUNTY LOP
Address :	3880 LEMON ST SUITE 200
City :	RIVERSIDE
Phone Number :	9519558982
Email :	abriones@rivcocha.org

Global ID :	T0606500546
Contact Name :	VALERIE JAHN-BULL
Contact Type :	Regional Board Caseworker
Organization Name :	SANTA ANA RWQCB (REGION 8)
Address :	3737 MAIN STREET, SUITE 500
City :	RIVERSIDE
Phone Number :	9517824903
Email :	vjahn-bull@waterboards.ca.gov

Regulatory Activities

Date :	02/24/2015
Global ID :	T0606500546
Action Type :	ENFORCEMENT
Action :	Closure/No Further Action Letter - #RCDEH Closure Docs

Map Id: F22
Direction: WSW
Distance: 0.386 mi.
Actual: 2038.244 ft.
Elevation: 0.154 mi. / 810.696 ft.
Relative: Lower

Site Name: THRIFTY OIL #341 ARCO #9711
3399 VAN BUREN BLVD
RIVERSIDE, CA 92503

Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9818383
EPA ID: N/R

LUST_RIVERSIDE COUNTY - CA ***(Cont.)***

Date :	02/23/2015
Global ID :	T0606500546
Action Type :	ENFORCEMENT
Action :	File review - #RCDEH SITE SUMMARY
Date :	11/13/2014
Global ID :	T0606500546
Action Type :	RESPONSE
Action :	Well Destruction Report
Date :	09/29/2014
Global ID :	T0606500546
Action Type :	RESPONSE
Action :	Verbal Communication
Date :	08/04/2014
Global ID :	T0606500546
Action Type :	RESPONSE
Action :	Other Report / Document
Date :	07/14/2014
Global ID :	T0606500546
Action Type :	ENFORCEMENT
Action :	Notification - Public Notice of Case Closure - #RCDEH#071414
Date :	07/14/2014
Global ID :	T0606500546
Action Type :	ENFORCEMENT
Action :	Staff Letter - #RCDEH#071414
Date :	07/02/2014
Global ID :	T0606500546
Action Type :	ENFORCEMENT
Action :	LOP Case Closure Summary to RB - #RCDEH#070214
Date :	08/20/2013
Global ID :	T0606500546
Action Type :	RESPONSE

Map Id: F22
Direction: WSW
Distance: 0.386 mi.
Actual: 2038.244 ft.
Elevation: 0.154 mi. / 810.696 ft.
Relative: Lower

Site Name: THRIFTY OIL #341 ARCO #9711
3399 VAN BUREN BLVD
RIVERSIDE, CA 92503

Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9818383
EPA ID: N/R

LUST_RIVERSIDE COUNTY - CA ***(Cont.)***

Action :	Other Report / Document
Date :	08/22/2012
Global ID :	T0606500546
Action Type :	RESPONSE
Action :	Other Workplan
Date :	08/09/2012
Global ID :	T0606500546
Action Type :	RESPONSE
Action :	Correspondence
Date :	07/15/2012
Global ID :	T0606500546
Action Type :	RESPONSE
Action :	Monitoring Report - Quarterly
Date :	06/21/2012
Global ID :	T0606500546
Action Type :	ENFORCEMENT
Action :	Staff Letter - #RCDEH062112
Date :	04/15/2012
Global ID :	T0606500546
Action Type :	RESPONSE
Action :	Monitoring Report - Quarterly
Date :	01/15/2012
Global ID :	T0606500546
Action Type :	RESPONSE
Action :	Monitoring Report - Quarterly
Date :	10/15/2011
Global ID :	T0606500546
Action Type :	RESPONSE
Action :	Monitoring Report - Quarterly
Date :	07/15/2011

Map Id: F22
Direction: WSW
Distance: 0.386 mi.
Actual: 2038.244 ft.
Elevation: 0.154 mi. / 810.696 ft.
Relative: Lower

Site Name: THRIFTY OIL #341 ARCO #9711
3399 VAN BUREN BLVD
RIVERSIDE, CA 92503

Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9818383
EPA ID: N/R

LUST_RIVERSIDE COUNTY - CA ***(Cont.)***

Global ID :	T0606500546
Action Type :	RESPONSE
Action :	Monitoring Report - Quarterly
Date :	04/15/2011
Global ID :	T0606500546
Action Type :	RESPONSE
Action :	Monitoring Report - Quarterly
Date :	01/15/2011
Global ID :	T0606500546
Action Type :	RESPONSE
Action :	Monitoring Report - Quarterly
Date :	10/15/2010
Global ID :	T0606500546
Action Type :	RESPONSE
Action :	Monitoring Report - Quarterly
Date :	07/15/2010
Global ID :	T0606500546
Action Type :	RESPONSE
Action :	Monitoring Report - Quarterly
Date :	04/15/2010
Global ID :	T0606500546
Action Type :	RESPONSE
Action :	Monitoring Report - Quarterly
Date :	03/15/2010
Global ID :	T0606500546
Action Type :	RESPONSE
Action :	Clean Up Fund - 5-Year Review Summary
Date :	01/15/2010
Global ID :	T0606500546
Action Type :	RESPONSE
Action :	Monitoring Report - Quarterly

Map Id: F22
Direction: WSW
Distance: 0.386 mi.
Actual: 2038.244 ft.
Elevation: 0.154 mi. / 810.696 ft.
Relative: Lower

Site Name: THRIFTY OIL #341 ARCO #9711
3399 VAN BUREN BLVD
RIVERSIDE, CA 92503

Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9818383
EPA ID: N/R

LUST_RIVERSIDE COUNTY - CA ***(Cont.)***

Date :	10/15/2009
Global ID :	T0606500546
Action Type :	RESPONSE
Action :	Monitoring Report - Quarterly

Date :	10/15/2009
Global ID :	T0606500546
Action Type :	RESPONSE
Action :	Other Report / Document

Date :	09/10/2009
Global ID :	T0606500546
Action Type :	RESPONSE
Action :	Other Report / Document

Date :	08/13/2009
Global ID :	T0606500546
Action Type :	ENFORCEMENT
Action :	Staff Letter - #RCDEH081309

Date :	07/31/2009
Global ID :	T0606500546
Action Type :	RESPONSE
Action :	Other Report / Document

Date :	07/22/2009
Global ID :	T0606500546
Action Type :	RESPONSE
Action :	Other Report / Document

Date :	07/15/2009
Global ID :	T0606500546
Action Type :	RESPONSE
Action :	Monitoring Report - Quarterly

Date :	06/19/2009
Global ID :	T0606500546
Action Type :	RESPONSE

Map Id: F22
Direction: WSW
Distance: 0.386 mi.
Actual: 2038.244 ft.
Elevation: 0.154 mi. / 810.696 ft.
Relative: Lower

Site Name: THRIFTY OIL #341 ARCO #9711
3399 VAN BUREN BLVD
RIVERSIDE, CA 92503

Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9818383
EPA ID: N/R

LUST_RIVERSIDE COUNTY - CA ***(Cont.)***

Action :	Other Workplan
Date :	06/10/2009
Global ID :	T0606500546
Action Type :	ENFORCEMENT
Action :	Staff Letter - #RCDEH061009
Date :	06/02/2009
Global ID :	T0606500546
Action Type :	RESPONSE
Action :	Other Workplan
Date :	05/21/2009
Global ID :	T0606500546
Action Type :	RESPONSE
Action :	Other Report / Document
Date :	05/07/2009
Global ID :	T0606500546
Action Type :	ENFORCEMENT
Action :	Staff Letter - #RCDEH050709
Date :	04/15/2009
Global ID :	T0606500546
Action Type :	RESPONSE
Action :	Monitoring Report - Quarterly
Date :	02/17/2009
Global ID :	T0606500546
Action Type :	RESPONSE
Action :	Clean Up Fund - 5-Year Review Summary
Date :	02/17/2009
Global ID :	T0606500546
Action Type :	RESPONSE
Action :	Monitoring Report - Other
Date :	01/15/2009

Map Id: F22
Direction: WSW
Distance: 0.386 mi.
Actual: 2038.244 ft.
Elevation: 0.154 mi. / 810.696 ft.
Relative: Lower

Site Name: THRIFTY OIL #341 ARCO #9711
3399 VAN BUREN BLVD
RIVERSIDE, CA 92503

Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9818383
EPA ID: N/R

LUST_RIVERSIDE COUNTY - CA ***(Cont.)***

Global ID : T0606500546
Action Type : RESPONSE
Action : Monitoring Report - Quarterly

Date : 12/15/2008
Global ID : T0606500546
Action Type : ENFORCEMENT
Action : Staff Letter - #RCDEH121108

Date : 10/15/2008
Global ID : T0606500546
Action Type : RESPONSE
Action : Monitoring Report - Quarterly

Date : 06/23/2008
Global ID : T0606500546
Action Type : RESPONSE
Action : Clean Up Fund - 5-Year Review Summary

Date : 04/15/2008
Global ID : T0606500546
Action Type : RESPONSE
Action : Monitoring Report - Quarterly

Date : 02/27/2008
Global ID : T0606500546
Action Type : ENFORCEMENT
Action : Technical Correspondence / Assistance / Other - #RCDEH 022708

Date : 01/15/2008
Global ID : T0606500546
Action Type : RESPONSE
Action : Monitoring Report - Quarterly

Date : 11/19/2007
Global ID : T0606500546
Action Type : ENFORCEMENT

Map Id: F22
Direction: WSW
Distance: 0.386 mi.
Actual: 2038.244 ft.
Elevation: 0.154 mi. / 810.696 ft.
Relative: Lower

Site Name: THRIFTY OIL #341 ARCO #9711
3399 VAN BUREN BLVD
RIVERSIDE, CA 92503

Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9818383
EPA ID: N/R

LUST_RIVERSIDE COUNTY - CA ***(Cont.)***

Action :	File review
Date :	11/01/2007
Global ID :	T0606500546
Action Type :	REMEDIATION
Action :	Pump & Treat (P & T) Groundwater
Date :	10/15/2007
Global ID :	T0606500546
Action Type :	RESPONSE
Action :	Monitoring Report - Quarterly
Date :	05/01/2007
Global ID :	T0606500546
Action Type :	REMEDIATION
Action :	Other (Use Description Field)
Date :	04/19/2007
Global ID :	T0606500546
Action Type :	ENFORCEMENT
Action :	Technical Correspondence / Assistance / Other - #041907
Date :	08/07/2006
Global ID :	T0606500546
Action Type :	REMEDIATION
Action :	Soil Vapor Extraction (SVE)
Date :	10/01/2001
Global ID :	T0606500546
Action Type :	REMEDIATION
Action :	Other (Use Description Field)
Date :	03/01/2001
Global ID :	T0606500546
Action Type :	REMEDIATION
Action :	Free Product Removal
Date :	05/26/1998

Map Id: F22
Direction: WSW
Distance: 0.386 mi.
Actual: 2038.244 ft.
Elevation: 0.154 mi. / 810.696 ft.
Relative: Lower

Site Name: THRIFTY OIL #341 ARCO #9711
3399 VAN BUREN BLVD
RIVERSIDE, CA 92503

Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9818383
EPA ID: N/R

LUST_RIVERSIDE COUNTY - CA ***(Cont.)***

Global ID :	T0606500546
Action Type :	Other
Action :	Leak Reported
Date :	05/13/1998
Global ID :	T0606500546
Action Type :	Other
Action :	Leak Stopped
Date :	05/01/1998
Global ID :	T0606500546
Action Type :	REMEDIATION
Action :	Excavation
Date :	12/02/1997
Global ID :	T0606500546
Action Type :	Other
Action :	Leak Discovery

Status History Summary

Status Date :	02/24/2015
Global ID :	T0606500546
Status :	Completed - Case Closed
Status Date :	07/14/2014
Global ID :	T0606500546
Status :	Open - Eligible for Closure
Status Date :	12/20/2013
Global ID :	T0606500546
Status :	Open - Eligible for Closure
Status Date :	08/07/2006
Global ID :	T0606500546
Status :	Open - Remediation
Status Date :	05/26/1998

Map Id: F22
Direction: WSW
Distance: 0.386 mi.
Actual: 2038.244 ft.
Elevation: 0.154 mi. / 810.696 ft.
Relative: Lower

Site Name: THRIFTY OIL #341 ARCO #9711
3399 VAN BUREN BLVD
RIVERSIDE, CA 92503

Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9818383
EPA ID: N/R

LUST_RIVERSIDE COUNTY - CA ***(Cont.)***

Global ID :	T0606500546
Status :	Open - Site Assessment
Status Date :	07/01/1997
Global ID :	T0606500546
Status :	Open - Case Begin Date
Status Date :	07/01/1997
Global ID :	T0606500546
Status :	Open - Site Assessment

Map Id: F23
Direction: WSW
Distance: 0.386 mi.
Actual: 2038.244 ft.
Elevation: 0.154 mi. / 810.696 ft.
Relative: Lower

Site Name: THRIFTY OIL #341 ARCO #9711
3399 VAN BUREN BLVD
RIVERSIDE, CA

Database(s): [CORRECTIVE ACTION_Riverside County - CA]

Envirosite ID: 30245585
EPA ID: N/R

CORRECTIVE ACTION_Riverside County - CA

Date Opened :	05/26/1998
Date Closed :	02/24/2015
Case Closed :	Y
Case Type :	Drinking Water Aquifer
RCDEH LOP ID :	980443
GeoTracker Global ID :	T0606500546

Map Id: F24
Direction: WSW
Distance: 0.391 mi.
Actual: 2065.446 ft.
Elevation: 0.155 mi. / 820.866 ft.
Relative: Lower

Site Name: BROOKHURST MILL
3315 VAN BUREN BLVD
RIVERSIDE, CA

Database(s): [CORRECTIVE ACTION_Riverside County - CA]

Envirosite ID: 30245584
EPA ID: N/R

CORRECTIVE ACTION_Riverside County - CA

Date Opened :	08/23/1994
Date Closed :	01/12/1995
Case Closed :	Y
Case Type :	Soil Impacted
RCDEH LOP ID :	94714
GeoTracker Global ID :	T0606500400

Map Id: F25
Direction: WSW
Distance: 0.391 mi.
Actual: 2065.446 ft.
Elevation: 0.155 mi. / 820.866 ft.
Relative: Lower

Site Name: BROOKHURST MILL
3315 VAN BUREN BLVD
RIVERSIDE, CA 92503

Database(s): [LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA]

Envirosite ID: 9815419
EPA ID: N/R

LUST REG 8 - CA

Status Date :	01/12/1995
Status :	Completed - Case Closed
Begin Date :	08/19/1994
Global ID :	T0606500400
Site History :	N/R
RB Case Number :	083302548T
Potential Media Affected :	Soil
Potential Contaminants of Concern :	Diesel
Local Agency :	RIVERSIDE COUNTY LOP
Local Case Number :	94714
Lead Agency :	RIVERSIDE COUNTY LOP
File Location :	Local Agency Warehouse
CUF Case :	YES
Caseworker :	SCB
Case Type :	LUST Cleanup Site
How Discovered :	Tank Closure
How Discovered Description :	N/R
Stop Method :	Close and Remove Tank
Stop Description :	N/R

Map Id: F25
Direction: WSW
Distance: 0.391 mi.
Actual: 2065.446 ft.
Elevation: 0.155 mi. / 820.866 ft.
Relative: Lower

Site Name: BROOKHURST MILL
3315 VAN BUREN BLVD
RIVERSIDE, CA 92503

Database(s): [LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9815419
EPA ID: N/R

LUST REG 8 - CA ***(Cont.)***

Contacts Summary

Global ID :	T0606500400
Contact Name :	NANCY OLSON-MARTIN
Contact Type :	Regional Board Caseworker
Organization Name :	SANTA ANA RWQCB (REGION 8)
Address :	3737 MAIN STREET, SUITE 500
City :	RIVERSIDE
Phone Number :	N/R
Email :	nolson-martin@waterboards.ca.gov

Global ID :	T0606500400
Contact Name :	SHARON BOLTINGHOUSE
Contact Type :	Local Agency Caseworker
Organization Name :	RIVERSIDE COUNTY LOP
Address :	3880 LEMON ST SUITE 200
City :	RIVERSIDE
Phone Number :	9519558980
Email :	sbolting@rivcocha.org

Regulatory Activities

Date :	01/12/1995
Global ID :	T0606500400
Action Type :	ENFORCEMENT
Action :	Closure/No Further Action Letter - #RCDEH11295

Date :	01/11/1995
Global ID :	T0606500400
Action Type :	ENFORCEMENT
Action :	File review - #RCDEH Upload Site File 1/14/2015

Date :	12/05/1994
Global ID :	T0606500400
Action Type :	RESPONSE
Action :	Tank Removal Report / UST Sampling Report

Date :	11/28/1994
Global ID :	T0606500400

Map Id: F25
Direction: WSW
Distance: 0.391 mi.
Actual: 2065.446 ft.
Elevation: 0.155 mi. / 820.866 ft.
Relative: Lower

Site Name: BROOKHURST MILL
3315 VAN BUREN BLVD
RIVERSIDE, CA 92503

Database(s): [LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9815419
EPA ID: N/R

LUST REG 8 - CA ***(Cont.)***

Action Type :	ENFORCEMENT
Action :	File review
Date :	09/23/1994
Global ID :	T0606500400
Action Type :	REMEDIATION
Action :	Excavation
Date :	08/23/1994
Global ID :	T0606500400
Action Type :	Other
Action :	Leak Reported
Date :	08/19/1994
Global ID :	T0606500400
Action Type :	Other
Action :	Leak Discovery
Date :	08/19/1994
Global ID :	T0606500400
Action Type :	Other
Action :	Leak Stopped
Date :	08/19/1994
Global ID :	T0606500400
Action Type :	REMEDIATION
Action :	Other (Use Description Field)

Status History

Status Date :	01/12/1995
Global ID :	T0606500400
Status :	Completed - Case Closed
Status Date :	08/31/1994
Global ID :	T0606500400
Status :	Open - Remediation

Map Id: F25
Direction: WSW
Distance: 0.391 mi.
Actual: 2065.446 ft.
Elevation: 0.155 mi. / 820.866 ft.
Relative: Lower

Site Name: BROOKHURST MILL
3315 VAN BUREN BLVD
RIVERSIDE, CA 92503

Database(s): [LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9815419
EPA ID: N/R

LUST REG 8 - CA ***(Cont.)***

Status Date :	08/24/1994
Global ID :	T0606500400
Status :	Open - Site Assessment
Status Date :	08/19/1994
Global ID :	T0606500400
Status :	Open - Case Begin Date

LUST_RIVERSIDE COUNTY - CA

Status Date :	01/12/1995
Status :	COMPLETED - CASE CLOSED
Begin Date :	08/19/1994
Global ID :	T0606500400
Facility Type :	LUST CLEANUP SITE
RB Case Number :	083302548T
Potential Media of Concern :	Soil
Potential Contaminants of Concern :	Diesel
Local Agency :	RIVERSIDE COUNTY LOP
Loc Case Number :	94714
Lead Agency :	RIVERSIDE COUNTY LOP
File Location :	Local Agency Warehouse
CUF Case :	YES
Caseworker :	SCB
Site History :	N/R

Contacts Summary

Global ID :	T0606500400
Contact Name :	NANCY OLSON-MARTIN
Contact Type :	Regional Board Caseworker
Organization Name :	SANTA ANA RWQCB (REGION 8)
Address :	3737 MAIN STREET, SUITE 500
City :	RIVERSIDE
Phone Number :	N/R
Email :	nolson-martin@waterboards.ca.gov
Global ID :	T0606500400
Contact Name :	SHARON BOLTINGHOUSE

Map Id: F25
Direction: WSW
Distance: 0.391 mi.
Actual: 2065.446 ft.
Elevation: 0.155 mi. / 820.866 ft.
Relative: Lower

Site Name: BROOKHURST MILL
3315 VAN BUREN BLVD
RIVERSIDE, CA 92503

Database(s): [LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9815419
EPA ID: N/R

LUST_RIVERSIDE COUNTY - CA ***(Cont.)***

Contact Type :	Local Agency Caseworker
Organization Name :	RIVERSIDE COUNTY LOP
Address :	3880 LEMON ST SUITE 200
City :	RIVERSIDE
Phone Number :	9519558980
Email :	sbolting@rivcocha.org

Regulatory Activities

Date :	01/12/1995
Global ID :	T0606500400
Action Type :	ENFORCEMENT
Action :	Closure/No Further Action Letter - #RCDEH11295

Date :	01/11/1995
Global ID :	T0606500400
Action Type :	ENFORCEMENT
Action :	File review - #RCDEH Upload Site File 1/14/2015

Date :	12/05/1994
Global ID :	T0606500400
Action Type :	RESPONSE
Action :	Tank Removal Report / UST Sampling Report

Date :	11/28/1994
Global ID :	T0606500400
Action Type :	ENFORCEMENT
Action :	File review

Date :	09/23/1994
Global ID :	T0606500400
Action Type :	REMEDIATION
Action :	Excavation

Date :	08/23/1994
Global ID :	T0606500400
Action Type :	Other
Action :	Leak Reported

Map Id: F25
Direction: WSW
Distance: 0.391 mi.
Actual: 2065.446 ft.
Elevation: 0.155 mi. / 820.866 ft.
Relative: Lower

Site Name: BROOKHURST MILL
3315 VAN BUREN BLVD
RIVERSIDE, CA 92503

Database(s): [LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9815419
EPA ID: N/R

LUST_RIVERSIDE COUNTY - CA ***(Cont.)***

Date :	08/19/1994
Global ID :	T0606500400
Action Type :	Other
Action :	Leak Discovery
Date :	08/19/1994
Global ID :	T0606500400
Action Type :	Other
Action :	Leak Stopped
Date :	08/19/1994
Global ID :	T0606500400
Action Type :	REMEDIATION
Action :	Other (Use Description Field)

Status History Summary

Status Date :	01/12/1995
Global ID :	T0606500400
Status :	Completed - Case Closed
Status Date :	08/31/1994
Global ID :	T0606500400
Status :	Open - Remediation
Status Date :	08/24/1994
Global ID :	T0606500400
Status :	Open - Site Assessment
Status Date :	08/19/1994
Global ID :	T0606500400
Status :	Open - Case Begin Date

Map Id: G26
Direction: W
Distance: 0.405 mi.
Actual: 2138.827 ft.
Elevation: 0.152 mi. / 804.462 ft.
Relative: Lower

Site Name: TEXACO SERVICE STATION
3483 VAN BUREN BLVD
RIVERSIDE, CA 92503

Database(s): [LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA]

Envirosite ID: 9818312
EPA ID: N/R

LUST REG 8 - CA

Status Date :	06/17/2003
Status :	Completed - Case Closed
Begin Date :	06/08/2001
Global ID :	T0606500477
Site History :	N/R
RB Case Number :	083302914T
Potential Media Affected :	Soil
Potential Contaminants of Concern :	Gasoline
Local Agency :	RIVERSIDE COUNTY LOP
Local Case Number :	200117614
Lead Agency :	RIVERSIDE COUNTY LOP
File Location :	Local Agency
CUF Case :	YES
Caseworker :	SCB
Case Type :	LUST Cleanup Site
How Discovered :	Tank Closure
How Discovered Description :	N/R
Stop Method :	Close and Remove Tank
Stop Description :	N/R

Contacts Summary

Global ID :	T0606500477
Contact Name :	SHARON BOLTINGHOUSE
Contact Type :	Local Agency Caseworker
Organization Name :	RIVERSIDE COUNTY LOP
Address :	3880 LEMON ST SUITE 200
City :	RIVERSIDE
Phone Number :	9519558980
Email :	sbolting@rivcocha.org

Global ID :	T0606500477
Contact Name :	TOM E. MBEKE-EKANEM
Contact Type :	Regional Board Caseworker
Organization Name :	SANTA ANA RWQCB (REGION 8)
Address :	3737 MAIN STREET, SUITE 500
City :	RIVERSIDE
Phone Number :	9513202007
Email :	tmbeke-ekanem@waterboards.ca.gov

Map Id: G26
Direction: W
Distance: 0.405 mi.
Actual: 2138.827 ft.
Elevation: 0.152 mi. / 804.462 ft.
Relative: Lower

Site Name: TEXACO SERVICE STATION
3483 VAN BUREN BLVD
RIVERSIDE, CA 92503

Database(s): [LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9818312
EPA ID: N/R

LUST REG 8 - CA ***(Cont.)***

Regulatory Activities

Date :	01/30/2003
Global ID :	T0606500477
Action Type :	ENFORCEMENT
Action :	Closure/No Further Action Letter
Date :	07/11/2001
Global ID :	T0606500477
Action Type :	Other
Action :	Leak Reported
Date :	07/10/2001
Global ID :	T0606500477
Action Type :	Other
Action :	Leak Discovery
Date :	07/10/2001
Global ID :	T0606500477
Action Type :	REMEDIATION
Action :	N/R
Date :	06/08/2001
Global ID :	T0606500477
Action Type :	Other
Action :	Leak Stopped

Status History

Status Date :	06/17/2003
Global ID :	T0606500477
Status :	Completed - Case Closed
Status Date :	07/11/2001
Global ID :	T0606500477
Status :	Open - Site Assessment
Status Date :	06/08/2001
Global ID :	T0606500477

Map Id: G26
Direction: W
Distance: 0.405 mi.
Actual: 2138.827 ft.
Elevation: 0.152 mi. / 804.462 ft.
Relative: Lower

Site Name: TEXACO SERVICE STATION
3483 VAN BUREN BLVD
RIVERSIDE, CA 92503

Database(s): [LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9818312
EPA ID: N/R

LUST REG 8 - CA ***(Cont.)***

Status :	Open - Case Begin Date

LUST_RIVERSIDE COUNTY - CA

Status Date :	06/17/2003
Status :	COMPLETED - CASE CLOSED
Begin Date :	06/08/2001
Global ID :	T0606500477
Facility Type :	LUST CLEANUP SITE
RB Case Number :	083302914T
Potential Media of Concern :	Soil
Potential Contaminants of Concern :	Gasoline
Local Agency :	RIVERSIDE COUNTY LOP
Loc Case Number :	200117614
Lead Agency :	RIVERSIDE COUNTY LOP
File Location :	Local Agency
CUF Case :	YES
Caseworker :	SCB
Site History :	N/R

Contacts Summary

Global ID :	T0606500477
Contact Name :	SHARON BOLTINGHOUSE
Contact Type :	Local Agency Caseworker
Organization Name :	RIVERSIDE COUNTY LOP
Address :	3880 LEMON ST SUITE 200
City :	RIVERSIDE
Phone Number :	9519558980
Email :	sbolting@rivcocha.org

Global ID :	T0606500477
Contact Name :	TOM E. MBEKE-EKANEM
Contact Type :	Regional Board Caseworker
Organization Name :	SANTA ANA RWQCB (REGION 8)
Address :	3737 MAIN STREET, SUITE 500
City :	RIVERSIDE
Phone Number :	9513202007
Email :	tmbeke-ekanem@waterboards.ca.gov

Map Id: G26
Direction: W
Distance: 0.405 mi.
Actual: 2138.827 ft.
Elevation: 0.152 mi. / 804.462 ft.
Relative: Lower

Site Name: TEXACO SERVICE STATION
3483 VAN BUREN BLVD
RIVERSIDE, CA 92503

Database(s): [LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9818312
EPA ID: N/R

LUST_RIVERSIDE COUNTY - CA ***(Cont.)***

Regulatory Activities

Date :	01/30/2003
Global ID :	T0606500477
Action Type :	ENFORCEMENT
Action :	Closure/No Further Action Letter
Date :	07/11/2001
Global ID :	T0606500477
Action Type :	Other
Action :	Leak Reported
Date :	07/10/2001
Global ID :	T0606500477
Action Type :	Other
Action :	Leak Discovery
Date :	07/10/2001
Global ID :	T0606500477
Action Type :	REMEDIATION
Action :	N/R
Date :	06/08/2001
Global ID :	T0606500477
Action Type :	Other
Action :	Leak Stopped

Status History Summary

Status Date :	06/17/2003
Global ID :	T0606500477
Status :	Completed - Case Closed
Status Date :	07/11/2001
Global ID :	T0606500477
Status :	Open - Site Assessment
Status Date :	06/08/2001
Global ID :	T0606500477

Map Id: G26
Direction: W
Distance: 0.405 mi.
Actual: 2138.827 ft.
Elevation: 0.152 mi. / 804.462 ft.
Relative: Lower

Site Name: TEXACO SERVICE STATION
3483 VAN BUREN BLVD
RIVERSIDE, CA 92503

Database(s): [LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9818312
EPA ID: N/R

LUST_RIVERSIDE COUNTY - CA ***(Cont.)***

Status :	Open - Case Begin Date

Map Id: F27
Direction: WSW
Distance: 0.422 mi.
Actual: 2229.693 ft.
Elevation: 0.153 mi. / 808.399 ft.
Relative: Lower

Site Name: UNOCAL #5714
9501 INDIANA AVE
RIVERSIDE, CA 92503

Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA]

Envirosite ID: 9818721
EPA ID: N/R

FRS

Registry ID :	110065471554

The California Environmental Protection Agency (CalEPA) has recently implemented a new data warehouse system (nSite). This data warehouse combines and merges facility and site information from five different systems managed within CalEPA. The five systems are: California Environmental Reporting System (CERS), EnviroStor, GeoTracker, California Integrated Water Quality System (CIWQS), and Toxic Release Inventory (TRI).

LUST REG 8 - CA

Status Date :	04/30/1996
Status :	Completed - Case Closed
Begin Date :	07/07/1995
Global ID :	T0606500461
Site History :	N/R
RB Case Number :	083302835T
Potential Media Affected :	Soil
Potential Contaminants of Concern :	Gasoline
Local Agency :	RIVERSIDE COUNTY LOP
Local Case Number :	95842
Lead Agency :	RIVERSIDE COUNTY LOP
File Location :	Local Agency Warehouse
CUF Case :	YES

Map Id: F27
Direction: WSW
Distance: 0.422 mi.
Actual: 2229.693 ft.
Elevation: 0.153 mi. / 808.399 ft.
Relative: Lower

Site Name: UNOCAL #5714
9501 INDIANA AVE
RIVERSIDE, CA 92503

Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9818721
EPA ID: N/R

LUST REG 8 - CA ***(Cont.)***

Caseworker :	UNK
Case Type :	LUST Cleanup Site
How Discovered :	Tank Closure
How Discovered Description :	N/R
Stop Method :	Other Means
Stop Description :	N/R

Contacts Summary

Global ID :	T0606500461
Contact Name :	NANCY OLSON-MARTIN
Contact Type :	Regional Board Caseworker
Organization Name :	SANTA ANA RWQCB (REGION 8)
Address :	3737 MAIN STREET, SUITE 500
City :	RIVERSIDE
Phone Number :	N/R
Email :	nolson-martin@waterboards.ca.gov

Global ID :	T0606500461
Contact Name :	UNK
Contact Type :	Local Agency Caseworker
Organization Name :	RIVERSIDE COUNTY LOP
Address :	3880 LEMON ST SUITE 200
City :	RIVERSIDE
Phone Number :	N/R
Email :	N/R

Regulatory Activities

Date :	04/30/1996
Global ID :	T0606500461
Action Type :	ENFORCEMENT
Action :	Closure/No Further Action Letter - #RivCo Closure

Date :	04/29/1996
Global ID :	T0606500461
Action Type :	ENFORCEMENT
Action :	File review - #RCDEH Upload Site File 10/30/2015

Map Id: F27
Direction: WSW
Distance: 0.422 mi.
Actual: 2229.693 ft.
Elevation: 0.153 mi. / 808.399 ft.
Relative: Lower

Site Name: UNOCAL #5714
9501 INDIANA AVE
RIVERSIDE, CA 92503

Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9818721
EPA ID: N/R

LUST REG 8 - CA ***(Cont.)***

Date :	10/11/1995
Global ID :	T0606500461
Action Type :	Other
Action :	Leak Reported
Date :	07/07/1995
Global ID :	T0606500461
Action Type :	Other
Action :	Leak Discovery
Date :	07/07/1995
Global ID :	T0606500461
Action Type :	Other
Action :	Leak Stopped

Status History

Status Date :	04/30/1996
Global ID :	T0606500461
Status :	Completed - Case Closed
Status Date :	07/07/1995
Global ID :	T0606500461
Status :	Open - Case Begin Date
Status Date :	01/24/1995
Status :	Completed - Case Closed
Begin Date :	09/07/1993
Global ID :	T0606500351
Site History :	N/R
RB Case Number :	083302378T
Potential Media Affected :	Soil
Potential Contaminants of Concern :	Diesel
Local Agency :	RIVERSIDE COUNTY LOP
Local Case Number :	931016
Lead Agency :	RIVERSIDE COUNTY LOP
File Location :	Local Agency
CUF Case :	NO

Map Id: F27
Direction: WSW
Distance: 0.422 mi.
Actual: 2229.693 ft.
Elevation: 0.153 mi. / 808.399 ft.
Relative: Lower

Site Name: UNOCAL #5714
9501 INDIANA AVE
RIVERSIDE, CA 92503

Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9818721
EPA ID: N/R

LUST REG 8 - CA ***(Cont.)***

Caseworker :	UNK
Case Type :	LUST Cleanup Site
How Discovered :	Tank Closure
How Discovered Description :	N/R
Stop Method :	Close and Remove Tank
Stop Description :	N/R

Contacts Summary

Global ID :	T0606500351
Contact Name :	NANCY OLSON-MARTIN
Contact Type :	Regional Board Caseworker
Organization Name :	SANTA ANA RWQCB (REGION 8)
Address :	3737 MAIN STREET, SUITE 500
City :	RIVERSIDE
Phone Number :	N/R
Email :	nolson-martin@waterboards.ca.gov

Global ID :	T0606500351
Contact Name :	UNK
Contact Type :	Local Agency Caseworker
Organization Name :	RIVERSIDE COUNTY LOP
Address :	3880 LEMON ST SUITE 200
City :	RIVERSIDE
Phone Number :	N/R
Email :	N/R

Regulatory Activities

Date :	01/24/1995
Global ID :	T0606500351
Action Type :	ENFORCEMENT
Action :	Closure/No Further Action Letter - #RivCo Closure

Date :	01/23/1995
Global ID :	T0606500351
Action Type :	ENFORCEMENT
Action :	File review - #RCDEH Upload Site File 10/30/2015

Map Id: F27
Direction: WSW
Distance: 0.422 mi.
Actual: 2229.693 ft.
Elevation: 0.153 mi. / 808.399 ft.
Relative: Lower

Site Name: UNOCAL #5714
9501 INDIANA AVE
RIVERSIDE, CA 92503

Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9818721
EPA ID: N/R

LUST REG 8 - CA ***(Cont.)***

Date :	11/04/1993
Global ID :	T0606500351
Action Type :	Other
Action :	Leak Reported
Date :	09/07/1993
Global ID :	T0606500351
Action Type :	Other
Action :	Leak Discovery
Date :	09/07/1993
Global ID :	T0606500351
Action Type :	Other
Action :	Leak Stopped

Status History

Status Date :	01/24/1995
Global ID :	T0606500351
Status :	Completed - Case Closed
Status Date :	12/29/1993
Global ID :	T0606500351
Status :	Open - Site Assessment
Status Date :	09/07/1993
Global ID :	T0606500351
Status :	Open - Case Begin Date

LUST_RIVERSIDE COUNTY - CA

Status Date :	04/30/1996
Status :	COMPLETED - CASE CLOSED
Begin Date :	07/07/1995
Global ID :	T0606500461
Facility Type :	LUST CLEANUP SITE
RB Case Number :	083302835T
Potential Media of Concern :	Soil

Map Id: F27
Direction: WSW
Distance: 0.422 mi.
Actual: 2229.693 ft.
Elevation: 0.153 mi. / 808.399 ft.
Relative: Lower

Site Name: UNOCAL #5714
9501 INDIANA AVE
RIVERSIDE, CA 92503

Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9818721
EPA ID: N/R

LUST_RIVERSIDE COUNTY - CA ***(Cont.)***

Potential Contaminants of Concern :	Gasoline
Local Agency :	RIVERSIDE COUNTY LOP
Loc Case Number :	95842
Lead Agency :	RIVERSIDE COUNTY LOP
File Location :	Local Agency Warehouse
CUF Case :	YES
Caseworker :	UNK
Site History :	N/R

Status Date :	01/24/1995
Status :	COMPLETED - CASE CLOSED
Begin Date :	09/07/1993
Global ID :	T0606500351
Facility Type :	LUST CLEANUP SITE
RB Case Number :	083302378T
Potential Media of Concern :	Soil
Potential Contaminants of Concern :	Diesel
Local Agency :	RIVERSIDE COUNTY LOP
Loc Case Number :	931016
Lead Agency :	RIVERSIDE COUNTY LOP
File Location :	Local Agency
CUF Case :	NO
Caseworker :	UNK
Site History :	N/R

Contacts Summary

Global ID :	T0606500351
Contact Name :	NANCY OLSON-MARTIN
Contact Type :	Regional Board Caseworker
Organization Name :	SANTA ANA RWQCB (REGION 8)
Address :	3737 MAIN STREET, SUITE 500
City :	RIVERSIDE
Phone Number :	N/R
Email :	nolson-martin@waterboards.ca.gov

Global ID :	T0606500351
Contact Name :	UNK
Contact Type :	Local Agency Caseworker

Map Id: F27
Direction: WSW
Distance: 0.422 mi.
Actual: 2229.693 ft.
Elevation: 0.153 mi. / 808.399 ft.
Relative: Lower

Site Name: UNOCAL #5714
9501 INDIANA AVE
RIVERSIDE, CA 92503

Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9818721
EPA ID: N/R

LUST_RIVERSIDE COUNTY - CA ***(Cont.)***

Organization Name :	RIVERSIDE COUNTY LOP
Address :	3880 LEMON ST SUITE 200
City :	RIVERSIDE
Phone Number :	N/R
Email :	N/R

Global ID :	T0606500461
Contact Name :	NANCY OLSON-MARTIN
Contact Type :	Regional Board Caseworker
Organization Name :	SANTA ANA RWQCB (REGION 8)
Address :	3737 MAIN STREET, SUITE 500
City :	RIVERSIDE
Phone Number :	N/R
Email :	nolson-martin@waterboards.ca.gov

Global ID :	T0606500461
Contact Name :	UNK
Contact Type :	Local Agency Caseworker
Organization Name :	RIVERSIDE COUNTY LOP
Address :	3880 LEMON ST SUITE 200
City :	RIVERSIDE
Phone Number :	N/R
Email :	N/R

Regulatory Activities

Date :	04/30/1996
Global ID :	T0606500461
Action Type :	ENFORCEMENT
Action :	Closure/No Further Action Letter - #RivCo Closure

Date :	04/29/1996
Global ID :	T0606500461
Action Type :	ENFORCEMENT
Action :	File review - #RCDEH Upload Site File 10/30/2015

Date :	10/11/1995
Global ID :	T0606500461

Map Id: F27
Direction: WSW
Distance: 0.422 mi.
Actual: 2229.693 ft.
Elevation: 0.153 mi. / 808.399 ft.
Relative: Lower

Site Name: UNOCAL #5714
9501 INDIANA AVE
RIVERSIDE, CA 92503

Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9818721
EPA ID: N/R

LUST_RIVERSIDE COUNTY - CA ***(Cont.)***

Action Type :	Other
Action :	Leak Reported
Date :	07/07/1995
Global ID :	T0606500461
Action Type :	Other
Action :	Leak Discovery
Date :	07/07/1995
Global ID :	T0606500461
Action Type :	Other
Action :	Leak Stopped
Date :	01/24/1995
Global ID :	T0606500351
Action Type :	ENFORCEMENT
Action :	Closure/No Further Action Letter - #RivCo Closure
Date :	01/23/1995
Global ID :	T0606500351
Action Type :	ENFORCEMENT
Action :	File review - #RCDEH Upload Site File 10/30/2015
Date :	11/04/1993
Global ID :	T0606500351
Action Type :	Other
Action :	Leak Reported
Date :	09/07/1993
Global ID :	T0606500351
Action Type :	Other
Action :	Leak Discovery
Date :	09/07/1993
Global ID :	T0606500351
Action Type :	Other
Action :	Leak Stopped

Map Id: F27
Direction: WSW
Distance: 0.422 mi.
Actual: 2229.693 ft.
Elevation: 0.153 mi. / 808.399 ft.
Relative: Lower

Site Name: UNOCAL #5714
9501 INDIANA AVE
RIVERSIDE, CA 92503

Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9818721
EPA ID: N/R

LUST_RIVERSIDE COUNTY - CA ***(Cont.)***

Status History Summary

Status Date :	04/30/1996
Global ID :	T0606500461
Status :	Completed - Case Closed
Status Date :	07/07/1995
Global ID :	T0606500461
Status :	Open - Case Begin Date
Status Date :	01/24/1995
Global ID :	T0606500351
Status :	Completed - Case Closed
Status Date :	12/29/1993
Global ID :	T0606500351
Status :	Open - Site Assessment
Status Date :	09/07/1993
Global ID :	T0606500351
Status :	Open - Case Begin Date

Map Id: F28
Direction: WSW
Distance: 0.422 mi.
Actual: 2229.693 ft.
Elevation: 0.153 mi. / 808.399 ft.
Relative: Lower

Site Name: 76 STATION 5693
9501 INDIANA AVENUE
RIVERSIDE, CA 92503

Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA]

Envirosite ID: 9814917
EPA ID: N/R

FRS

Registry ID : 110065429012

The California Environmental Protection Agency (CalEPA) has recently implemented a new data warehouse system (nSite). This data warehouse combines and merges facility and site information from five different systems managed within CalEPA. The five systems are:

Map Id: F28
Direction: WSW
Distance: 0.422 mi.
Actual: 2229.693 ft.
Elevation: 0.153 mi. / 808.399 ft.
Relative: Lower

Site Name: 76 STATION 5693
9501 INDIANA AVENUE
RIVERSIDE, CA 92503

Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9814917
EPA ID: N/R

FRS ***(Cont.)***

California Environmental Reporting System (CERS), EnviroStor, GeoTracker, California Integrated Water Quality System (CIWQS), and Toxic Release Inventory (TRI).

LUST REG 8 - CA

Status Date :	11/01/2013
Status :	Completed - Case Closed
Begin Date :	09/01/2007
Global ID :	T0606509047

Site History :

Two pea gravel samples were collected from an approximate depth of 1.5 fbg from a UST manhole excavation under the supervision of RCDEH on December 11, 2007. One sample was collected from the north side and one from the south side of the tank. Concentrations of total lead were detected in the north and south pea gravel samples at 5.5 mg/kg and 13 mg/kg, respectively. On February 20, through March 2, 2009, soil borings B-6 through B-11 were drilled to a total depth of 56.5 to 60 fbg.Results of this assessment indicate that oxygenates MTBE and TBA are present in saturated soil and groundwater beneath the Site. Oxygenate concentrations in groundwater are highest in the vicinity of borings B-10 and B-11, located on the northeastern side of the USTs, and B-9, located south of the USTs. Oxygenate concentrations in soil are highest at or slightly above the groundwater table in the vicinity of borings B-9, B-10 and B-11, located in the south and southeast portions of the site. Impact to vadose zone soils is minimal. Site History- SITE HISTORY / RELEASE INFORMATION: Previous Release - 1995: In July 1995, a leak was discovered in the 87-octane product line. October 1995, the UST system, consisting of two 12,000 gallon fuel UST's, piping, and dispensers, was removed and a new UST system was installed in the western corner of the site. All soil samples under the UST's were non-detect (ND) for all constituents analyzed, however, multiple soil samples collected below the product lines and dispensers detected hydrocarbon constituents. Concentrations up to 8300 ppm TPHg and 120 ppm benzene were detected below the northwestern dispenser island. Impacted soils near the affected dispenser island and product piping areas were over-excavated to 24 feet below grade (ft bg). Approximately 760 tons hydrocarbon-impacted soil was hauled off-site for recycling. Riverside County Environmental Health (RCDEH) issued a No Further Action letter for this release on April 30, 1996. NEARBY UST CLEANUP SITE: 1998 to Present: A UST cleanup site (Thrifty #341) is located southeast of the former 76 Station (diagonally across the intersection) at 3399 Van Buren Blvd. Depth to groundwater at this site has ranged from approximately 40 feet to the current depth of approximately 60 feet. Groundwater flow direction has been predominantly to the northwest. Soil and groundwater remediation has been conducted at this site. The status of this site is currently pending closure. ASSESSMENT / IDENTIFICATION OF ADDITIONAL RELEASE: September 2007: A due diligence baseline assessment was conducted for a property ownership

Map Id: F28
Direction: WSW
Distance: 0.422 mi.
Actual: 2229.693 ft.
Elevation: 0.153 mi. / 808.399 ft.
Relative: Lower

Site Name: 76 STATION 5693
9501 INDIANA AVENUE
RIVERSIDE, CA 92503

Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9814917
EPA ID: N/R

LUST REG 8 - CA ***(Cont.)***

transfer. Five soil borings (B-1 through B-5) were drilled near the existing UST's and dispensers to a maximum depth of 35 ft bg. One soil sample from 25 ft bg or 35 ft bg from each boring was analyzed by the laboratory. Hydrocarbon constituents were detected in several soil samples. The highest detections were 0.34 ppm TPHg, 2.8 ppb benzene, 2.2 ppb toluene, and 370 ppb methyl tertiary butyl ether (MTBE) all from boring B-2 at 35 ft bg. June 2008: The due diligence assessment report was provided to Local Oversight Program (LOP) staff. The site was subsequently entered into the LOP. February 2009: Six soil borings (B-6 through B-11) were drilled in various locations around the UST system to depths of approximately 55 to 56 ft bg. Laboratory results for all samples collected above 40 ft bg in all borings were at or below the detection limits for all constituents tested. The highest detections were in samples collected between 40 and 50 ft bg (2.8 ppm TPHg (B10-51'), ND < 10 ppm TPHd, 4.8 ppm MTBE (B9-46') and 3.5 ppm TBA (B11-56')). Groundwater was encountered in the borings at depths of 53 to 55.5 ft bg and groundwater grab samples were collected from each borehole. All groundwater samples were impacted with the highest concentrations in B-9 and B-11 (1800 ppb TPHg (B-11), 14000 ppb MTBE (B-11), and 820 ppb TBA (B-11)). April 2009: The site property was acquired by the City of Riverside by eminent domain and the station ceased operating. November 2009: Two 15,000-gallon gasoline USTs, the piping and four dispensers were removed. A total of 10 soil samples were collected below the UST system. All of the soil samples were ND for all constituents tested (TPH & VOCs). 2012 - Present: The site is a currently a vacant landscaped area between the 91 freeway / Indiana Avenue / Van Buren Boulevard. Recent highway improvements have encroached on the property and it is now too small for development. Future site use will be vacant property adjacent to freeway. GROUNDWATER MONITORING: Not required at this former 76 station site, however, groundwater has been monitored since 1999 across the intersection at the Thrifty station located southeast (diagonally) of the former 76 station site. The depth to groundwater at the Thrifty site has varied from 40 to 60 ft with a general flow direction to the northwest. Currently, the depth to groundwater at the Thrifty site is approximately 60 ft bg. REMEDIATION: Soil or groundwater remediation was not required and has not been conducted at the site. SOIL AND GROUNDWATER VERIFICATION: Not required. COMMENTS / JUSTIFICATION FOR CLOSURE: Based the lack of shallow soil impacts at this site as seen in the soil borings and sampling conducted below the UST system, as well as the depth to groundwater at the Thrifty cleanup site (ranging from 40 to 60 ft bg), it appears that soil impacts below 40 ft at this site may be associated with impacted groundwater / capillary fringe soils now exposed due to the drop in the water table (previously ~40 ft bg, now ~60 ft bg). Due to the small size of the property and location (between/adjacent to major streets and freeway), groundwater impacts that may exist below this site cannot be accessed for assessment or remediation (width of freeway is ~400 ft wide). Removal of both UST systems and prior excavation of impacted soils have removed potential contaminant sources that may have contributed to groundwater impacts. Further, the closest known water well is greater than 1 mile from the site. 11/1/2013 CASE CLOSED

Map Id: F28
Direction: WSW
Distance: 0.422 mi.
Actual: 2229.693 ft.
Elevation: 0.153 mi. / 808.399 ft.
Relative: Lower

Site Name: 76 STATION 5693
9501 INDIANA AVENUE
RIVERSIDE, CA 92503

Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9814917
EPA ID: N/R

LUST REG 8 - CA ***(Cont.)***

RB Case Number :	N/R
Potential Media Affected :	Aquifer used for drinking water supply
Potential Contaminants of Concern :	Gasoline
Local Agency :	RIVERSIDE COUNTY LOP
Local Case Number :	200825010
Lead Agency :	RIVERSIDE COUNTY LOP
File Location :	Local Agency
CUF Case :	NO
Caseworker :	AB
Case Type :	LUST Cleanup Site
How Discovered :	Other Means
How Discovered Description :	SOIL SAMPLING CONDUCTED DURING THE DUE DILIGENCE SITE ASSESSMENT.
Stop Method :	Other Means
Stop Description :	1995/1996 UST REPLACEMENT

Contacts Summary

Global ID :	T0606509047
Contact Name :	ANDREA BRIONES
Contact Type :	Local Agency Caseworker
Organization Name :	RIVERSIDE COUNTY LOP
Address :	3880 LEMON ST SUITE 200
City :	RIVERSIDE
Phone Number :	9519558982
Email :	abriones@rivcocha.org

Global ID :	T0606509047
Contact Name :	NANCY OLSON-MARTIN
Contact Type :	Regional Board Caseworker
Organization Name :	SANTA ANA RWQCB (REGION 8)
Address :	3737 MAIN STREET, SUITE 500
City :	RIVERSIDE
Phone Number :	N/R
Email :	nolson-martin@waterboards.ca.gov

Regulatory Activities

Date :	11/01/2013

Map Id: F28
Direction: WSW
Distance: 0.422 mi.
Actual: 2229.693 ft.
Elevation: 0.153 mi. / 808.399 ft.
Relative: Lower

Site Name: 76 STATION 5693
9501 INDIANA AVENUE
RIVERSIDE, CA 92503

Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9814917
EPA ID: N/R

LUST REG 8 - CA ***(Cont.)***

Global ID :	T0606509047
Action Type :	ENFORCEMENT
Action :	Closure/No Further Action Letter - #RCDEH Closure Documents
Date :	09/05/2013
Global ID :	T0606509047
Action Type :	RESPONSE
Action :	Verbal Communication
Date :	08/13/2013
Global ID :	T0606509047
Action Type :	RESPONSE
Action :	Correspondence
Date :	07/11/2013
Global ID :	T0606509047
Action Type :	RESPONSE
Action :	Other Report / Document
Date :	06/18/2013
Global ID :	T0606509047
Action Type :	ENFORCEMENT
Action :	Notification - Public Notice of Case Closure - #RCDEH#061813
Date :	06/18/2013
Global ID :	T0606509047
Action Type :	ENFORCEMENT
Action :	Staff Letter - #RCDEH#061813
Date :	05/20/2013
Global ID :	T0606509047
Action Type :	ENFORCEMENT
Action :	LOP Case Closure Summary to RB - #RCDEH#502013
Date :	05/02/2013
Global ID :	T0606509047
Action Type :	ENFORCEMENT
Action :	Staff Letter - #RCDEH 05022013

Map Id: F28
Direction: WSW
Distance: 0.422 mi.
Actual: 2229.693 ft.
Elevation: 0.153 mi. / 808.399 ft.
Relative: Lower

Site Name: 76 STATION 5693
9501 INDIANA AVENUE
RIVERSIDE, CA 92503

Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9814917
EPA ID: N/R

LUST REG 8 - CA ***(Cont.)***

Date :	03/06/2013
Global ID :	T0606509047
Action Type :	RESPONSE
Action :	Request for Closure - Regulator Responded

Date :	10/15/2012
Global ID :	T0606509047
Action Type :	RESPONSE
Action :	Monitoring Report - Quarterly

Date :	07/15/2012
Global ID :	T0606509047
Action Type :	RESPONSE
Action :	Monitoring Report - Quarterly

Date :	04/15/2012
Global ID :	T0606509047
Action Type :	RESPONSE
Action :	Monitoring Report - Quarterly

Date :	01/15/2012
Global ID :	T0606509047
Action Type :	RESPONSE
Action :	Monitoring Report - Quarterly

Date :	10/15/2011
Global ID :	T0606509047
Action Type :	RESPONSE
Action :	Monitoring Report - Quarterly

Date :	07/15/2011
Global ID :	T0606509047
Action Type :	RESPONSE
Action :	Monitoring Report - Quarterly

Date :	04/15/2011
Global ID :	T0606509047
Action Type :	RESPONSE

Map Id: F28
Direction: WSW
Distance: 0.422 mi.
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Site Name: 76 STATION 5693
9501 INDIANA AVENUE
RIVERSIDE, CA 92503

Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9814917
EPA ID: N/R

LUST REG 8 - CA ***(Cont.)***

Action :	Monitoring Report - Quarterly
Date :	01/15/2011
Global ID :	T0606509047
Action Type :	RESPONSE
Action :	Monitoring Report - Quarterly
Date :	10/15/2010
Global ID :	T0606509047
Action Type :	RESPONSE
Action :	Monitoring Report - Quarterly
Date :	07/15/2010
Global ID :	T0606509047
Action Type :	RESPONSE
Action :	Monitoring Report - Quarterly
Date :	04/15/2010
Global ID :	T0606509047
Action Type :	RESPONSE
Action :	Monitoring Report - Quarterly
Date :	01/15/2010
Global ID :	T0606509047
Action Type :	RESPONSE
Action :	Monitoring Report - Quarterly
Date :	12/22/2009
Global ID :	T0606509047
Action Type :	RESPONSE
Action :	Tank Removal Report / UST Sampling Report
Date :	12/01/2009
Global ID :	T0606509047
Action Type :	RESPONSE
Action :	Other Report / Document
Date :	11/01/2009

Map Id: F28
Direction: WSW
Distance: 0.422 mi.
Actual: 2229.693 ft.
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Relative: Lower

Site Name: 76 STATION 5693
9501 INDIANA AVENUE
RIVERSIDE, CA 92503

Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9814917
EPA ID: N/R

LUST REG 8 - CA ***(Cont.)***

Global ID :	T0606509047
Action Type :	Other
Action :	Leak Stopped
Date :	10/15/2009
Global ID :	T0606509047
Action Type :	RESPONSE
Action :	Monitoring Report - Quarterly
Date :	10/01/2009
Global ID :	T0606509047
Action Type :	ENFORCEMENT
Action :	Staff Letter
Date :	08/12/2009
Global ID :	T0606509047
Action Type :	ENFORCEMENT
Action :	Staff Letter - #RCDEH081209
Date :	06/25/2009
Global ID :	T0606509047
Action Type :	RESPONSE
Action :	Other Workplan
Date :	05/08/2009
Global ID :	T0606509047
Action Type :	ENFORCEMENT
Action :	Staff Letter - #RCDEH050809
Date :	03/30/2009
Global ID :	T0606509047
Action Type :	RESPONSE
Action :	Other Report / Document
Date :	12/19/2008
Global ID :	T0606509047
Action Type :	ENFORCEMENT
Action :	Staff Letter - #RCDEH121708

Map Id: F28
Direction: WSW
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Actual: 2229.693 ft.
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Site Name: 76 STATION 5693
9501 INDIANA AVENUE
RIVERSIDE, CA 92503

Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9814917
EPA ID: N/R

LUST REG 8 - CA ***(Cont.)***

Date :	12/12/2008
Global ID :	T0606509047
Action Type :	RESPONSE
Action :	Other Workplan
Date :	06/13/2008
Global ID :	T0606509047
Action Type :	ENFORCEMENT
Action :	Notice of Responsibility - #RCDEH061308 NOR
Date :	06/13/2008
Global ID :	T0606509047
Action Type :	ENFORCEMENT
Action :	Staff Letter - #RCDEH061308
Date :	06/09/2008
Global ID :	T0606509047
Action Type :	Other
Action :	Leak Reported
Date :	09/01/2007
Global ID :	T0606509047
Action Type :	Other
Action :	Leak Discovery

Status History

Status Date :	11/01/2013
Global ID :	T0606509047
Status :	Completed - Case Closed
Status Date :	06/18/2013
Global ID :	T0606509047
Status :	Open - Eligible for Closure
Status Date :	06/13/2008
Global ID :	T0606509047
Status :	Open - Site Assessment

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Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9814917
EPA ID: N/R

LUST REG 8 - CA ***(Cont.)***

Status Date :	09/01/2007
Global ID :	T0606509047
Status :	Open - Case Begin Date

LUST_RIVERSIDE COUNTY - CA

Status Date :	11/01/2013
Status :	COMPLETED - CASE CLOSED
Begin Date :	09/01/2007
Global ID :	T0606509047
Facility Type :	LUST CLEANUP SITE
RB Case Number :	N/R
Potential Media of Concern :	Aquifer used for drinking water supply
Potential Contaminants of Concern :	Gasoline
Local Agency :	RIVERSIDE COUNTY LOP
Loc Case Number :	200825010
Lead Agency :	RIVERSIDE COUNTY LOP
File Location :	Local Agency
CUF Case :	NO
Caseworker :	AB

Site History :

Two pea gravel samples were collected from an approximate depth of 1.5 fbg from a UST manhole excavation under the supervision of RCDEH on December 11, 2007. One sample was collected from the north side and one from the south side of the tank. Concentrations of total lead were detected in the north and south pea gravel samples at 5.5 mg/kg and 13 mg/kg, respectively. On February 20, through March 2, 2009, soil borings B-6 through B-11 were drilled to a total depth of 56.5 to 60 fbg.Results of this assessment indicate that oxygenates MTBE and TBA are present in saturated soil and groundwater beneath the Site. Oxygenate concentrations in groundwater are highest in the vicinity of borings B-10 and B-11, located on the northeastern side of the USTs, and B-9, located south of the USTs. Oxygenate concentrations in soil are highest at or slightly above the groundwater table in the vicinity of borings B-9, B-10 and B-11, located in the south and southeast portions of the site. Impact to vadose zone soils is minimal. Site History- SITE HISTORY / RELEASE INFORMATION: Previous Release - 1995: In July 1995, a leak was discovered in the 87-octane product line. October 1995, the UST system, consisting of two 12,000 gallon fuel UST's, piping, and dispensers, was removed and a new UST system was installed in the western corner of the site. All soil samples under the UST's were non-detect (ND) for all constituents analyzed, however, multiple soil samples collected below the product lines and dispensers detected hydrocarbon constituents. Concentrations up to 8300 ppm TPHg and 120 ppm benzene were detected below the northwestern dispenser island. Impacted soils near the affected dispenser island and product piping areas were over-excavated to 24 feet below grade (ft bg). Approximately 760 tons

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RIVERSIDE, CA 92503

Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9814917
EPA ID: N/R

LUST_RIVERSIDE COUNTY - CA ***(Cont.)***

hydrocarbon-impacted soil was hauled off-site for recycling. Riverside County Environmental Health (RCDEH) issued a No Further Action letter for this release on April 30, 1996. NEARBY UST CLEANUP SITE: 1998 to Present: A UST cleanup site (Thrifty #341) is located southeast of the former 76 Station (diagonally across the intersection) at 3399 Van Buren Blvd. Depth to groundwater at this site has ranged from approximately 40 feet to the current depth of approximately 60 feet. Groundwater flow direction has been predominantly to the northwest. Soil and groundwater remediation has been conducted at this site. The status of this site is currently pending closure. ASSESSMENT / IDENTIFICATION OF ADDITIONAL RELEASE: September 2007: A due diligence baseline assessment was conducted for a property ownership transfer. Five soil borings (B-1 through B-5) were drilled near the existing UST's and dispensers to a maximum depth of 35 ft bg. One soil sample from 25 ft bg or 35 ft bg from each boring was analyzed by the laboratory. Hydrocarbon constituents were detected in several soil samples. The highest detections were 0.34 ppm TPHg, 2.8 ppb benzene, 2.2 ppb toluene, and 370 ppb methyl tertiary butyl ether (MTBE) all from boring B-2 at 35 ft bg. June 2008: The due diligence assessment report was provided to Local Oversight Program (LOP) staff. The site was subsequently entered into the LOP. February 2009: Six soil borings (B-6 through B-11) were drilled in various locations around the UST system to depths of approximately 55 to 56 ft bg. Laboratory results for all samples collected above 40 ft bg in all borings were at or below the detection limits for all constituents tested. The highest detections were in samples collected between 40 and 50 ft bg (2.8 ppm TPHg (B10-51'), ND < 10 ppm TPHd, 4.8 ppm MTBE (B9-46') and 3.5 ppm TBA (B11-56')). Groundwater was encountered in the borings at depths of 53 to 55.5 ft bg and groundwater grab samples were collected from each borehole. All groundwater samples were impacted with the highest concentrations in B-9 and B-11 (1800 ppb TPHg (B-11), 14000 ppb MTBE (B-11), and 820 ppb TBA (B-11)). April 2009: The site property was acquired by the City of Riverside by eminent domain and the station ceased operating. November 2009: Two 15,000-gallon gasoline USTs, the piping and four dispensers were removed. A total of 10 soil samples were collected below the UST system. All of the soil samples were ND for all constituents tested (TPH & VOCs). 2012 - Present: The site is a currently a vacant landscaped area between the 91 freeway / Indiana Avenue / Van Buren Boulevard. Recent highway improvements have encroached on the property and it is now too small for development. Future site use will be vacant property adjacent to freeway. GROUNDWATER MONITORING: Not required at this former 76 station site, however, groundwater has been monitored since 1999 across the intersection at the Thrifty station located southeast (diagonally) of the former 76 station site. The depth to groundwater at the Thrifty site has varied from 40 to 60 ft with a general flow direction to the northwest. Currently, the depth to groundwater at the Thrifty site is approximately 60 ft bg. REMEDIATION: Soil or groundwater remediation was not required and has not been conducted at the site. SOIL AND GROUNDWATER VERIFICATION: Not required. COMMENTS / JUSTIFICATION FOR CLOSURE: Based the lack of shallow soil impacts at this site as seen in the soil borings and sampling conducted below the UST system, as well as the depth to groundwater at the Thrifty cleanup site (ranging from 40 to 60 ft bg), it appears that soil impacts below

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Direction: WSW
Distance: 0.422 mi.
Actual: 2229.693 ft.
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Site Name: 76 STATION 5693
9501 INDIANA AVENUE
RIVERSIDE, CA 92503

Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9814917
EPA ID: N/R

LUST_RIVERSIDE COUNTY - CA ***(Cont.)***

40 ft at this site may be associated with impacted groundwater / capillary fringe soils now exposed due to the drop in the water table (previously ~40 ft bg, now ~60 ft bg). Due to the small size of the property and location (between/adjacent to major streets and freeway), groundwater impacts that may exist below this site cannot be accessed for assessment or remediation (width of freeway is ~400 ft wide). Removal of both UST systems and prior excavation of impacted soils have removed potential contaminant sources that may have contributed to groundwater impacts. Further, the closest known water well is greater than 1 mile from the site. 11/1/2013 CASE CLOSED

Contacts Summary

Global ID :	T0606509047
Contact Name :	ANDREA BRIONES
Contact Type :	Local Agency Caseworker
Organization Name :	RIVERSIDE COUNTY LOP
Address :	3880 LEMON ST SUITE 200
City :	RIVERSIDE
Phone Number :	9519558982
Email :	abriones@rivcocha.org

Global ID :	T0606509047
Contact Name :	NANCY OLSON-MARTIN
Contact Type :	Regional Board Caseworker
Organization Name :	SANTA ANA RWQCB (REGION 8)
Address :	3737 MAIN STREET, SUITE 500
City :	RIVERSIDE
Phone Number :	N/R
Email :	nolson-martin@waterboards.ca.gov

Regulatory Activities

Date :	11/01/2013
Global ID :	T0606509047
Action Type :	ENFORCEMENT
Action :	Closure/No Further Action Letter - #RCDEH Closure Documents

Date :	09/05/2013
Global ID :	T0606509047

Map Id: F28
Direction: WSW
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Relative: Lower

Site Name: 76 STATION 5693
9501 INDIANA AVENUE
RIVERSIDE, CA 92503

Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9814917
EPA ID: N/R

LUST_RIVERSIDE COUNTY - CA ***(Cont.)***

Action Type :	RESPONSE
Action :	Verbal Communication
Date :	08/13/2013
Global ID :	T0606509047
Action Type :	RESPONSE
Action :	Correspondence
Date :	07/11/2013
Global ID :	T0606509047
Action Type :	RESPONSE
Action :	Other Report / Document
Date :	06/18/2013
Global ID :	T0606509047
Action Type :	ENFORCEMENT
Action :	Notification - Public Notice of Case Closure - #RCDEH#061813
Date :	06/18/2013
Global ID :	T0606509047
Action Type :	ENFORCEMENT
Action :	Staff Letter - #RCDEH#061813
Date :	05/20/2013
Global ID :	T0606509047
Action Type :	ENFORCEMENT
Action :	LOP Case Closure Summary to RB - #RCDEH#502013
Date :	05/02/2013
Global ID :	T0606509047
Action Type :	ENFORCEMENT
Action :	Staff Letter - #RCDEH 05022013
Date :	03/06/2013
Global ID :	T0606509047
Action Type :	RESPONSE
Action :	Request for Closure - Regulator Responded

Map Id: F28
Direction: WSW
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Site Name: 76 STATION 5693
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Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9814917
EPA ID: N/R

LUST_RIVERSIDE COUNTY - CA ***(Cont.)***

Date :	10/15/2012
Global ID :	T0606509047
Action Type :	RESPONSE
Action :	Monitoring Report - Quarterly
Date :	07/15/2012
Global ID :	T0606509047
Action Type :	RESPONSE
Action :	Monitoring Report - Quarterly
Date :	04/15/2012
Global ID :	T0606509047
Action Type :	RESPONSE
Action :	Monitoring Report - Quarterly
Date :	01/15/2012
Global ID :	T0606509047
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Date :	10/15/2011
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Global ID :	T0606509047
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Action :	Monitoring Report - Quarterly
Date :	04/15/2011
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Action Type :	RESPONSE
Action :	Monitoring Report - Quarterly
Date :	01/15/2011
Global ID :	T0606509047
Action Type :	RESPONSE

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Site Name: 76 STATION 5693
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Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9814917
EPA ID: N/R

LUST_RIVERSIDE COUNTY - CA ***(Cont.)***

Action :	Monitoring Report - Quarterly
Date :	10/15/2010
Global ID :	T0606509047
Action Type :	RESPONSE
Action :	Monitoring Report - Quarterly
Date :	07/15/2010
Global ID :	T0606509047
Action Type :	RESPONSE
Action :	Monitoring Report - Quarterly
Date :	04/15/2010
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Action Type :	RESPONSE
Action :	Monitoring Report - Quarterly
Date :	01/15/2010
Global ID :	T0606509047
Action Type :	RESPONSE
Action :	Monitoring Report - Quarterly
Date :	12/22/2009
Global ID :	T0606509047
Action Type :	RESPONSE
Action :	Tank Removal Report / UST Sampling Report
Date :	12/01/2009
Global ID :	T0606509047
Action Type :	RESPONSE
Action :	Other Report / Document
Date :	11/01/2009
Global ID :	T0606509047
Action Type :	Other
Action :	Leak Stopped
Date :	10/15/2009

Map Id: F28
Direction: WSW
Distance: 0.422 mi.
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Site Name: 76 STATION 5693
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Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9814917
EPA ID: N/R

LUST_RIVERSIDE COUNTY - CA ***(Cont.)***

Global ID :	T0606509047
Action Type :	RESPONSE
Action :	Monitoring Report - Quarterly
Date :	10/01/2009
Global ID :	T0606509047
Action Type :	ENFORCEMENT
Action :	Staff Letter
Date :	08/12/2009
Global ID :	T0606509047
Action Type :	ENFORCEMENT
Action :	Staff Letter - #RCDEH081209
Date :	06/25/2009
Global ID :	T0606509047
Action Type :	RESPONSE
Action :	Other Workplan
Date :	05/08/2009
Global ID :	T0606509047
Action Type :	ENFORCEMENT
Action :	Staff Letter - #RCDEH050809
Date :	03/30/2009
Global ID :	T0606509047
Action Type :	RESPONSE
Action :	Other Report / Document
Date :	12/19/2008
Global ID :	T0606509047
Action Type :	ENFORCEMENT
Action :	Staff Letter - #RCDEH121708
Date :	12/12/2008
Global ID :	T0606509047
Action Type :	RESPONSE
Action :	Other Workplan

Map Id: F28
Direction: WSW
Distance: 0.422 mi.
Actual: 2229.693 ft.
Elevation: 0.153 mi. / 808.399 ft.
Relative: Lower

Site Name: 76 STATION 5693
9501 INDIANA AVENUE
RIVERSIDE, CA 92503

Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9814917
EPA ID: N/R

LUST_RIVERSIDE COUNTY - CA ***(Cont.)***

Date :	06/13/2008
Global ID :	T0606509047
Action Type :	ENFORCEMENT
Action :	Notice of Responsibility - #RCDEH061308 NOR

Date :	06/13/2008
Global ID :	T0606509047
Action Type :	ENFORCEMENT
Action :	Staff Letter - #RCDEH061308

Date :	06/09/2008
Global ID :	T0606509047
Action Type :	Other
Action :	Leak Reported

Date :	09/01/2007
Global ID :	T0606509047
Action Type :	Other
Action :	Leak Discovery

Status History Summary

Status Date :	11/01/2013
Global ID :	T0606509047
Status :	Completed - Case Closed

Status Date :	06/18/2013
Global ID :	T0606509047
Status :	Open - Eligible for Closure

Status Date :	06/13/2008
Global ID :	T0606509047
Status :	Open - Site Assessment

Status Date :	09/01/2007
Global ID :	T0606509047
Status :	Open - Case Begin Date

Map Id: F29
Direction: WSW
Distance: 0.422 mi.
Actual: 2229.693 ft.
Elevation: 0.153 mi. / 808.399 ft.
Relative: Lower

Site Name: 76 STATION #5693
9501 INDIANA AVE
RIVERSIDE, CA

Database(s): [CORRECTIVE ACTION_Riverside County - CA]

Envirosite ID: 325064265
EPA ID: N/R

CORRECTIVE ACTION_Riverside County - CA

Date Opened :	06/03/2008
Date Closed :	11/01/2013
Case Closed :	Y
Case Type :	Soil Impacted
RCDEH LOP ID :	200825010
GeoTracker Global ID :	T0606509047

Map Id: F30
Direction: WSW
Distance: 0.422 mi.
Actual: 2229.693 ft.
Elevation: 0.153 mi. / 808.399 ft.
Relative: Lower

Site Name: UNOCAL #5714
9501 INDIANA AVE
RIVERSIDE, CA

Database(s): [CORRECTIVE ACTION_Riverside County - CA]

Envirosite ID: 30245455
EPA ID: N/R

CORRECTIVE ACTION_Riverside County - CA

Date Opened :	10/11/1995
Date Closed :	04/29/1996
Case Closed :	Y
Case Type :	Soil Impacted
RCDEH LOP ID :	95842
GeoTracker Global ID :	T0606500461

Date Opened :	11/04/1993
Date Closed :	01/24/1995
Case Closed :	Y
Case Type :	Soil Impacted
RCDEH LOP ID :	931016
GeoTracker Global ID :	T0606500351

Map Id: G31
Direction: W
Distance: 0.425 mi.
Actual: 2246.355 ft.
Elevation: 0.153 mi. / 806.759 ft.
Relative: Lower

Site Name: CHEVRON #9-4702
3476 VAN BUREN BLVD
RIVERSIDE, CA

Database(s): [CORRECTIVE ACTION_Riverside County - CA]

Envirosite ID: 30245587
EPA ID: N/R

CORRECTIVE ACTION_Riverside County - CA

Date Opened :	10/27/1998
Date Closed :	04/08/1999
Case Closed :	Y
Case Type :	Soil Impacted
RCDEH LOP ID :	9814667
GeoTracker Global ID :	T0606500552

Map Id: G32
Direction: W
Distance: 0.425 mi.
Actual: 2246.355 ft.
Elevation: 0.153 mi. / 806.759 ft.
Relative: Lower

Site Name: CHEVRON #94702 (RAYS CHEVRON)
3476 VAN BUREN BLVD
RIVERSIDE, CA 92503

Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA]

Envirosite ID: 9815705
EPA ID: N/R

FRS

Registry ID :	110066308212

The California Environmental Protection Agency (CalEPA) has recently implemented a new data warehouse system (nSite). This data warehouse combines and merges facility and site information from five different systems managed within CalEPA. The five systems are: California Environmental Reporting System (CERS), EnviroStor, GeoTracker, California Integrated Water Quality System (CIWQS), and Toxic Release Inventory (TRI).

LUST REG 8 - CA

Status Date :	05/15/1995
Status :	Completed - Case Closed
Begin Date :	07/11/1991
Global ID :	T0606500236
Site History :	N/R
RB Case Number :	083301853T
Potential Media Affected :	Soil
Potential Contaminants of Concern :	Gasoline
Local Agency :	RIVERSIDE COUNTY LOP

Map Id: G32
Direction: W
Distance: 0.425 mi.
Actual: 2246.355 ft.
Elevation: 0.153 mi. / 806.759 ft.
Relative: Lower

Site Name: CHEVRON #94702 (RAYS CHEVRON)
3476 VAN BUREN BLVD
RIVERSIDE, CA 92503

Envirosite ID: 9815705
EPA ID: N/R

Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

LUST REG 8 - CA ***(Cont.)***

Local Case Number :	91629
Lead Agency :	RIVERSIDE COUNTY LOP
File Location :	Local Agency Warehouse
CUF Case :	NO
Caseworker :	SCB
Case Type :	LUST Cleanup Site
How Discovered :	Other Means
How Discovered Description :	N/R
Stop Method :	N/R
Stop Description :	N/R

Contacts Summary

Global ID :	T0606500236
Contact Name :	ROSE SCOTT
Contact Type :	Regional Board Caseworker
Organization Name :	SANTA ANA RWQCB (REGION 8)
Address :	3737 MAIN STREET, SUITE 500
City :	RIVERSIDE
Phone Number :	9513206375
Email :	rscott@waterboards.ca.gov

Global ID :	T0606500236
Contact Name :	SHARON BOLTINGHOUSE
Contact Type :	Local Agency Caseworker
Organization Name :	RIVERSIDE COUNTY LOP
Address :	3880 LEMON ST SUITE 200
City :	RIVERSIDE
Phone Number :	9519558980
Email :	sbolting@rivcocha.org

Regulatory Activities

Date :	05/15/1995
Global ID :	T0606500236
Action Type :	ENFORCEMENT
Action :	Closure/No Further Action Letter - #RCDEH5151995

Map Id: G32
Direction: W
Distance: 0.425 mi.
Actual: 2246.355 ft.
Elevation: 0.153 mi. / 806.759 ft.
Relative: Lower

Site Name: CHEVRON #94702 (RAYS CHEVRON)
3476 VAN BUREN BLVD
RIVERSIDE, CA 92503

Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9815705
EPA ID: N/R

LUST REG 8 - CA ***(Cont.)***

Date :	05/14/1995
Global ID :	T0606500236
Action Type :	ENFORCEMENT
Action :	File review - #RCDEH Upload Site File 1/16/2015

Date :	07/15/1991
Global ID :	T0606500236
Action Type :	Other
Action :	Leak Reported

Date :	07/15/1991
Global ID :	T0606500236
Action Type :	REMEDIATION
Action :	Soil Vapor Extraction (SVE)

Date :	07/12/1991
Global ID :	T0606500236
Action Type :	Other
Action :	Leak Stopped

Date :	07/11/1991
Global ID :	T0606500236
Action Type :	Other
Action :	Leak Discovery

Status History

Status Date :	05/15/1995
Global ID :	T0606500236
Status :	Completed - Case Closed

Status Date :	05/24/1993
Global ID :	T0606500236
Status :	Open - Remediation

Status Date :	07/16/1991
Global ID :	T0606500236
Status :	Open - Site Assessment

Map Id: G32
Direction: W
Distance: 0.425 mi.
Actual: 2246.355 ft.
Elevation: 0.153 mi. / 806.759 ft.
Relative: Lower

Site Name: CHEVRON #94702 (RAYS CHEVRON)
3476 VAN BUREN BLVD
RIVERSIDE, CA 92503

Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9815705
EPA ID: N/R

LUST REG 8 - CA ***(Cont.)***

Status Date :	07/11/1991
Global ID :	T0606500236
Status :	Open - Case Begin Date

LUST_RIVERSIDE COUNTY - CA

Status Date :	05/15/1995
Status :	COMPLETED - CASE CLOSED
Begin Date :	07/11/1991
Global ID :	T0606500236
Facility Type :	LUST CLEANUP SITE
RB Case Number :	083301853T
Potential Media of Concern :	Soil
Potential Contaminants of Concern :	Gasoline
Local Agency :	RIVERSIDE COUNTY LOP
Loc Case Number :	91629
Lead Agency :	RIVERSIDE COUNTY LOP
File Location :	Local Agency Warehouse
CUF Case :	NO
Caseworker :	SCB
Site History :	N/R

Contacts Summary

Global ID :	T0606500236
Contact Name :	ROSE SCOTT
Contact Type :	Regional Board Caseworker
Organization Name :	SANTA ANA RWQCB (REGION 8)
Address :	3737 MAIN STREET, SUITE 500
City :	RIVERSIDE
Phone Number :	9513206375
Email :	rscott@waterboards.ca.gov

Global ID :	T0606500236
Contact Name :	SHARON BOLTINGHOUSE
Contact Type :	Local Agency Caseworker
Organization Name :	RIVERSIDE COUNTY LOP
Address :	3880 LEMON ST SUITE 200
City :	RIVERSIDE

Map Id: G32
Direction: W
Distance: 0.425 mi.
Actual: 2246.355 ft.
Elevation: 0.153 mi. / 806.759 ft.
Relative: Lower

Site Name: CHEVRON #94702 (RAYS CHEVRON)
3476 VAN BUREN BLVD
RIVERSIDE, CA 92503

Envirosite ID: 9815705
EPA ID: N/R

Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

LUST_RIVERSIDE COUNTY - CA ***(Cont.)***

Phone Number :	9519558980
Email :	sbolting@rivcocha.org

Regulatory Activities

Date :	05/15/1995
Global ID :	T0606500236
Action Type :	ENFORCEMENT
Action :	Closure/No Further Action Letter - #RCDEH5151995

Date :	05/14/1995
Global ID :	T0606500236
Action Type :	ENFORCEMENT
Action :	File review - #RCDEH Upload Site File 1/16/2015

Date :	07/15/1991
Global ID :	T0606500236
Action Type :	Other
Action :	Leak Reported

Date :	07/15/1991
Global ID :	T0606500236
Action Type :	REMEDIATION
Action :	Soil Vapor Extraction (SVE)

Date :	07/12/1991
Global ID :	T0606500236
Action Type :	Other
Action :	Leak Stopped

Date :	07/11/1991
Global ID :	T0606500236
Action Type :	Other
Action :	Leak Discovery

Status History Summary

Status Date :	05/15/1995

Map Id: G32
Direction: W
Distance: 0.425 mi.
Actual: 2246.355 ft.
Elevation: 0.153 mi. / 806.759 ft.
Relative: Lower

Site Name: CHEVRON #94702 (RAYS CHEVRON)
3476 VAN BUREN BLVD
RIVERSIDE, CA 92503

Database(s): [FRS, LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9815705
EPA ID: N/R

LUST_RIVERSIDE COUNTY - CA ***(Cont.)***

Global ID :	T0606500236
Status :	Completed - Case Closed
Status Date :	05/24/1993
Global ID :	T0606500236
Status :	Open - Remediation
Status Date :	07/16/1991
Global ID :	T0606500236
Status :	Open - Site Assessment
Status Date :	07/11/1991
Global ID :	T0606500236
Status :	Open - Case Begin Date

Map Id: G33
Direction: W
Distance: 0.425 mi.
Actual: 2246.355 ft.
Elevation: 0.153 mi. / 806.759 ft.
Relative: Lower

Site Name: CHEVRON #9-4702
3476 VAN BUREN BLVD
RIVERSIDE, CA 92503

Database(s): [LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA]

Envirosite ID: 9815651
EPA ID: N/R

LUST REG 8 - CA

Status Date :	04/12/1999
Status :	Completed - Case Closed
Begin Date :	10/27/1998
Global ID :	T0606500552
Site History :	N/R
RB Case Number :	083303310T
Potential Media Affected :	Soil
Potential Contaminants of Concern :	Gasoline
Local Agency :	RIVERSIDE COUNTY LOP
Local Case Number :	9814667

Map Id: G33
Direction: W
Distance: 0.425 mi.
Actual: 2246.355 ft.
Elevation: 0.153 mi. / 806.759 ft.
Relative: Lower

Site Name: CHEVRON #9-4702
3476 VAN BUREN BLVD
RIVERSIDE, CA 92503

Database(s): [LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

Envirosite ID: 9815651
EPA ID: N/R

LUST REG 8 - CA ***(Cont.)***

Lead Agency :	RIVERSIDE COUNTY LOP
File Location :	Local Agency Warehouse
CUF Case :	YES
Caseworker :	SCB
Case Type :	LUST Cleanup Site
How Discovered :	Other Means
How Discovered Description :	N/R
Stop Method :	Close and Remove Tank
Stop Description :	N/R

Contacts Summary

Global ID :	T0606500552
Contact Name :	SHARON BOLTINGHOUSE
Contact Type :	Local Agency Caseworker
Organization Name :	RIVERSIDE COUNTY LOP
Address :	3880 LEMON ST SUITE 200
City :	RIVERSIDE
Phone Number :	9519558980
Email :	sbolting@rivcocha.org

Global ID :	T0606500552
Contact Name :	TOM E. MBEKE-EKANEM
Contact Type :	Regional Board Caseworker
Organization Name :	SANTA ANA RWQCB (REGION 8)
Address :	3737 MAIN STREET, SUITE 500
City :	RIVERSIDE
Phone Number :	9513202007
Email :	tmbeke-ekanem@waterboards.ca.gov

Regulatory Activities

Date :	04/12/1999
Global ID :	T0606500552
Action Type :	ENFORCEMENT
Action :	Closure/No Further Action Letter - #Riv Co Closure

Date :	04/11/1999

Map Id: G33
Direction: W
Distance: 0.425 mi.
Actual: 2246.355 ft.
Elevation: 0.153 mi. / 806.759 ft.
Relative: Lower

Site Name: CHEVRON #9-4702
3476 VAN BUREN BLVD
RIVERSIDE, CA 92503

Envirosite ID: 9815651
EPA ID: N/R

Database(s): [LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

LUST REG 8 - CA ***(Cont.)***

Global ID :	T0606500552
Action Type :	ENFORCEMENT
Action :	Closure/No Further Action Letter
Date :	04/10/1999
Global ID :	T0606500552
Action Type :	ENFORCEMENT
Action :	File review - #RCDEH Upload Site File 4/21/2010
Date :	11/16/1998
Global ID :	T0606500552
Action Type :	Other
Action :	Leak Reported
Date :	11/16/1998
Global ID :	T0606500552
Action Type :	Other
Action :	Leak Stopped
Date :	10/27/1998
Global ID :	T0606500552
Action Type :	Other
Action :	Leak Discovery

Status History

Status Date :	04/12/1999
Global ID :	T0606500552
Status :	Completed - Case Closed
Status Date :	10/27/1998
Global ID :	T0606500552
Status :	Open - Case Begin Date

LUST_RIVERSIDE COUNTY - CA

Status Date :	04/12/1999
Status :	COMPLETED - CASE CLOSED

Map Id: G33
Direction: W
Distance: 0.425 mi.
Actual: 2246.355 ft.
Elevation: 0.153 mi. / 806.759 ft.
Relative: Lower

Site Name: CHEVRON #9-4702
3476 VAN BUREN BLVD
RIVERSIDE, CA 92503

Envirosite ID: 9815651
EPA ID: N/R

Database(s): [LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

LUST_RIVERSIDE COUNTY - CA ***(Cont.)***

Begin Date :	10/27/1998
Global ID :	T0606500552
Facility Type :	LUST CLEANUP SITE
RB Case Number :	083303310T
Potential Media of Concern :	Soil
Potential Contaminants of Concern :	Gasoline
Local Agency :	RIVERSIDE COUNTY LOP
Loc Case Number :	9814667
Lead Agency :	RIVERSIDE COUNTY LOP
File Location :	Local Agency Warehouse
CUF Case :	YES
Caseworker :	SCB
Site History :	N/R

Contacts Summary

Global ID :	T0606500552
Contact Name :	SHARON BOLTINGHOUSE
Contact Type :	Local Agency Caseworker
Organization Name :	RIVERSIDE COUNTY LOP
Address :	3880 LEMON ST SUITE 200
City :	RIVERSIDE
Phone Number :	9519558980
Email :	sbolting@rivcocha.org

Global ID :	T0606500552
Contact Name :	TOM E. MBEKE-EKANEM
Contact Type :	Regional Board Caseworker
Organization Name :	SANTA ANA RWQCB (REGION 8)
Address :	3737 MAIN STREET, SUITE 500
City :	RIVERSIDE
Phone Number :	9513202007
Email :	tmbeke-ekanem@waterboards.ca.gov

Regulatory Activities

Date :	04/12/1999
Global ID :	T0606500552

Map Id: G33
Direction: W
Distance: 0.425 mi.
Actual: 2246.355 ft.
Elevation: 0.153 mi. / 806.759 ft.
Relative: Lower

Site Name: CHEVRON #9-4702
3476 VAN BUREN BLVD
RIVERSIDE, CA 92503

Envirosite ID: 9815651
EPA ID: N/R

Database(s): [LUST REG 8 - CA, LUST_RIVERSIDE COUNTY - CA] ***(Cont.)***

LUST_RIVERSIDE COUNTY - CA ***(Cont.)***

Action Type :	ENFORCEMENT
Action :	Closure/No Further Action Letter - #Riv Co Closure
Date :	04/11/1999
Global ID :	T0606500552
Action Type :	ENFORCEMENT
Action :	Closure/No Further Action Letter
Date :	04/10/1999
Global ID :	T0606500552
Action Type :	ENFORCEMENT
Action :	File review - #RCDEH Upload Site File 4/21/2010
Date :	11/16/1998
Global ID :	T0606500552
Action Type :	Other
Action :	Leak Reported
Date :	11/16/1998
Global ID :	T0606500552
Action Type :	Other
Action :	Leak Stopped
Date :	10/27/1998
Global ID :	T0606500552
Action Type :	Other
Action :	Leak Discovery

Status History Summary

Status Date :	04/12/1999
Global ID :	T0606500552
Status :	Completed - Case Closed
Status Date :	10/27/1998
Global ID :	T0606500552
Status :	Open - Case Begin Date

Map Id: G34
Direction: W
Distance: 0.425 mi.
Actual: 2246.355 ft.
Elevation: 0.153 mi. / 806.759 ft.
Relative: Lower

Site Name: CHEVRON #9-4702 (RAY'S CHEVRON)
3476 VAN BUREN BLVD
RIVERSIDE, CA

Database(s): [CORRECTIVE ACTION_Riverside County - CA]

Envirosite ID: 30245586
EPA ID: N/R

CORRECTIVE ACTION_Riverside County - CA

Date Opened :	07/15/1991
Date Closed :	05/15/1995
Case Closed :	Y
Case Type :	Soil Impacted
RCDEH LOP ID :	91629
GeoTracker Global ID :	T0606500236

Map Id: 35
Direction: ESE
Distance: 0.509 mi.
Actual: 2686.154 ft.
Elevation: 0.164 mi. / 865.158 ft.
Relative: Higher

Site Name: N/R
33 54 47.14N, 117 25 39.90W
ARLINGTON, CA

Database(s): [DIGITAL OBSTACLE]

Envirosite ID: 317370998
EPA ID: N/R

DIGITAL OBSTACLE

Date of Action :	06/10/2010
Action :	Change
FAA Study Number :	2010AWP02564OE
ORS Code :	06-020668
Obstacle Type :	TOWER
Country Identifier :	US
Type of Lighting :	None
Verification Status :	Verified
Quantity :	1
Mark Indicator :	None
Above Ground Level Height (Feet) :	00071
Above Mean Sea Level Height (Feet) :	00945
Horizontal Accuracy :	+-500'
Vertical Accuracy :	+-125'

Map Id: 36
Direction: NNW
Distance: 0.601 mi.
Actual: 3174.672 ft.
Elevation: 0.147 mi. / 773.95 ft.
Relative: Lower

Site Name: SHERMAN INDIAN HIGH SCHOOL
9010 MAGNOLIA AVE
RIVERSIDE, CA

Database(s): [CORRECTIVE ACTION_Riverside County - CA]

Envirosite ID: 30245495
EPA ID: N/R

CORRECTIVE ACTION_Riverside County - CA

Date Opened :	02/17/1994
Date Closed :	07/25/1994
Case Closed :	Y
Case Type :	Soil Impacted
RCDEH LOP ID :	94128
GeoTracker Global ID :	T0606500365

Map Id: 37
Direction: WNW
Distance: 0.630 mi.
Actual: 3325.844 ft.
Elevation: 0.149 mi. / 785.105 ft.
Relative: Lower

Site Name: J & R FAST FUEL / FORMER QUALITY GAS
9407 MAGNOLIA AVE
RIVERSIDE, CA

Database(s): [CORRECTIVE ACTION_Riverside County - CA]

Envirosite ID: 30245496
EPA ID: N/R

CORRECTIVE ACTION_Riverside County - CA

Date Opened :	10/16/1995
Date Closed :	N/R
Case Closed :	N/R
Case Type :	Drinking Water Aquifer
RCDEH LOP ID :	95865
GeoTracker Global ID :	T0606500430

Map Id: 38
Direction: WNW
Distance: 0.701 mi.
Actual: 3699.697 ft.
Elevation: 0.149 mi. / 785.761 ft.
Relative: Lower

Site Name: MOBIL #18-HVR
9505 MAGNOLIA AVE
RIVERSIDE, CA

Database(s): [CORRECTIVE ACTION_Riverside County - CA]

Envirosite ID: 30245497
EPA ID: N/R

CORRECTIVE ACTION_Riverside County - CA

Date Opened :	11/10/2005

Map Id: 38
Direction: WNW
Distance: 0.701 mi.
Actual: 3699.697 ft.
Elevation: 0.149 mi. / 785.761 ft.
Relative: Lower

Site Name: MOBIL #18-HVR
9505 MAGNOLIA AVE
RIVERSIDE, CA

Database(s): [CORRECTIVE ACTION_Riverside County - CA] ***(Cont.)***

Envirosite ID: 30245497
EPA ID: N/R

CORRECTIVE ACTION_Riverside County - CA ***(Cont.)***

Date Closed :	N/R
Case Closed :	N/R
Case Type :	Drinking Water Aquifer
RCDEH LOP ID :	200522145
GeoTracker Global ID :	T0606549611

Map Id: 39
Direction: ENE
Distance: 0.711 mi.
Actual: 3751.487 ft.
Elevation: 0.159 mi. / 839.895 ft.
Relative: Higher

Site Name: N/R
33 55 10.60N, 117 25 24.60W
RIVERSIDE, CA

Database(s): [DIGITAL OBSTACLE]

Envirosite ID: 317371069
EPA ID: N/R

DIGITAL OBSTACLE

Date of Action :	05/22/2014
Action :	Action
FAA Study Number :	2010AWP04931OE
ORS Code :	06-037259
Obstacle Type :	TOWER
Country Identifier :	US
Type of Lighting :	None
Verification Status :	Verified
Quantity :	1
Mark Indicator :	None
Above Ground Level Height (Feet) :	00050
Above Mean Sea Level Height (Feet) :	00887
Horizontal Accuracy :	+-500'
Vertical Accuracy :	+-125'

Map Id: 40
Direction: NE
Distance: 0.754 mi.
Actual: 3980.217 ft.
Elevation: 0.151 mi. / 799.541 ft.
Relative: Lower

Site Name: N/R
33 55 33.61N, 117 25 41.85W
RIVERSIDE, CA

Database(s): [DIGITAL OBSTACLE]

Envirosite ID: 322385859
EPA ID: N/R

DIGITAL OBSTACLE

Date of Action :	12/11/2015
Action :	Action
FAA Study Number :	2013AWP04026OE
ORS Code :	06-038455
Obstacle Type :	POLE
Country Identifier :	US
Type of Lighting :	None
Verification Status :	Verified
Quantity :	1
Mark Indicator :	None
Above Ground Level Height (Feet) :	00080
Above Mean Sea Level Height (Feet) :	00886
Horizontal Accuracy :	+-500'
Vertical Accuracy :	+-125'

Map Id: 41
Direction: W
Distance: 0.774 mi.
Actual: 4086.644 ft.
Elevation: 0.149 mi. / 784.121 ft.
Relative: Lower

Site Name: ARLINGTON AUTOMOTIVE
9611 MAGNOLIA AVE
RIVERSIDE, CA

Database(s): [CORRECTIVE ACTION_Riverside County - CA]

Envirosite ID: 30245498
EPA ID: N/R

CORRECTIVE ACTION_Riverside County - CA

Date Opened :	08/05/1987
Date Closed :	03/06/1990
Case Closed :	R
Case Type :	(none)
RCDEH LOP ID :	87518
GeoTracker Global ID :	T0606500071

Map Id: 42
Direction: W
Distance: 0.902 mi.
Actual: 4763.638 ft.
Elevation: 0.148 mi. / 780.184 ft.
Relative: Lower

Site Name: AHLSWEDE FERTILIZER COMPANY
9758 MAGNOLIA AV
RIVERSIDE, CA 92503

Database(s): [BOND EXPENDITURE PLAN - CA, ENVIROSTOR - CA, PERCHLORATE 2 - CA]

Envirosite ID: 9483063
EPA ID: N/R

BOND EXPENDITURE PLAN - CA

Status Date :	01/03/2008
Site Type :	Evaluation
Site Type Detailed :	Evaluation
Acreage :	1
APN :	234092041
National Priorities List :	NO
Regulatory Agencies Involved :	DTSC - Site Cleanup Program; US EPA
Lead Agency :	DTSC - Site Cleanup Program
Project Manager :	N/R
Supervisor :	* Greg Holmes
Division Branch :	Cleanup Cypress
Envirostor ID :	60000222
Site Code :	N/R
Assembly :	60
Senate :	31
Congressional District :	41
Special Program :	EPA - PASI
Status :	No Action Required
Past Uses :	MANUFACTURING - OTHER
Potential COC :	Perchlorate
Confirmed COC :	Perchlorate-NO
Potential Media Affected :	Other Groundwater affected (uses other than drinking water)
Restricted Use :	NO
Site Management Req :	NONE SPECIFIED
Funding :	Not Applicable
Latitude :	33.9171083178558
Longitude :	-117.450896495662

Alias Details

Alias :	234092041
Alias Type :	APN
Alias :	60000222
Alias Type :	Envirostor ID Number

Completed Activities

Completed Date :	04/28/2006

Map Id: 42
Direction: W
Distance: 0.902 mi.
Actual: 4763.638 ft.
Elevation: 0.148 mi. / 780.184 ft.
Relative: Lower

Site Name: AHLSWEDE FERTILIZER COMPANY
9758 MAGNOLIA AV
RIVERSIDE, CA 92503

Database(s): [BOND EXPENDITURE PLAN - CA, ENVIROSTOR - CA, PERCHLORATE 2 - CA] ***(Cont.)***

Envirosite ID: 9483063
EPA ID: N/R

BOND EXPENDITURE PLAN - CA ***(Cont.)***

Area Name :	PROJECT WIDE
Sub Area Name :	N/R
Document Type :	Site Screening
Comments :	Site Screening Assessment submitted to EPA on 03/23/2006. EPA approval on 04/12/2006 as " not a valid site " . DTSC concurs. Document is no longer confidential.

Future Activities

Area Name :	N/R
Sub Area Name :	N/R
Document Type :	N/R
Due Date :	N/R

Scheduled Activites

Due Date :	N/R
Revised Date :	N/R
Area Name :	N/R
Sub Area Name :	N/R
Document Type :	N/R

ENVIROSTOR - CA

Cleanup Date :	01/03/2008
Cleanup Status :	NO ACTION REQUIRED
Envirostor ID :	60000222
Program Type :	EVALUATION
Site Code :	N/R
Site Type :	EVALUATION
Project Manager :	N/R
Supervisor :	* GREG HOLMES
Office :	CLEANUP CYPRESS
Press Contact :	N/R
School District :	N/R
Public Participation Specialist :	N/R

Map Id: 42
Direction: W
Distance: 0.902 mi.
Actual: 4763.638 ft.
Elevation: 0.148 mi. / 780.184 ft.
Relative: Lower

Site Name: AHLSWEDE FERTILIZER COMPANY
9758 MAGNOLIA AV
RIVERSIDE, CA 92503

Database(s): [BOND EXPENDITURE PLAN - CA, ENVIROSTOR - CA, PERCHLORATE 2 - CA] ***(Cont.)***

Envirosite ID: 9483063
EPA ID: N/R

ENVIROSTOR - CA ***(Cont.)***

Permit Renewal Lead :	N/R
National Priorities List :	NO
Acres :	1 ACRES
APN :	234092041
Cleanup Oversight Agencies :	DTSC - SITE CLEANUP PROGRAM - LEAD US EPA
Special Program :	EPA - PASI
Funding :	NOT APPLICABLE
Assembly District :	60
Senate District :	31
Past Use(s) that Caused Contamination :	MANUFACTURING - OTHER
Potential Contaminants of Concern :	PERCHLORATE
Potential Media Affected :	OTHER GROUNDWATER AFFECTED (USES OTHER THAN DRINKING WATER)
Latitude :	33.9171083178558
Longitude :	-117.450896495662

PERCHLORATE 2 - CA

Status Date :	01/03/2008
Status :	NO ACTION REQUIRED
Envirostor ID :	60000222
Site Code :	N/R
Program Type :	EVALUATION
Latitude :	33.9171083178558
Longitude :	-117.450896495662

Map Id: 43
Direction: ENE
Distance: 0.987 mi.
Actual: 5211.808 ft.
Elevation: 0.159 mi. / 840.551 ft.
Relative: Higher

Site Name: N/R
33 55 19.20N, 117 25 09.80W
RIVERSIDE, CA

Database(s): [DIGITAL OBSTACLE]

Envirosite ID: 317371218
EPA ID: N/R

DIGITAL OBSTACLE

Date of Action :	05/22/2014
Action :	Action
FAA Study Number :	2010AWP04930OE
ORS Code :	06-037258
Obstacle Type :	TOWER
Country Identifier :	US
Type of Lighting :	None
Verification Status :	Verified
Quantity :	1
Mark Indicator :	None
Above Ground Level Height (Feet) :	00040
Above Mean Sea Level Height (Feet) :	00885
Horizontal Accuracy :	+-500'
Vertical Accuracy :	+-125'

CITY:	ENVIROSITE ID:	SITE NAME:	SITE ADDRESS:	ZIP:	DATABASE(S):
RIVERSIDE	30822408	1X CIGNA PROPERTY & CASUALTY INC.	TYLER MALL	92503	HAZNET - CA
RIVERSIDE	30977576	1X CO OF RIVERSIDE HAZ MAT BRNCH	COUNTY ROAD YARD		HAZNET - CA
RIVERSIDE	30829056	1X RIVERSIDE UNIFIED SCHOOL DIST	RAMONA HIGH SCHOOL		HAZNET - CA
RIVERSIDE	30833124	1X SPECIALIZED MOTOR SERVICE	RUBIDOUX BLVD HWY 60		HAZNET - CA
RIVERSIDE	30862613	C & C TRANSPORTATION	SW CORNER OF VAN BUREN & RUDICILL	92503	HAZNET - CA
RIVERSIDE	19069854	CALTRANS D-8/CONSTR/EA08-203204	RTE 91 EB/WB PM 13.5-14.5	92503	HAZNET - CA
ARLINGTON	9638013	CITRUS ORCHARD	VICTORIA AND GRATTON	92503	HIST UST - CA
RIVERSIDE	30840576	CITY OF RIVERSIDE	INTERSECTION OF INDIANA AND	92503	HAZNET - CA
RIVERSIDE	30245599	COUNTY OF RIVERSIDE	11511 VENTURE DR		CORRECTIVE ACTION_Riverside County - CA
RIVERSIDE	9827086	FOUR CORNERS PIPE LINE COMPANY	WOODCREST AREA		SLIC REG 8 - CA
RIVERSIDE	30851743	HOME SAVINGS OF AMERICA	CORNER W AGUA MONSA & HALL AVE		HAZNET - CA
RIVERSIDE	30922107	JOHN ERWIN	PARC 136-421-001	92503	HAZNET - CA
RIVERSIDE	31083927	KEMPER REAL ESTATE MGMT	PARCEL#935-370-030-4		HAZNET - CA
RIVERSIDE	318352867	LA SIERRA UNIVERSITY (FORMER LOMA LINDA)	00 COLLETT AVE & PIERCE		CORRECTIVE ACTION_Riverside County - CA
RIVERSIDE	30245360	LVW BROWN ESTATES INC	SPRING ST & OBSERVATION DR		CORRECTIVE ACTION_Riverside County - CA
RIVERSIDE	325064278	MCLANE FOOD SERVICE	14813 MERIDIAN PKWY		CORRECTIVE ACTION_Riverside County - CA
RIVERSIDE	30851594	REALTY DEALERS	LOT 1 OF TRACT 22335		HAZNET - CA
RIVERSIDE	31070045	RIVERSIDE COUNTY EMERGENCY RESPONSE ESPERANZA FIRE	RIVERSIDE COUNTY ESPERANZA FIRE		HAZNET - CA
RIVERSIDE	19066702	RIVERSIDE COUNTY/CLANDESTINE DRUG LABS	VARIOUS LOCATIONS WITHIN RIVERSIDE		HAZNET - CA
	19066327	RIVERSIDE COUNTY/EMERG RESPONSE ONLY	RIVERSIDE COUNTY		HAZNET - CA
RIVERSIDE	9827256	RIVERSIDE PLUME	DOWNTOWN RIVERSIDE		SLIC REG 8 - CA
RIVERSIDE	30865518	SCD LCC	INDIAN TRUCK TRAILS		HAZNET - CA
RIVERSIDE	19157288	SOUTHERN CALIFORNIA EDISON - EL SOBRANTE SUB	EL SOBRANTE SUBSTATION	92503	HAZNET - CA
ARLINGTON	31017910	SUKUT EQUIPMENT INC	PARC 28816 @BUCCANAN & LAKEPORT DR	92503	HAZNET - CA

CITY:	ENVIROSITE ID:	SITE NAME:	SITE ADDRESS:	ZIP:	DATABASE(S):
RIVERSIDE	21167501	TORNEY GENERAL HOSPITAL	RIVERSIDE	92503	BOND EXPENDITURE PLAN - CA, CORTESE - CA, ENVIROSTOR - CA
RIVERSIDE	30245545	UCR - PARKING LOT 6	UNIVERSITY OF CALIF, RIVERSIDE		CORRECTIVE ACTION_Riverside County - CA
	317715227	WEST RIVERSIDE SANITARY LANDFILL	HALL AVENUE		ODI

To maintain currency of the following federal and state databases, Envirosite Corporation contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

STANDARD ENVIRONMENTAL RECORDS:

FEDERAL RCRA NON-CORRACTS TSD FACILITIES LIST

ARCHIVED RCRA TSDF: Resource Conservation and Recovery Act hazardous waste transportation storage disposal and treatment facilities

Date of Government Version: 10/31/2016
Date Release Frequency: Varies
Next Scheduled Contact: 01/09/2017
Source: U.S. Environmental Protection Agency
Telephone: 215-814-2469
Last Contact: 10/31/2016

RCRA_TSDF: Resource Conservation and Recovery Act hazardous waste transportation storage disposal and treatment facilities

Date of Government Version: 10/31/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 01/09/2017
Source: U.S. Environmental Protection Agency
Telephone: 215-814-2469
Last Contact: 10/31/2016

FEDERAL CERCLIS LIST

CERCLIS: Comprehensive Environmental Response Compensation and Liability Act program sites reported to the Environmental Protection Agency and can be proposed for the NPL List

Date of Government Version: 11/15/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 01/24/2017
Source: U.S. Environmental Protection Agency
Telephone: 800-424-9346
Last Contact: 11/15/2016

CERCLIS NFRAP: Comprehensive Environmental Response Compensation and Liability Act No Further Remedial Action Planned sites that have been removed and archived

Date of Government Version: 11/16/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 01/25/2017
Source: U.S. Environmental Protection Agency
Telephone: 800-424-9346
Last Contact: 11/16/2016

FEDERAL FACILITY: Sites where Federal Facilities Restoration and Reuse Office (FFRRO) arranged cleanup for Base Closure and Property Transfer at Federal Facilities

Date of Government Version: 12/25/2015
Date Release Frequency: Varies
Next Scheduled Contact: 02/23/2017
Source: U.S. Environmental Protection Agency
Telephone: 703-603-8712
Last Contact: 12/15/2016

SEMS_8R_ACTIVE SITES: The Active Site Inventory Report displays site and location information at active SEMS sites. An active site is one at which site assessment, removal, remedial, enforcement, cost recovery, or oversight activities are being planned or conducted. NPL sites include latitude and longitude information. For non-NPL sites, a brief site status is provided.

Date of Government Version: 11/21/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 01/30/2017
Source: U.S. Environmental Protection Agency
Telephone: 703-603-8867
Last Contact: 11/21/2016

SEMS_8R_ARCHIVED SITES: The Archived Site Inventory displays site and location information at sites archived from SEMS. An archived site is one at which EPA has determined that assessment has been completed and no further remedial action is planned under the Superfund program at this time.

Date of Government Version: 11/21/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 01/30/2017
Source: U.S. Environmental Protection Agency
Telephone: 703-603-8867
Last Contact: 11/21/2016

Federal RCRA CORRACTS facilities list

CORRACTS: List of facilities where Resource Conservation and Recovery Act Corrective Action Program used to investigate and remediate hazardous releases

Date of Government Version: 10/31/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 01/09/2017
Source: U.S. Environmental Protection Agency
Telephone: 202-566-1667
Last Contact: 10/31/2016

FEDERAL DELISTED NPL SITE LIST

DELISTED NPL: National Priority List of sites that were delisted and no longer require action

Date of Government Version: 11/21/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 01/30/2017
Source: U.S. Environmental Protection Agency
Telephone: 703-603-8867
Last Contact: 11/21/2016

DELISTED PROPOSED NPL: Sites that have been delisted from the proposed National Priority List

Date of Government Version: 11/21/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 01/30/2017
Source: U.S. Environmental Protection Agency
Telephone: 703-603-8867
Last Contact: 11/21/2016

SEMS_DELETED NPL: All Deleted National Priority List Sties

Date of Government Version: 11/21/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 01/30/2017
Source: U.S. Environmental Protection Agency
Telephone: 703-603-8867
Last Contact: 11/21/2016

FEDERAL ERNS LIST

ERNS: Emergency Response Notification System records of reported spills

Date of Government Version: 10/05/2016
Date Release Frequency: Annually
Next Scheduled Contact: 02/22/2017
Source: National Response Center United States Coast Guard
Telephone: NULL
Last Contact: 12/14/2016

FEDERAL INSTITUTIONAL CONTROLS / ENGINEERING CONTROLS REGISTRIES

Fed E C: Federal listing of remediation sites with engineering controls

Date of Government Version: 10/19/2016
Date Release Frequency: Varies
Next Scheduled Contact: 12/28/2016
Source: U.S. Environmental Protection Agency
Telephone: 800-424-9346
Last Contact: 10/19/2016

Fed I C: Federal listing of remediation sites with institutional controls

Date of Government Version: 10/19/2016
Date Release Frequency: Varies
Next Scheduled Contact: 12/28/2016
Source: U.S. Environmental Protection Agency
Telephone: 800-424-9346
Last Contact: 10/19/2016

Fed-Published Institutional Controls: A land use restricted site is a property where there are limits or requirements on future use of the property due to varying levels of cleanup possible practical or necessary at the site.

Date of Government Version: 04/01/2015
Date Release Frequency: Varies
Next Scheduled Contact: 01/10/2017
Source: U.S. Environmental Protection Agency
Telephone: 855-246-3642
Last Contact: 10/14/2016

RCRA IC_EC: Sites with institutional or engineering controls related to Resource Conservation and Recovery Act

Date of Government Version: 10/31/2016
Date Release Frequency: Varies
Next Scheduled Contact: 01/09/2017
Source: U.S. Environmental Protection Agency
Telephone: 215-814-2469
Last Contact: 10/31/2016

FEDERAL NPL SITE LIST

NPL: List of priority contaminated sites among identified releases or threatened releases of hazardous substances pollutants or contaminants nationally

Date of Government Version: 11/21/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 01/30/2017
Source: U.S. Environmental Protection Agency
Telephone: 703-603-8867
Last Contact: 11/21/2016

NPL EPA R1 GIS: Geospatial data for the Environmental Protection Agency Region 1 National Priority List subject to environmental regulation

Date of Government Version: 11/21/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 01/30/2017
Source: U.S. Environmental Protection Agency
Telephone: 202-566-2132
Last Contact: 11/21/2016

NPL EPA R6 GIS: Geospatial data for the Environmental Protection Agency Region 6 National Priority List subject to environmental regulation

Date of Government Version: 11/21/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 01/30/2017
Source: U.S. Environmental Protection Agency
Telephone: 202-566-2132
Last Contact: 11/21/2016

NPL EPA R8 GIS: Geospatial data for the Environmental Protection Agency Region 8 National Priority List subject to environmental regulation

Date of Government Version: 11/21/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 01/30/2017
Source: U.S. Environmental Protection Agency
Telephone: 202-566-2132
Last Contact: 11/21/2016

NPL EPA R9 GIS: Geospatial data for the Environmental Protection Agency Region 9 National Priority List subject to environmental regulation

Date of Government Version: 11/21/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 01/30/2017
Source: U.S. Environmental Protection Agency
Telephone: 202-566-2132
Last Contact: 11/21/2016

NPL LIENS: National Priority List of sites with Liens

Date of Government Version: 11/15/2016
Date Release Frequency: Varies
Next Scheduled Contact: 01/20/2017
Source: U.S. Environmental Protection Agency
Telephone: 703-603-8867
Last Contact: 10/24/2016

PART NPL: Sites that are a part of an National Priority List site referred to as the parent site

Date of Government Version: 11/21/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 01/30/2017
Source: U.S. Environmental Protection Agency
Telephone: 703-603-8867
Last Contact: 11/21/2016

PROPOSED NPL: Sites that have been proposed for the National Priority List

Date of Government Version: 11/16/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 01/25/2017
Source: U.S. Environmental Protection Agency
Telephone: 703-603-8867
Last Contact: 11/16/2016

SEMS_FINAL NPL: All Included National Priority List Sites

Date of Government Version: 11/21/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 01/30/2017
Source: U.S. Environmental Protection Agency
Telephone: 703-603-8867
Last Contact: 11/21/2016

SEMS_PROPOSED NPL: All Proposed National Priority List Sites

Date of Government Version: 11/21/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 01/30/2017
Source: U.S. Environmental Protection Agency
Telephone: 703-603-8867
Last Contact: 11/21/2016

FEDERAL RCRA GENERATORS LIST

RCRA_CESQG: Resource Conservation and Recovery Act listing of licensed conditionally exempt small quantity generators

Date of Government Version: 10/31/2016
Date Release Frequency: Varies
Next Scheduled Contact: 01/09/2017
Source: U.S. Environmental Protection Agency
Telephone: 215-814-2469
Last Contact: 10/31/2016

RCRA_FULL_DETAIL: Full detail of related sites to the Resource Conservation and Recovery Act

Date of Government Version: 10/31/2016
Date Release Frequency: Varies
Next Scheduled Contact: 01/09/2017
Source: U.S. Environmental Protection Agency
Telephone: 215-814-2469
Last Contact: 10/31/2016

RCRA_LQG: Resource Conservation and Recovery Act listing of licensed large quantity generators

Date of Government Version: 10/31/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 01/09/2017
Source: U.S. Environmental Protection Agency
Telephone: 215-814-2469
Last Contact: 10/31/2016

RCRA_NONGEN: Resource Conservation and Recovery Act listing of licensed non-generators

Date of Government Version: 10/31/2016
Date Release Frequency: Varies
Next Scheduled Contact: 01/09/2017
Source: U.S. Environmental Protection Agency
Telephone: 215-814-2469
Last Contact: 10/31/2016

RCRA_SQG: Resource Conservation and Recovery Act listing of licensed small quantity generators

Date of Government Version: 10/31/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 01/09/2017
Source: U.S. Environmental Protection Agency
Telephone: 215-814-2469
Last Contact: 10/31/2016

STATE AND TRIBAL REGISTERED STORAGE TANK LISTS

FEMA UST: FEMA underground storage tank listing

Date of Government Version: 03/21/2016
Date Release Frequency: Varies
Next Scheduled Contact: 02/17/2017
Source: FEMA
Telephone: 202-212-5283
Last Contact: 11/21/2016

INDIAN UST R1: Underground Storage Tanks on Indian Land in EPA Region 1

Date of Government Version: 12/01/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 02/09/2017
Source: U.S. Environmental Protection Agency Region 1
Telephone: 855-246-3642
Last Contact: 12/01/2016

INDIAN UST R10: Underground Storage Tanks on Indian Land in EPA Region 10

Date of Government Version: 10/27/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 01/05/2017
Source: U.S. Environmental Protection Agency Region 10
Telephone: 855-246-3642
Last Contact: 10/27/2016

INDIAN UST R2: Underground Storage Tanks on Indian Land in EPA Region 2

Date of Government Version: 09/28/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 02/15/2017
Source: U.S. Environmental Protection Agency Region 2
Telephone: 855-246-3642
Last Contact: 12/07/2016

INDIAN UST R4: Underground Storage Tanks on Indian Land in EPA Region 4

Date of Government Version: 11/10/2016
Date Release Frequency: Semi Annually
Next Scheduled Contact: 01/19/2017
Source: U.S. Environmental Protection Agency Region 4
Telephone: 855-246-3642
Last Contact: 11/10/2016

INDIAN UST R5: Underground Storage Tanks on Indian Land in EPA Region 5

Date of Government Version: 10/06/2016
Date Release Frequency: Varies
Next Scheduled Contact: 02/23/2017
Source: U.S. Environmental Protection Agency Region 5
Telephone: 855-246-3642
Last Contact: 12/15/2016

INDIAN UST R6: Underground Storage Tanks on Indian Land in EPA Region 6

Date of Government Version: 06/16/2016
Date Release Frequency: Semi Annually
Next Scheduled Contact: 12/29/2016
Source: U.S. Environmental Protection Agency Region 6
Telephone: 855-246-3642
Last Contact: 10/20/2016

INDIAN UST R7: Underground Storage Tanks on Indian Land in EPA Region 7

Date of Government Version: 10/06/2016
Date Release Frequency: Varies
Next Scheduled Contact: 02/23/2017
Source: U.S. Environmental Protection Agency Region 7
Telephone: 855-246-3642
Last Contact: 12/15/2016

INDIAN UST R8: Underground Storage Tanks on Indian Land in EPA Region 8

Date of Government Version: 12/03/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 02/10/2017
Source: U.S. Environmental Protection Agency Region 8
Telephone: 855-246-3642
Last Contact: 12/03/2016

INDIAN UST R9: Underground Storage Tanks on Indian Land in EPA Region 9

Date of Government Version: 09/27/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 02/10/2017
Source: U.S. Environmental Protection Agency Region 9
Telephone: 855-246-3642
Last Contact: 12/03/2016

AST - CA: Listing of tank facilities that are subject to the California Aboveground Petroleum Storage Act

Date of Government Version: 07/17/2016
Date Release Frequency: No update
Next Scheduled Contact: 01/03/2017
Source: California Environmental Protection Agency Unified Program Section
Telephone: 916-327-5092
Last Contact: 10/07/2016

AST_CONTRA COSTA COUNTY - CA: Listing of aboveground storage tanks in Contra Costa County

Date of Government Version: 09/08/2014
Date Release Frequency: Varies
Next Scheduled Contact: 01/16/2017
Source: Contra Costa Health Services Department
Telephone: 925-335-3200
Last Contact: 10/10/2016

AST_Kern County - CA: Kern County aboveground storage tank sites

Date of Government Version: 11/03/2016
Date Release Frequency: Varies
Next Scheduled Contact: 01/30/2017
Source: Kern County Environment Health Division
Telephone: 661-862-8774
Last Contact: 11/03/2016

AST_ORANGE COUNTY - CA: Orange county aboveground storage tanks

Date of Government Version: 10/20/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 12/29/2016
Source: Orange County Health Care Agency
Telephone: 714-433-6000
Last Contact: 10/20/2016

AST_PLACER COUNTY - CA: Placer county aboveground storage tank sites

Date of Government Version: 06/27/2016
Date Release Frequency: Semi Annually
Next Scheduled Contact: 01/03/2017
Source: Placer County Environmental Health
Telephone: 530-745-2350
Last Contact: 10/07/2016

AST_Yolo County - CA: Yolo county above ground storage tank sites listing

Date of Government Version: 05/11/2016
Date Release Frequency: Annually
Next Scheduled Contact: 02/24/2017
Source: Yolo County Environmental Health
Telephone: 530-666-8646
Last Contact: 12/15/2016

BP HW OUT_Ventura County - CA: Ventura County Business Plan Hazardous Waste Producers and Operating Underground Tanks

Date of Government Version: 10/17/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 12/26/2016
Source: Ventura County Environmental Health Division
Telephone: 805-654-2815
Last Contact: 10/17/2016

BUSINESS INVENTORY_San Mateo County - CA: San Mateo County listing of underground storage tanks hazardous materials business plan and hazardous waste generators

Date of Government Version: 06/10/2016
Date Release Frequency: Annually
Next Scheduled Contact: 03/12/2017
Source: San Mateo County Environmental Health Services Division
Telephone: 650-372-6200
Last Contact: 12/12/2016

CLOSED UST_Ventura County - CA: Ventura County closed underground storage tank site listing

Date of Government Version: 10/04/2016
Date Release Frequency: Varies
Next Scheduled Contact: 02/21/2017
Source: Environmental Health Division
Telephone: 805-654-2815
Last Contact: 12/13/2016

CS_PLACER COUNTY - CA: Placer county cleanup sites listing

Date of Government Version: 09/08/2014
Date Release Frequency: Semi Annually
Next Scheduled Contact: 01/14/2017
Source: Placer County Environmental Health
Telephone: 530-745-2350
Last Contact: 10/18/2016

FID UST - CA: The State Water Resource Control Board's Facility Inventory Database underground storage tank locations listing

Date of Government Version: 11/10/2016
Date Release Frequency: Varies
Next Scheduled Contact: 01/19/2017
Source: California Environmental Protection Agency
Telephone: 916-341-5791
Last Contact: 11/10/2016

HIST UST - CA: Historical UST listing

Date of Government Version: 05/25/2016
Date Release Frequency: No Update
Next Scheduled Contact: 01/13/2017
Source: State Water Resources Control Board
Telephone: 916-341-5791
Last Contact: 11/04/2016

LOP_Santa Clara County - CA: Santa Clara county leaking underground storage tank sites

Date of Government Version: 12/31/2015
Date Release Frequency: Annually
Next Scheduled Contact: 03/12/2017
Source: Department of Environmental Health
Telephone: 408-280-6479
Last Contact: 12/12/2016

SITE LIST_Contra Costa County - CA: Listing of underground tank hazardous waste generator and business plan sites in Contra Costa County

Date of Government Version: 05/24/2016
Date Release Frequency: Semi Annually
Next Scheduled Contact: 01/10/2017
Source: Contra Costa Health Services Department
Telephone: 925-335-3200
Last Contact: 10/14/2016

UST - CA: Listing of active underground storage tank facilities

Date of Government Version: 11/04/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 01/13/2017
Source: CA Gov geotracker state water resources control bo
Telephone: NULL
Last Contact: 11/04/2016

UST_Alameda County - CA: Alameda County Underground Storage Tank sites

Date of Government Version: 11/04/2016
Date Release Frequency: Varies
Next Scheduled Contact: 01/13/2017
Source: CA Gov geotracker state water resources control bo
Telephone: NULL
Last Contact: 11/04/2016

UST_City of Long Beach - CA: City of Long Beach underground storage tank sites

Date of Government Version: 07/13/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 01/03/2017
Source: City of Long Beach Fire Department
Telephone: 562-570-6782
Last Contact: 10/07/2016

UST_City of Torrance - CA: City of Torrance underground storage tank sites

Date of Government Version: 10/04/2016
Date Release Frequency: Semi Annually
Next Scheduled Contact: 12/24/2016
Source: City of Torrance Fire Department
Telephone: 310-618-2872
Last Contact: 09/27/2016

UST_El Segundo City - CA: City of El Segundo Underground Storage Tanks

Date of Government Version: 09/15/2016
Date Release Frequency: Semi Annually
Next Scheduled Contact: 03/12/2017
Source: City of El Segundo Fire Department
Telephone: 310-524-2242
Last Contact: 12/12/2016

UST_Kern County - CA: Kern County underground storage tank sites

Date of Government Version: 10/06/2016
Date Release Frequency: Varies
Next Scheduled Contact: 01/02/2017
Source: Kern County Environment Health Division
Telephone: 661-862-8774
Last Contact: 10/06/2016

UST_Marin County - CA: Marin county underground storage tank sites

Date of Government Version: 03/28/2016
Date Release Frequency: Semi Annually
Next Scheduled Contact: 12/20/2016
Source: Marin County Department of Public Works
Telephone: 415-473-5051
Last Contact: 09/23/2016

UST_Mendocino County - CA: A listing of underground storage tank locations in Mendocino County

Date of Government Version: 11/04/2016
Date Release Frequency: Varies
Next Scheduled Contact: 01/13/2017
Source: CA Gov geotracker state water resources control bo
Telephone: NULL
Last Contact: 11/04/2016

UST_Napa County - CA: Underground storage tank sites located in Napa county.

Date of Government Version: 11/04/2016
Date Release Frequency: Varies
Next Scheduled Contact: 01/13/2017
Source: CA Gov geotracker state water resources control bo
Telephone: NULL
Last Contact: 11/04/2016

UST_ORANGE COUNTY - CA: Orange county underground storage tanks

Date of Government Version: 10/20/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 12/29/2016
Source: Orange County Health Care Agency
Telephone: 714-433-6000
Last Contact: 10/20/2016

UST_PLACER COUNTY - CA: Placer county underground storage tank sites

Date of Government Version: 05/27/2016
Date Release Frequency: Semi Annually
Next Scheduled Contact: 01/29/2017
Source: Placer County Environmental Health
Telephone: 530-745-2350
Last Contact: 11/02/2016

UST_Riverside County - CA: Riverside county underground storage tank sites

Date of Government Version: 11/04/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 01/13/2017
Source: CA Gov geotracker state water resources control bo
Telephone: NULL
Last Contact: 11/04/2016

UST_San Francisco County - CA: San Francisco county Underground storage tank sites listing

Date of Government Version: 08/08/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 01/24/2017
Source: San Francisco Department of Public Health
Telephone: 415-252-3908
Last Contact: 10/28/2016

UST_San Joaquin County - CA: San Joaquin County Underground storage tank sites listing

Date of Government Version: 11/04/2016
Date Release Frequency: Semi Annually
Next Scheduled Contact: 01/13/2017
Source: CA Gov geotracker state water resources control bo
Telephone: NULL
Last Contact: 11/04/2016

UST_Solano County - CA: Solano county underground storage tank listing

Date of Government Version: 11/04/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 01/13/2017
Source: CA Gov geotracker state water resources control bo
Telephone: NULL
Last Contact: 11/04/2016

UST_Sutter County - CA: Sutter county underground storage tank listing

Date of Government Version: 06/27/2016
Date Release Frequency: Semi Annually
Next Scheduled Contact: 12/20/2016
Source: Sutter County Department of Agriculture
Telephone: 530-822-7400
Last Contact: 09/23/2016

UST_Yolo County - CA: Yolo county underground storage tank sites listing

Date of Government Version: 08/18/2016
Date Release Frequency: Annually
Next Scheduled Contact: 02/10/2017
Source: Yolo County Environmental Health
Telephone: 530-666-8646
Last Contact: 11/14/2016

RECORDS OF EMERGENCY RELEASE REPORTS

HMIRS (DOT): Hazardous Material spills reported by the Department of Transportation

Date of Government Version: 11/03/2016
Date Release Frequency: Varies
Next Scheduled Contact: 01/12/2017
Source: U.S. Department of Transportation
Telephone: (202) 366-4996
Last Contact: 11/03/2016

STATE AND TRIBAL LEAKING STORAGE TANK LISTS

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land in EPA Region 1

Date of Government Version: 03/23/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 02/09/2017
Source: U.S. Environmental Protection Agency Region 1
Telephone: 855-246-3642
Last Contact: 12/01/2016

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land in EPA Region 10

Date of Government Version: 07/18/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 01/17/2017
Source: U.S. Environmental Protection Agency Region 10
Telephone: 855-246-3642
Last Contact: 10/11/2016

INDIAN LUST R2: Leaking Underground Storage Tanks on Indian Land in EPA Region 2

Date of Government Version: 06/28/2014
Date Release Frequency: Quarterly
Next Scheduled Contact: 02/15/2017
Source: U.S. Environmental Protection Agency Region 2
Telephone: 855-246-3642
Last Contact: 12/07/2016

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land in EPA Region 4

Date of Government Version: 10/17/2016
Date Release Frequency: Semi Annually
Next Scheduled Contact: 12/26/2016
Source: U.S. Environmental Protection Agency Region 4
Telephone: 855-246-3642
Last Contact: 10/17/2016

INDIAN LUST R5: Leaking Underground Storage Tanks on Indian Land in EPA Region 5

Date of Government Version: 10/06/2016
Date Release Frequency: Varies
Next Scheduled Contact: 02/23/2017
Source: U.S. Environmental Protection Agency Region 5
Telephone: 855-246-3642
Last Contact: 12/15/2016

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land in EPA Region 6

Date of Government Version: 10/10/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 12/19/2016
Source: U.S. Environmental Protection Agency Region 6
Telephone: 855-246-3642
Last Contact: 10/10/2016

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land in EPA Region 7

Date of Government Version: 10/06/2016
Date Release Frequency: Varies
Next Scheduled Contact: 02/23/2017
Source: U.S. Environmental Protection Agency Region 7
Telephone: 855-246-3642
Last Contact: 12/15/2016

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land in EPA Region 8

Date of Government Version: 10/07/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 02/24/2017
Source: U.S. Environmental Protection Agency Region 8
Telephone: 855-246-3642
Last Contact: 12/16/2016

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land in EPA Region 9

Date of Government Version: 12/03/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 02/10/2017
Source: U.S. Environmental Protection Agency Region 9
Telephone: 855-246-3642
Last Contact: 12/03/2016

LUFT_Alameda County - CA: Listing of Alameda County leaking underground fuel tank sites

Date of Government Version: 10/11/2016
Date Release Frequency: Semi Annually
Next Scheduled Contact: 12/20/2016
Source: Alameda County Environmental Health Services
Telephone: 510-567-6721
Last Contact: 10/11/2016

LUST ORANGE COUNTY - CA: Orange county leaking underground storage tanks

Date of Government Version: 10/22/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 02/16/2017
Source: Orange County Health Care Agency
Telephone: 714-433-6000
Last Contact: 12/08/2016

LUST REG 1 - CA: Leaking underground storage tanks in Region 1: Del Norte Glenn Humboldt Lake Marin Mendocino Modoc Siskiyou Sonoma andTrinity counties.

Date of Government Version: 11/30/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 02/08/2017
Source: California Regional Water Quality Control Board
Telephone: 916-341-5791
Last Contact: 11/30/2016

LUST REG 2 - CA: Leaking underground storage tanks in Region 2: Alameda Contra Costa San Francisco Santa Clara (north of Morgan Hill) San Mateo Marin Sonoma Napa Solano counties

Date of Government Version: 09/18/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 02/08/2017
Source: California Regional Water Quality Control Board
Telephone: 916-341-5791
Last Contact: 11/30/2016

LUST REG 3 - CA: Leaking underground storage tanks in Region 3: Santa Clara (south of Morgan Hill) San Mateo (southern part) Santa Cruz SanBenito Monterey Kern (some parts) San Luis Obispo Santa Barbara Ventura(northern part) counties

Date of Government Version: 11/30/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 02/08/2017
Source: California Regional Water Quality Control Board
Telephone: 916-341-5791
Last Contact: 11/30/2016

LUST REG 4 - CA: Leaking underground storage tanks in Region 4: Los Angeles Ventura counties (Small parts of Kern and Santa Barbara counties).

Date of Government Version: 11/30/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 02/08/2017
Source: California Regional Water Quality Control Board
Telephone: 916-341-5791
Last Contact: 11/30/2016

LUST REG 5 - CA: Leaking underground storage tanks in Region 5: Modoc Shasta Lassen Plumas Butte Glen Colusa Lake Sutter Yuba Sierra Nevada Placer Yolo Napa (Northeast) Solano (West) Sacramento El Dorado Amador Calaveras San Joaquin Contra Costa (East) Stanislaus Toulumne Merced Mariposa Madera Kings Fresno Tulare Kern (Very small portions of San Benito and SanLuis Obispo) counties

Date of Government Version: 09/18/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 02/08/2017
Source: California Regional Water Quality Control Board
Telephone: 916-341-5791
Last Contact: 11/30/2016

LUST REG 6 - CA: Leaking underground storage tanks in Region 6: Modoc (East) Lassen (East side and Eagle Lake) Sierra Nevada Placer El Dorado Alpine Mono Inyo Kern (East) San Bernardino Los Angeles (Northeast corner) counties

Date of Government Version: 11/30/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 02/08/2017
Source: California Regional Water Quality Control Board
Telephone: 916-341-5791
Last Contact: 11/30/2016

LUST REG 7 - CA: Leaking underground storage tanks in Region 7: Imperial San Bernardino Riverside and San Diego counties.

Date of Government Version: 11/30/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 02/08/2017
Source: California Regional Water Quality Control Board
Telephone: 916-341-5791
Last Contact: 11/30/2016

LUST REG 8 - CA: Leaking underground storage tanks in Region 8: Orange Riverside San Bernardino counties.

Date of Government Version: 11/30/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 02/08/2017
Source: California Regional Water Quality Control Board
Telephone: 916-341-5791
Last Contact: 11/30/2016

LUST REG 9 - CA: Leaking underground storage tanks in Region 9: San Diego Imperial Riverside counties.

Date of Government Version: 11/30/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 02/08/2017
Source: California Regional Water Quality Control Board
Telephone: 916-341-5791
Last Contact: 11/30/2016

LUST_HAZMAT_Yolo County - CA: Yolo county leaking underground storage tank sites listing

Date of Government Version: 09/19/2016
Date Release Frequency: Varies
Next Scheduled Contact: 03/12/2017
Source: Yolo County Environmental Health
Telephone: 530-666-8646
Last Contact: 12/12/2016

LUST_Kern County - CA: Kern County leaking underground tank sites

Date of Government Version: 09/27/2016
Date Release Frequency: Varies
Next Scheduled Contact: 02/14/2017
Source: CA Gov geotracker state water resources control bo
Telephone: NULL
Last Contact: 12/06/2016

LUST_Riverside County - CA: Riverside county leaking underground storage tank sites

Date of Government Version: 09/27/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 02/14/2017
Source: CA Gov geotracker state water resources control bo
Telephone: NULL
Last Contact: 12/06/2016

LUST_SUTTER COUNTY - CA: Sutter County Leaking Underground Storage Tanks

Date of Government Version: 09/27/2016
Date Release Frequency: Varies
Next Scheduled Contact: 02/14/2017
Source: CA Gov geotracker state water resources control bo
Telephone: NULL
Last Contact: 12/06/2016

LUST_San Francisco County - CA: A listing of leaking underground storage tank sites located in San Francisco county.

Date of Government Version: 09/27/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 02/14/2017
Source: CA Gov geotracker state water resources control bo
Telephone: NULL
Last Contact: 12/06/2016

LUST_San Mateo County - CA: San Mateo county leaking underground storage tank listing

Date of Government Version: 09/27/2016
Date Release Frequency: Semi Annually
Next Scheduled Contact: 02/14/2017
Source: CA Gov geotracker state water resources control bo
Telephone: NULL
Last Contact: 12/06/2016

LUST_Solano County - CA: Solano county leaking underground storage tank listing

Date of Government Version: 09/27/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 02/14/2017
Source: CA Gov geotracker state water resources control bo
Telephone: NULL
Last Contact: 12/06/2016

LUST_Sonoma County - CA: Sonoma county leaking underground storage tank sites listing

Date of Government Version: 09/27/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 02/14/2017
Source: CA Gov geotracker state water resources control bo
Telephone: NULL
Last Contact: 12/06/2016

LUST_Ventura County - CA: Ventura County leaking underground storage tank site listing

Date of Government Version: 09/27/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 02/14/2017
Source: CA Gov geotracker state water resources control bo
Telephone: NULL
Last Contact: 12/06/2016

SLIC REG 1 - CA: GeoTracker Site Cleanup Program (formerly known as SLIC) database listing in Region 1: Del Norte Glenn Humboldt Lake Marin Mendocino Modoc Siskiyou Sonoma and Trinity counties.

Date of Government Version: 11/30/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 02/08/2017
Source: California Regional Water Quality Control Board
Telephone: 916-341-5791
Last Contact: 11/30/2016

SLIC REG 2 - CA: GeoTracker Site Cleanup Program (formerly known as SLIC) database listing in Region 2: Alameda Contra Costa San Francisco Santa Clara (north of Morgan Hill) San Mateo Marin Sonoma Napa Solano counties.

Date of Government Version: 11/30/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 02/08/2017
Source: California Regional Water Quality Control Board
Telephone: 916-341-5791
Last Contact: 11/30/2016

SLIC REG 3 - CA: GeoTracker Site Cleanup Program (formerly known as SLIC) database listing in Region 3: Santa Clara (south of Morgan Hill) San Mateo (southern part) Santa Cruz San Benito Monterey Kern (some parts) San Luis Obispo Santa Barbara Ventura(northern part) counties

Date of Government Version: 11/30/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 02/08/2017
Source: California Regional Water Quality Control Board
Telephone: 916-341-5791
Last Contact: 11/30/2016

SLIC REG 4 - CA: GeoTracker Site Cleanup Program (formerly Site Cleanup Program (formerly known as SLIC) database listing in Region 4: Los Angeles Ventura counties (Small parts of Kern and Santa Barbara counties).

Date of Government Version: 09/18/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 02/08/2017
Source: California Regional Water Quality Control Board
Telephone: 916-341-5791
Last Contact: 11/30/2016

SLIC REG 5 - CA: GeoTracker Site Cleanup Program (formerly known as SLIC) database listing in Region 5: Modoc Shasta Lassen Plumas Butte Glen Colusa Lake Sutter Yuba Sierra Nevada Placer Yolo Napa (Northeast) Solano (West) Sacramento El Dorado Amador Calaveras San Joaquin Contra Costa (East) Stanislaus Toulumne Merced Mariposa Madera Kings Fresno Tulare Kern (Very small portions of San Benito and SanLuis Obispo) counties

Date of Government Version: 09/18/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 02/08/2017
Source: California Regional Water Quality Control Board
Telephone: 916-341-5791
Last Contact: 11/30/2016

SLIC REG 6 - CA: GeoTracker Site Cleanup Program (formerly known as SLIC) database listing in Region 6: Modoc (East) Lassen (East side and Eagle Lake) Sierra Nevada Placer El Dorado Alpine Mono Inyo Kern (East) San Bernardino Los Angeles (Northeast corner) counties.

Date of Government Version: 09/18/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 02/08/2017
Source: California Regional Water Quality Control Board
Telephone: 916-341-5791
Last Contact: 11/30/2016

SLIC REG 7 - CA: GeoTracker Site Cleanup Program (formerly known as SLIC) database listing in Region 7: Imperial San Bernardino Riverside and San Diego counties.

Date of Government Version: 09/18/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 02/08/2017
Source: California Regional Water Quality Control Board
Telephone: 916-341-5791
Last Contact: 11/30/2016

SLIC REG 8 - CA: GeoTracker Site Cleanup Program (formerly known as SLIC) database listing in Region 8: Orange Riverside San Bernardino counties.

Date of Government Version: 09/18/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 02/08/2017
Source: California Regional Water Quality Control Board
Telephone: 916-341-5791
Last Contact: 11/30/2016

SLIC REG 9 - CA: GeoTracker Site Cleanup Program (formerly known as SLIC) database listing in Region 9: San Diego Imperial Riverside counties.

Date of Government Version: 09/18/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 02/08/2017
Source: California Regional Water Quality Control Board
Telephone: 916-341-5791
Last Contact: 11/30/2016

SLIC_Alameda County - CA: Listing of spills leaks investigation & cleanup sites

Date of Government Version: 10/11/2016
Date Release Frequency: Semi Annually
Next Scheduled Contact: 12/20/2016
Source: Alameda County Environmental Health Services
Telephone: 510-567-6721
Last Contact: 10/11/2016

LOCAL LISTS OF HAZARDOUS WASTE / CONTAMINATED SITES

CORRECTIVE ACTION_Riverside County - CA: Riverside county corrective action sites list

Date of Government Version: 04/26/2016
Date Release Frequency: Varies
Next Scheduled Contact: 01/14/2017
Source: Riverside County Environmental Health
Telephone: 888-722-4234
Last Contact: 10/18/2016

TOXIC SITE_Sacramento County - CA: Sacramento county hazardous material release sites listing

Date of Government Version: 10/20/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 12/29/2016
Source: Sacramento County Environmental Management
Telephone: 916-875-8550
Last Contact: 10/20/2016

STATE AND TRIBAL LANDFILL AND/OR SOLID WASTE DISPOSAL SITE LISTS

LF_Los Angeles County - CA: Listing of City of Los Angeles landfills

Date of Government Version: 10/04/2016
Date Release Frequency: Varies
Next Scheduled Contact: 02/21/2017
Source: City of Los Angeles Sanitation Department of Public Works
Telephone: 800-773-2489
Last Contact: 12/13/2016

LF_San Diego County - CA: San Diego county landfill listing

Date of Government Version: 09/26/2016
Date Release Frequency: Varies
Next Scheduled Contact: 12/23/2016
Source: County of San Diego Department of Environmental Health
Telephone: 858-694-2801
Last Contact: 09/26/2016

SWF/LF - CA: Solid Waste Information System's facility listing of solid waste facilities and landfills

Date of Government Version: 11/10/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 01/19/2017
Source: Department of Resources Recycling and Recovery
Telephone: 916-341-6066
Last Contact: 11/10/2016

SWF_Los Angeles County - CA: Listing of Los Angeles County solid waste facilities

Date of Government Version: 10/20/2016
Date Release Frequency: Varies
Next Scheduled Contact: 12/29/2016
Source: LA County Department of Public Works
Telephone: 800-320-1771
Last Contact: 10/20/2016

SWF_San Diego County - CA: San Diego county solid waste facilities listing

Date of Government Version: 10/25/2016
Date Release Frequency: Varies
Next Scheduled Contact: 01/03/2017
Source: County of San Diego Department of Environmental Health
Telephone: 858-694-2801
Last Contact: 10/25/2016

STATE- AND TRIBAL - EQUIVALENT NPL

RESPONSE - CA: State response sites with confirmed releases and potential high risk

Date of Government Version: 11/03/2016
Date Release Frequency: Annually
Next Scheduled Contact: 01/12/2017

Source: Department of Toxic Substances Control
Telephone: 916-327-1077
Last Contact: 11/03/2016

STATE- AND TRIBAL - EQUIVALENT CERCLIS

TOXIC PITS - CA: Listing of Toxic Pit Cleanup Act sites

Date of Government Version: 03/15/2016
Date Release Frequency: No update
Next Scheduled Contact: 02/24/2017

Source: State Water Resources Control Board
Telephone: 916-341-5810
Last Contact: 11/28/2016

STATE AND TRIBAL VOLUNTARY CLEANUP SITES

VCP - CA: Voluntary Cleanup Program remediation sites listing

Date of Government Version: 11/03/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 01/12/2017

Source: Department of Toxic Substances Control
Telephone: 916-322-2861
Last Contact: 11/03/2016

OTHER ASCERTAINABLE RECORDS

Corrective Actions_2020: The RCRA cleanup baseline includes facilities expected to need corrective action.

Date of Government Version: 10/18/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 01/09/2017

Source: U.S. Environmental Protection Agency
Telephone:
Last Contact: 10/18/2016

ADDITIONAL ENVIRONMENTAL RECORDS:

LOCAL LISTS OF LANDFILL / SOLID WASTE DISPOSAL SITES

DEBRIS REGION 9: Torres Martinez Reservation illegal dump site listing

Date of Government Version: 06/28/2014
Date Release Frequency: Varies
Next Scheduled Contact: 01/02/2017

Source: U.S. Environmental Protection Agency Region 9
Telephone: 855-246-3642
Last Contact: 10/06/2016

INDIAN ODI R8: Region 8 Indian land open dump inventory sites mainted within the STARS program

Date of Government Version: 10/03/2016
Date Release Frequency: Varies
Next Scheduled Contact: 02/20/2017

Source: Indian Health Service
Telephone: 855-246-3642
Last Contact: 12/12/2016

ODI: Open dump inventory sites

Date of Government Version: 08/17/2016
Date Release Frequency: No Update
Next Scheduled Contact: 12/29/2016
Source: U.S. Environmental Protection Agency
Telephone: 855-246-3642
Last Contact: 10/20/2016

TRIBAL ODI: Indian land open dump inventory for all regions

Date of Government Version: 10/20/2016
Date Release Frequency: Varies
Next Scheduled Contact: 12/29/2016
Source: Indian Health Service
Telephone: 301-443-3593
Last Contact: 10/20/2016

HAULERS - CA: Waste Tire Manifest Program Hauler Registration listing

Date of Government Version: 11/18/2016
Date Release Frequency: Varies
Next Scheduled Contact: 01/27/2017
Source: California Department of Resources Recycling and Recovery (CalRecycle)
Telephone: 916-341-6066
Last Contact: 11/18/2016

SWRCY - CA: Listing of facilities which perform recycled material processing activities

Date of Government Version: 10/05/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 02/22/2017
Source: California Department of Resources Recycling and Recovery (CalRecycle)
Telephone: 916-341-6066
Last Contact: 12/14/2016

LOCAL LISTS OF HAZARDOUS WASTE / CONTAMINATED SITES

FED CDL: The U.S. Department of Justice listing of clandestine drug lab locations

Date of Government Version: 09/22/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 02/09/2017
Source: U.S. Department of Justice
Telephone: 202-307-7610
Last Contact: 12/01/2016

US HIST CDL: The U.S. Department of Justice historical listing of clandestine drug lab locations

Date of Government Version: 09/22/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 02/09/2017
Source: U.S. Department of Justice
Telephone: 202-307-7610
Last Contact: 12/01/2016

CALARP_Kern County - CA: Kern County hazardous material permitted facilities

Date of Government Version: 08/10/2016
Date Release Frequency: Varies
Next Scheduled Contact: 12/28/2016
Source: County of Kern Public Health Services Department
Telephone: 661-862-8740
Last Contact: 10/19/2016

CASE LIST_San Diego County - CA: San Diego county listing of hazardous chemical releases

Date of Government Version: 09/21/2016
Date Release Frequency: Varies
Next Scheduled Contact: 02/08/2017
Source: County of San Diego Department of Environmental Health
Telephone: 619-338-2259
Last Contact: 11/30/2016

CDL - CA: Listing of Meth and clandestine drug labs maintained by the Department of Toxic Substances Control

Date of Government Version: 01/19/2016
Date Release Frequency: Varies
Next Scheduled Contact: 12/04/2016
Source: Department of Toxic Substances Control
Telephone: 916-322-2861
Last Contact: 11/04/2016

CS_Napa County - CA: Napa county listing of Contaminated sites

Date of Government Version: 10/04/2016
Date Release Frequency: Varies
Next Scheduled Contact: 02/21/2017
Source: Napa County Department of Environmental Management
Telephone: 707-253-4471
Last Contact: 12/13/2016

SCH - CA: Listing of possible hazardous material contamination sites on existing school properties

Date of Government Version: 10/03/2016
Date Release Frequency: Varies
Next Scheduled Contact: 02/20/2017
Source: Department of Toxic Substances Control
Telephone: 916-322-2861
Last Contact: 12/12/2016

LOCAL BROWNFIELD LISTS

Fed Brownfields: Federal brownfield remediation sites

Date of Government Version: 09/26/2016
Date Release Frequency: Semi Annually
Next Scheduled Contact: 02/10/2017
Source: U.S. Environmental Protection Agency
Telephone: 855-246-3642
Last Contact: 12/03/2016

TRIBAL BROWNFIELDS: Tribal brownfield remediation site listing

Date of Government Version: 06/28/2014
Date Release Frequency: Quarterly
Next Scheduled Contact: 02/07/2017
Source: U.S. Environmental Protection Agency
Telephone: 855-246-3642
Last Contact: 11/11/2016

LOCAL LAND RECORDS

LIENS 2: Comprehensive Environmental Response Compensation and Liability Act sites with liens

Date of Government Version: 01/07/2016
Date Release Frequency: Varies
Next Scheduled Contact: 12/22/2016
Source: U.S. Environmental Protection Agency
Telephone: 800-424-9346
Last Contact: 11/22/2016

DEED - CA: The Department of Toxic Substances Control's listing of property locations with Deed restrictions

Date of Government Version: 10/03/2016
Date Release Frequency: Semi Annually
Next Scheduled Contact: 02/20/2017
Source: Department of Toxic Substances Control
Telephone: 916-341-5791
Last Contact: 12/12/2016

LIENS - CA: The Department of Toxic Substances Control's listing of property locations with environmental liens

Date of Government Version: 10/25/2016
Date Release Frequency: Varies
Next Scheduled Contact: 01/03/2017
Source: Department of Toxic Substances Control
Telephone: 916-322-2861
Last Contact: 10/25/2016

STATE- AND TRIBAL - EQUIVALENT CERCLIS

ENVIROSTOR - CA: Department of Toxic Substances Controls

Date of Government Version: 11/03/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 01/12/2017
Source: Department of Toxic Substances Control
Telephone: 916-327-1077
Last Contact: 11/03/2016

RECORDS OF EMERGENCY RELEASE REPORTS

INDUSTRIAL CLEANUP_Orange County - CA: Petroleum and non-petroleum industrial spills

Date of Government Version: 10/20/2016
Date Release Frequency: Annually
Next Scheduled Contact: 12/29/2016
Source: Orange County Health Care Agency
Telephone: 714-433-6000
Last Contact: 10/20/2016

LDS - CA: A listing of areas of land on or in which hazardous waste is places or the largest area in which there is significant likelihood of mixing hazardous waste constituents in the same area

Date of Government Version: 09/07/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 01/26/2017
Source: State Water Qualilty Control Board
Telephone: 916-341-5791
Last Contact: 11/17/2016

MCS - CA: The State Water Resources Control Board's investigation and remediation of water quality issues at military facilities.

Date of Government Version: 10/24/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 01/02/2017
Source: State Water Resources Control Board
Telephone: 916-341-5791
Last Contact: 10/24/2016

SML_Los Angeles County - CA: Listing of all Emergency Response session spills

Date of Government Version: 08/25/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 02/14/2017
Source: Los Angeles Department of Public Health
Telephone: 323-890-7808
Last Contact: 11/18/2016

OTHER ASCERTAINABLE RECORDS

AFS: Air Facility Systems Quarterly Extract

Date of Government Version: 07/10/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 12/30/2016
Source: Environmental Protection Agency
Telephone: (202) 566-1667
Last Contact: 10/03/2016

BRS: Reporting of hazardous waste generation and management from large quantity generators

Date of Government Version: 10/31/2016
Date Release Frequency: Biennial
Next Scheduled Contact: 01/09/2017
Source: Environmental Protection Agency
Telephone: (202) 566-1667
Last Contact: 10/31/2016

CDC HAZDAT: The Agency for Toxic Substances and Disease Registry's Hazardous Substance Release/Health Effects Database.

Date of Government Version: 06/28/2014
Date Release Frequency: Varies
Next Scheduled Contact: 01/23/2017
Source: Agency for Toxic Substances and Disease Registry
Telephone: 770-488-6399
Last Contact: 11/14/2016

COAL ASH DOE: List of existing and planned generators with 1 megawatt or greater of combined capacity that are utilizing coal ash impoundments.

Date of Government Version: 11/09/2016
Date Release Frequency: Varies
Next Scheduled Contact: 01/18/2017
Source: Department of Energy
Telephone: (202) 586-8800
Last Contact: 11/09/2016

COAL ASH EPA: Coal Combustion Residues Surface Impoundments List

Date of Government Version: 10/10/2016
Date Release Frequency: Varies
Next Scheduled Contact: 12/19/2016
Source: Environmental Protection Agency
Telephone: (202) 566-1667
Last Contact: 10/10/2016

COAL GAS: Manufactured Gas Plant locations

Date of Government Version: 06/28/2014
Date Release Frequency: No update
Next Scheduled Contact: 02/05/2017
Source: U.S. Environmental Protection Agency
Telephone: 855-246-3642
Last Contact: 11/09/2016

CONSENT (DECREES): Legal decisions regarding responsibility for Superfund locations

Date of Government Version: 11/08/2016
Date Release Frequency: Varies
Next Scheduled Contact: 01/17/2017
Source: Environmental Protection Agency
Telephone: (800) 424-9346
Last Contact: 11/08/2016

DIGITAL OBSTACLE: The Digital Obstacle File describes all known obstacles of interest to aviation users in the U.S. with limited coverage of the Pacific the Caribbean Canada and Mexico. The obstacles are assigned unique numerical identifiers; accuracy codes and listed in order of ascending latitude within each state or area by FAA Region.

Date of Government Version: 09/29/2016
Date Release Frequency: Varies
Next Scheduled Contact: 02/16/2017
Source: Federal Aviation Administration
Telephone: 855-379-6518
Last Contact: 12/08/2016

DOD: Department of Defense sites

Date of Government Version: 11/14/2016
Date Release Frequency: Varies
Next Scheduled Contact: 01/23/2017
Source: Environmental Protection Agency
Telephone: (800) 424-9346
Last Contact: 11/14/2016

DOT OPS: Incident Data Report

Date of Government Version: 08/08/2016
Date Release Frequency: Varies
Next Scheduled Contact: 12/26/2016
Source: U.S. Department of Transportation
Telephone: (202) 366-4996
Last Contact: 10/17/2016

ECHO: ECHO is EPA Enforcement and Compliance History Online website to search for facilities in your community to assess their compliance with environmental regulations related to CAA, CWA, RCRA, & SDWA.

Date of Government Version: 11/18/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 01/27/2017
Source: U.S. Environmental Protection Agency
Telephone: 202-566-1667
Last Contact: 11/18/2016

ENOI: ENOI - EPA Electronic Notice of Intent (eNOI) database contains construction sites industrial facilities pesticides and vessel operators to apply for coverage and submit a variety of other reports electronically required under EPAs Construction Genera

Date of Government Version: 08/13/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 12/31/2016
Source: Environmental Protection Agency
Telephone: (202) 566-1667
Last Contact: 10/22/2016

FA HWF: Hazardous Waste Facilities with Financial Assurance

Date of Government Version: 11/14/2016
Date Release Frequency: Varies
Next Scheduled Contact: 01/17/2017
Source: Environmental Protection Agency
Telephone: (800) 424-9346
Last Contact: 10/21/2016

FEDLAND: Federal land locations

Date of Government Version: 11/19/2016
Date Release Frequency: Varies
Next Scheduled Contact: 01/27/2017
Source: Environmental Protection Agency
Telephone: (800) 424-9346
Last Contact: 11/19/2016

FRS: Facility Registry Systems

Date of Government Version: 10/13/2016
Date Release Frequency: Varies
Next Scheduled Contact: 12/22/2016
Source: Environmental Protection Agency
Telephone: (202) 566-1667
Last Contact: 10/13/2016

FTTS: Tracking of administrative and enforcement activities related to FIFRA/TSCA

Date of Government Version: 06/28/2014
Date Release Frequency: Varies
Next Scheduled Contact: 02/12/2017
Source: Environmental Protection Agency
Telephone: (202) 564-2280
Last Contact: 11/16/2016

FTTS INSP: Tracking of inspections related to FIFRA/TSCA

Date of Government Version: 06/28/2014
Date Release Frequency: Varies
Next Scheduled Contact: 02/12/2017
Source: Environmental Protection Agency
Telephone: (202) 564-2280
Last Contact: 11/16/2016

FUDS: Defense sites that require cleanup

Date of Government Version: 10/10/2016
Date Release Frequency: Varies
Next Scheduled Contact: 12/19/2016
Source: US Army Corps of Engineering
Telephone: (202) 761-0011
Last Contact: 10/10/2016

ICIS: Comprised of all Federal Administrative and Judicial enforcement information [intended to replace PCS] by tracking enforcement and compliance information (also contains what used to be known as FFTS)

Date of Government Version: 09/03/2016
Date Release Frequency: Varies
Next Scheduled Contact: 01/24/2017
Source: Environmental Protection Agency
Telephone: (202) 566-1667
Last Contact: 11/15/2016

INDIAN RESERVATION: Indian Reservation sites

Date of Government Version: 10/12/2016
Date Release Frequency: Varies
Next Scheduled Contact: 12/21/2016
Source: Environmental Protection Agency
Telephone: (800) 424-9346
Last Contact: 10/12/2016

LEAD_SMELTER: Listing of former Lead Smelter Sites

Date of Government Version: 08/05/2016
Date Release Frequency: Varies
Next Scheduled Contact: 12/27/2016
Source: Environmental Protection Agency
Telephone: (202) 566-1667
Last Contact: 10/18/2016

LUCIS: Land Use Control Information Systems

Date of Government Version: 06/28/2014
Date Release Frequency: Varies
Next Scheduled Contact: 01/24/2017
Source: Department of the Navy: BRAC PMO
Telephone: (619) 532-0900
Last Contact: 10/28/2016

MINES: Mines Master Index Files

Date of Government Version: 09/17/2016
Date Release Frequency: Varies
Next Scheduled Contact: 02/01/2017
Source: Department of Labor
Telephone: (202) 693-9400
Last Contact: 11/23/2016

MLTS: Sites in possession/use of radioactive materials regulated by NRC

Date of Government Version: 07/12/2016
Date Release Frequency: Varies
Next Scheduled Contact: 12/30/2016
Source: Nuclear Regulatory Commission
Telephone: (800) 397-4209
Last Contact: 10/03/2016

NPL AOC: All remediation site listings

Date of Government Version: 09/13/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 01/23/2017
Source: Environmental Protection Agency
Telephone:
Last Contact: 11/14/2016

OSHA: OSHA's listing of inspections violations and fatality information

Date of Government Version: 11/14/2016
Date Release Frequency: Varies
Next Scheduled Contact: 01/23/2017
Source: Occupational Safety & Health Administration
Telephone: 800-321-6742
Last Contact: 11/14/2016

PADS: Listing of generators transporters commercial store/ brokers and disposers of PCB

Date of Government Version: 10/03/2016
Date Release Frequency: Varies
Next Scheduled Contact: 02/20/2017
Source: Environmental Protection Agency
Telephone: (703) 308-8404
Last Contact: 12/12/2016

PCB TRANSFORMER: Registry of PCB's

Date of Government Version: 05/13/2016
Date Release Frequency: No Update
Next Scheduled Contact: 02/05/2017
Source: Environmental Protection Agency
Telephone: (703) 308-8404
Last Contact: 11/09/2016

RAATS: Listing of major violators with enforcement actions issued under RCRA. Includes administrative and civil actions filed by the EPA. This dataset is no longer maintained.

Date of Government Version: 10/31/2016
Date Release Frequency: Varies
Next Scheduled Contact: 01/09/2017
Source: Environmental Protection Agency
Telephone: (202) 566-1667
Last Contact: 10/31/2016

RADINFO: EPA regulated facilities with radiation and radioactive materials

Date of Government Version: 12/03/2016
Date Release Frequency: Varies
Next Scheduled Contact: 02/10/2017
Source: Environmental Protection Agency
Telephone: (202) 566-1667
Last Contact: 12/03/2016

RMP: Facilities producing/handling/ process/ distribute/ store specific chemicals report plans required by the Clean Air Act

Date of Government Version: 09/19/2016
Date Release Frequency: Monthly
Next Scheduled Contact: 03/12/2017
Source: Environmental Protection Agency
Telephone: (202) 564-2534
Last Contact: 12/12/2016

ROD: Permanent remedy at an NPL site

Date of Government Version: 10/22/2016
Date Release Frequency: Varies
Next Scheduled Contact: 02/17/2017
Source: Environmental Protection Agency
Telephone: (800) 424-9346
Last Contact: 12/09/2016

SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners

Date of Government Version: 10/20/2016
Date Release Frequency: No Update
Next Scheduled Contact: 12/29/2016
Source: Environmental Protection Agency
Telephone: (202) 566-1667
Last Contact: 10/20/2016

SEMS_SMELTER: This report includes sites that have smelting-related, or potentially smelting-related, indicators in the SEMS database. The report includes information on the site location as well as contaminants of concern.

Date of Government Version: 11/21/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 01/30/2017
Source: U.S. Environmental Protection Agency
Telephone: 703-603-8867
Last Contact: 11/21/2016

SSTS: Tracking of facilities who produce pesticides and their quantity

Date of Government Version: 04/07/2016
Date Release Frequency: Varies
Next Scheduled Contact: 01/01/2017
Source: Environmental Protection Agency
Telephone: (202) 566-1667
Last Contact: 10/05/2016

TOSCA-CHEMICAL: Chemicals controlled by the Toxic Substance Control Act

Date of Government Version: 06/28/2014
Date Release Frequency: Varies
Next Scheduled Contact: 12/20/2016
Source: Environmental Protection Agency
Telephone: (202) 566-1667
Last Contact: 10/11/2016

TOSCA-PLANT: Plants controlled by the Toxic Substance Control Act

Date of Government Version: 10/27/2016
Date Release Frequency: Varies
Next Scheduled Contact: 01/05/2017
Source: Environmental Protection Agency
Telephone: (202) 566-1667
Last Contact: 10/27/2016

TRIS: Information regarding toxic chemicals that are being used/manufactured/ treated/ transported/released into the environment

Date of Government Version: 09/14/2016
Date Release Frequency: Varies
Next Scheduled Contact: 01/31/2017
Source: Environmental Protection Agency
Telephone: (202) 566-1667
Last Contact: 11/22/2016

UMTRA: Uranium Recovery Sites

Date of Government Version: 11/15/2016
Date Release Frequency: Varies
Next Scheduled Contact: 01/24/2017
Source: United States Nuclear Regulatory Commission
Telephone: (301) 415-8200
Last Contact: 11/15/2016

AOC_SAN GABRIEL VALLEY - CA: San Gabriel Valley Superfund sites

Date of Government Version: 11/07/2016
Date Release Frequency: Varies
Next Scheduled Contact: 01/16/2017
Source: U.S. Environmental Protection Agency
Telephone: 415-972-3181
Last Contact: 11/07/2016

BOND EXPENDITURE PLAN - CA: Hazardous Substance Cleanup Bond Act of 1984 Article 7.5 of Health and Safety Code 25385 listing of orphan sites

Date of Government Version: 09/19/2016
Date Release Frequency: No Update
Next Scheduled Contact: 02/06/2017
Source: Department of Toxic Substance Control
Telephone: 916-322-2861
Last Contact: 11/28/2016

CHMIRS - CA: California Hazardous Material Incident Reporting System's reported accidental hazardous material incidents releases or spills

Date of Government Version: 11/30/2016
Date Release Frequency: Varies
Next Scheduled Contact: 02/08/2017
Source: California Emergency Management Agency
Telephone: 916-845-8275
Last Contact: 11/30/2016

CORTESE - CA: Compliance document used in providing information about the location of hazardous material release sites utilized by the state local agencies and developers

Date of Government Version: 08/25/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 01/12/2017
Source: Department of Toxic Substance Control
Telephone: 916-322-2861
Last Contact: 11/03/2016

CUPA_Fresno County - CA: Listing of the Fresno County Certified Unified Program Agency's hazardous material program sites

Date of Government Version: 10/12/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 01/08/2017
Source: Fresno County Department of Public Health
Telephone: 559-600-3271
Last Contact: 10/12/2016

DAYCARE - CA: List of daycare locations

Date of Government Version: 11/28/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 02/06/2017
Source: California Department of Social Services
Telephone: 916-651-6040
Last Contact: 11/28/2016

DRYCLEANERS - CA: Listing of drycleaning facilities

Date of Government Version: 09/09/2014
Date Release Frequency: No Update
Next Scheduled Contact: 02/03/2017
Source: California EPA Air Resources Board
Telephone: 916-324-3013
Last Contact: 11/07/2016

DRYCLEANERS_Amador County - CA: Listing of drycleaning facilities in Amador County

Date of Government Version: 11/02/2016
Date Release Frequency: Varies
Next Scheduled Contact: 01/29/2017
Source: Amador County APCD
Telephone: (209) 223-6439
Last Contact: 11/02/2016

DRYCLEANERS_Antelope Valley - CA: Listing of drycleaning facilities in Antelope Valley

Date of Government Version: 10/18/2016
Date Release Frequency: Varies
Next Scheduled Contact: 01/14/2017
Source: Antelope Valley AQMD
Telephone: 661-723-8070
Last Contact: 10/18/2016

DRYCLEANERS_Bay Area - CA: Listing of drycleaning facilities in Bay Area

Date of Government Version: 11/07/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 02/14/2017
Source: Bay Area AQMD
Telephone: 415-749-4784
Last Contact: 11/18/2016

DRYCLEANERS_Butte County - CA: Listing of drycleaning facilities in Butte County

Date of Government Version: 08/03/2016
Date Release Frequency: Semi Annually
Next Scheduled Contact: 01/27/2017
Source: Butte County AQMD
Telephone: 530-332-9400 ext. 107
Last Contact: 10/31/2016

DRYCLEANERS_Calaveras County - CA: Listing of drycleaning facilities in Calaveras County

Date of Government Version: 11/19/2015
Date Release Frequency: Varies
Next Scheduled Contact: 12/17/2016
Source: Calaveras County APCD
Telephone: 209-754-6504
Last Contact: 09/20/2016

DRYCLEANERS_Colusa County - CA: Listing of drycleaning facilities in Colusa County

Date of Government Version: 09/08/2014
Date Release Frequency: Quarterly
Next Scheduled Contact: 02/11/2017
Source: Colusa County APCD
Telephone: 530-458-0590
Last Contact: 11/15/2016

DRYCLEANERS_Eastern Kern County - CA: Listing of drycleaning facilities in Eastern Kern County

Date of Government Version: 09/25/2016
Date Release Frequency: Varies
Next Scheduled Contact: 12/24/2016
Source: Eastern Kern County APCD
Telephone: 661-862-5250
Last Contact: 09/27/2016

DRYCLEANERS_El Dorado County - CA: Listing of drycleaning facilities in El Dorado County

Date of Government Version: 03/18/2016
Date Release Frequency: Varies
Next Scheduled Contact: 12/16/2016
Source: El Dorado County AQMD
Telephone: 530-621-7503
Last Contact: 09/19/2016

DRYCLEANERS_Feather River - CA: Listing of drycleaning facilities in Feather River

Date of Government Version: 08/17/2016
Date Release Frequency: Varies
Next Scheduled Contact: 02/10/2017
Source: Feather River AQMD
Telephone: 530-634-7659 ext. 205
Last Contact: 11/14/2016

DRYCLEANERS_Glenn County - CA: Listing of drycleaning facilities in Glenn County

Date of Government Version: 10/25/2016
Date Release Frequency: Varies
Next Scheduled Contact: 01/21/2017
Source: Glenn County APCD
Telephone: 530-934-6500
Last Contact: 10/25/2016

DRYCLEANERS_Great Basin Unified - CA: Listing of drycleaning facilities in the Great Basin Unified region

Date of Government Version: 09/09/2014
Date Release Frequency: Varies
Next Scheduled Contact: 12/30/2016
Source: Great Basin Unified APCD
Telephone: 760-872-8211 ext. 228
Last Contact: 10/03/2016

DRYCLEANERS_Imperial County - CA: Listing of drycleaning facilities in Imperial County

Date of Government Version: 10/21/2016
Date Release Frequency: Annually
Next Scheduled Contact: 01/16/2017
Source: Imperial County APCD
Telephone: 760-482-4606
Last Contact: 10/20/2016

DRYCLEANERS_Lake County - CA: Listing of drycleaning facilities in Lake County

Date of Government Version: 03/29/2016
Date Release Frequency: Varies
Next Scheduled Contact: 03/12/2017
Source: Lake County AQMD
Telephone: 707-263-7000
Last Contact: 12/12/2016

DRYCLEANERS_Lassen County - CA: Listing of drycleaning facilities in Lassen County

Date of Government Version: 09/09/2014
Date Release Frequency: Varies
Next Scheduled Contact: 12/26/2016
Source: Lassen County APCD
Telephone: 530-257-1045
Last Contact: 09/29/2016

DRYCLEANERS_Mendocino County - CA: Listing of drycleaning facilities in Mendocino County

Date of Government Version: 08/24/2016
Date Release Frequency: Varies
Next Scheduled Contact: 03/12/2017
Source: Mendocino County AQMD
Telephone: 707-463-4354
Last Contact: 12/12/2016

DRYCLEANERS_Mojave Desert - CA: Listing of drycleaning facilities in the Mojave Desert region

Date of Government Version: 10/18/2016
Date Release Frequency: Varies
Next Scheduled Contact: 01/14/2017
Source: Mojave Desert AQMD
Telephone: 661-723-8070
Last Contact: 10/18/2016

DRYCLEANERS_Monterey Bay - CA: Listing of drycleaning facilities in the Monterey Bay region

Date of Government Version: 11/02/2016
Date Release Frequency: Varies
Next Scheduled Contact: 01/29/2017
Source: Monterey Bay Unified APCD
Telephone: 831-647-9418 ext.240
Last Contact: 11/02/2016

DRYCLEANERS_North Coast Unified - CA: Listing of drycleaning facilities in the North Coast region

Date of Government Version: 11/29/2016
Date Release Frequency: Varies
Next Scheduled Contact: 02/17/2017
Source: North Coast Unified AQMD
Telephone: 707-443-3093 ext. 111
Last Contact: 11/21/2016

DRYCLEANERS_Northern Sierra - CA: Listing of drycleaning facilities in the Northern Sierra region

Date of Government Version: 09/08/2014
Date Release Frequency: Semi Annually
Next Scheduled Contact: 01/27/2017
Source: Northern Sierra AQMD
Telephone: 530-274-9360 ext. 106
Last Contact: 10/31/2016

DRYCLEANERS_Northern Sonoma County - CA: Listing of drycleaning facilities in Northern Sonoma County

Date of Government Version: 10/25/2016
Date Release Frequency: Varies
Next Scheduled Contact: 01/21/2017
Source: Northern Sonoma County APCD
Telephone: 707-433-5911
Last Contact: 10/25/2016

DRYCLEANERS_Placer County - CA: Listing of drycleaning facilities in Placer County

Date of Government Version: 10/26/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 01/22/2017
Source: Placer County APCD
Telephone: 530-745-2324
Last Contact: 10/26/2016

DRYCLEANERS_Sacramento County - CA: Listing of drycleaning facilities in Sacramento County

Date of Government Version: 11/15/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 02/11/2017
Source: Sacramento Metro AQMD
Telephone: 916-874-4817
Last Contact: 11/15/2016

DRYCLEANERS_San Diego County - CA: Listing of drycleaning facilities in San Diego County

Date of Government Version: 10/19/2016
Date Release Frequency: Varies
Next Scheduled Contact: 01/14/2017
Source: San Diego County APCD
Telephone: 858-586-2618
Last Contact: 10/18/2016

DRYCLEANERS_San Joaquin Valley - CA: Listing of drycleaning facilities in the San Joaquin Valley

Date of Government Version: 11/02/2016
Date Release Frequency: Varies
Next Scheduled Contact: 12/26/2016
Source: San Joaquin Valley APCD
Telephone: 559-230-5936
Last Contact: 09/29/2016

DRYCLEANERS_San Luis Obispo - CA: Listing of drycleaning facilities in the San Luis Obispo region

Date of Government Version: 11/02/2016
Date Release Frequency: Varies
Next Scheduled Contact: 01/22/2017
Source: San Luis Obispo County APCD
Telephone: 805-781-5912
Last Contact: 10/26/2016

DRYCLEANERS_Santa Barbara County - CA: Listing of drycleaning facilities in Santa Barbara County

Date of Government Version: 10/25/2016
Date Release Frequency: Varies
Next Scheduled Contact: 01/20/2017
Source: Santa Barbara County APCD
Telephone: 805-961-8867
Last Contact: 10/24/2016

DRYCLEANERS_Shasta County - CA: Listing of drycleaning facilities in Shasta County

Date of Government Version: 09/08/2014
Date Release Frequency: Varies
Next Scheduled Contact: 01/06/2017
Source: Shasta County AQMD
Telephone: 530-225-5674
Last Contact: 10/10/2016

DRYCLEANERS_Siskiyou County - CA: Listing of drycleaning facilities in Siskiyou County

Date of Government Version: 09/08/2014
Date Release Frequency: Varies
Next Scheduled Contact: 02/28/2017
Source: Siskiyou County APCD
Telephone: 530-841-4029
Last Contact: 12/02/2016

DRYCLEANERS_South Coast - CA: Listing of drycleaning facilities in the South Coast region

Date of Government Version: 06/23/2016
Date Release Frequency: Varies
Next Scheduled Contact: 12/17/2016
Source: South Coast AQMD
Telephone: 909-396-2000
Last Contact: 09/20/2016

DRYCLEANERS_Tehama County - CA: Listing of drycleaning facilities in Tehama County

Date of Government Version: 11/08/2016
Date Release Frequency: Varies
Next Scheduled Contact: 01/24/2017
Source: Tehama County APCD
Telephone: 530-527-3717 ext.100
Last Contact: 10/28/2016

DRYCLEANERS_Tuolumne County - CA: Listing of drycleaning facilities in Tuolumne County

Date of Government Version: 09/08/2014
Date Release Frequency: Varies
Next Scheduled Contact: 01/14/2017
Source: Tuolumne County APCD
Telephone: 209-533-6678
Last Contact: 10/18/2016

DRYCLEANERS_Ventura County - CA: Listing of drycleaning facilities in Ventura County

Date of Government Version: 11/01/2016
Date Release Frequency: Varies
Next Scheduled Contact: 01/28/2017
Source: Ventura County APCD
Telephone: 805-645-1405
Last Contact: 11/01/2016

DRYCLEANERS_Yolo-Solano Counties - CA: Listing of drycleaning facilities in Yolo and Solano Counties

Date of Government Version: 06/15/2016
Date Release Frequency: Varies
Next Scheduled Contact: 02/03/2017
Source: Yolo-Solano AQMD
Telephone: 530-757-3664
Last Contact: 11/07/2016

EMI - CA: An estimation of air pollution for a listing of air permitted facilities

Date of Government Version: 06/25/2016
Date Release Frequency: Varies
Next Scheduled Contact: 01/18/2017
Source: California Air Resources Board
Telephone: 916-327-6251
Last Contact: 11/09/2016

FA - CA: Listing of the Department of Toxic Substance Control's Financial Assurance report sites and facilities

Date of Government Version: 11/10/2015
Date Release Frequency: Varies
Next Scheduled Contact: 12/23/2016
Source: Department of Toxic Substance Control
Telephone: 916-322-2861
Last Contact: 09/26/2016

FA 2 - CA: I would like to get data details for: List of Financial Assurance data to cover cost of closure, post-closure care and corrective measures if the owne

Date of Government Version: 09/22/2016
Date Release Frequency: Varies
Next Scheduled Contact: 03/12/2017
Source: Department of Environment & Natural Resources
Telephone: 916-341-6066
Last Contact: 12/12/2016

GCC_Santa Clara Valley - CA: Santa Clara Valley groundwater contamination cleanups listing

Date of Government Version: 10/20/2016
Date Release Frequency: Varies
Next Scheduled Contact: 12/29/2016
Source: CA State Water Resources Control Board
Telephone: 916-341-5791
Last Contact: 10/20/2016

HAZMAT INCIDENT_Contra Costa County - CA: Listing of hazardous material incident sites since 1993 in Contra Costa County

Date of Government Version: 11/15/2016
Date Release Frequency: Varies
Next Scheduled Contact: 12/24/2016
Source: Contra Costa Health Services Department
Telephone: 925-335-3200
Last Contact: 10/31/2016

HAZMAT_City of San Jose - CA: City of San Jose hazardous material facilities listing

Date of Government Version: 09/09/2014
Date Release Frequency: Varies
Next Scheduled Contact: 01/14/2017
Source: Santa Clara County Department of Environmental Health
Telephone: 408-918-1951
Last Contact: 10/18/2016

HAZMAT_Sacramento County - CA: Sacramento county hazardous material facilities listing

Date of Government Version: 08/22/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 12/27/2016
Source: Sacramento County Environmental Management
Telephone: 916-875-8550
Last Contact: 10/18/2016

HAZMAT_San Bernardino County - CA: San Bernardino county listing of hazardous material permitted facilities

Date of Government Version: 11/10/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 01/21/2017
Source: San Bernardino County Fire Department Hazardous Materials Division
Telephone: 909-386-8419
Last Contact: 10/25/2016

HAZMAT_San Diego County - CA: San Diego county listing of hazardous material permitted facilities

Date of Government Version: 10/13/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 12/22/2016
Source: Hazardous Materials Management Division
Telephone: 858-505-6700
Last Contact: 10/13/2016

HAZMAT_Santa Clara County - CA: Santa Clara county hazardous material facilities listing

Date of Government Version: 10/19/2016
Date Release Frequency: Annually
Next Scheduled Contact: 01/14/2017
Source: Santa Clara Department of Environmental Health
Telephone: 408-918-3428
Last Contact: 10/18/2016

HAZNET - CA: Listing of hazardous waste manifests from when hazardous waste is transported from generators to permitted recycling treatment storage or disposal facilities by registered hazardous waste transporters

Date of Government Version: 09/02/2016
Date Release Frequency: Annually
Next Scheduled Contact: 01/20/2017
Source: California Environmental Protection Agency
Telephone:
Last Contact: 11/11/2016

HAZWASTE_ORANGE COUNTY - CA: Orange county hazardous waste facilities

Date of Government Version: 10/18/2016
Date Release Frequency: Annually
Next Scheduled Contact: 12/27/2016
Source: Orange County Health Care Agency
Telephone: 714-433-6000
Last Contact: 10/18/2016

HIGH FIRE - CA: Fire hazard severity zones mapped as areas of significant fire hazards on the basis of fuels terrain weather and other factors

Date of Government Version: 10/25/2016
Date Release Frequency: No update
Next Scheduled Contact: 01/03/2017
Source: California Department of Forestry and Fire Protection
Telephone: 916-445-4302
Last Contact: 10/25/2016

HIST CORTESE - CA: The historical compliance document used in providing information about the location of hazardous material release sites utilized by the state local agencies and developers

Date of Government Version: 10/11/2016
Date Release Frequency: No update
Next Scheduled Contact: 12/20/2016
Source: Department of Toxic Substance Control
Telephone: 916-322-2861
Last Contact: 10/11/2016

HMS_Los Angeles County - CA: Listing of Los Angeles county industrial waste and underground storage tank sites

Date of Government Version: 02/10/2016
Date Release Frequency: Monthly
Next Scheduled Contact: 12/30/2016
Source: County of Los Angeles Department of Public Works
Telephone: 626-458-3518
Last Contact: 10/03/2016

HWM COMMERCIAL FACILITIES - CA: Listing of all commercial hazardous waste permitted off-site transfer recycling treatment storage and disposal facilities

Date of Government Version: 09/29/2016
Date Release Frequency: Varies
Next Scheduled Contact: 02/16/2017
Source: Department of Toxic Substance Control
Telephone: 916-322-5308
Last Contact: 12/08/2016

HWP - CA: Facility listing of the Department of Toxic Substance Control's hazardous waste transporters and corrective action

Date of Government Version: 10/03/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 02/20/2017
Source: Department of Toxic Substance Control
Telephone: 916-322-2861
Last Contact: 12/12/2016

HWT - CA: Listing of registered hazardous waste transporters

Date of Government Version: 10/04/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 02/21/2017
Source: Department of Toxic Substance Control
Telephone: 916-322-2861
Last Contact: 12/13/2016

MWMP - CA: Listing of treatment and transfer stations that properly handle and dispose of medical waste that are permitted and inspected by the Medical Waste Management Program

Date of Government Version: 10/03/2016
Date Release Frequency: Varies
Next Scheduled Contact: 02/17/2017
Source: California-Health Human Services Department of Public Health
Telephone: 916-449-5661
Last Contact: 12/10/2016

NFA - CA: No further action cleanup sites listing

Date of Government Version: 10/11/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 12/20/2016
Source: Department of Toxic Substances Control
Telephone: 916-322-2861
Last Contact: 10/11/2016

NFE - CA: Unconfirmed contaminated properties listing

Date of Government Version: 08/25/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 01/12/2017
Source: Department of Toxic Substances Control
Telephone: 916-322-2861
Last Contact: 11/03/2016

PERCHLORATE 2 - CA: Listing of contaminated sites where the primary known chemical is perchlorate

Date of Government Version: 11/03/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 01/12/2017
Source: Department of Toxic Substances Control
Telephone: 916-322-2861
Last Contact: 11/03/2016

PROPOSITION 65 - CA: Listing of Proposition 65 enforcement reporting notice sites in accordance with "The Safe Drinking Water and Toxic Enforcement Act of 1986"

Date of Government Version: 10/20/2016
Date Release Frequency: No update
Next Scheduled Contact: 12/29/2016
Source: State of California Department of JusticeOffice of the Attorney General
Telephone: 510-873-6321
Last Contact: 10/20/2016

RFR - CA: State Water Resources Control Board Regulated Facility Report database listing which includes program agency type and their permit status

Date of Government Version: 10/25/2016
Date Release Frequency: Varies
Next Scheduled Contact: 01/03/2017
Source: CA State Water Resources Control Board
Telephone: 916-341-5810
Last Contact: 10/25/2016

SITES INVENTORY_Ventura County - CA: Listing of Ventura County inventory of closed illegal abandoned and inactive sites

Date of Government Version: 10/11/2016
Date Release Frequency: Annually
Next Scheduled Contact: 12/20/2016
Source: Environmental Health Division
Telephone: 805-654-2815
Last Contact: 10/11/2016

SWAT - CA: The SWAT Reports Summary Data and the Waste Management Unit Database were published by State Water Resources Control Board staff and the Regional Water Quality Control Boards for tracking and inventory of waste management units.

Date of Government Version: 08/28/2015
Date Release Frequency: No Longer Maintained
Next Scheduled Contact: 02/24/2017
Source: Department of Ecology
Telephone:
Last Contact: 11/28/2016

VCCP_Ventura County - CA: Listing of Ventura County cleanup program sites

Date of Government Version: 10/04/2016
Date Release Frequency: Annually
Next Scheduled Contact: 02/21/2017
Source: Environmental Health Division
Telephone: 805-654-2815
Last Contact: 12/13/2016

WDS - CA: Listing of waste discharge system reporting facilities

Date of Government Version: 10/29/2016
Date Release Frequency: Quarterly
Next Scheduled Contact: 01/07/2017
Source: State Water Resources Control Board
Telephone: 916-341-5810
Last Contact: 10/29/2016

WILDLANDS - CA: The Wildlands Conservancy listing of preserves in California

Date of Government Version: 10/18/2016
Date Release Frequency: Varies
Next Scheduled Contact: 12/27/2016
Source: The Wildlands Conservancy
Telephone: 909-797-8507
Last Contact: 10/18/2016

WIP - CA: Listing of Well Investigation Program cases in the San Gabriel and San Fernando Valley area

Date of Government Version: 10/03/2016
Date Release Frequency: Varies
Next Scheduled Contact: 02/20/2017

Source: Los Angeles Water Quality Control Board
Telephone: 916-341-5810
Last Contact: 12/12/2016

OTHER STATE DATABASE INFORMATION:

OTHER

SEISMIC - CA: Earthquake Zones of Required Investigation. Shows the location of both Seismic Hazard Zones and Earthquake Fault Zones

Date of Government Version: 07/05/2016
Date Release Frequency: Varies
Next Scheduled Contact: 01/31/2017

Source: State of California Department of Conservation
Telephone: 916-324-7299
Last Contact: 11/22/2016

SUBJECT PROPERTY ADDRESS:

9174 Indiana Ave
9174 Indiana Ave
Riverside, CA 92503

SUBJECT PROPERTY COORDINATES:

Latitude(North):	33.916810 - 33° 55' 0.5"
Longitude(West):	-117.435400 - -117° 26' 7.4"
Universal Transverse Mercator:	Zone 11N
UTM X (Meters):	459752.45
UTM Y (Meters):	3753017.43
Elevation:	827.756 ft. above sea level

USGS TOPOGRAPHIC MAP:

Subject Property Map:	33117h4 RIVERSIDE WEST, CA
Most Recent Revision:	2012

Geological Landscape 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 principle 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.

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).

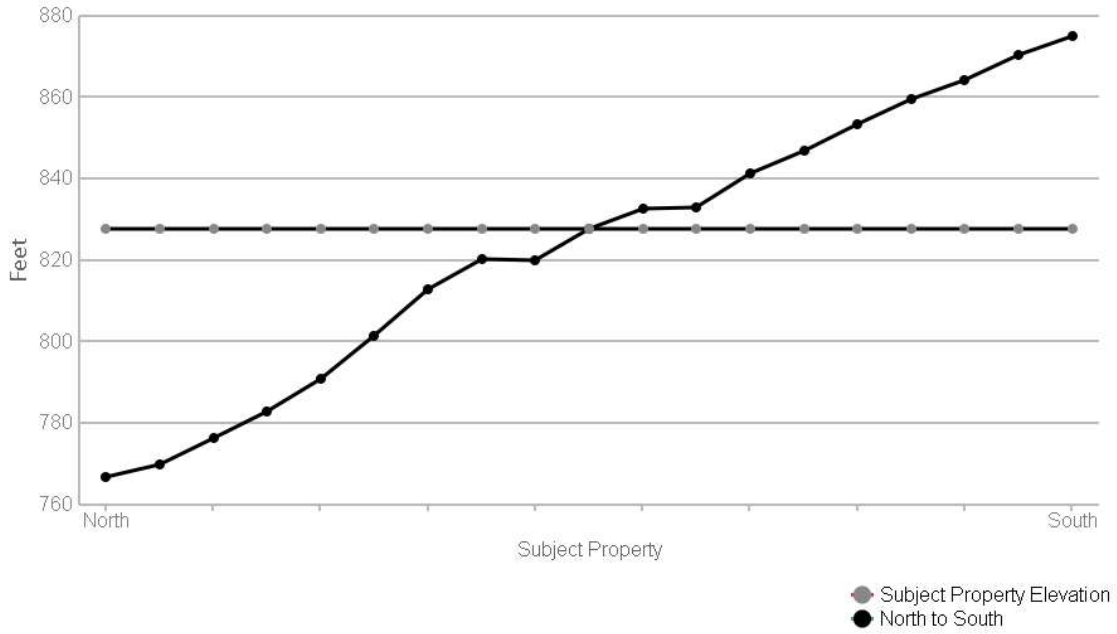
TOPOGRAPHIC INFORMATION:

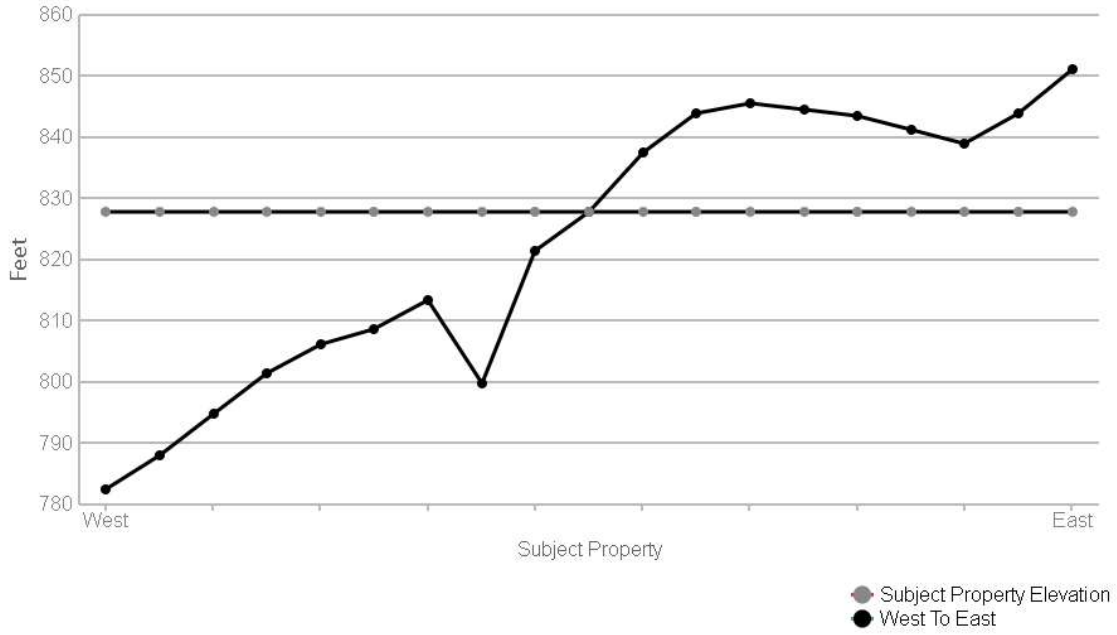
Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the subject property, what downgradient sites might be impacted

SUBJECT PROPERTY TOPOGRAPHY:

General Topographic Gradient: N

SURROUNDING TOPOGRAPHY: *ELEVATION PROFILES*





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.

HYDROGEOLOGIC 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 subject 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).

DFIRM FLOOD ZONE:

Subject Property County:	DFIRM Flood Electronic Data:
RIVERSIDE	Yes - refer to the PROPERTY PROXIMITY MAP and AREA MAP
Flood Plain Panel at Subject Property:	06065C
Additional Panels in search area:	No available data.

FEMA FLOOD ZONE:

Subject Property County:	FEMA Flood Electronic Data:
RIVERSIDE	Yes - refer to the PROPERTY PROXIMITY MAP and AREA MAP
Flood Plain Panel at Subject Property:	0602600025A
Additional Panels in search area:	0602600030A

NATIONAL WETLAND INVENTORY:

NWI Quad at Subject Property:	NWI Electronic Data Coverage:
RIVERSIDE WEST	Yes - refer to the Geological Setting Source Map

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 SUBJECT 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:

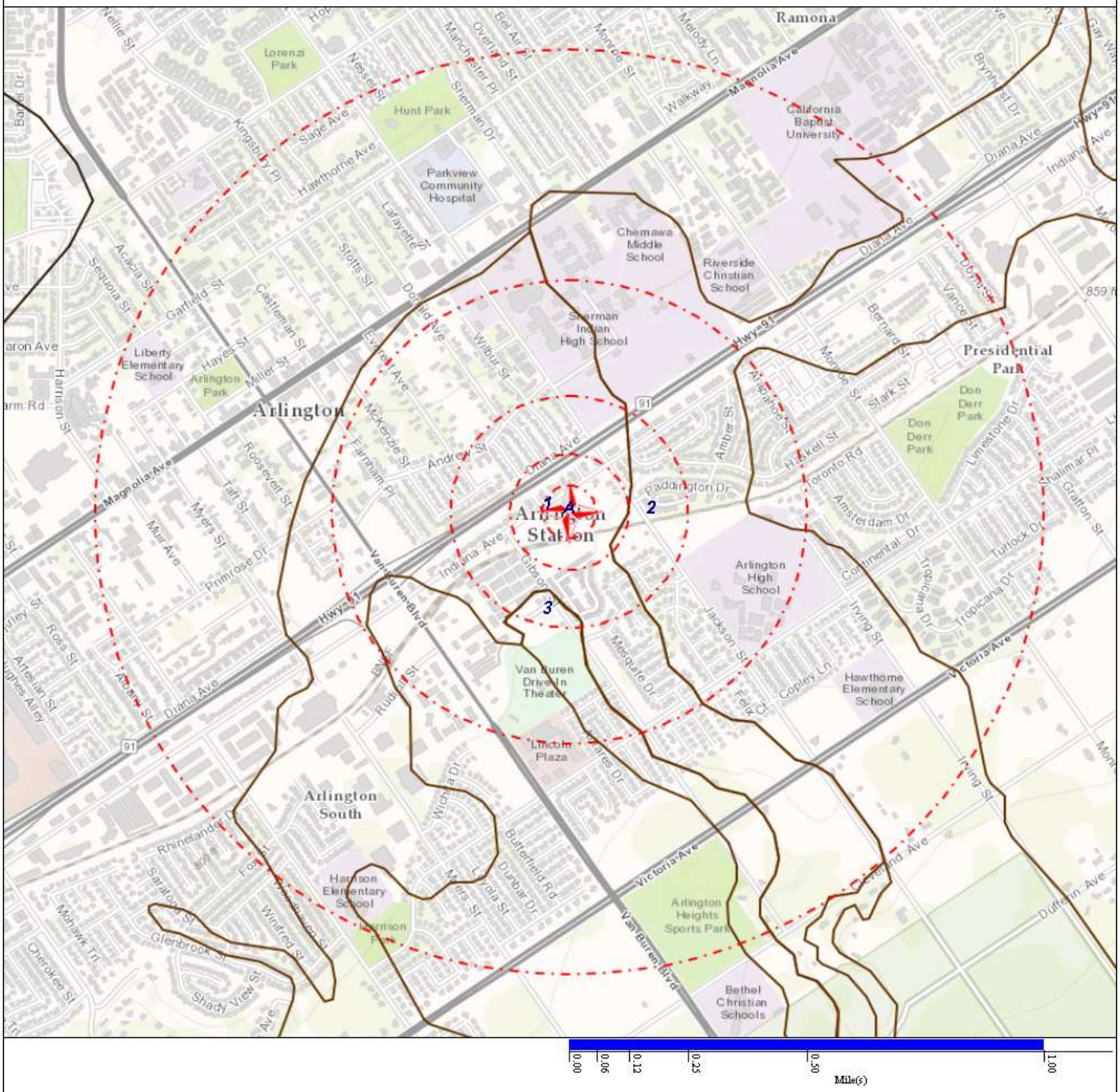
Era: Mesozoic
System: Cretaceous
Series: Cretaceous granitic rocks
Code: Kg

GEOLOGIC AGE IDENTIFICATION

Category: 45 Kg Cretaceous granitic rocks

SUBJECT NAME: 9174 Indiana Ave
ADDRESS: 9174 Indiana Ave, Riverside, CA 92503
LAT/LONG: 33.916810 / -117.435400

PREPARED FOR: LSA Associates Inc
ORDER #: 9081
REPORT DATE: December 19, 2016



Subject Property — SSURGO — STATSGO

DOMINANT SOIL COMPOSITION IN GENERAL AREA OF SUBJECT 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/STATSGO data.

SOIL MAP ID: 1

Soil Component Name: Hanford
Soil Surface Texture: Not Reported
Hydrologic Group: A
Soil Drainage Class: Well drained
Hydric Status: 0
Corrosion Potential - Uncoated Steel: High

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		20	Coarse sandy loam	Silt-Clay materials (more than 35% passing NO. 200), silty soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Min:42, Max:14	Min:7.8, Max:5.6
2	20	102	Fine sandy loam	Silt-Clay materials (more than 35% passing NO. 200), silty soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Min:42, Max:14	Min:7.8, Max:5.6
3	102	152	Coarse sandy loam	Granular materials (35% or less passing No. 200 sieve), silty or clayey gravel and sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Min:141, Max:42	Min:7.8, Max:5.6

SOIL MAP ID: 2

Soil Component Name: Arlington
Soil Surface Texture: Not Reported
Hydrologic Group: B
Soil Drainage Class: Well drained
Hydric Status: 0
Corrosion Potential - Uncoated Steel: Moderate

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		28	Fine sandy loam	Silt-Clay materials (more than 35% passing NO. 200), silty soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Min:42, Max:14	Min:7.8, Max:6.1
2	28	127	Sandy loam	Silt-Clay materials (more than 35% passing NO. 200), silty soils.		Min:14, Max:4	Min:7.8, Max:6.1
3	127	152		No data	No data	Min:1.4, Max:0.42	Min:, Max:
4	152	178	Coarse sandy loam	Granular materials (35% or less passing No. 200 sieve), silty or clayey gravel and sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Min:141, Max:42	Min:7.3, Max:6.6

SOIL MAP ID: 3

Soil Component Name: Arlington
Soil Surface Texture: Not Reported
Hydrologic Group: B
Soil Drainage Class: Well drained
Hydric Status: 0
Corrosion Potential - Uncoated Steel: Moderate

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		28	Fine sandy loam	Silt-Clay materials (more than 35% passing NO. 200), silty soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Min:42, Max:14	Min:7.8, Max:6.1
2	28	127	Sandy loam	Silt-Clay materials (more than 35% passing NO. 200), silty soils.		Min:14, Max:4	Min:7.8, Max:6.1
3	127	152		No data	No data	Min:1.4, Max:0.42	Min:, Max:
4	152	178	Coarse sandy loam	Granular materials (35% or less passing No. 200 sieve), silty or clayey gravel and sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Min:141, Max:42	Min:7.3, Max:6.6

SOIL MAP ID: A

Soil Component Name: Hanford
Soil Surface Texture: Coarse sandy loam
Hydrologic Group: B
Soil Drainage Class: Well drained
Hydric Status: 0
Corrosion Potential - Uncoated Steel: Moderate

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	30	Coarse sandy loam	No data	No data	Min:42.343, Max:14.1143	Min:7.8, Max:5.6
2	30	127	No data	No data	No data	Min:42.343, Max:14.1143	Min:7.8, Max:5.6
3	127	152	No data	No data	No data	Min:42.343, Max:14.1143	Min:7.8, Max:5.6

LOCAL / REGIONAL WATER AGENCY RECORDS:

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):
OIL & GAS WELLS - CA	1.000
PWS	1.000

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION:

MAP ID:	WELL ID:	LOCATION FROM SP:
A2	CA3301856	1/2 - 1 Mile NNW
A3	090500069	1/2 - 1 Mile NNW

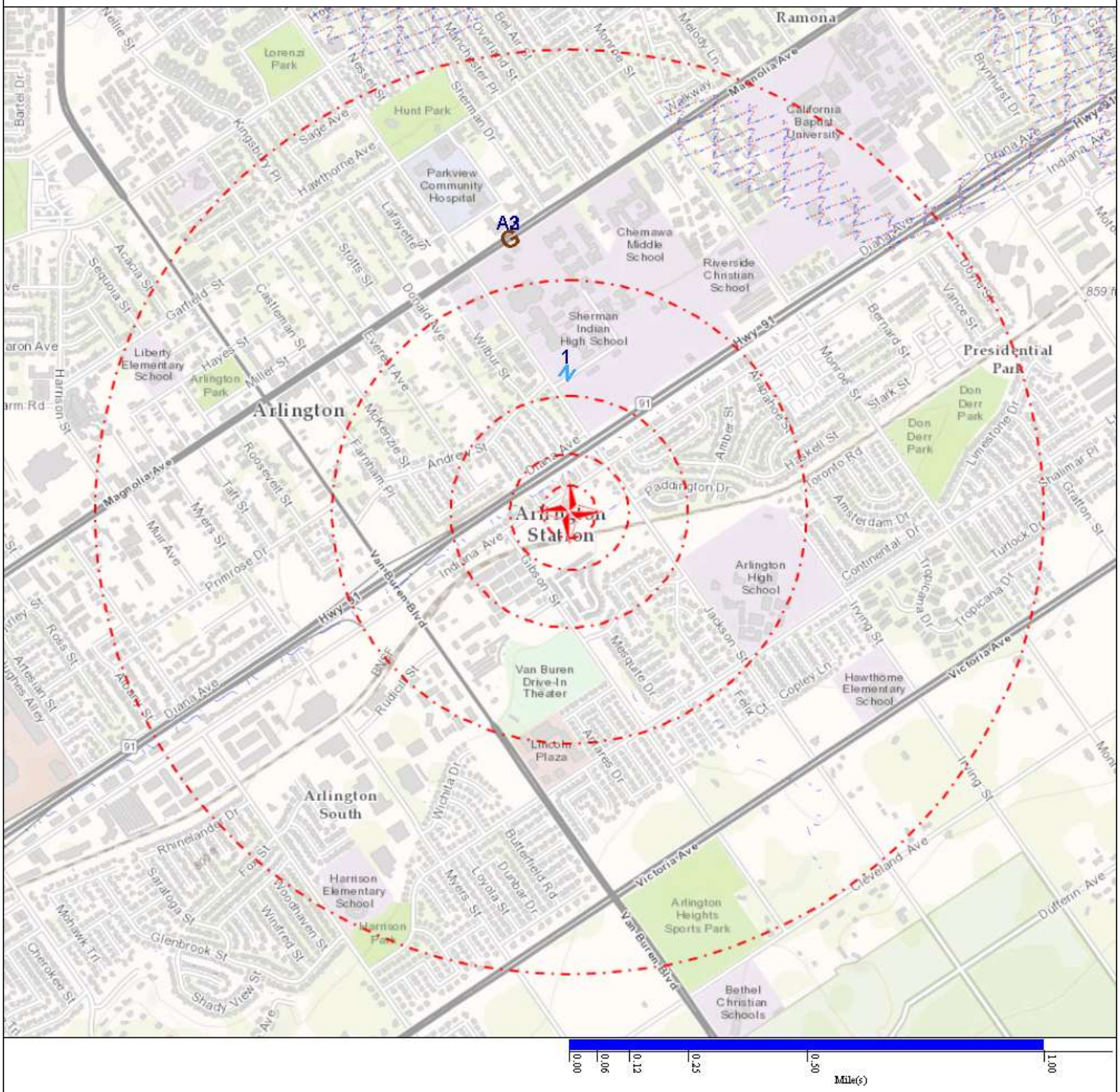
Note: PWS System location is not always the same as well location.

STATE DATABASE WELL INFORMATION:

MAP ID:	WELL ID:	LOCATION FROM SP:
No Wells Found	N/R	N/R

SUBJECT NAME: 9174 Indiana Ave
ADDRESS: 9174 Indiana Ave, Riverside, CA 92503
LAT/LONG: 33.916810 / -117.435400

PREPARED FOR: LSA Associates Inc
ORDER #: 9081
REPORT DATE: December 19, 2016



Subject Property
NWIS
Geological Site
Equal/Higher Elevation
Basins (No Data)
Lower Elevation
NWI
DAMS
Oil, Gas And Wells (No Data)

Map Id: 1
Direction: N
Distance: 0.296 mi.
Actual: 1565.383 ft.
Elevation: 0.154 mi. / 811.024 ft.
Relative: Lower

Site Name: N/R
Database(s): [NWIS]

Envirosite ID: N/R
EPA ID: N/R

NWIS

Agency: :	USGS
Site Identification Number: :	335500117260001
Site Name: :	003S005W07J002S
Site Type: :	GW
DMS Latitude:	335516.00
DMS Longitude:	1172607.70
Decimal Latitude: :	33.921111
Decimal Longitude: :	-117.435472
Latitude-Longitude Method:	G
Latitude-Longitude Accuracy:	5
Latitude-Longitude Datum:	NAD83
Decimal Latitude/Longitude Datum:	NAD83
District Code: :	06
State Code: :	06
County Code: :	065
Country Code: :	US
Land Net Location Description: :	N/R
Name of Location Map:	RIVERSIDE WEST
Scale of Location Map:	24000
Altitude of Gage/Land Surface:	805
Method Altitude Determined: :	M
Altitude Accuracy: :	5
Altitude Datum: :	NGVD29
Hydrologic Unit Code: :	18070203
Drainage Basin Code: :	N/R
Topographic Setting Code: :	F
Data Types: :	NONONNNNNNNNNNNNNNNNNNNNNNNNNN
Instruments: :	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
Construction Date: :	19711006
Date Site Established: :	20070109
Drainage Area: :	N/R
Contributing Drainage Area: :	N/R
Time-zone Abbreviation: :	PST
Daylight Saving Time: :	Y
Data Reliability Code: :	C
Data-Other GW File:	YY
National Aquifer Code: :	N100CACSTL
Local Aquifer Code: :	N/R
Local Aquifer Type Code: :	N/R
Well Depth: :	190
Hole Depth: :	190

Map Id: 1
Direction: N
Distance: 0.296 mi.
Actual: 1565.383 ft.
Elevation: 0.154 mi. / 811.024 ft.
Relative: Lower

Site Name: N/R
Database(s): [NWIS] ***(Cont.)***

Envirosite ID: N/R
EPA ID: N/R

NWIS ***(Cont.)***

Source of Depth Data:	D
Project Number: :	9677BHM52
Realtime-Data Flag:	0
Peak Begin Date: :	--
Peak End Date: :	--
Peak Count: :	0
Water Quality Begin Date: :	2007-01-09
Water Quality End Date: :	2007-01-09
Water Quality Count: :	2
Ground Water Begin Date: :	--
Ground Water End Date: :	--
Ground Water Count: :	0
Site Visit Begin Date: :	--
Site Visit End Date: :	--
Site Visit Count: :	0
State: :	CA
Classcode: :	NWIS

Map Id: A2
Direction: NNW
Distance: 0.601 mi.
Actual: 3174.672 ft.
Elevation: 0.147 mi. / 773.95 ft.
Relative: Lower

Site Name: CA3301856
9010 MAGNOLIA AVE, RIVERSIDE 92503
RIVERSIDE, CA 92503
Database(s): [PWS]

Envirosite ID: 340164844
EPA ID: N/R

PWS

PWS ID :	CA3301856
PWS Type :	Community water system
PWS Name :	SHERMAN INDIAN HIGH SCHOOL
Activity Status :	Inactive
Primary Source :	Ground water
Counties Served :	N/R
Cities Served :	N/R
Population Served Count :	1
Number of Facilities :	1
Number of Violations :	0

Map Id: A2
Direction: NNW
Distance: 0.601 mi.
Actual: 3174.672 ft.
Elevation: 0.147 mi. / 773.95 ft.
Relative: Lower

Site Name: CA3301856
9010 MAGNOLIA AVE, RIVERSIDE 92503
RIVERSIDE, CA 92503

Database(s): [PWS] ***(Cont.)***

Envirosite ID: 340164844
EPA ID: N/R

PWS ***(Cont.)***

Number of Site Visits :	0
Admin Name :	SHERMAN INDIAN HIGH SCHOOL
Alt Phone Number :	N/R
CDS ID :	N/R
DBPR Schedule Category :	N/R
Deactivation Date :	09/01/1981
EPA Region :	Region 9
Email Address :	N/R
Fax Number :	N/R
First Reported Date :	03/22/1979
GW or SW :	Groundwater
Is Grant Eligible :	N
Is Outstanding Performer :	N/R
Is School or Daycare :	N
Is Source Water Protected :	N/R
Is Wholesaler :	N
LT2 Schedule Category :	N/R
Last Reported Date :	07/24/1995
NPM Candidate :	N
Org Name :	N/R
Outstanding Performer Date :	N/R
Owner Type :	Unknown Owner Type
Phone Number :	N/R
Phone Ext Number :	N/R
Pop Cat 11 :	<=100
Pop Cat 2 :	< 10,000
Pop Cat 3 :	<=3300
Pop Cat 4 :	< 10K
Pop Cat 5 :	<=500
Primacy Agency :	California
Primacy Type :	State
Season Begin Date :	01-01
Season End Date :	12-31
Service Connections Count :	0
Source Water Protection Date :	N/R
Submission Quarter :	2
Submission Status Code :	Y
Submission Year :	2016
Submission Year Quarter :	2016Q2

Map Id: A3
Direction: NNW
Distance: 0.601 mi.
Actual: 3174.672 ft.
Elevation: 0.147 mi. / 773.95 ft.
Relative: Lower

Site Name: 090500069
9010 MAGNOLIA AVE.
RIVERSIDE, CA

Database(s): [PWS]

Envirosite ID: 333543270
EPA ID: N/R

PWS

PWS ID :	090500069
PWS Type :	Community water system
PWS Name :	SHERMAN IND HI SCHL
Activity Status :	Inactive
Primary Source :	Ground water
Counties Served :	N/R
Cities Served :	N/R
Population Served Count :	800
Number of Facilities :	1
Number of Violations :	0
Number of Site Visits :	0
Admin Name :	SHERMAN IND HI SCHL
Alt Phone Number :	N/R
CDS ID :	N/R
DBPR Schedule Category :	N/R
Deactivation Date :	05/01/1981
EPA Region :	Region 9
Email Address :	N/R
Fax Number :	N/R
First Reported Date :	03/22/1979
GW or SW :	Groundwater
Is Grant Eligible :	N
Is Outstanding Performer :	N/R
Is School or Daycare :	N
Is Source Water Protected :	N/R
Is Wholesaler :	N
LT2 Schedule Category :	N/R
Last Reported Date :	02/10/1996
NPM Candidate :	N
Org Name :	N/R
Outstanding Performer Date :	N/R
Owner Type :	Federal government
Phone Number :	N/R
Phone Ext Number :	N/R
Pop Cat 11 :	501-1,000
Pop Cat 2 :	< 10,000
Pop Cat 3 :	<=3300
Pop Cat 4 :	< 10K
Pop Cat 5 :	501-3,300
Primacy Agency :	EPA Region 9
Primacy Type :	Tribal

Map Id: A3
Direction: NNW
Distance: 0.601 mi.
Actual: 3174.672 ft.
Elevation: 0.147 mi. / 773.95 ft.
Relative: Lower

Site Name: 090500069
9010 MAGNOLIA AVE.
RIVERSIDE, CA

Database(s): [PWS] ***(Cont.)***

Envirosite ID: 333543270
EPA ID: N/R

PWS ***(Cont.)***

Season Begin Date :	01-01
Season End Date :	12-31
Service Connections Count :	1
Source Water Protection Date :	N/R
Submission Quarter :	2
Submission Status Code :	Y
Submission Year :	2016
Submission Year Quarter :	2016Q2

AREA RADON INFORMATION:

STATE DATABASE: CA

Radon Test Results

Zip:	Total Sites:	Cnt >=4 Pci/L:	Pct >= 4 Pci/L:
92503	17	0	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 < 2 pCI/L

FEDERAL AREA RADON INFORMATION FOR: 92503

NUMBER OF SITES TESTED: 1

Area:	Average Activity:	% <4 pCi/L:	% 4-20 pCi/L:	% >20 pCi/L:
first floor	-0.5pCI/L	100%	0%	0%

LOCAL / REGIONAL WATER AGENCY RECORDS

FEDERAL WATER WELLS

INACTIVE PCS
Inactive Permit Compliance Facilities
Environmental Protection Agency
(202) 564-6582
Inactive Permitted facilities to discharge wastewater

NWIS
National Water Information Systems
United States Geological Society
(703) 648-5953
Information on all water resources for the United States. This database contains all current and historical data for the nation.

PCS ENF
Enforced Permit Compliance Facilities
Environmental Protection Agency
(202) 564-6582
Permitted facilities to discharge wastewater (Federal equivalent to NPDES)

PCS FACILITY
Permit Compliance Facilities
Environmental Protection Agency
(202) 564-6582
Permitted facilities to discharge wastewater (Federal equivalent to NPDES)

PWS
Public Water Supply
Environmental Protection Agency
(800) 426-4791
Safe drinking water information Systems

PWS ENF
Public Water Supply locations with Enforcement Violations
Environmental Protection Agency
(800) 426-4791
Safe drinking water information Systems with enforcememnt violations

STORM WATER
Storm Water Permits
Environmental Protection Agency
(202) 566-1667
Permitted storm water sites

LOCAL / REGIONAL WATER AGENCY RECORDS

CIWQS - CA
California Integrated Water Quality System
CA State Water Resources Control Board
916-341-5791
California Integrated Water Quality System database facilities listing which includer owner information violations inspections and other regulatory matters

STATE RECORDS

GAMA - CA
California Groundwater Ambient Monitoring Assessment
State Water Resources Control Board
916-341-5791
Brings together datasets from California state agencies including: Public Health Water Resources and Pesticide Regulation as well as from the US Geological Survey Lawrence Livermore National Laboratory and the Water Boards. It shows results for untreated raw water in different types of wells for naturally-occurring and man-made chemicals.

NPDES - CA
National Pollutant Discharge Elimination System
State Water Resources Control Board
916-341-5810
A listing of National Pollutant Discharge Elimination System permits including stormwater

HYDROLOGIC INFORMATION

OTHER

FLOOD Q3
Flood data
Environmental Protection Agency
(202) 566-1667
Q3 Flood Data

OTHER ASCERTAINABLE RECORDS

HYDROLOGIC UNIT
Hydrologic Unit Maps
USGS
The United States Geological Survey created a hierarchical system of hydrologic units originally called regions, sub-regions, accounting units, and cataloging units. Each unit was assigned a unique Hydrologic Unit Code (HUC). As first implemented the system had 21 regions, 221 subregions, 378 accounting units, and 2,264 cataloging units. Over time the system was changed and expanded. As of 2010 there are six levels in the hierarchy, represented by hydrologic unit codes from 2 to 12 digits long, called regions, subregions, basins, subbasins, watersheds, and subwatersheds. The table below describes the system's hydrologic unit levels and their characteristics, along with example names and codes.

WETLANDS NWI
National Wetland Inventory
U.S. Fish and Wildlife Service
(703) 358-2171
Wetland Inventory for the United States

GEOLOGIC INFORMATION

OTHER

SSURGO
Detailed Soil Data Map
Natural Resources Conservation Service: U.S. Department of Agriculture
(202) 690-4985
Detailed Soil Data Map

STATSGO & MUI
General Soil Data Map
Natural Resources Conservation Service: U.S. Department of Agriculture
(202) 690-4985
General Soil Data Map

USGS GEOLOGIC AGE
USGS Digital Data Series DDS
Natural Resources Conservation Service: U.S. Department of Agriculture
(202) 690-4985
USGS Digital Data Series DDS: Geologic Age and Rock Stratigraphic Unit

OTHER STATE DATABASE INFORMATION

OTHER

AIRPORT FACILITIES
Airport landing facilities
Federal Aviation Administration
(866) 835-5322
Airport landing facilities

EPICENTERS
National Geographical Data Center
National Geographical Data Center
303-497-6826
Data on over four million earthquakes dating from 2100 B.C. to 1995 A.D.

DAMS - CA
California Dam Inundation Maps
California Emergency Management Agency
916-845-8275
Dam inundation maps show the maximum extent of damage of a flood wave from a dam failure

RADON

RADON
National Radon Database
USGS
703-605-6008
A study of the EPA/State Residential Radon Survey and the National Residential Radon Survey.

RADON - CA
Radon tested locations in California
California Department of Health Services
(916) 449-5674
A table of long term and short term indoor radon measurments

STATE RECORDS

OIL & GAS WELLS - CA
Oil and Gas Well Data
State of California Department of Conservation
916-327-1042
Oil and gas well locations and detail for all 6 districts

ADDITIONAL ENVIRONMENTAL RECORDS

OTHER ASCERTAINABLE RECORDS

BASINS
Better Assessment Science Integrating point & Non-point Sources
U.S. Environmental Protection Agency
855-246-3642
Integrated geographical information system national watershed data and environmental assessment known as Better Assessment Science Integrating point & Non-point Sources

FLOOD DFIRM
National Flood Hazard Layer Database
Federal Emergency Management Agency
The National Flood Hazard Layer Database (NFHL) is a computer database that contains the flood hazard map information from FEMAs Flood Map Modernization program. These map data are from Digital Flood Insurance Rate Map (DFIRM) databases and Letters of Map Revision.

Appendix C: Supporting Materials (on CD)

- Historical Topographic Maps
- Historical Aerial Photographs
- County HAZMAT search letter memo
- Soils Report
- Title Report
- TTM 37032

Envirosite Corporation

Historical Aerial Photo Report | 2016

Order Number: 9081
Report Generated: 12/22/2016

Project Name: Hawthorne Property Phase I
Project Number:

9174 Indiana Ave
9174 Indiana Ave
Riverside, CA 92503

1175 Post Road East
Westport, CT 06880
Toll Free: 866-211-2028
www.envirositecorp.com

Historical Aerial Photo Report 2016

Envirosite's Aerial Report is designed to assist in evaluating a subject property resulting from past activities. Envirosite's Aerial Map Report includes a search of USGS historical aerial maps, dating back to the early 1900s.

ENVIROSITE SEARCHED SOURCES

SUBJECT PROPERTY:
9174 Indiana Ave
9174 Indiana Ave
Riverside, CA 92503

YEAR:	SCALE:	SOURCE:
1948	1" = 500'	U.S.G.S.
1966	1" = 500'	U.S.G.S.
1974	1" = 1,000'	U.S.G.S.
1980	1" = 500'	U.S.G.S.
1985	1" = 1,000'	U.S.G.S.
1990	1" = 1,000'	U.S.G.S.
1994	1" = 500'	U.S.G.S.
2002	1" = 500'	U.S.G.S.
2005	1" = 500'	U.S.G.S.
2010	1" = 500'	U.S.G.S.
2014	1" = 500'	U.S.G.S.

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AERIAL PHOTO

FLIGHT YEAR:
1948

N
W E
S

Scale: 1” = 500’

AERIAL PHOTO

FLIGHT YEAR:
1966

N
W E
S

Scale: 1” = 500’

AERIAL PHOTO

FLIGHT YEAR:
1974

N
W E
S

Scale: 1” = 1,000’

AERIAL PHOTO

FLIGHT YEAR:
1980

N
W E
S

Scale: 1” = 500’

AERIAL PHOTO

FLIGHT YEAR:
1985

N
W E
S

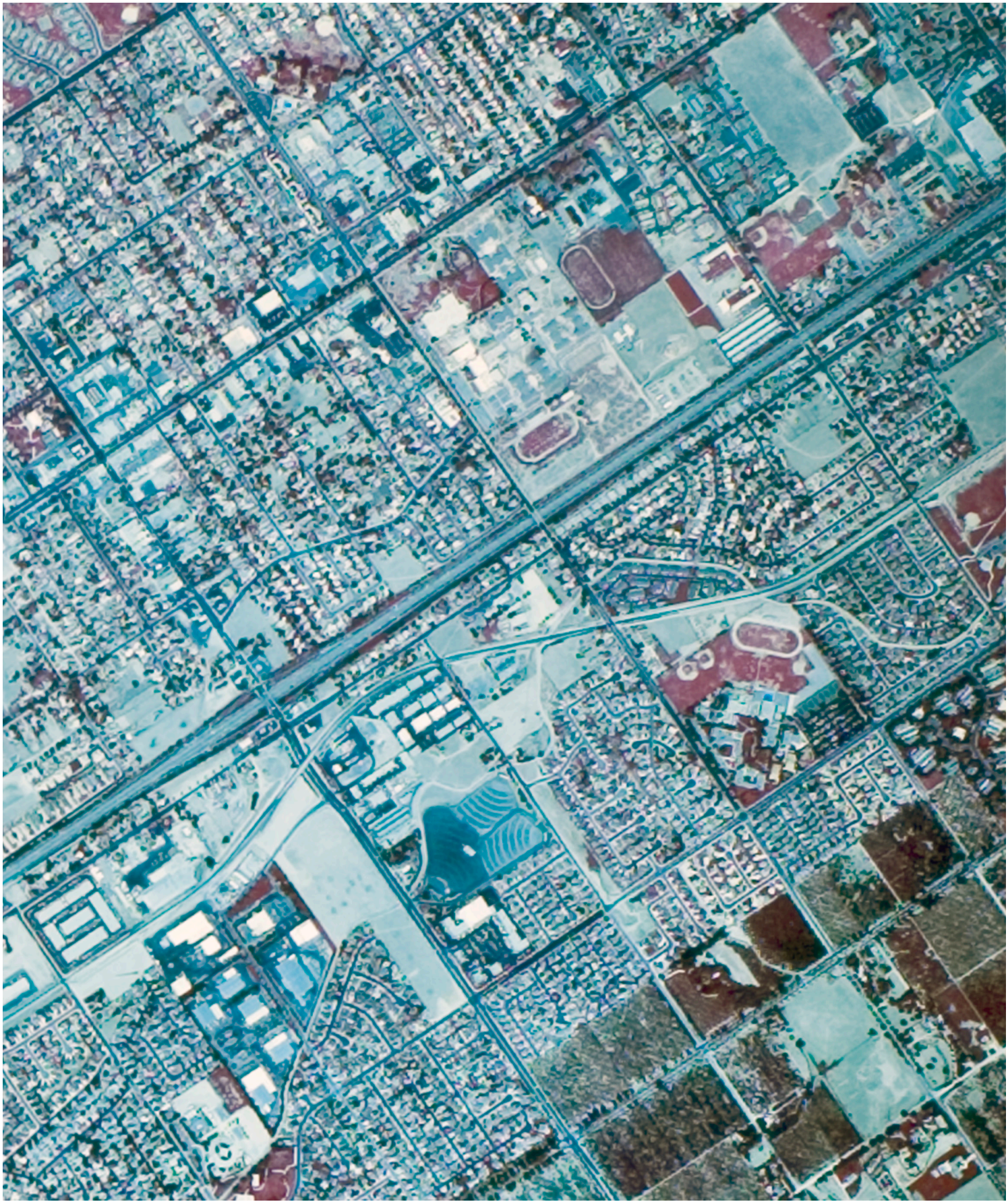
Scale: 1” = 1,000’

AERIAL PHOTO

FLIGHT YEAR:
1990

N
W E
S

Scale: 1” = 1,000’



AERIAL PHOTO

FLIGHT YEAR:
1994

N
W E
S

Scale: 1” = 500’

AERIAL PHOTO

FLIGHT YEAR:
2002

N
W E
S

Scale: 1” = 500’

AERIAL PHOTO

FLIGHT YEAR:
2005

N
W E
S

Scale: 1” = 500’

AERIAL PHOTO

FLIGHT YEAR:
2010

N
W E
S

Scale: 1” = 500’

Envirosite Corporation

Historical Topographic Map Report | 2016

Order Number: 9081
Report Generated: 12/19/2016

Project Name: Hawthorne Property Phase I
Project Number:

9174 Indiana Ave
9174 Indiana Ave
Riverside, CA 92503

1175 Post Road East
Westport, CT 06880
Toll Free: 866-211-2028
www.envirositecorp.com

DRAFT

Envirosite's Historical Topographic Map Report is designed to assist in evaluating a subject property resulting from past activities. Envirosite's Historical Topographic Map Report includes a search of USGS historical topographic maps, dating back to the early 1900s.

TOPOGRAPHIC MAPS FOUND:

	Map Name:	Year:	Revision Year:	Scale:	Series:
1.	Riverside	1901	N/R	1 : 62500	7.5
2.	Riverside	1901	N/R	1 : 62500	7.5
3.	Riverside	1901	N/R	1 : 62500	7.5
4.	Riverside	1901	N/R	1 : 62500	7.5
5.	Riverside	1901	N/R	1 : 62500	7.5
6.	Riverside	1901	N/R	1 : 62500	7.5
7.	Riverside	1942	N/R	1 : 62500	7.5
8.	Riverside West	1953	N/R	1 : 24000	7.5
9.	Riverside West	1953	N/R	1 : 24000	7.5
10.	Riverside West	1967	1980	1 : 24000	7.5
11.	Riverside West	1967	1973	1 : 24000	7.5
12.	Riverside West	1967	N/R	1 : 24000	7.5
13.	Riverside West	1967	1980	1 : 24000	7.5
14.	Riverside_West	2012	N/R	1 : 24000	7.5
15.	Riverside_West	2015	N/R	1 : 24000	7.5
16.	Riverside_West	2015	N/R	1 : 24000	7.5

DRAFT

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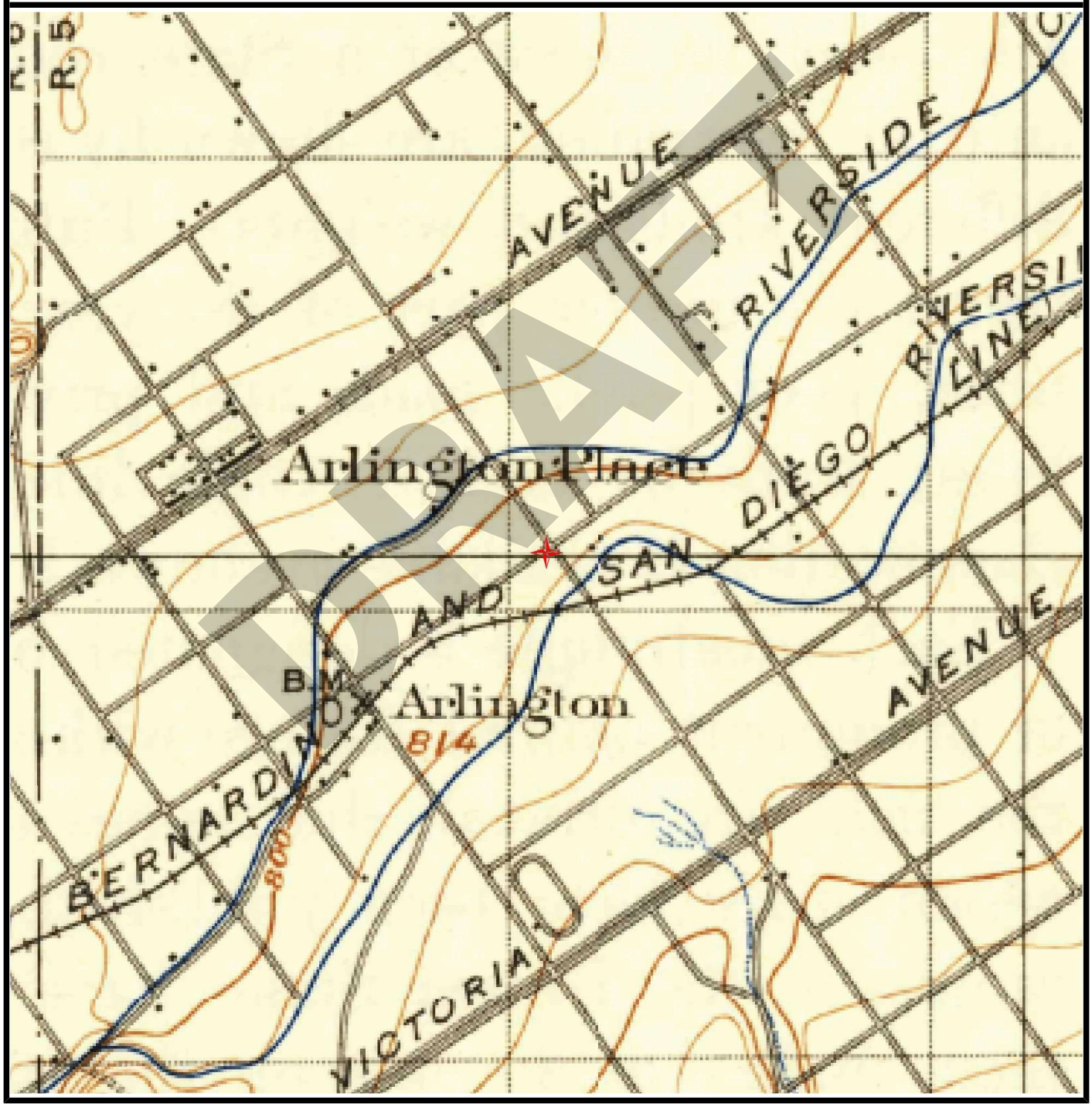
SUBJECT NAME: 9174 Indiana Ave
ADDRESS: 9174 Indiana Ave, Riverside, CA 92503
LAT/LONG: 33.916810 / -117.435400

PREPARED FOR: LSA Associates Inc
ORDER #: 9081
REPORT DATE: 12/19/2016

SUBJECT QUAD:

MAP NAME:	Riverside	MAP YEAR:	1901	REVISION YEAR:	N/R
SERIES:	7.5	SCALE:	1 : 62500	Part	1

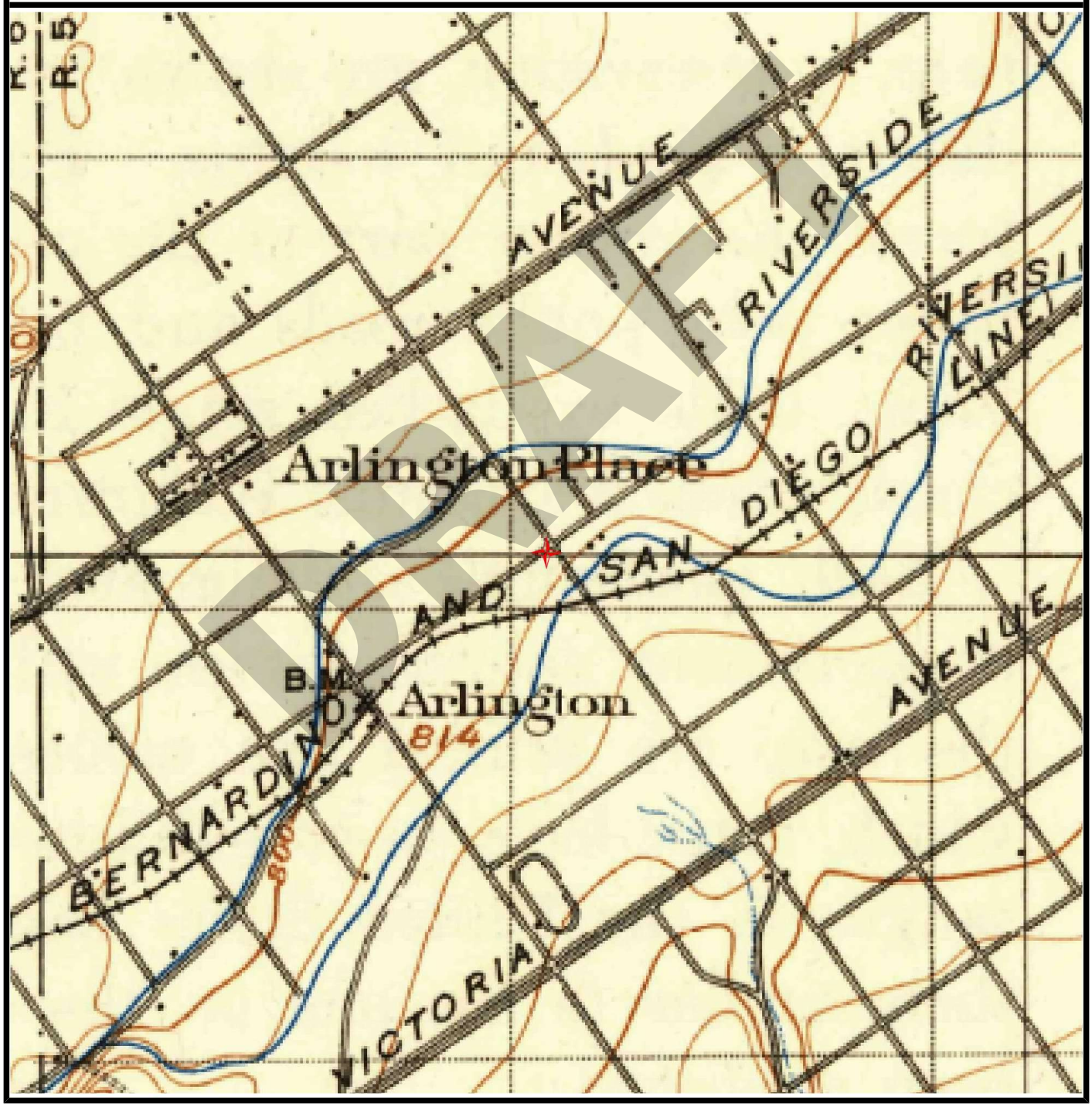


SUBJECT NAME: 9174 Indiana Ave
ADDRESS: 9174 Indiana Ave, Riverside, CA 92503
LAT/LONG: 33.916810 / -117.435400

PREPARED FOR: LSA Associates Inc
ORDER #: 9081
REPORT DATE: 12/19/2016

SUBJECT QUAD:

MAP NAME:	Riverside	MAP YEAR:	1901	REVISION YEAR:	N/R
SERIES:	7.5	SCALE:	1 : 62500	Part	1



SUBJECT NAME: 9174 Indiana Ave
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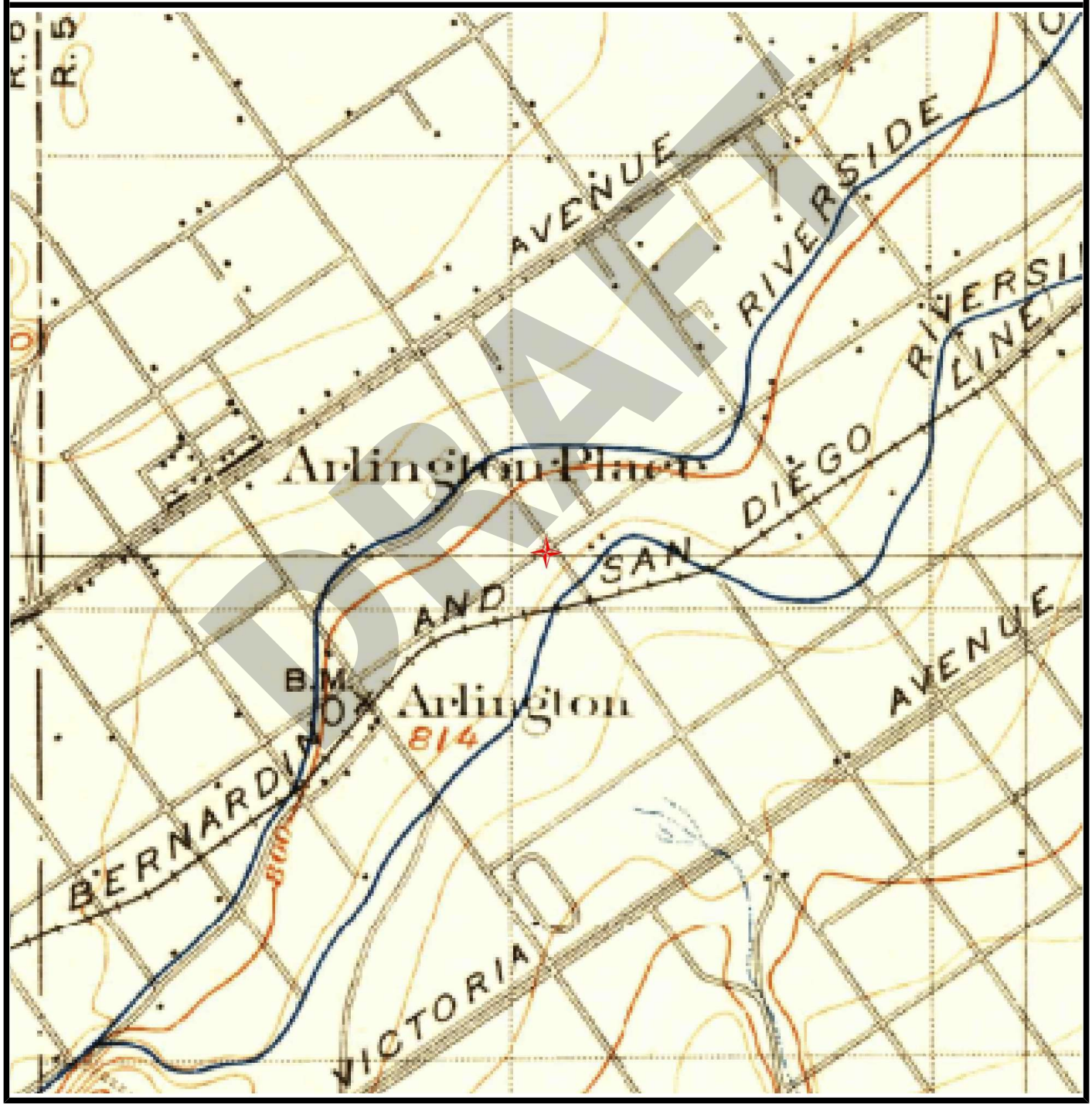
LAT/LONG: 33.916810 / -117.435400

PREPARED FOR: LSA Associates Inc
ORDER #: 9081
REPORT DATE: 12/19/2016

SUBJECT QUAD:

MAP NAME:	Riverside	MAP YEAR:	1901	REVISION YEAR:	N/R
SERIES:	7.5	SCALE:	1 : 62500	Part	1

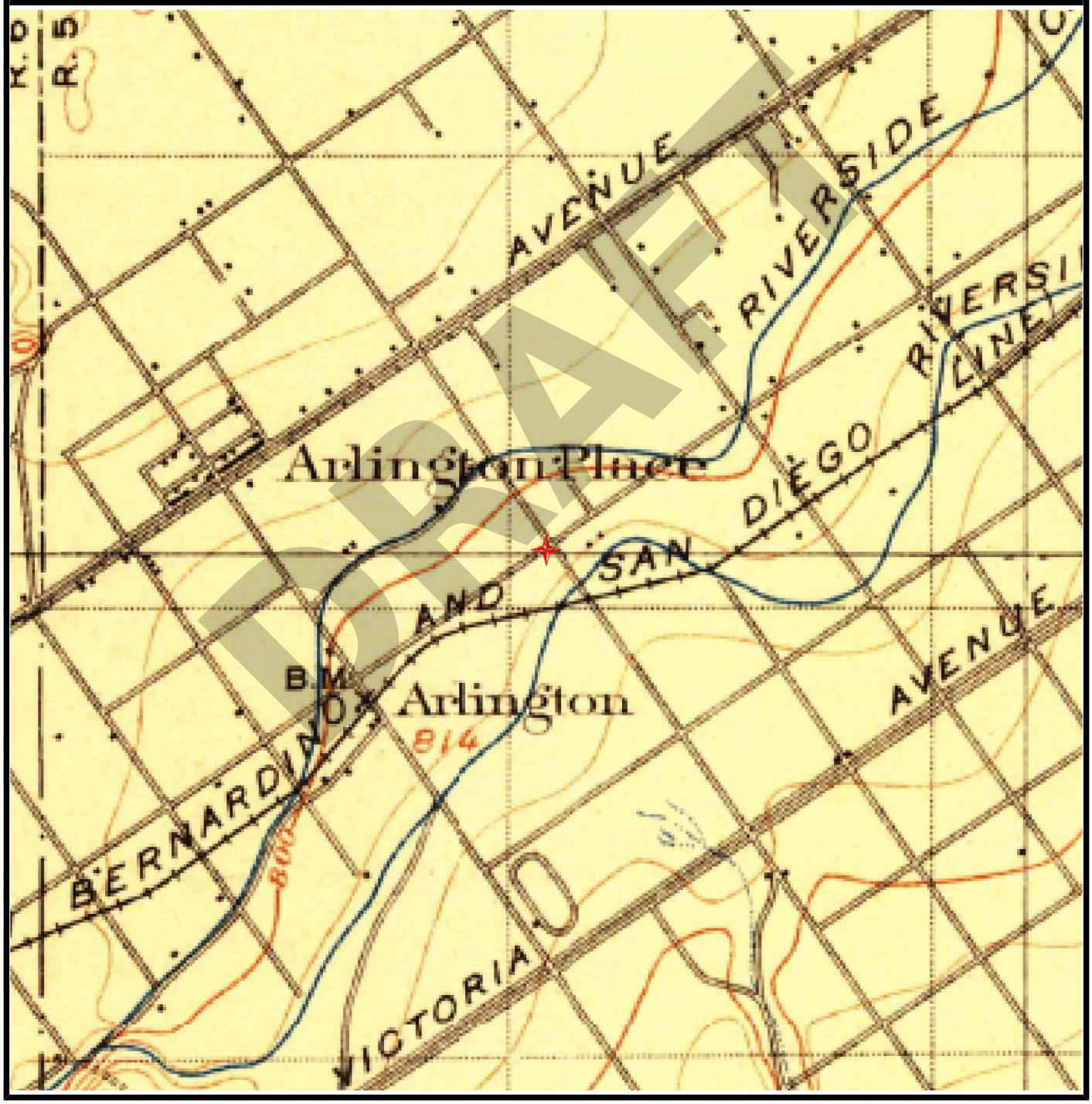


SUBJECT NAME: 9174 Indiana Ave
ADDRESS: 9174 Indiana Ave, Riverside, CA 92503
LAT/LONG: 33.916810 / -117.435400

PREPARED FOR: LSA Associates Inc
ORDER #: 9081
REPORT DATE: 12/19/2016

SUBJECT QUAD:

MAP NAME:	Riverside	MAP YEAR:	1901	REVISION YEAR:	N/R
SERIES:	7.5	SCALE:	1 : 62500	Part	1

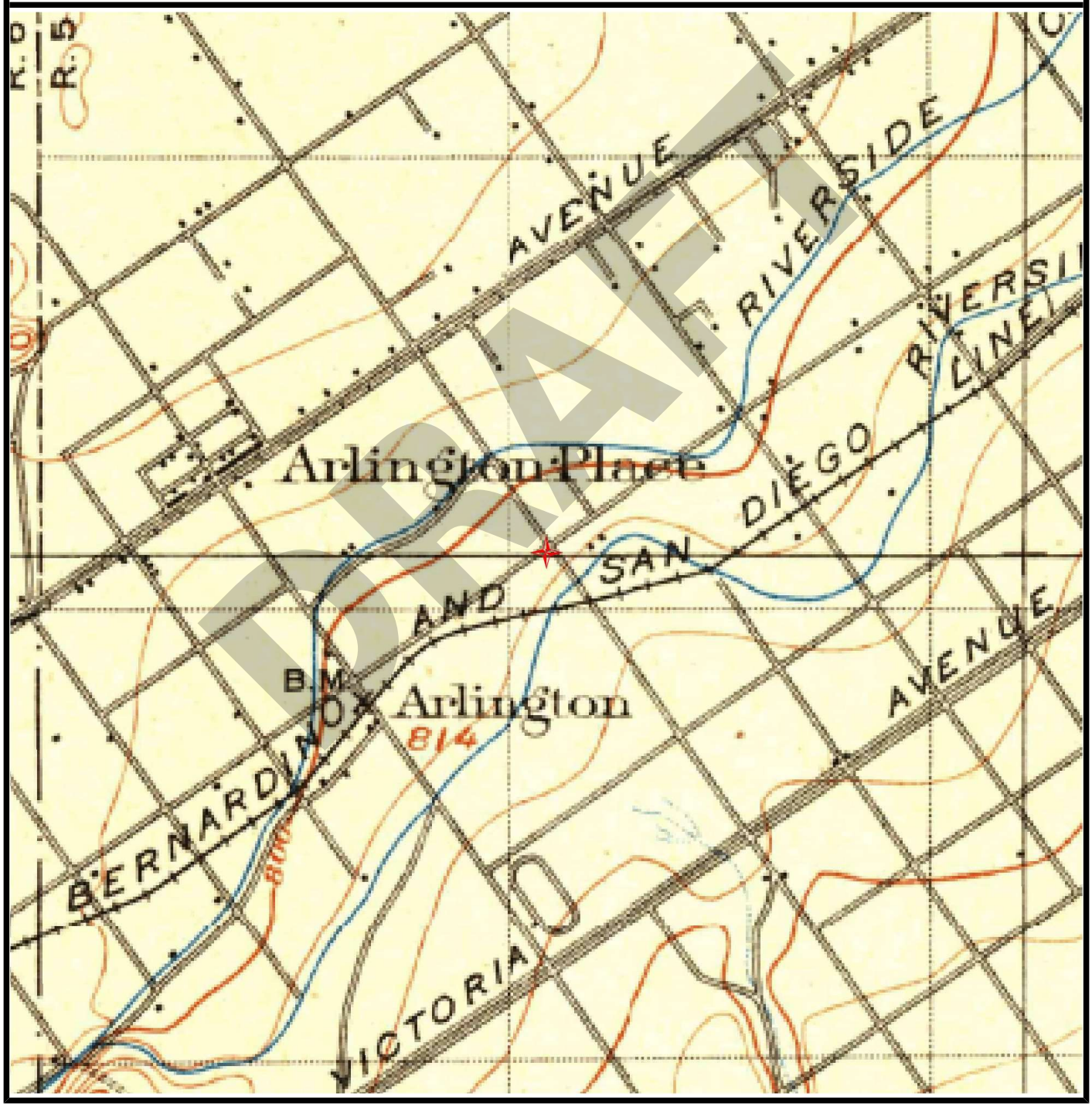


SUBJECT NAME: 9174 Indiana Ave
ADDRESS: 9174 Indiana Ave, Riverside, CA 92503
LAT/LONG: 33.916810 / -117.435400

PREPARED FOR: LSA Associates Inc
ORDER #: 9081
REPORT DATE: 12/19/2016

SUBJECT QUAD:

MAP NAME:	Riverside	MAP YEAR:	1901	REVISION YEAR:	N/R
SERIES:	7.5	SCALE:	1 : 62500	Part	1

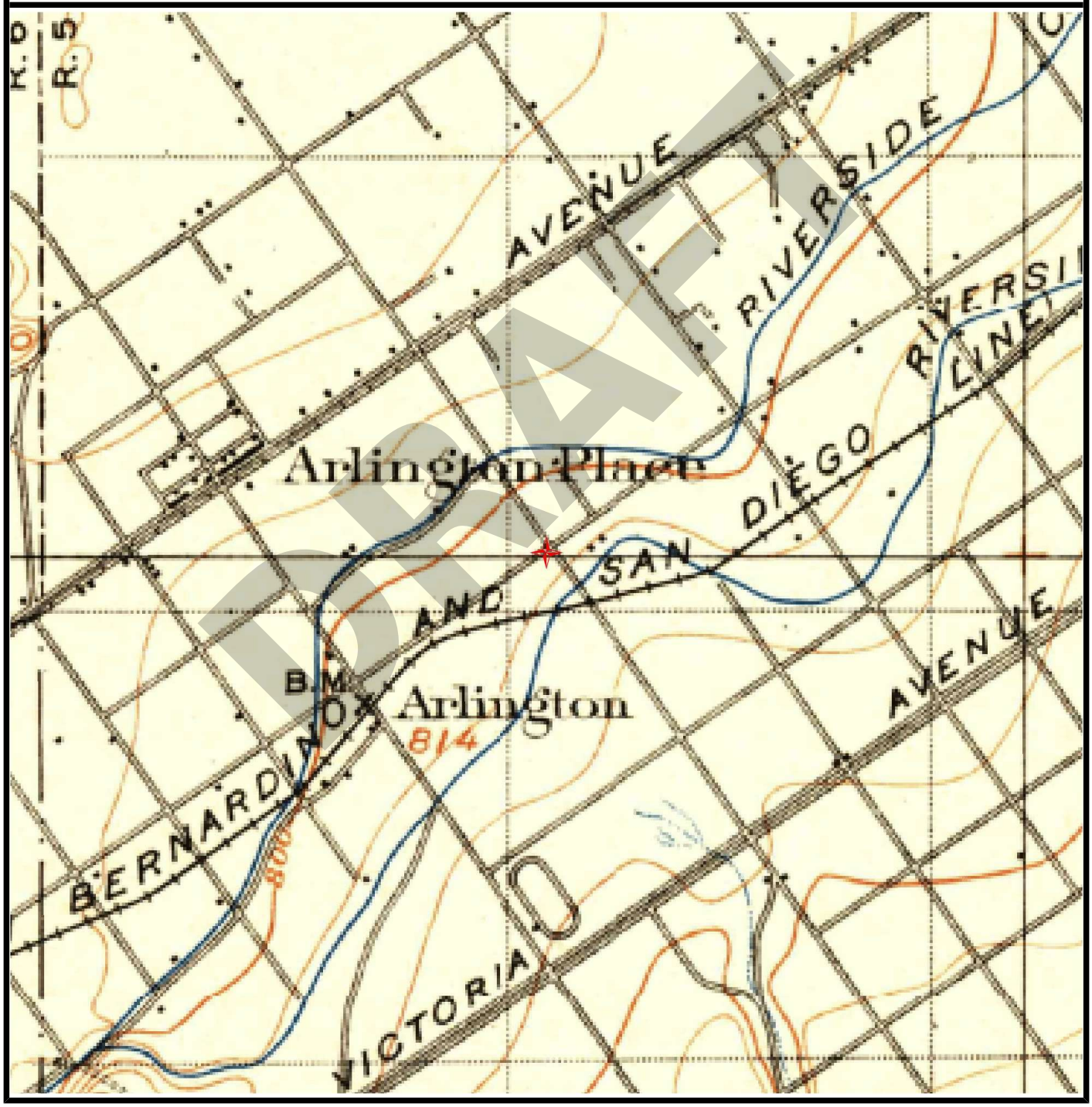


SUBJECT NAME: 9174 Indiana Ave
ADDRESS: 9174 Indiana Ave, Riverside, CA 92503
LAT/LONG: 33.916810 / -117.435400

PREPARED FOR: LSA Associates Inc
ORDER #: 9081
REPORT DATE: 12/19/2016

SUBJECT QUAD:

MAP NAME:	Riverside	MAP YEAR:	1901	REVISION YEAR:	N/R
SERIES:	7.5	SCALE:	1 : 62500	Part	1

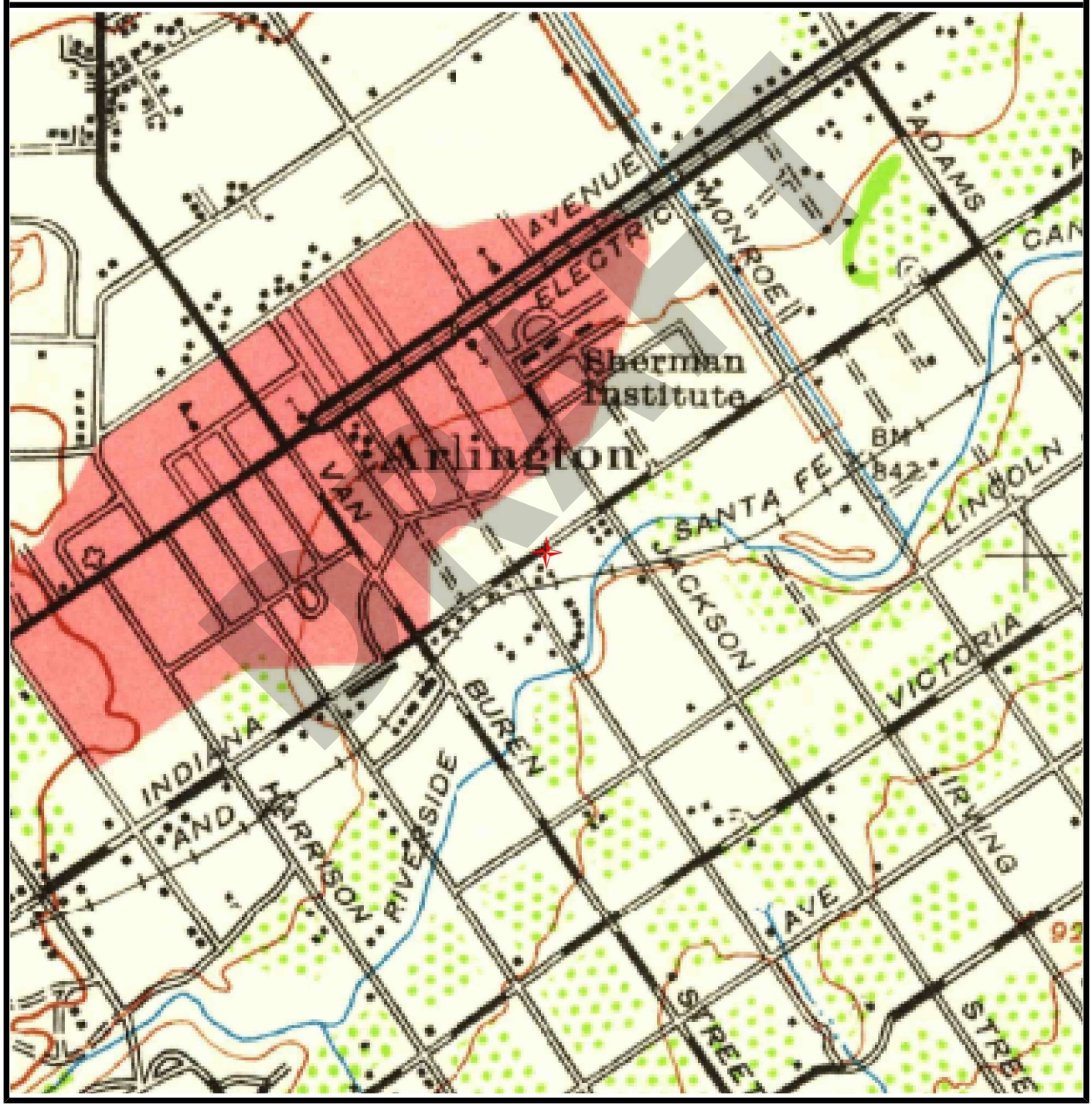


SUBJECT NAME: 9174 Indiana Ave
ADDRESS: 9174 Indiana Ave, Riverside, CA 92503
LAT/LONG: 33.916810 / -117.435400

PREPARED FOR: LSA Associates Inc
ORDER #: 9081
REPORT DATE: 12/19/2016

SUBJECT QUAD:

MAP NAME:	Riverside	MAP YEAR:	1942	REVISION YEAR:	N/R
SERIES:	7.5	SCALE:	1 : 62500	Part	1



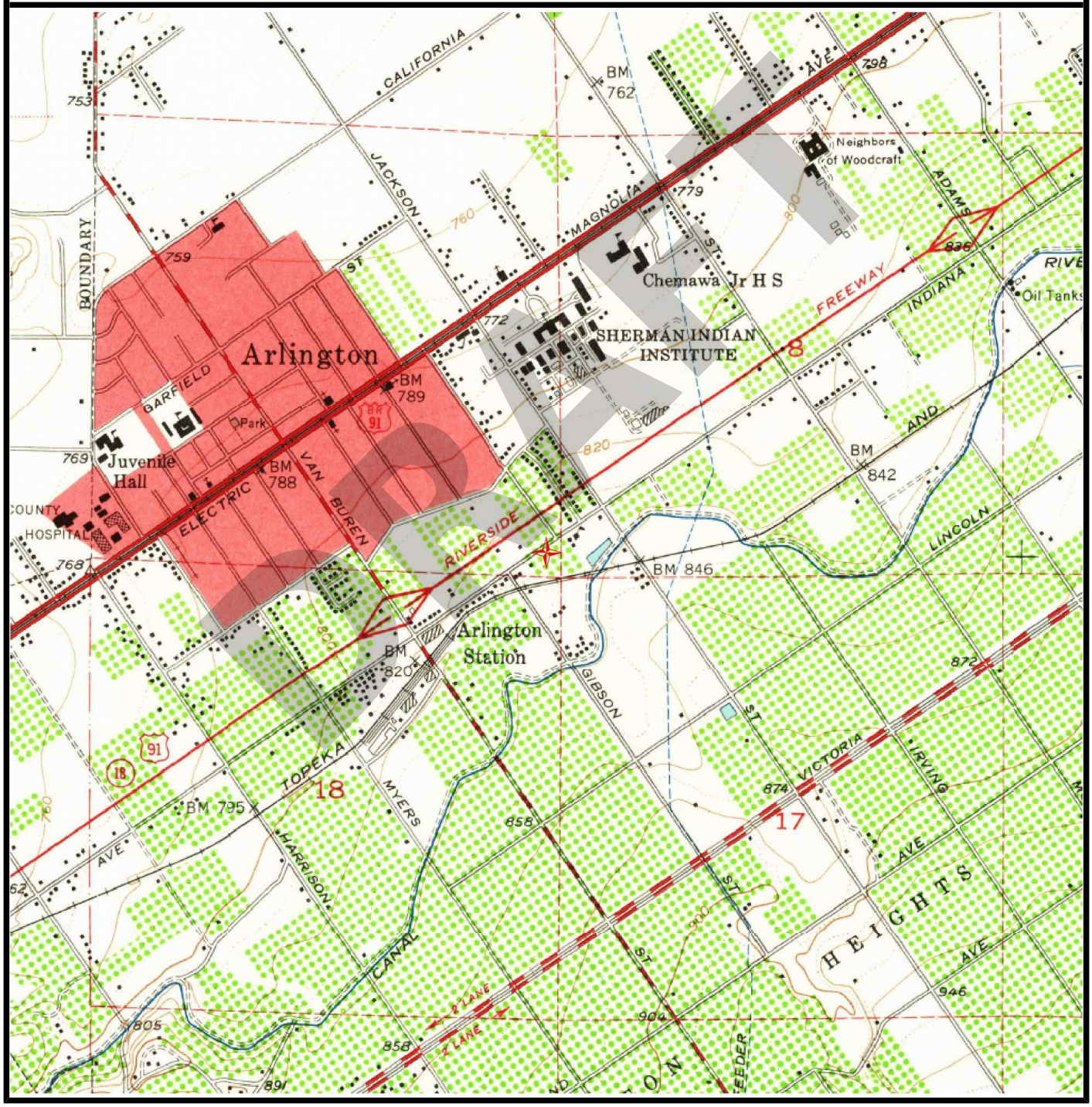
DRAFT

SUBJECT NAME: 9174 Indiana Ave
ADDRESS: 9174 Indiana Ave, Riverside, CA 92503
LAT/LONG: 33.916810 / -117.435400

PREPARED FOR: LSA Associates Inc
ORDER #: 9081
REPORT DATE: 12/19/2016

SUBJECT QUAD:

MAP NAME:	Riverside West	MAP YEAR:	1953	REVISION YEAR:	N/R
SERIES:	7.5	SCALE:	1 : 24000	Part	1

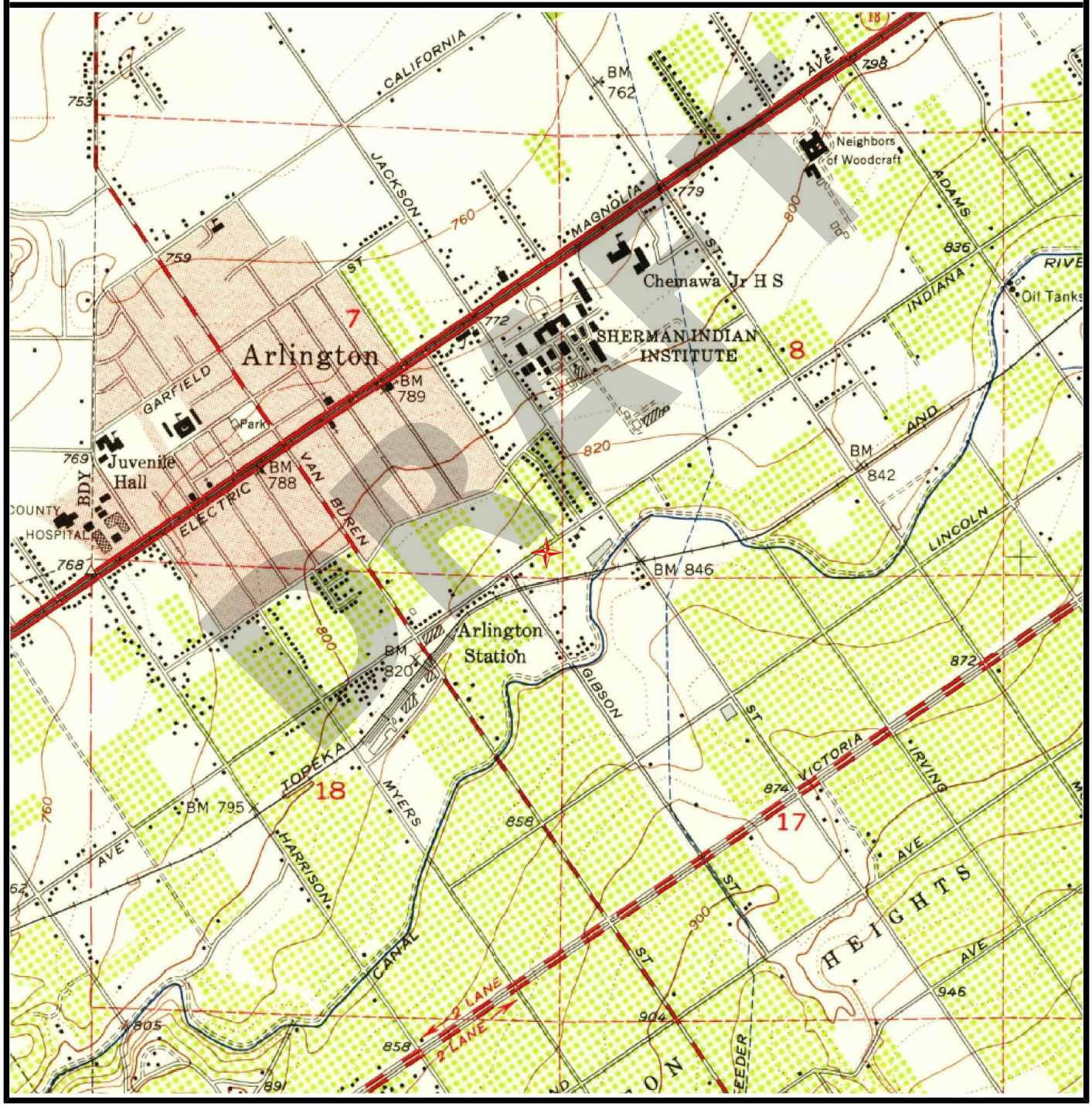


SUBJECT NAME: 9174 Indiana Ave
ADDRESS: 9174 Indiana Ave, Riverside, CA 92503
LAT/LONG: 33.916810 / -117.435400

PREPARED FOR: LSA Associates Inc
ORDER #: 9081
REPORT DATE: 12/19/2016

SUBJECT QUAD:

MAP NAME:	Riverside West	MAP YEAR:	1953	REVISION YEAR:	N/R
SERIES:	7.5	SCALE:	1 : 24000	Part	1

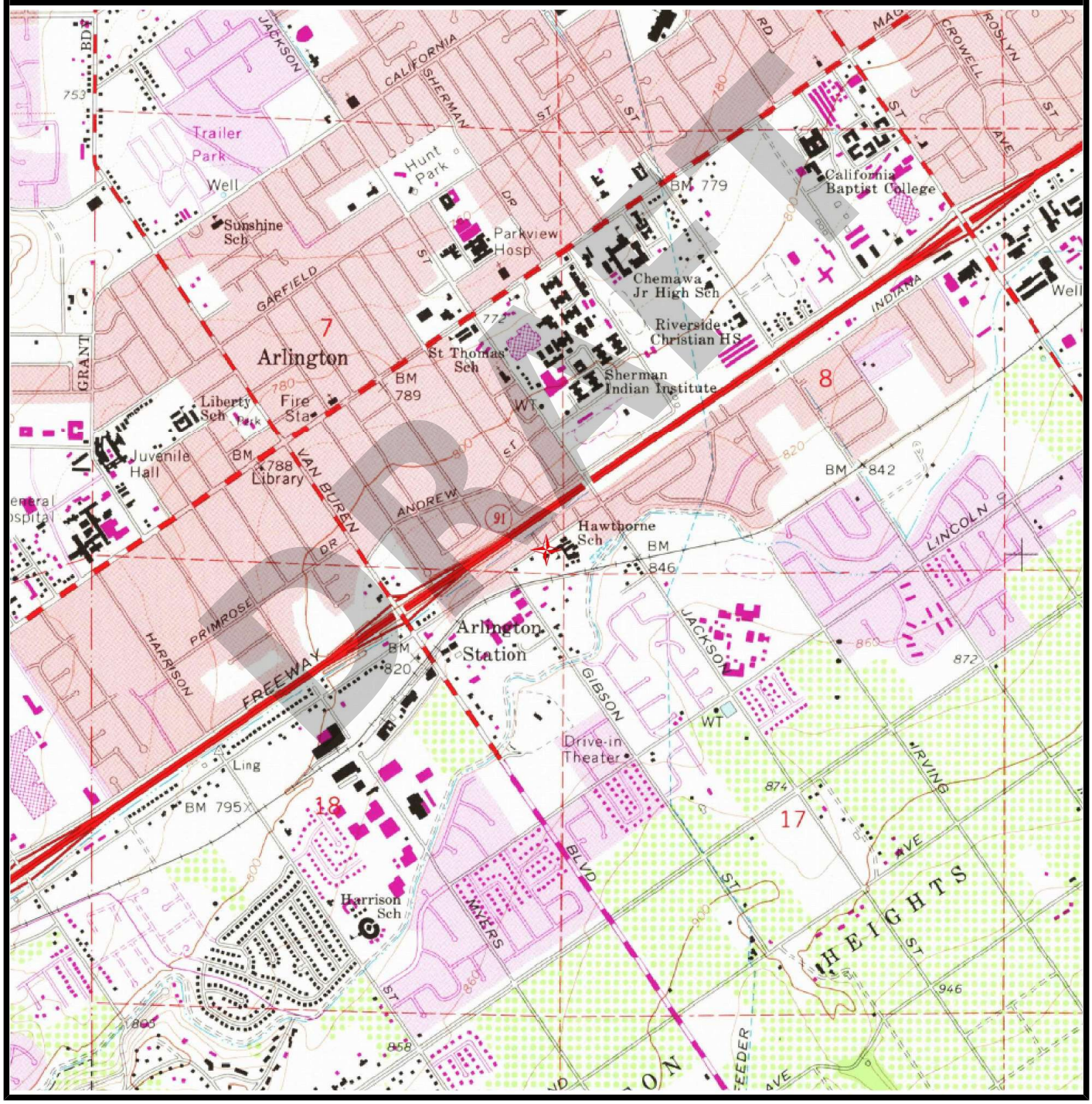


SUBJECT NAME: 9174 Indiana Ave
ADDRESS: 9174 Indiana Ave, Riverside, CA 92503
LAT/LONG: 33.916810 / -117.435400

PREPARED FOR: LSA Associates Inc
ORDER #: 9081
REPORT DATE: 12/19/2016

SUBJECT QUAD:

MAP NAME:	Riverside West	MAP YEAR:	1967	REVISION YEAR:	1980
SERIES:	7.5	SCALE:	1 : 24000	Part	1

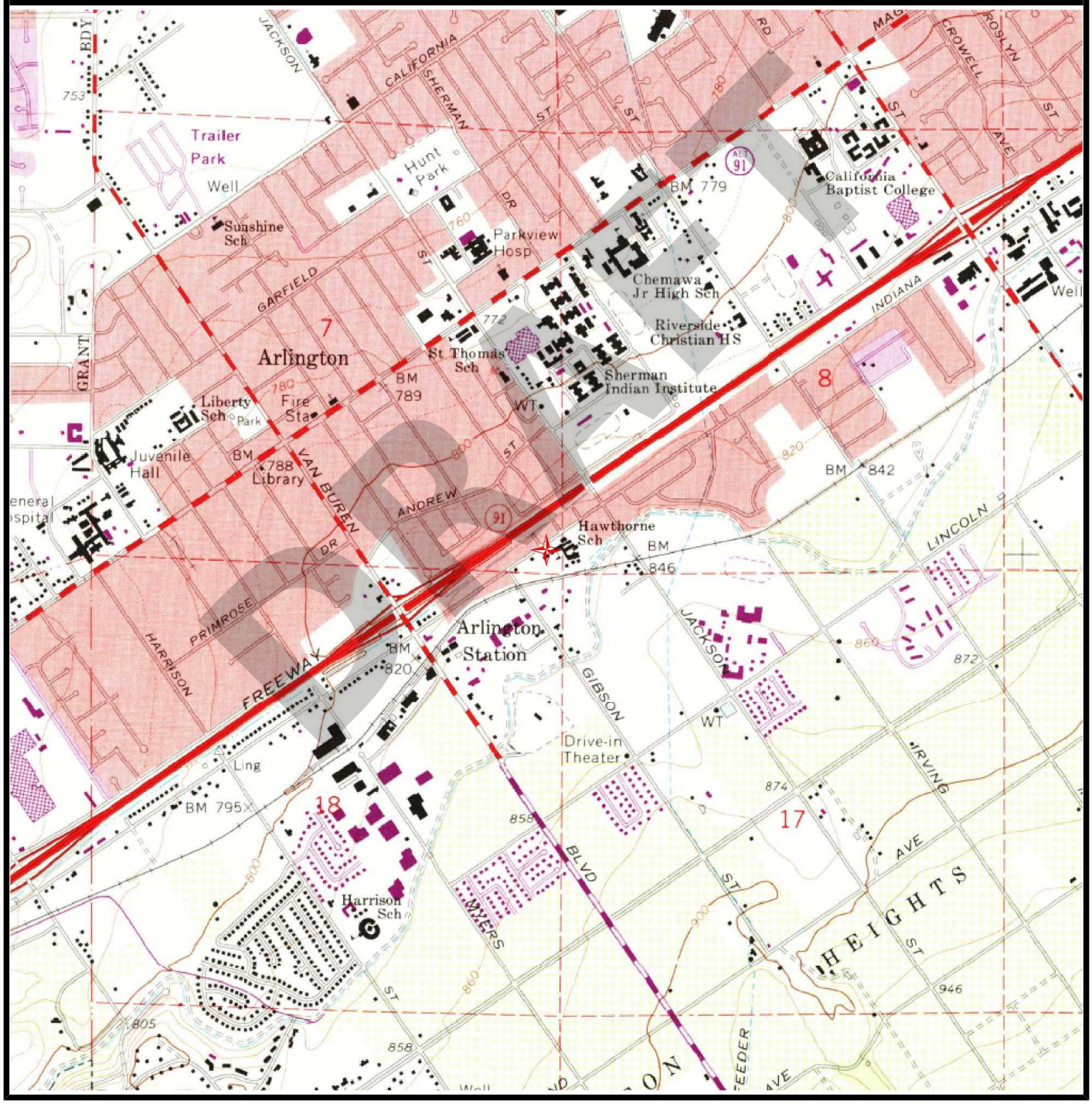


SUBJECT NAME: 9174 Indiana Ave
ADDRESS: 9174 Indiana Ave, Riverside, CA 92503
LAT/LONG: 33.916810 / -117.435400

PREPARED FOR: LSA Associates Inc
ORDER #: 9081
REPORT DATE: 12/19/2016

SUBJECT QUAD:

MAP NAME:	Riverside West	MAP YEAR:	1967	REVISION YEAR:	1973
SERIES:	7.5	SCALE:	1 : 24000	Part	1

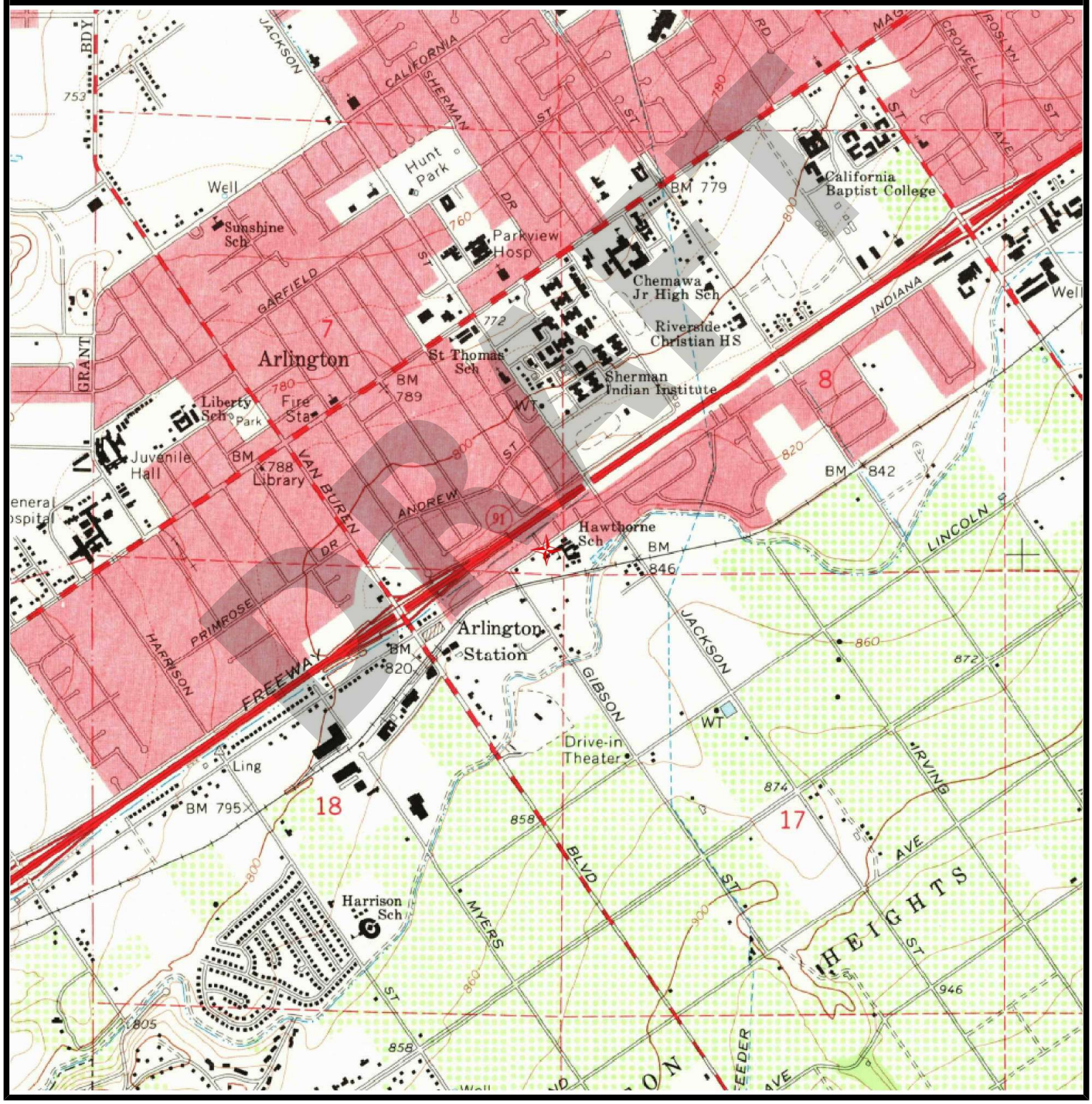


SUBJECT NAME: 9174 Indiana Ave
ADDRESS: 9174 Indiana Ave, Riverside, CA 92503
LAT/LONG: 33.916810 / -117.435400

PREPARED FOR: LSA Associates Inc
ORDER #: 9081
REPORT DATE: 12/19/2016

SUBJECT QUAD:

MAP NAME:	Riverside West	MAP YEAR:	1967	REVISION YEAR:	N/R
SERIES:	7.5	SCALE:	1 : 24000	Part	1

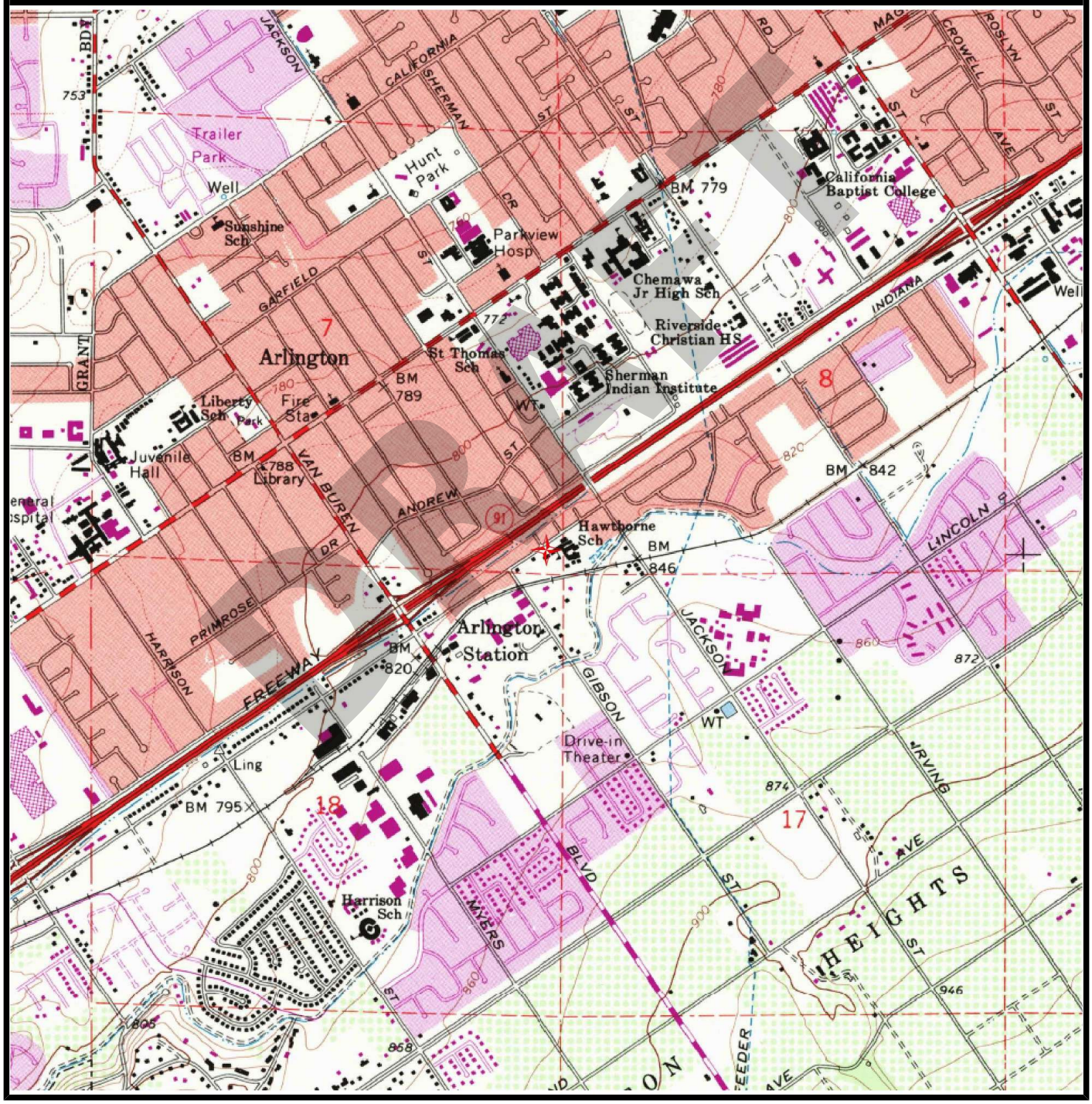


SUBJECT NAME: 9174 Indiana Ave
ADDRESS: 9174 Indiana Ave, Riverside, CA 92503
LAT/LONG: 33.916810 / -117.435400

PREPARED FOR: LSA Associates Inc
ORDER #: 9081
REPORT DATE: 12/19/2016

SUBJECT QUAD:

MAP NAME:	Riverside West	MAP YEAR:	1967	REVISION YEAR:	1980
SERIES:	7.5	SCALE:	1 : 24000	Part	1

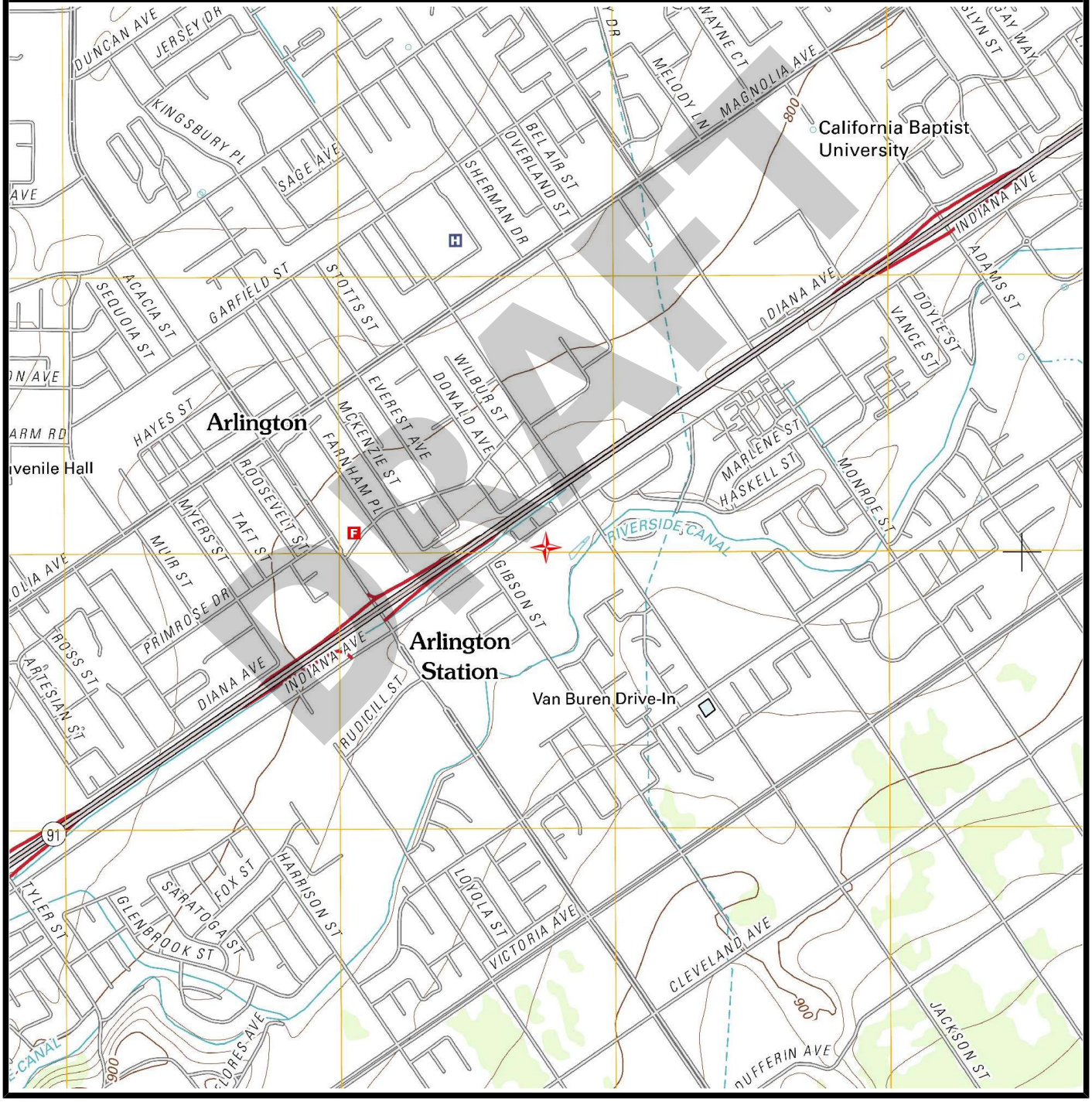


SUBJECT NAME: 9174 Indiana Ave
ADDRESS: 9174 Indiana Ave, Riverside, CA 92503
LAT/LONG: 33.916810 / -117.435400

PREPARED FOR: LSA Associates Inc
ORDER #: 9081
REPORT DATE: 12/19/2016

SUBJECT QUAD:

MAP NAME:	Riverside_West	MAP YEAR:	2012	REVISION YEAR:	N/R
SERIES:	7.5	SCALE:	1 : 24000	Part	1

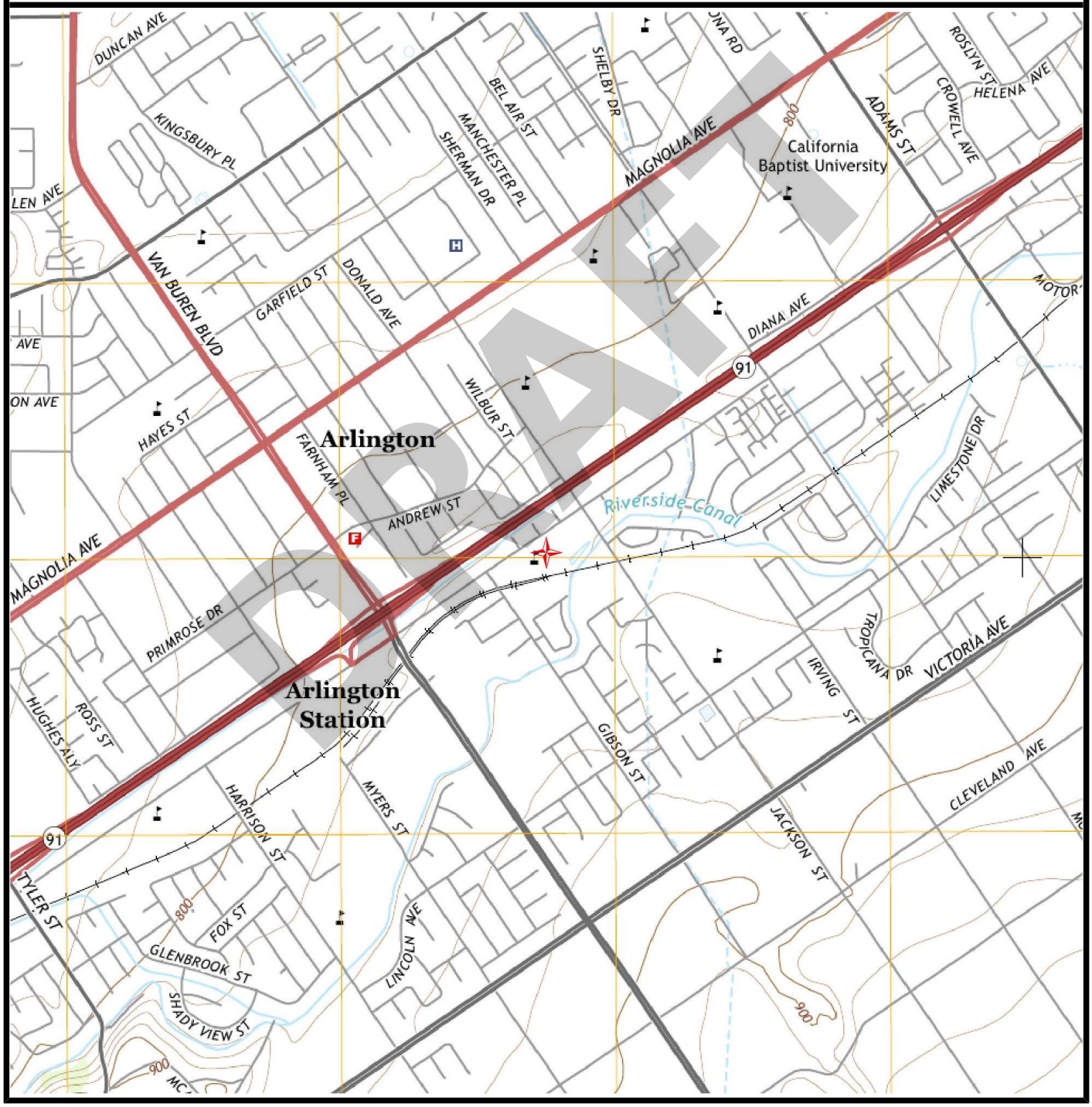


SUBJECT NAME: 9174 Indiana Ave
ADDRESS: 9174 Indiana Ave, Riverside, CA 92503
LAT/LONG: 33.916810 / -117.435400

PREPARED FOR: LSA Associates Inc
ORDER #: 9081
REPORT DATE: 12/19/2016

SUBJECT QUAD:

MAP NAME:	Riverside_West	MAP YEAR:	2015	REVISION YEAR:	N/R
SERIES:	7.5	SCALE:	1 : 24000	Part	1

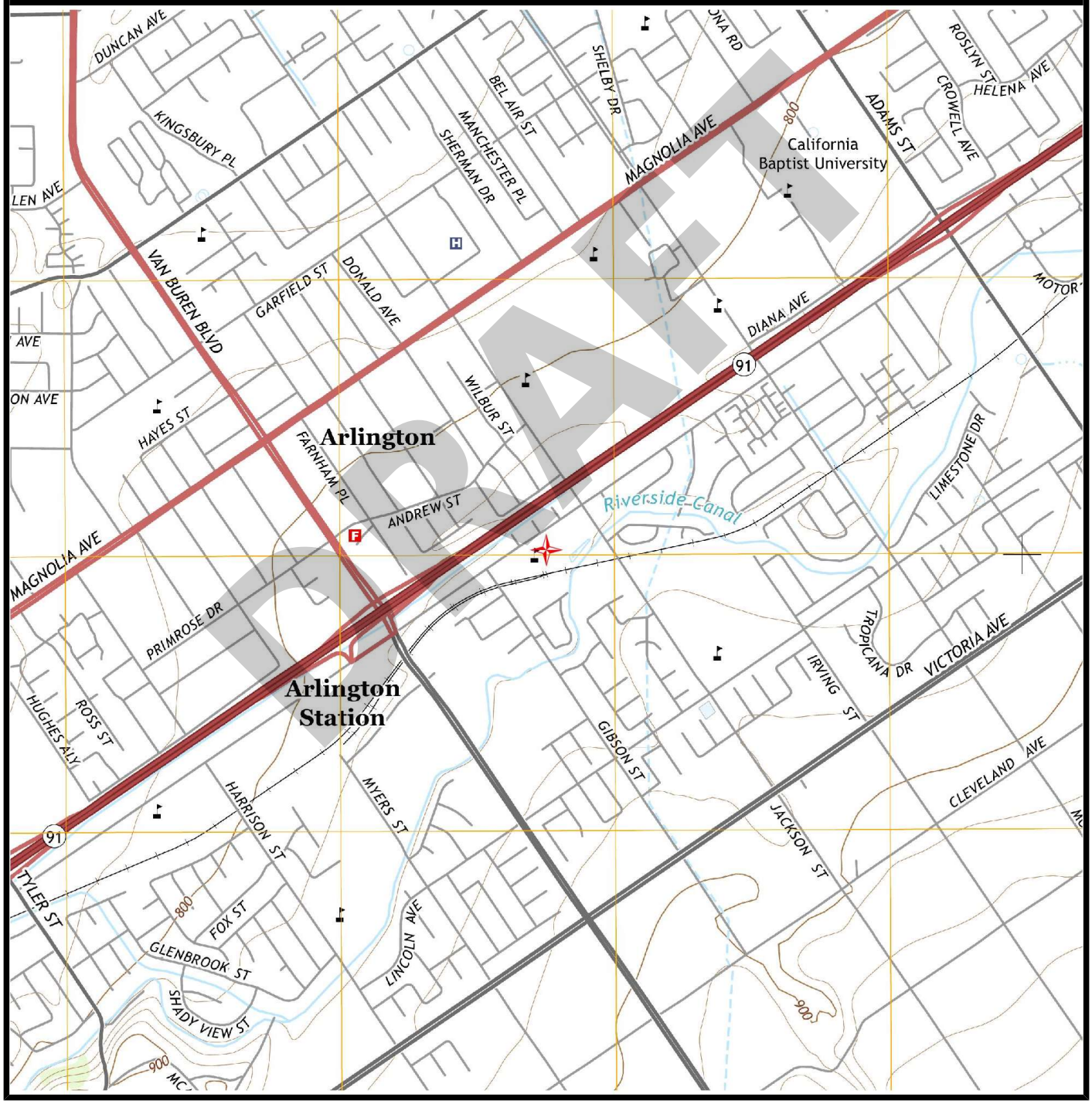


SUBJECT NAME: 9174 Indiana Ave
ADDRESS: 9174 Indiana Ave, Riverside, CA 92503
LAT/LONG: 33.916810 / -117.435400

PREPARED FOR: LSA Associates Inc
ORDER #: 9081
REPORT DATE: 12/19/2016

SUBJECT QUAD:

MAP NAME:	Riverside_West	MAP YEAR:	2015	REVISION YEAR:	N/R
SERIES:	7.5	SCALE:	1 : 24000	Part	1



AERIAL PHOTO

FLIGHT YEAR:
2014

N
W E
S

Scale: 1” = 500’

LSA

LSA ASSOCIATES, INC.
1500 IOWA AVENUE, SUITE 200
RIVERSIDE, CALIFORNIA 92507

951.781.9310 TEL
951.781.4277 FAX

OTHER OFFICES:
IRVINE
PT. RICHMOND
SAN LUIS OBISPO
PALM SPRINGS
BERKELEY
ROCKLIN
CARLSBAD
FRESNO

PROJECT MEMORANDUM

Date: January 5, 2017

To: Steve Berzansky, BP Riverside Partners, LLC

From: Kent Norton, LSA Associates

Project: Hawthorne Elem. School Site, 9174 Indiana Avenue, City of Riverside

Subject: Riverside County Hazmat Records

On December 28, 2016, LSA faxed to the County a letter requesting a file search for the above-referenced property. This request was regarding preparation of a Phase 1 Environmental Site Assessment (ESA) for potential contamination by hazardous materials (hazmat) on that site.

This morning Suzanne Cauffiel with the Riverside County Department of Health Services, Hazardous Materials Division, contacted me via telephone regarding the Hawthorne School Property located on the south side of Indiana Avenue east of Van Buren Boulevard in the City of Riverside consisting of Assessor's Parcel Numbers (APNs) 233-170-001 & 233-180-007. She indicated they did not have any files on the subject property even though it is listed in standard governmental hazmat databases. There are no County records of chemicals used on the site, which were mainly low concentrations of laboratory chemicals for class demonstrations and some asbestos-containing materials that were remediated and disposed of at an approved disposal facility. There were also no records of underground storage tanks, leaks of materials requiring remediation, or other similar data indicating past or current hazmat contamination or incidents.

If I receive any official correspondence from the County in this regard I will transmit it as an addendum to the Phase 1 Report, especially if it changes any of the conclusions of the report.

GeoMat Testing Laboratories, Inc.

Soil Engineering, Environmental Engineering, Materials Testing, Geology

October 27, 2015

Project No. 15101-01

TO: Steven Walker Communities
7111 Indiana Avenue, Suite 300
Riverside, California 92504

SUBJECT: Basic Soil Infiltration Testing Report, Hawthorn Heights Project, Single-Family Homes, APN 227-130-025, City of Riverside, California

Introduction

This report provides a summary of the geotechnical engineering services conducted to support evaluation of the feasibility of infiltration at the subject site. The purpose of our services was to complete four insitu infiltration tests utilizing percolation testing procedure in boreholes to evaluate the feasibility of infiltration for disposal of stormwater runoff following the falling head method.

Available Documents

A site plan prepared by SDH and Associates was provided to us for 56 lot subdivision. The plan shows three possible locations for an infiltration basin(s).

Proposed Soil Infiltration Facility

Tentatively infiltration basin(s) are proposed.

Scope of Services

GeoMat Testing Laboratories, Inc. was retained to provide geotechnical engineering services to support the project. Our scope of work consisted of the following specific tasks:

1) Drill deep exploratory borehole.

2) Complete four infiltration tests at the site utilizing the shallow boring percolation testing per Riverside County Environmental Health Department procedures. The tests were completed in general accordance with the falling head method.

3) Complete laboratory gradation analysis and testing of selected soil sample.

4) Complete data analysis.

5) Preparation of this report summarizing our findings, conclusions, and recommendations. The report includes:

- Site plan showing the location of exploratory borehole and infiltration tests.
- Summary of site conditions observed at the testing locations.
- Results of the laboratory testing.
- Discussion of the results of insitu infiltration testing.
- A discussion of the surficial soil and anticipated groundwater conditions at the site.
- Evaluation of the feasibility of infiltration.
- Recommendations for infiltration facility.

Existing Site Conditions

Currently, the subject site is a vacated elementary school site. School buildings, school building equipment, asphalt and concrete pavement, school yard, storage sheds, etc. remains onsite. The site area is approximately 7(±) acres. The site is bordered from the north by Indiana Avenue, the south by railroad tracks, the east by group of older single family homes, and the west by vacant land. Indiana Avenue is a fully developed road.

Groundwater

Groundwater study is not within the scope of this work. Groundwater was not observed in the test borings at the time of field exploration. These observations represent groundwater conditions at the time of the field exploration and may not be indicative of other times, or at other locations. Depth to groundwater is not expected to impact site development

State Department of Water Resources shows shallowest groundwater on November 2011 at 29.6 feet (elevation 754.5) below ground surface in well 339251N1174342W001.

The well measuring program for regional water Districts maintained by Hydrologist Steven Mains shows shallowest groundwater On January 2001 at 43 feet (elevation 768.3) below ground surface in well 3S5W07J002S and at 46.1 feet (elevation 759.6) below ground surface on June 2006 in well 3S5W18B.

The USGS Groundwater Watch website (http://groundwaterwatch.usgs.gov/countymap) was searched for groundwater records; none found.

The potential for rain or irrigation water locally seeping through from adjacent areas cannot be precluded. Our experience indicates that surface or near-surface groundwater conditions can develop in areas where groundwater conditions did not exist prior to site development, especially in areas where a substantial increase in surface water infiltration results from landscape irrigation and stormwater infiltration systems.

In addition, changes in local or regional water and management patterns, or both, can significantly raise the water table or create zones of perched water. We therefore recommend that landscape irrigation be kept to the minimum necessary to maintain plant vigor and any leaking pipes/sprinklers, etc. should be promptly repaired.

The depth to the groundwater may fluctuate with seasonal changes and from one year to the next. We have no way of predicting future groundwater levels or perched water due to increase in surface water infiltration from rainfall or from landscape irrigation. Subdrains, horizontal drains, toe drains, French drains, heel drains or other devices may be recommended in future for graded areas that exhibit nuisance water seepage, past evidence for shallow water, or areas with a potential for future shallow/surface water

Exploratory Boreholes

One deep exploratory borehole was drilled on October 24, 2015 to a maximum depth of 15 feet below ground surface. The boreholes were drilled utilizing a CME 45 drill rig equipped with 6 inch hollow stem augers. A field engineer from this office observed the drilling and prepared the boring logs. The logs of the boreholes are included with this report.

Soil Sampling and Laboratory Testing

Bulk soil samples were obtained from the bottom of percolation holes for laboratory classification. Laboratory sieve analysis was performed for the collected soil samples. The soil classifications are in conformance with the Unified Soil Classifications System (USCS), as outlined in the Classification and Symbols Chart (Appendix B).

A summary of our laboratory testing is presented in Appendix C.

Percolation Testing Method

The four test holes were drilled with a mobile drill rig. A 3-inch-diameter perforated PVC casing wrapped with filter fabric was placed in the borehole. Pea gravel was placed below and around the pipe for stability of the borehole.

The boreholes were presoaked prior to the percolation testing. Presoaking was conducted using five gallon water bottles. Five gallons of water was absorbed in few minutes in test holes P-2, P-3, and P-4. Additional presoaking water was introduced to facilitate for reasonable test reading interval. Based on field observations and testing, the material was evaluated to be permeable and met the sandy soil criteria. Infiltration testing was conducted on the same day after presoaking. Infiltration testing was conducted for at least one hour with readings taken 10 minutes apart from a fixed reference point. The measurements were taken by filling up the test hole with water and allowing the water to percolate. The drop of water level was recorded every 10 minutes. A wrist watch was used to record the time measurements.

Test hole P-1 did not meet the sandy soil criteria. Infiltration testing for this test hole was conducted the next day after presoaking. Testing was conducted for six hours with readings taken 30 minutes apart from a fixed reference point. The measurements were taken by filling up the test hole with water and allowing the water to percolate. The drop of water level was recorded every 30 minutes. A wrist watch was used to record the time measurements.

Infiltration Test Results

Infiltration tests were conducted betyween 43 and 67 inches below ground surface. The following summarizes the result of the infiltration feasibility study.

Test No.	Depth Below Surface	Percolation Rate (in/hr)	Adjusted Infiltration Rate (in/hr)	% Passing No. 200 Sieve
P-1	43”	7.5	0.8	44
P-2	45”	24	2.5	42
P-3	52”	22.5	2.3	46
P-4	67”	72	10.3	48

The percolation rate is the rate in horizontal and vertical direction. This rate is adjusted using Porchet Method for horizontal water infiltration. Refer to Appendix D for test results.

A safety factor should be applied to this rate by the design engineer. Safety factor discussion is in the following paragraph.

Factors of Safety

Long-term infiltration rates may be reduced significantly by factors such as soil variability and inaccuracy in the infiltration rate measurement. The correction factor for site variability is between 3 and 10. Safety factors for operating the system, maintenance, siltation, biofouling, etc. should also be considered by the design civil engineer at his discretion. Minimum safety factor required by the County of Riverside for tests conducted when deep exploratory borehole has been drilled at the site is 3.

Conclusions/Recommendations

- In our opinion, water infiltration at the site is expected to be fast in the upper five feet of soil.

- The test results may be utilized when the bottom of the infiltration system will be located within the alluvial soil observed/tested. Should this system be located in a different soil type, the infiltration characteristics will be different than those observed during the infiltration testing. The infiltration rate recommended above is based on the assumption that only clean water will be introduced to the subsurface profile. Any fines, debris, or organic materials could significantly impact the infiltration rate.

- The planned infiltration system should extend vertically into native soil.

- Infiltration water should not be allowed to saturate subgrade of pavement, and shallow concrete structures including curb and gutter’s subgrade soils. We recommend installing Stego wrap 15 mil barrier sheeting (or equivalent) around shallow concrete structures (ie curb, gutter, etc.) to the depth of proposed sub-base reservoir of porous pavement. The intent is to minimize saturating subgrades of such items.

- Filter fabric should be used whenever aggregates are placed against native soils.

- Please note that soils in infiltration areas should not be subject to compaction during construction.

- The proposed system by the civil engineer should be constructed and maintained in accordance with manufacturer guidelines.

An important consideration for infiltration facilities is that, during construction, great care must be taken not to reduce the infiltrative capacity of the soil in the facility through compaction by heavy equipment or by using the infiltration area as a sediment trap.

Infiltration facilities should be constructed late in the site development after soils (that might erode and clog the units) have been stabilized, or should be protected (by flagging) until site work is completed.

Infiltration facilities should be sited with the following guidelines:

INFILTRATION FACILITY SETBACKS	
Setback From	Distance
Property Lines and Public Right of Way	5 feet
Foundations	15 feet or within a 1:1 plane drawn up from the bottom of foundation
Slopes	H/2, 5 feet minimum (H: is slope height)
Private drinking water wells	100 feet

Ferrous metal pipes should be protected from potential corrosion by bituminous coating, etc. We recommend that all utility pipes be nonmetallic and/or corrosion resistant. Recommendations should be verified by soluble sulfate and corrosion testing of soil samples obtained from specific locations during construction.

If applicable, four to six inch diameter observation well(s), with locking cap, extending vertically into the system's bottom is suggested as an observation point. Observation well(s) should be checked regularly and after large storm event. Once performance stabilizes, frequency of monitoring may be reduced.

GeoMat Testing Laboratories should observe the basin excavation. Additional laboratory testing including but not limited to grain size analysis, sand equivalent, sulfate content, etc should be conducted during construction.

Use of this Report

This report was prepared for the exclusive use of the addressee and his consultants for specific application to the proposed site. The use by others, or for the purposes other than intended, is at the user's sole risk.

The findings, conclusions, and recommendations presented herein are based on our understanding of the project and on subsurface conditions observed during our site work. Within the limitations of scope, schedule, and budget, the conclusions and recommendations presented in this report were prepared in accordance with generally accepted geotechnical engineering principles and practices in the area at the time the report was prepared. We make no other warranty either expressed or implied.

We appreciate this opportunity to provide geotechnical services on this project and look forward to assisting the Project Team as the design progresses. If you have any questions or comments regarding the information contained in this report, or if we may be of further services, please call us at (951) 688-5400.

Submitted for GeoMat Testing Laboratories, Inc.

Haytham Nabilsi, GE 2375
Principal Engineer

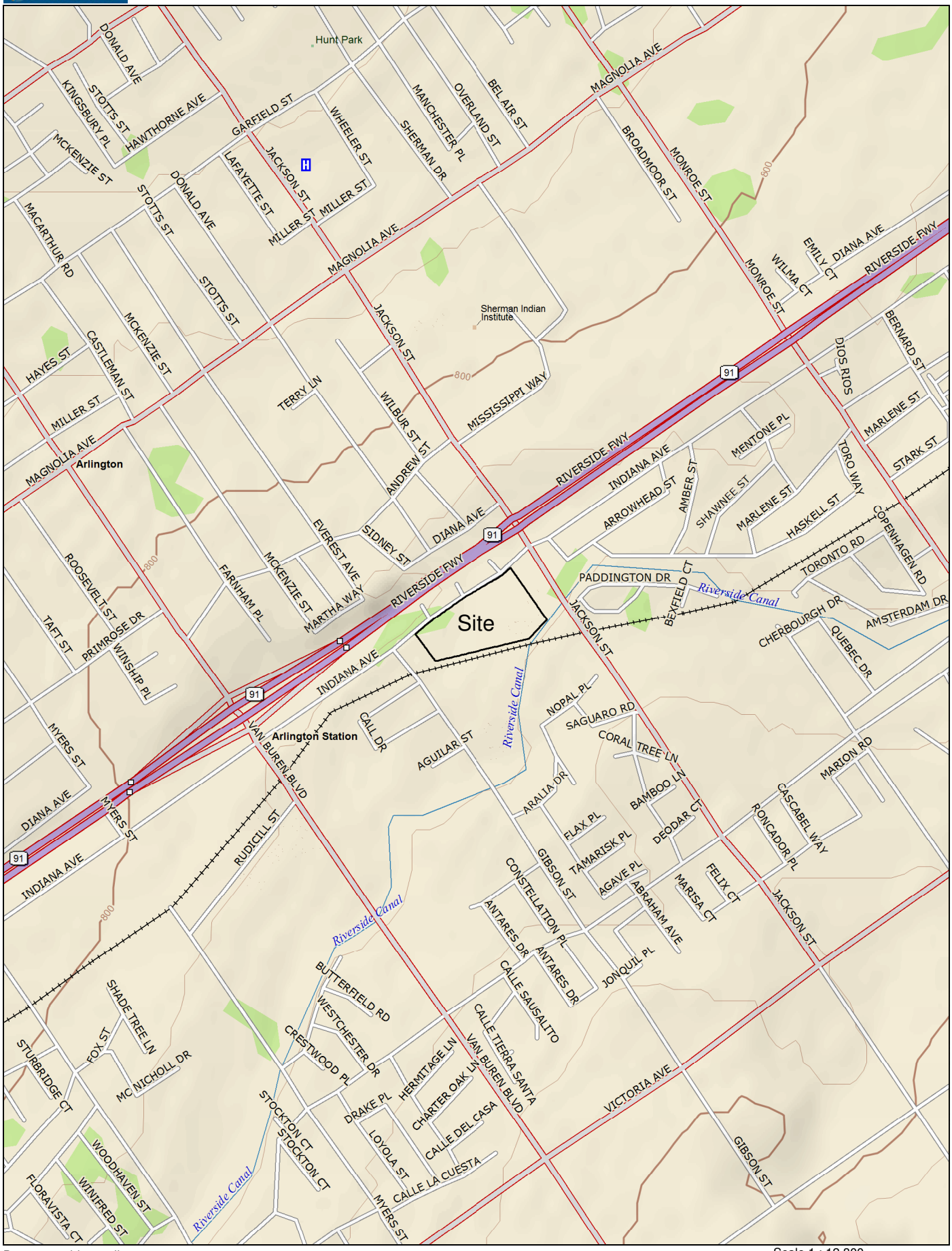
Art Martinez
Project Engineer

REGISTERED PROFESSIONAL ENGINEER
HAYTHAM NABILSI
No. 2375
Exp. 12/31/16
GEOTECHNICAL
STATE OF CALIFORNIA

Distribution: [3] Addressee

Attachments:

	Figure 1	Site Location Map
	Plate 1	Infiltration Test Location Map
	Appendix A	References
	Appendix B	Exploratory Borehole Logs
	Appendix C	Laboratory Test Results
	Appendix D	Infiltration Data/Graph



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www.delorme.com

TN
MN (12.0°E)

Scale 1 : 12,800

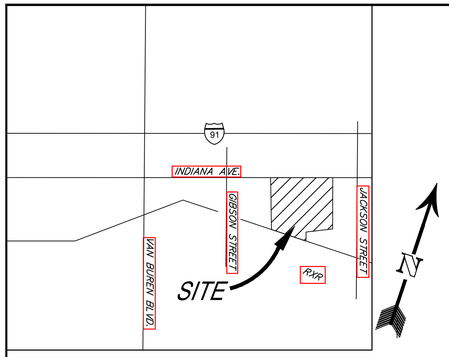
1" = 1,066.7 ft

Data Zoom 14-0

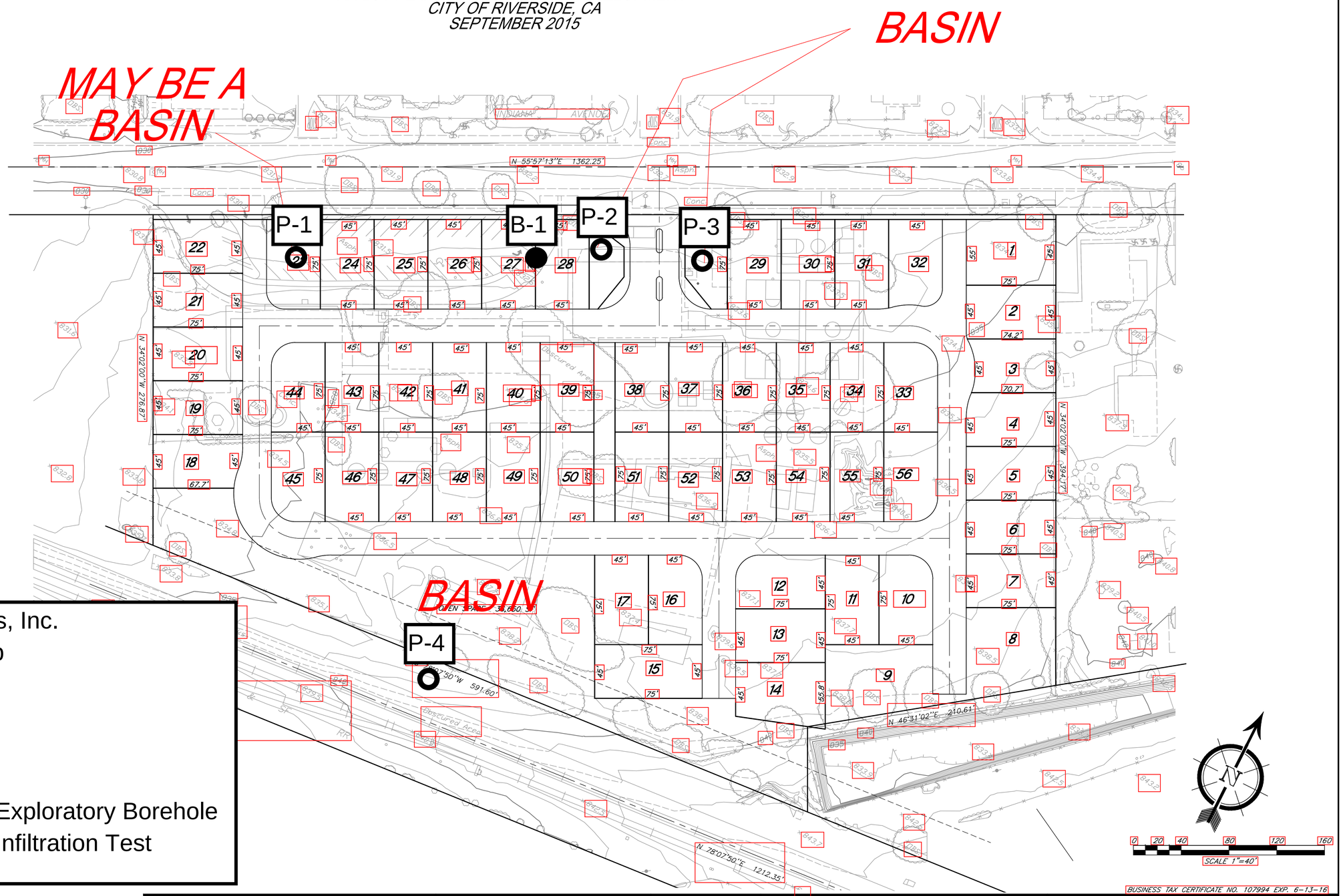
IN THE CITY RIVERSIDE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA.

TENTATIVE TRACT MAP NO.XXXXX
HAWTHORN HEIGHTS

XX LOT PLANNED RESIDENTIAL DEVELOPMENT
CITY OF RIVERSIDE, CA
SEPTEMBER 2015



VICINITY MAP
NOT TO SCALE
THOMAS GUIDE PAGE: 715 GRID: A6



OWNER/APPLICANT
STEVEN WALKER COMMUNITIES, INC.
7161 INDIANA AVE. STE. 300
RIVERSIDE, CA 92504
951-274-3679

ENGINEER
SDH & ASSOCIATES, INC
5225 CANYON CREST DRIVE 71439
RIVERSIDE, CA. 92507
VOICE: (951) 683-3691
FAX: (951) 788-2314

ASSESSOR'S PARCEL NO.
227-130-025

PROJECT INFO
AREA OF SITE = XXXXXX
NUMBER OF UNITS = XX

GENERAL PLAN DESIGNATION
EXISTING –
PROPOSED –

ZONING
EXISTING – XXX
PROPOSED – XXXX

SCHOOL DISTRICT
RIVERSIDE UNIFIED
SCHOOL DISTRICT

UTILITY PURVEYORS
WATER.....CITY OF RIVERSIDE
GAS.....SO. CALIF. GAS
ELECTRICAL.....CITY OF RIVERSIDE
TELEPHONE.....PACIFIC BELL
SEWER.....CITY OF RIVERSIDE
CABLE .....CHARTER COMM.

LEGAL DESCRIPTION

GeoMat Testing Laboratories, Inc.
Infiltration Test Location Map
Project No. 15101-01
Plate 1
October 27, 2015

● Approximate Location of Exploratory Borehole
○ Approximate Location of Infiltration Test

TRACT BOUNDARY
CENTERLINE
CURB AND GUTTER
1280 EXISTING CONTOUR LINE
LOT LINE
SLOPE

REVISIONS

MARK	DESCRIPTION	BY	APPR	DATE

DESIGNED BY: S.J.S. DRAWN BY: S.J.S.
CHECKED BY: R.V.Z. PROJECT MANAGER: S.S.

PREPARED BY: DATE:
ROBERT C. VAN ZANTEN
R.C.E. NO.: 62325 EXP. 9-30-17

SEAL: REGISTERED PROFESSIONAL ENGINEER ROBERT C. VAN ZANTEN No. 62325 Exp. 9-30-17 CIVIL STATE OF CALIFORNIA

PREPARED BY: SDH & ASSOCIATES INCORPORATED
SDH AND ASSOCIATES INC.
5225 CANYON CREST DRIVE 71439
Riverside, California 92507
TEL: (951) 683-3691 FAX (951) 788-2314

SCALE: 1" =40'
BENCHMARK
DATE: SEPTEMBER 2015

BUSINESS TAX CERTIFICATE NO. 107994 EXP. 6-13-16

CITY OF RIVERSIDE

TTM XXXXX
HAWTHORN HEIGHTS

1 OF 1 SHEETS

Appendix A

REFERENCES

SDH and Associates, Site Plan Showing 56 single family lots.

Riverside County, Stormwater Quality Best Management Practice, Design Handbook, July 21, 2006

Riverside County, Design handbook for Low Impact Development Best management Pactices, September 2011.

Riverside County, Water Quality Management Plan For Urban Runoff, Santa Ana River Region, Santa Margarita River Region, September 17, 2004

California Stormwater Quality Association, Stormwater Best Management Practice, Handbook, Jan. 2003.

California Department of Transportation, Stormwater Quality Handbook, Project Training and Design Guide, Sacramento, 2000.

California Department of Transportation, Stormwater Quality Handbook, Project Planning and Design Guide, Sacramento, 2005.

Federal Highway Administration, Urban Design Drainage Manual, Washington DC, 1996

Water Quality Control Plan, Santa Ana River Basin (8), California Regional Water Quality Control Board, Santa Ana Region, 1995,

Massmann, JW, Butchart, and S Stolar, Infiltration Characteristics, Performance, and Design of Stormwater Facilities, Final Research Report, Research Project TI 803, Task 12, Washington DOT 2003.

Soilvision Systems, A Knowledge-Based Soils Database, Murray Fredlund, Canada, 2004.

US Environmental Protection Agency, Storm water Technology Fact Sheet, Infiltration Trench, EPA 832-F-99-019, 1999.

California Stormwater Quality Association (QASCA), California Stormwater BMP Handbook, Infiltration Trench, TC-10 Design Considerations

BMP Handbook, Part B, Planning Activities, Stormwater Mitigation Measures, Watershed Protection Division, City of Los Angeles.

Appendix B

GENERAL NOTES

DRILLING NOTES

WATER LEVEL MEASUREMENTS

Water levels indicated on the boring logs are levels measured in the borings at the times indicated. In permeable materials, the indicated levels may reflect the location of groundwater. In low permeability soils, the accurate determination of groundwater levels is not possible with only short-term observations.

WATER LEVEL OBSERVATION DESIGNATION

W.D.	While Drilling
A.B.	After Boring
B.C.R.	Before Casing Removal
A.C.R.	After Casing Removal
24 hr.	Water level taken approximately 24 hrs. after boring completion

DRILLING AND SAMPLING SYMBOLS

AS	Auger Sample
CS	Continuous Sampler
DB	Diamond Bit -NX unless otherwise noted
HA	Hand Auger
HS	Hollow Stem Auger
PA	Power Auger
RB	Rock Bit
SS*	Split-Barrel
ST	Shelby Tube - 2" (51mm) unless otherwise noted
WB	Wash Bore
CR	Calfornia Ring Sampler 3" O.D., Lined with 2.5"X1" Rings

*The Standard Penetration Test is conducted in conjunction with the split-barrel sampling procedure. The "N" value corresponds to the number of blows required to drive the last 1 foot (0.3m) of an 18 in. (0.46m) long, 2 in. (51mm) O.D. split-barrel sampler with a 140 lb. (63.5 kg) hammer falling a distance of 30 in. (0.76m). The Standard Penetration Test is carried out according to ASTM D-1586. (See "N" Value below.)

SOIL PROPERTIES & DESCRIPTIONS

TEXTURE

PARTICLE	SIZE	
Clay	< 0.002 mm	(< 0.002 mm)
Silt	< #200 Sieve	(0.075 mm)
Sand	#4 to #200 Sieve	(4.75 to 0.075 mm)
Gravel	3 in. to #4 Sieve	(75 mm to 4.75 mm)
Cobbles	12 in. to 3 in.	(300 mm to 75 mm)
Boulders	> 12 in.	(300 mm)

COMPOSITION

SAND & GRAVEL

Description	% by Dry Weight
trace	< 15
with	15 - 29
modifer	> 30

FINES

Description	% by Dry Weight
trace	< 5
with	5 - 12
modifier	> 12

Soil descriptions are based on the Unified Soil Classification System (USCS) as outlined in ASTM Designations D-2487 and D-2488. The USCS group symbol shown on the boring logs correspond to the group names listed below. The description includes soil constituents, consistency, relative density, color and other appropriate descriptive terms. Geologic description of bedrock, when encountered, also is shown in the description column.

GROUP SYMBOL	GROUP NAME	GROUP SYMBOL	GROUP NAME
GW	Well Graded Gravel	CL	Lean Clay
GP	Poorly Graded Gravel	ML	Silt
GM	Silty Gravel	OL	Organic Clay or Silt
GC	Clayey Gravel	CH	Fat Clay
SW	Well Graded Sand	MH	Elastic Silt
SP	Poorly Graded Sand	OH	Organic Clay or Silt
SM	Silty Sand	PT	Peat
SC	Clayey Sand	CL-CH	Lean to Fat Clay

COHESIVE SOILS

CONSISTENCY	UNCONFINED COMPRESSIVE STRENGTH (Qu) (psf)	(kPa)
Very Soft	< 500	(< 24)
Soft	500 - 1000	(24 - 48)
Medium	1001 - 2000	(48 - 96)
Stiff	2001 - 4000	(96 - 192)
Very Stiff	4001 - 8000	(192 - 383)
Hard	> 8001	(> 383)

PLASTICITY Description	Liquid Limit (%)
Lean	< 45%
Lean to Fat	45 to 49%
Fat	≥ 50%

Cohessive Soils Consistenacy	"N" value
Very Soft	<2
Soft	2-4
Medium	4-8
Stiff (Firm)	8-15
Very Stiff (Very Firm)	15-30
Hard	>30

COHESIONLESS SOILS

RELATIVE DENSITY	"N" VALUE*
Very Loose	0 - 3
Loose	4 - 9
Medium Dense	10 - 29
Dense	30 - 49
Very Dense	≥ 50

BEDROCK PROPERTIES & DESCRIPTIONS

ROCK QUALITY DESIGNATION (RQD**)

DESCRIPTION OF ROCK QUALITY	RQD (%)
Very Poor	0 - 25
Poor	25 - 50
Fair	50 - 75
Good	75 - 90
Excellent	90 - 100

**RQD is defined as the total length of sound core pieces, 4 inches (102mm) or greater in length, expressed as a percentage of the total length cored. RQD provides an indication of the integrity of the rock mass and relative extent of seams and bedding planes.

DEGREE OF WEATHERING

Slightly Weathered	Slight decomposition of parent material in joints and seams.
Weathered	Well-developed and decomposed joints and seams.
Highly Weathered	Rock highly decomposed, may be extremely broken.

SOLUTION AND VOID CONDITIONS

Solid	Contains no voids.
Vuggy	Containing small pits or cavities < 1/2" (13mm).
Porous	Containing numerous voids which may be interconnected.
Cavernous	Containing cavities, sometimes quite large.

When classification of rock materials has been estimated from disturbed samples, core samples and petrographic analysis may reveal other rock types.

HARDNESS & DEGREE OF CEMENTATION

LIMESTONE

Hard	Difficult to scratch with knife.
Moderately Hard	Can scratch with knife but not with fingernail.
Soft	Can be scratched with fingernail.

SHALE

Hard	Can scratch with knife but not with fingernail.
Moderately Hard	Can be scratched with fingernail.
Soft	Can be molded easily with fingers.

SANDSTONE

Well Cemented	Capable of scratching a knife blade.
Cemented	Can be scratched with knife.
Poorly Cemented	Can be broken apart easily with fingers.

BEDDING CHARACTERISTICS

TERM	THICKNESS (inches)	THICKNESS (mm)
Very Thick Bedded	> 36	> 915
Thick Bedded	12 - 36	305 - 915
Medium Bedded	4 - 12	102 - 305
Thin Bedded	1 - 4	25 - 102
Very Thin Bedded	0.4 - 1	10 - 25
Laminated	0.1 - 0.4	2.5 - 10
Thinly Laminated	< 0.1	< 2.5

Bedding Planes	Planes dividing the individual layers, beds or strata of rocks.
Joint	Fracture in rock, generally more or less vertical or transverse to the bedding.
Seam	Applies to bedding plane with an unspecified degree of weathering.

BORHOLE LOG — BH-1

Sheet	1 OF 1		
Date	10/24/2015		
Project No.	15101-01	Drilling Co.	GeoMat
Project	Steven Walker Homes - Hawthorne Heights	Sampler	Cal Mod. And SPT
Client	Steven Walker Homes	Method	Hollow Stem
Location	APN 227-130-025, Riverside, California	Hammer Type	140 lb
Coodinate		Surface Elev.	
Notes		Total Depth	15'

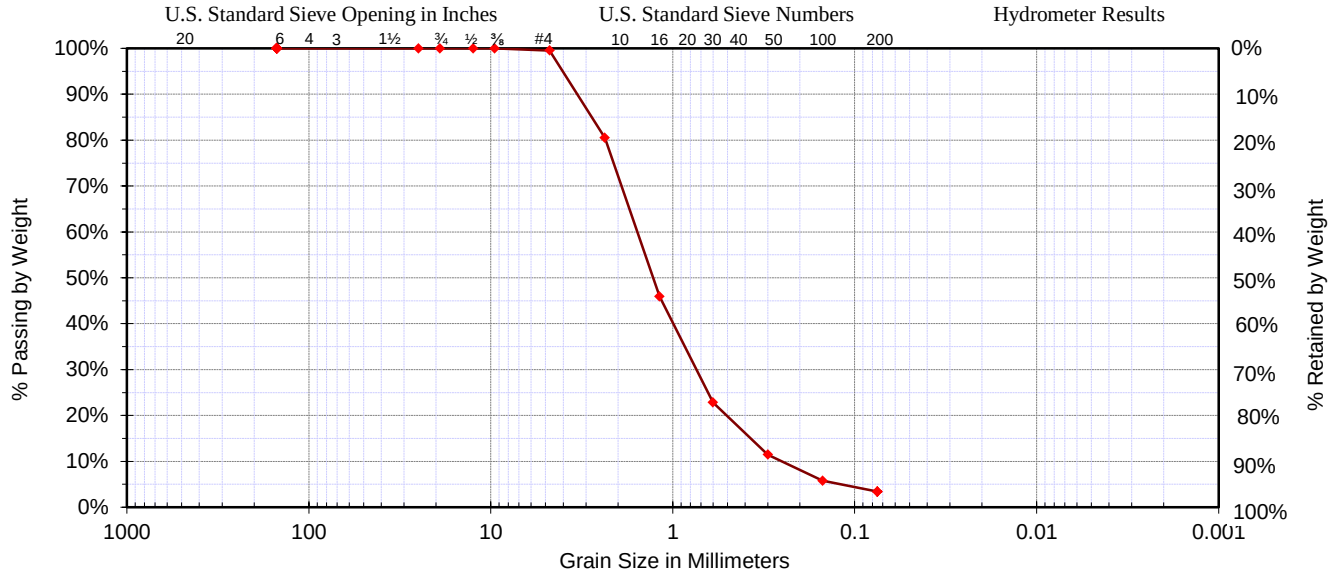
Type/Symbol	Casing	Split Spoon	Ring Sampler	Cutting	Date	Time	Water Depth (ft)	Casing Size (in)	Casing Depth (ft)	Hole Depth (ft)	Symbol
I.D.		S	R	C							
O.D.					10/24/2015		None				
Length											
Hammer Wt.											
Hammer Fall											

Depth Below Surface (ft)	Elevation (ft)	Graphic	Soil Sample Type	Number	Symbol	Depth	Blows 0-152.4 mm	152.4-304.8 mm	304.8-457.2 mm	N-Value	N60	(N1)60	VISUAL MATERIAL CLASSIFICATION AND REMARKS	Moisture (%)	Dry Density (pcf)	Test
0													**SILTY SAND (SM)**			
1													medium brown silty sand, moist			
2																
3																
4																
5			R				4	5	7	8			loose	8	124	
6													becoming more coarse grained			
7																
8													**WELL-GRADED SAND (SW)**			
9													gray-brown sand with silt, dry			
10			R				5	8	11	12			medium dense	2	111	
11													% Passing No. 200 Sieve = 3			
12																
13																
14													**SILTY SAND (SM)**			
15			S				8	10	10	20			medium brown silty sand, moist	6		
16													medium dense			
17													% Passing No. 200 Sieve = 21			
18																
19																
20																
21																
22																
23																
24																

The stratification lines represent the approximate boundary lines between soil and rock types. In-situ, the transition may be gradual.

Appendix C

LABORATORY TEST RESULTS



Date :	10/24/15	D_{10} =	0.26	**Classification**	% Gravel
Sample #:		D_{30} =	0.78	SW, Well-graded Sand	0.49%
Sample ID:	B-1 @ 10'	D_{60} =	1.66		% Sand
Source:	Cal Ring	C_C =	1.40	**Specifications**	96.10%
Project:	Steven Walker Communities - Hawthorne Heights	C_U =	6.35	custom specs 1	% Silt & Clay
Location:	APN: 227-130-025	Liquid Limit=	n/a		3.41%
Boring #:	B-1	Plastic Limit=	n/a	Fineness Modulus	Sample Moisture
Depth:	10'	Plasticity Index=	n/a	3.34	**1.9%**

Coarse Section Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min	**Fines Section** Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
6.00"	150.00		100.0%			#4	4.750	99.5%	99.5%		
4.00"	100.00		100.0%			#8	2.360	80.5%	80.5%		
3.00"	75.00		100.0%			#10	2.000		69.9%		
2.50"	63.00		100.0%			#16	1.180	45.9%	45.9%		
2.00"	50.00		100.0%			#20	0.850		32.8%		
1.75"	45.00		100.0%			#30	0.600	22.8%	22.8%		
1.50"	37.50		100.0%			#40	0.425		16.2%		
1.25"	31.50		100.0%			#50	0.300	11.5%	11.5%		
1.00"	25.00	100.0%	100.0%			#60	0.250		9.6%		
7/8"	22.40		100.0%			#80	0.180		6.9%		
3/4"	19.00	100.0%	100.0%			#100	0.150	5.8%	5.8%		
5/8"	16.00		100.0%			#140	0.106		4.4%		
1/2"	12.50	100.0%	100.0%			#170	0.090		3.9%		
3/8"	9.50	100.0%	100.0%			#200	0.075	3.4%	3.4%		
1/4"	6.30		99.7%			#270	0.053				
#4	4.75	99.5%	99.5%								

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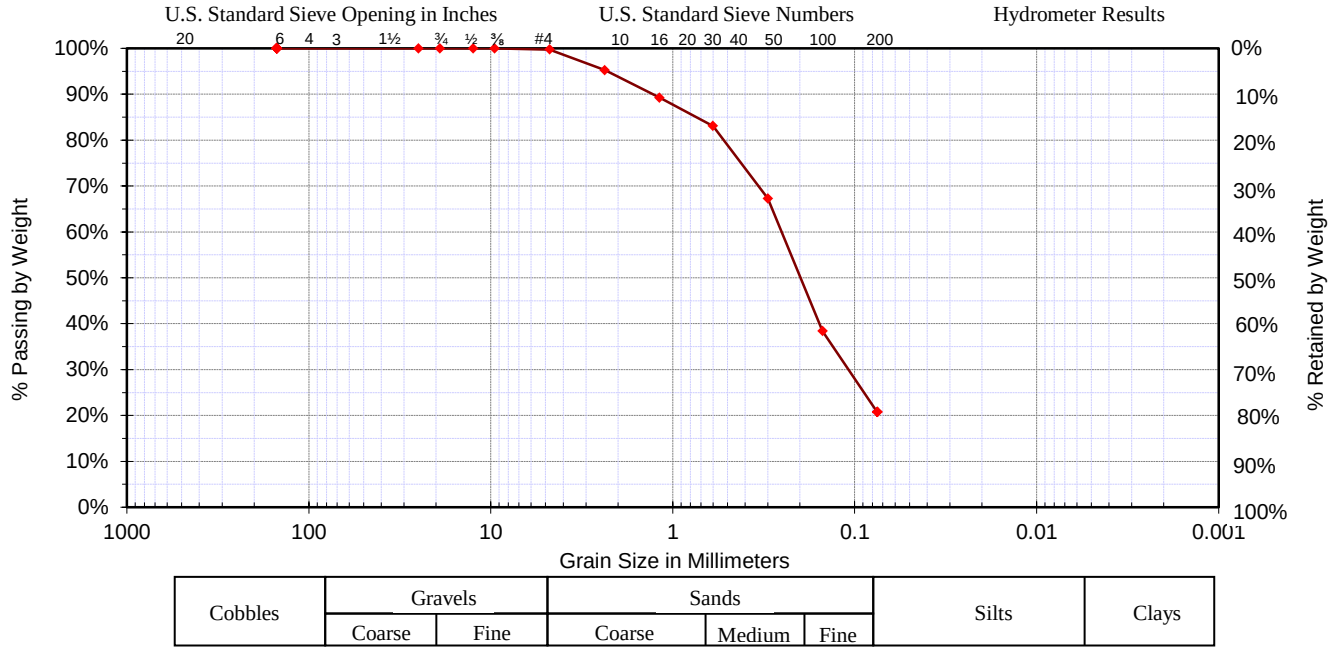
LABORATORY TEST RESULTS



Date :	10/24/15	D_{10} =	0.04	**Classification**	% Gravel
Sample #:		D_{30} =	0.11	SM, Silty Sand	0.26%
Sample ID:	B-1 @ 15'	D_{60} =	0.26		% Sand
Source:	Standard	C_C =	1.38	**Specifications**	79.01%
Project:	Steven Walker Communities - Hawthorne Heights	C_U =	7.25	custom specs 1	% Silt & Clay
Location:	APN: 227-130-025	Liquid Limit=	n/a		20.72%
Boring #:	B-1	Plastic Limit=	n/a	Fineness Modulus	Sample Moisture
Depth:	15'	Plasticity Index=	n/a	1.27	**6.4%**

Coarse Section Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min	**Fines Section** Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
6.00"	150.00		100.0%			#4	4.750	99.7%	99.7%		
4.00"	100.00		100.0%			#8	2.360	95.2%	95.2%		
3.00"	75.00		100.0%			#10	2.000		93.4%		
2.50"	63.00		100.0%			#16	1.180	89.2%	89.2%		
2.00"	50.00		100.0%			#20	0.850		85.7%		
1.75"	45.00		100.0%			#30	0.600	83.1%	83.1%		
1.50"	37.50		100.0%			#40	0.425		73.9%		
1.25"	31.50		100.0%			#50	0.300	67.3%	67.3%		
1.00"	25.00	100.0%	100.0%			#60	0.250		57.6%		
7/8"	22.40		100.0%			#80	0.180		44.1%		
3/4"	19.00	100.0%	100.0%			#100	0.150	38.4%	38.4%		
5/8"	16.00		100.0%			#140	0.106		28.0%		
1/2"	12.50	100.0%	100.0%			#170	0.090		24.3%		
3/8"	9.50	100.0%	100.0%			#200	0.075	20.7%	20.7%		
1/4"	6.30		99.8%			#270	0.053				
#4	4.75	99.7%	99.7%								

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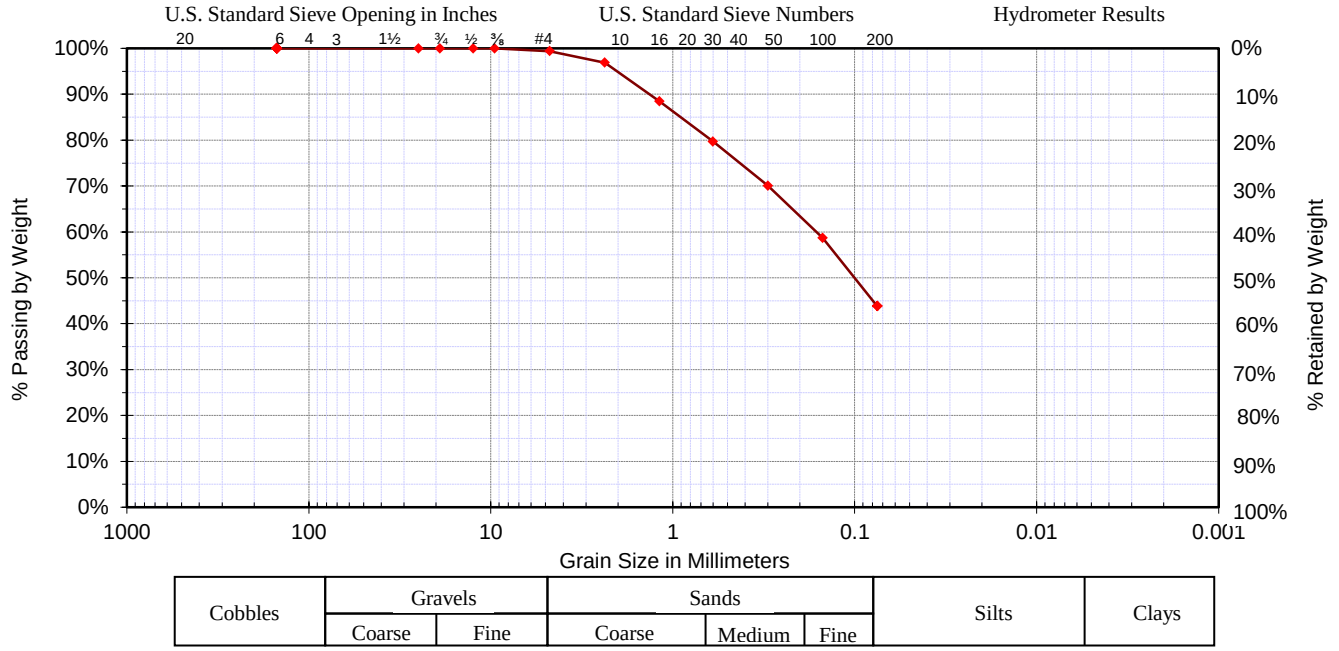
LABORATORY TEST RESULTS



Date :	10/24/15	D_{10} =	0.02	**Classification**	% Gravel
Sample #:		D_{30} =	0.05	SM, Silty Sand	0.60%
Sample ID:	P-1 @ 43"	D_{60} =	0.17		% Sand
Source:	Bulk	C_C =	0.92	**Specifications**	55.58%
Project:	Steven Walker Communities - Hawthorne Heights	C_U =	9.77	custom specs 1	% Silt & Clay
Location:	APN: 227-130-025	Liquid Limit=	n/a		43.82%
Boring #:	P-1	Plastic Limit=	n/a	Fineness Modulus	Sample Moisture
Depth:	43"	Plasticity Index=	n/a	1.07	**7.9%**

Coarse Section Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min	**Fines Section** Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
6.00"	150.00		100.0%			#4	4.750	99.4%	99.4%		
4.00"	100.00		100.0%			#8	2.360	96.9%	96.9%		
3.00"	75.00		100.0%			#10	2.000		94.3%		
2.50"	63.00		100.0%			#16	1.180	88.4%	88.4%		
2.00"	50.00		100.0%			#20	0.850		83.5%		
1.75"	45.00		100.0%			#30	0.600	79.7%	79.7%		
1.50"	37.50		100.0%			#40	0.425		74.1%		
1.25"	31.50		100.0%			#50	0.300	70.1%	70.1%		
1.00"	25.00	100.0%	100.0%			#60	0.250		66.3%		
7/8"	22.40		100.0%			#80	0.180		61.0%		
3/4"	19.00	100.0%	100.0%			#100	0.150	58.7%	58.7%		
5/8"	16.00		100.0%			#140	0.106		50.0%		
1/2"	12.50	100.0%	100.0%			#170	0.090		46.8%		
3/8"	9.50	100.0%	100.0%			#200	0.075	43.8%	43.8%		
1/4"	6.30		99.6%			#270	0.053				
#4	4.75	99.4%	99.4%								

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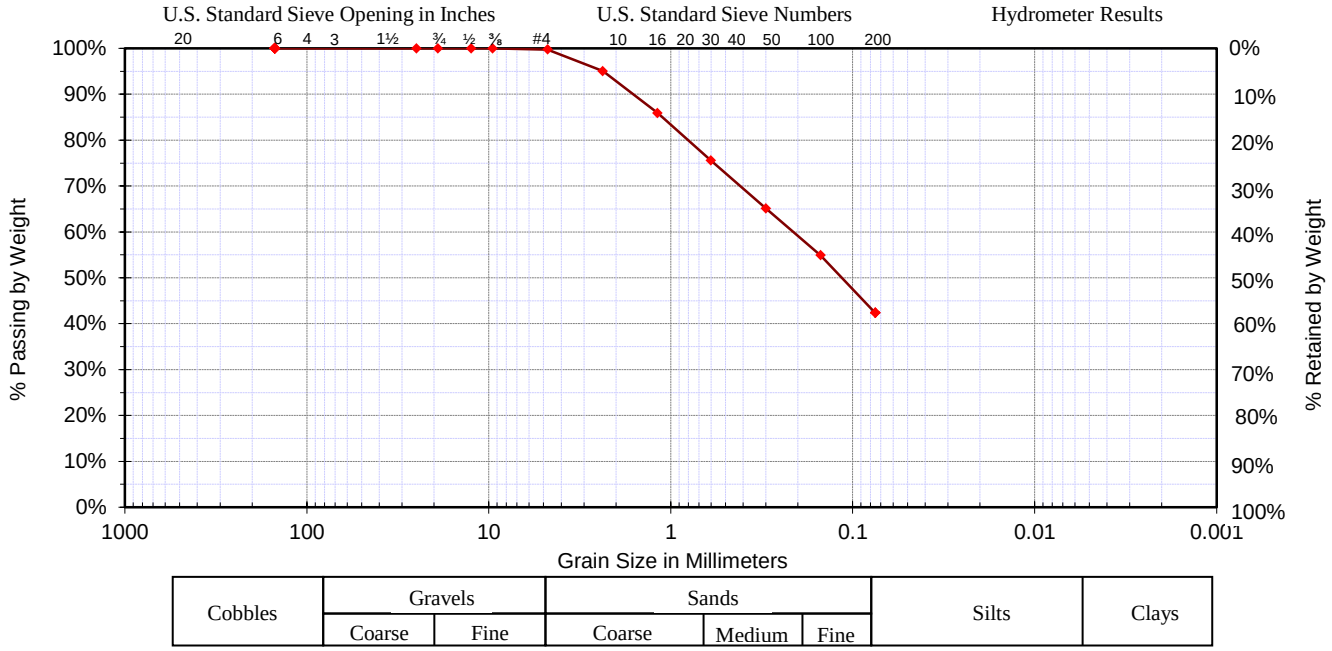
LABORATORY TEST RESULTS



Date :	10/24/15	D_{10} =	0.02	**Classification**	% Gravel
Sample #:		D_{30} =	0.05	SM, Silty Sand	0.27%
Sample ID:	P-2 @ 45"	D_{60} =	0.22		% Sand
Source:	Bulk	C_C =	0.71	**Specifications**	57.39%
Project:	Steven Walker Communities - Hawthorne Heights	C_U =	12.69	custom specs 1	% Silt & Clay
Location:	APN: 227-130-025	Liquid Limit=	n/a		42.34%
Boring #:	P-2	Plastic Limit=	n/a	Fineness Modulus	Sample Moisture
Depth:	45"	Plasticity Index=	n/a	1.24	**6.7%**

Coarse Section Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min	**Fines Section** Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
6.00"	150.00		100.0%			#4	4.750	99.7%	99.7%		
4.00"	100.00		100.0%			#8	2.360	95.0%	95.0%		
3.00"	75.00		100.0%			#10	2.000		92.2%		
2.50"	63.00		100.0%			#16	1.180	85.9%	85.9%		
2.00"	50.00		100.0%			#20	0.850		80.0%		
1.75"	45.00		100.0%			#30	0.600	75.5%	75.5%		
1.50"	37.50		100.0%			#40	0.425		69.5%		
1.25"	31.50		100.0%			#50	0.300	65.1%	65.1%		
1.00"	25.00	100.0%	100.0%			#60	0.250		61.7%		
7/8"	22.40		100.0%			#80	0.180		56.9%		
3/4"	19.00	100.0%	100.0%			#100	0.150	54.9%	54.9%		
5/8"	16.00		100.0%			#140	0.106		47.5%		
1/2"	12.50	100.0%	100.0%			#170	0.090		44.9%		
3/8"	9.50	100.0%	100.0%			#200	0.075	42.3%	42.3%		
1/4"	6.30		99.8%			#270	0.053				
#4	4.75	99.7%	99.7%								

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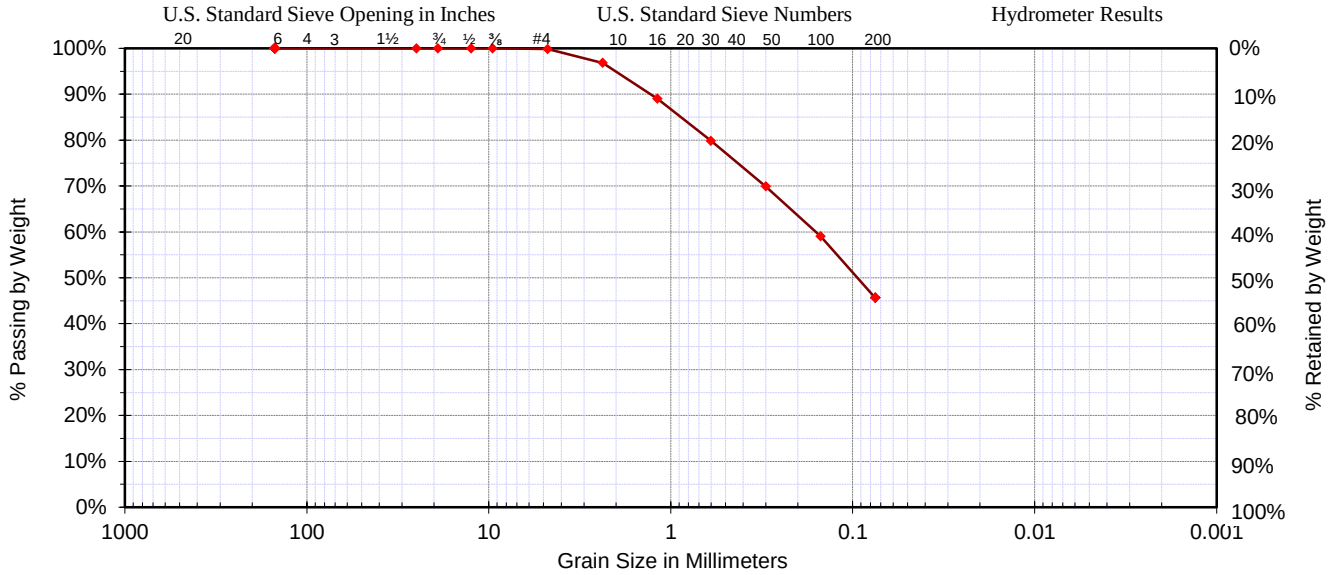
LABORATORY TEST RESULTS



Date :	10/24/15	D_{10} =	0.02	**Classification**	% Gravel
Sample #:		D_{30} =	0.05	SM, Silty Sand	0.16%
Sample ID:	P-3 @ 52"	D_{60} =	0.16		% Sand
Source:	Bulk	C_C =	0.91	**Specifications**	54.22%
Project:	Steven Walker Communities - Hawthorne Heights	C_U =	9.91	custom specs 1	% Silt & Clay
Location:	APN: 227-130-025	Liquid Limit=	n/a		45.61%
Boring #:	P-3	Plastic Limit=	n/a	Fineness Modulus	Sample Moisture
Depth:	52"	Plasticity Index=	n/a	1.06	**6.5%**

Coarse Section Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min	**Fines Section** Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
6.00"	150.00		100.0%			#4	4.750	99.8%	99.8%		
4.00"	100.00		100.0%			#8	2.360	96.8%	96.8%		
3.00"	75.00		100.0%			#10	2.000		94.4%		
2.50"	63.00		100.0%			#16	1.180	89.0%	89.0%		
2.00"	50.00		100.0%			#20	0.850		83.8%		
1.75"	45.00		100.0%			#30	0.600	79.8%	79.8%		
1.50"	37.50		100.0%			#40	0.425		74.0%		
1.25"	31.50		100.0%			#50	0.300	69.9%	69.9%		
1.00"	25.00	100.0%	100.0%			#60	0.250		66.3%		
7/8"	22.40		100.0%			#80	0.180		61.2%		
3/4"	19.00	100.0%	100.0%			#100	0.150	59.1%	59.1%		
5/8"	16.00		100.0%			#140	0.106		51.2%		
1/2"	12.50	100.0%	100.0%			#170	0.090		48.3%		
3/8"	9.50	100.0%	100.0%			#200	0.075	45.6%	45.6%		
1/4"	6.30		99.9%			#270	0.053				
#4	4.75	99.8%	99.8%								

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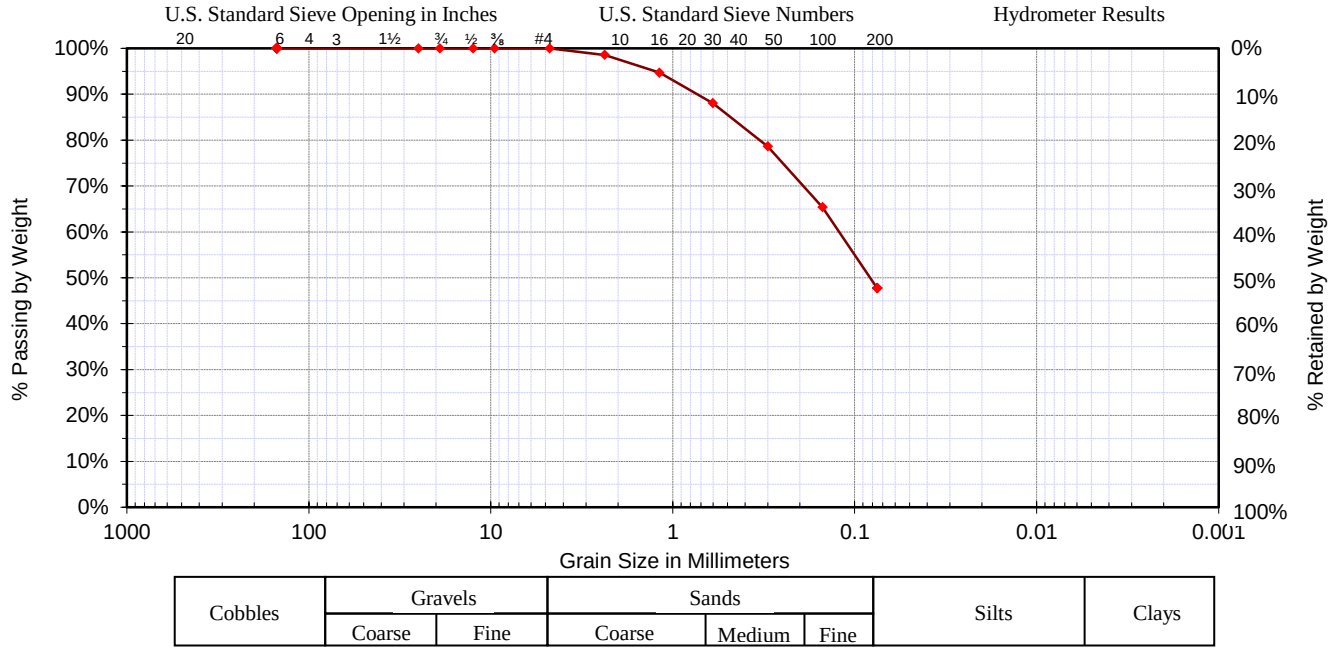
LABORATORY TEST RESULTS



Date :	10/24/15	D_{10} =	0.02	**Classification**	% Gravel
Sample #:		D_{30} =	0.05	SM, Silty Sand	0.00%
Sample ID:	P-4 @ 67"	D_{60} =	0.13		% Sand
Source:	Bulk	C_C =	1.11	**Specifications**	52.27%
Project:	Steven Walker Communities - Hawthorne Heights	C_U =	8.10	custom specs 1	% Silt & Clay
Location:	APN: 227-130-025	Liquid Limit=	n/a		47.73%
Boring #:	P-4	Plastic Limit=	n/a	Fineness Modulus	Sample Moisture
Depth:	67"	Plasticity Index=	n/a	0.75	**4.2%**

Coarse Section Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min	**Fines Section** Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
6.00"	150.00		100.0%			#4	4.750	100.0%	100.0%		
4.00"	100.00		100.0%			#8	2.360	98.5%	98.5%		
3.00"	75.00		100.0%			#10	2.000		97.4%		
2.50"	63.00		100.0%			#16	1.180	94.7%	94.7%		
2.00"	50.00		100.0%			#20	0.850		90.9%		
1.75"	45.00		100.0%			#30	0.600	88.0%	88.0%		
1.50"	37.50		100.0%			#40	0.425		82.5%		
1.25"	31.50		100.0%			#50	0.300	78.6%	78.6%		
1.00"	25.00	100.0%	100.0%			#60	0.250		74.2%		
7/8"	22.40		100.0%			#80	0.180		68.0%		
3/4"	19.00	100.0%	100.0%			#100	0.150	65.4%	65.4%		
5/8"	16.00		100.0%			#140	0.106		55.0%		
1/2"	12.50	100.0%	100.0%			#170	0.090		51.3%		
3/8"	9.50	100.0%	100.0%			#200	0.075	47.7%	47.7%		
1/4"	6.30		100.0%			#270	0.053				
#4	4.75	100.0%	100.0%								

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Appendix D

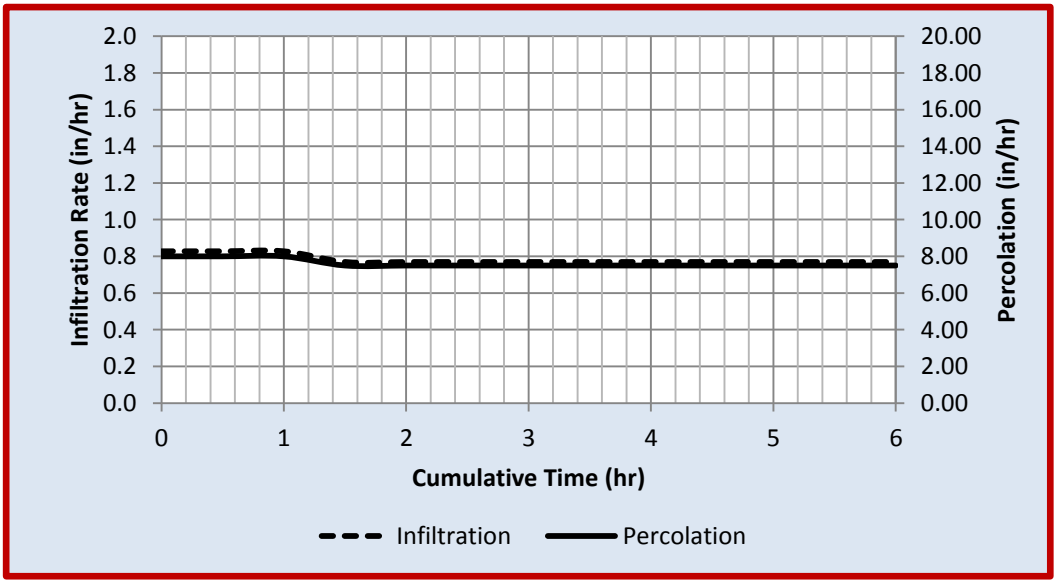
PERCOLATION TEST - P-1

Project No.	15110-01	Project Name	Hawthorne Hills School Site		
Proj. Location	Indaian Avenue, Riverside				
Drilling Date	10/24/2015	Soak Date	10/24/2015	Soak Method	5 gallons
Testing Date	10/25/2015	Borehole Size (in)	6	Test Depth (in)	43

CRITERIA	TIME	TIME INTERVAL (min)	D_0, INITIAL DEPTH TO WATER (in)	D_f, FINAL DEPTH TO WATER (in)	ΔH, WATER DROP (in)	AVERAGE WETTED DEPTH (in)	PERC RATE (min/in)	PERC RATE (in/hr)	CORECTED* INFILTRATION RATE (in/hr)
Sandy Soil Criteria									
Percolation Test Data	0:00:00	0:30:00	28	32	4	13	7.5	8.0	0.8
	0:30:00	30.00							
	0:00:00	0:30:00	28	32	4	13	7.5	8.0	0.8
	0:30:00	30.00							
	0:00:00	0:30:00	28	31.75	3.75	13.125	8.0	7.5	0.8
	0:30:00	30.00							
	0:00:00	0:30:00	28	31.75	3.75	13.125	8.0	7.5	0.8
	0:30:00	30.00							
	0:00:00	0:30:00	28	31.75	3.75	13.125	8.0	7.5	0.8
	0:30:00	30.00							
	0:00:00	0:30:00	28	31.75	3.75	13.125	8.0	7.5	0.8
	0:30:00	30.00							
	0:00:00	0:30:00	28	31.75	3.75	13.125	8.0	7.5	0.8
	0:30:00	30.00							
	0:00:00	0:30:00	28	31.75	3.75	13.125	8.0	7.5	0.8
	0:30:00	30.00							
	0:00:00	0:30:00	28	31.75	3.75	13.125	8.0	7.5	0.8
	0:30:00	30.00							
	0:00:00	0:30:00	28	31.75	3.75	13.125	8.0	7.5	0.8
	0:30:00	30.00							
	0:00:00	0:30:00	28	31.75	3.75	13.125	8.0	7.5	0.8
	0:30:00	30.00							
	0:00:00	0:30:00	28	31.75	3.75	13.125	8.0	7.5	0.8
	0:30:00	30.00							
	0:00:00	0:30:00	28	31.75	3.75	13.125	8.0	7.5	0.8
	0:30:00	30.00							

*Porchet Method

Cumulative Time (hr)	Percolation (in/hr)	Infiltration (in/hr
0	8.00	0.8
0.50	8.00	0.8
1.00	8.00	0.8
1.50	7.50	0.8
2.00	7.50	0.8
2.50	7.50	0.8
3.00	7.50	0.8
3.50	7.50	0.8
4.00	7.50	0.8
4.50	7.50	0.8
5.00	7.50	0.8
5.50	7.50	0.8
6.00	7.50	0.8



PERCOLATION TEST - P-2

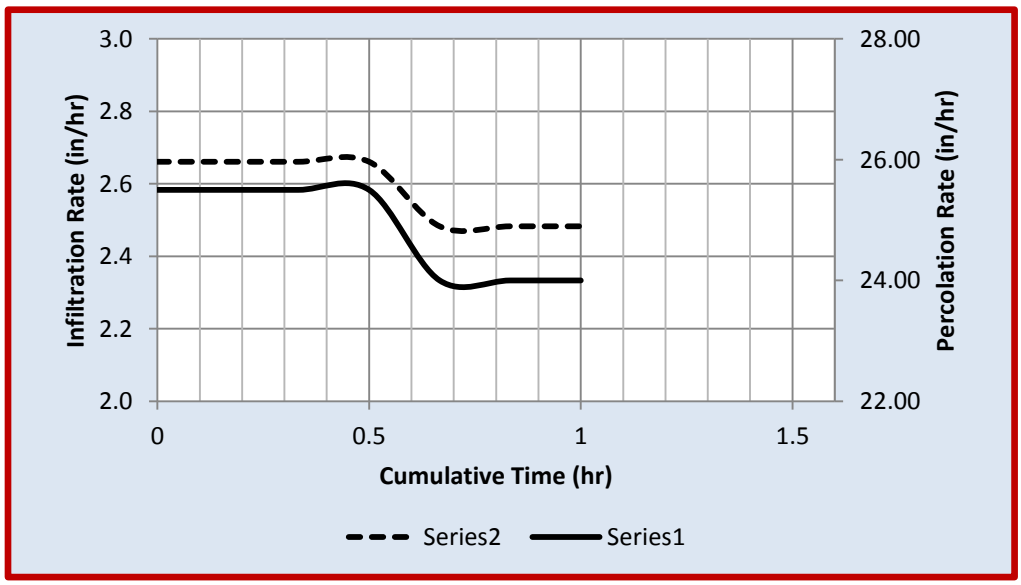
Project No.	15101-01	Project Name	Hawthorne Hills School Site		
Project Location	Indiana Avenue, Riverside				
Drilling Date	10/24/2015	Soak Date	10/24/2015		5 gallons
Testing Date	10/24/2015	Borehole Size (in)	6	Depth (in)	45

All field measurements in inches and time measurement in minutes: seconds

CRITERIA	TIME	TIME INTERVAL	H_o INITIAL WATER HEIGHT	ΔH WATER DROP	H_f FINAL WATER HEIGHT	D_o INITIAL DEPTH TO WATER	D_f FINAL DEPTH TO WATER	H_{ave} AVERAGE HEAD HEIGHT	PERC RATE (in/hr)	CORECTED* INFILTRATION RATE (in/hr)
Sandy Soil Criteria	0:00:00	0:25:00	15	9	6	30	39	10.5	21.6	
	0:25:00	25.00								
	0:00:00	0:25:00	15	8	7	30	38	11	19.2	
	0:25:00	25.00								
Percolation Test Data	0:00:00	12:10:00	15	4.25	10.75	30	34.25	12.875	25.5	2.7
	12:10:00	10.00								
	12:00:00	0:10:00	15	4.25	10.75	30	34.25	12.875	25.5	2.7
	12:10:00	10.00								
	12:00:00	0:10:00	15	4.25	10.75	30	34.25	12.875	25.5	2.7
	12:10:00	10.00								
	12:00:00	0:10:00	15	4	11	30	34	13	24.0	2.5
	12:10:00	10.00								
	12:00:00	0:10:00	15	4	11	30	34	13	24.0	2.5
	12:10:00	10.00								
	12:00:00	0:10:00	15	4	11	30	34	13	24.0	2.5
	12:10:00	10.00								

*Porchet Method

Cmltv. Time (hr)	Perc. (in/hr)	Inf. (in/hr)
0	25.50	2.7
0.17	25.50	2.7
0.33	25.50	2.7
0.50	25.50	2.7
0.67	24.00	2.5
0.83	24.00	2.5
1.00	24.00	2.5



PERCOLATION TEST - P-3

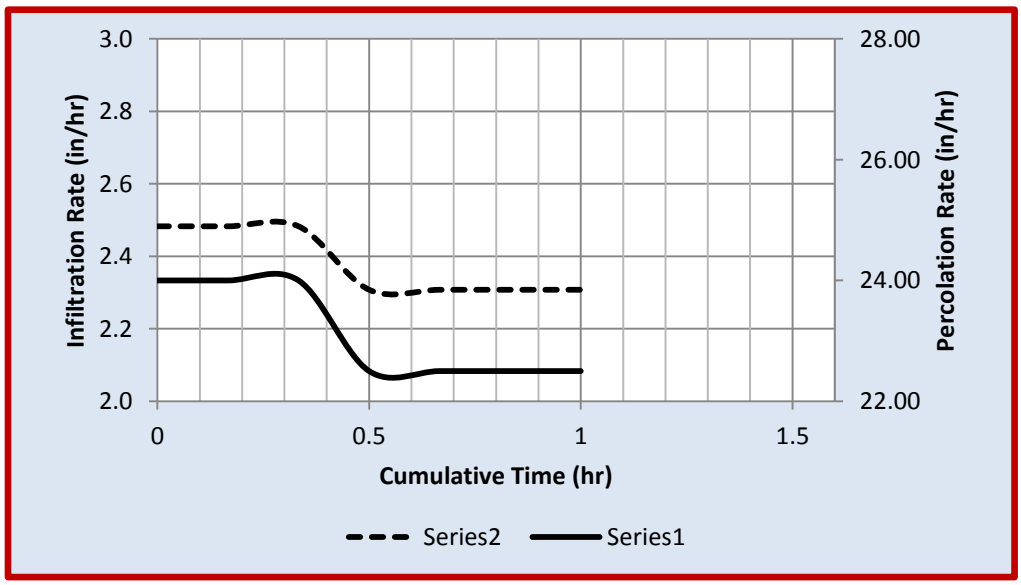
Project No.	15101-01	Project Name	Hawthorne Hills School Site		
Project Location	Indiana Avenue, Riverside				
Drilling Date	10/24/2015	Soak Date	10/24/2015		5 gallons
Testing Date	10/24/2015	Borehole Size (in)	6	Depth (in)	52

All field measurements in inches and time measurement in minutes: seconds

CRITERIA	TIME	TIME INTERVAL	H_o INITIAL WATER HEIGHT	ΔH WATER DROP	H_f FINAL WATER HEIGHT	D_o INITIAL DEPTH TO WATER	D_f FINAL DEPTH TO WATER	H_{ave} AVERAGE HEAD HEIGHT	PERC RATE (in/hr)	CORECTED* INFILTRATION RATE (in/hr)
Sandy Soil Criteria	0:00:00	0:25:00	15	10	5	37	47	10	24.0	
	0:25:00	25.00								
	0:00:00	0:25:00	15	8.5	6.5	37	45.5	10.75	20.4	
	0:25:00	25.00								
Percolation Test Data	0:00:00	12:10:00	15	4	11	37	41	13	24.0	2.5
	12:10:00	10.00								
	12:00:00	0:10:00	15	4	11	37	41	13	24.0	2.5
	12:10:00	10.00								
	12:00:00	0:10:00	15	3.75	11.25	37	40.75	13.125	22.5	2.3
	12:10:00	10.00								
	12:00:00	0:10:00	15	3.75	11.25	37	40.75	13.125	22.5	2.3
	12:10:00	10.00								
	12:00:00	0:10:00	15	3.75	11.25	37	40.75	13.125	22.5	2.3
	12:10:00	10.00								
	12:00:00	0:10:00	15	3.75	11.25	37	40.75	13.125	22.5	2.3
	12:10:00	10.00								

*Porchet Method

Cmltv. Time (hr)	Perc. (in/hr)	Inf. (in/hr)
0	24.00	2.5
0.17	24.00	2.5
0.33	24.00	2.5
0.50	22.50	2.3
0.67	22.50	2.3
0.83	22.50	2.3
1.00	22.50	2.3



PERCOLATION TEST - P-4

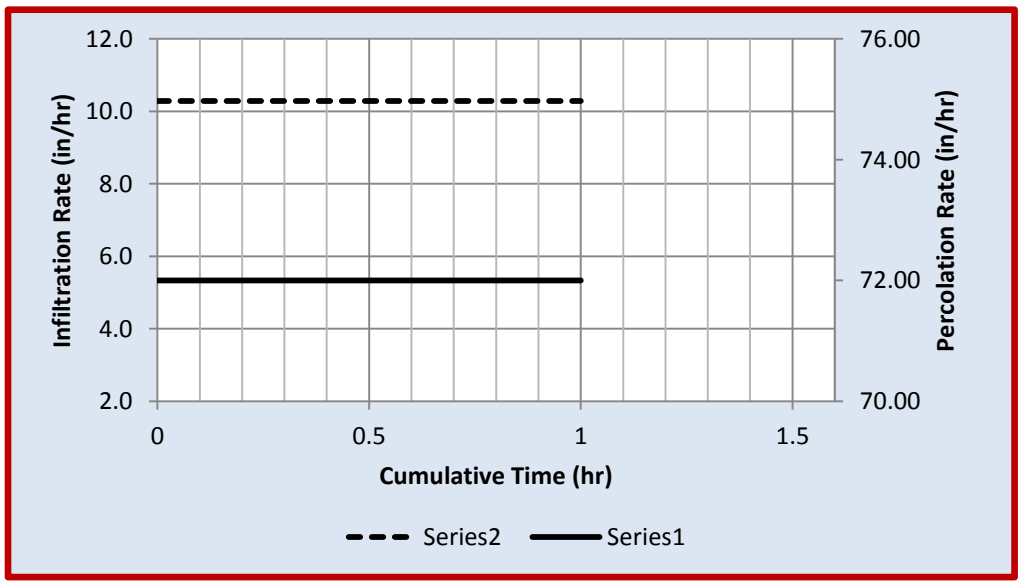
Project No.	15101-01	Project Name	Hawthorne Hills School Site		
Project Location	Indiana Avenue, Riverside				
Drilling Date	10/24/2015	Soak Date	10/24/2015		5 gallons
Testing Date	10/24/2015	Borehole Size (in)	6	Depth (in)	67

All field measurements in inches and time measurement in minutes: seconds

CRITERIA	TIME	TIME INTERVAL	H_o INITIAL WATER HEIGHT	ΔH WATER DROP	H_f FINAL WATER HEIGHT	D_o INITIAL DEPTH TO WATER	D_f FINAL DEPTH TO WATER	H_{ave} AVERAGE HEAD HEIGHT	PERC RATE (in/hr)	CORECTED* INFILTRATION RATE (in/hr)
Sandy Soil Criteria	0:00:00	0:12:00	15	15	0	52	67	7.5	75.0	
	0:12:00	12.00								
	0:00:00	0:13:00	15	15	0	52	67	7.5	69.2	
	0:13:00	13.00								
Percolation Test Data	0:00:00	12:10:00	15	12	3	52	64	9	72.0	10.3
	12:10:00	10.00								
	12:00:00	0:10:00	15	12	3	52	64	9	72.0	10.3
	12:10:00	10.00								
	12:00:00	0:10:00	15	12	3	52	64	9	72.0	10.3
	12:10:00	10.00								
	12:00:00	0:10:00	15	12	3	52	64	9	72.0	10.3
	12:10:00	10.00								
	12:00:00	0:10:00	15	12	3	52	64	9	72.0	10.3
	12:10:00	10.00								
	12:00:00	0:10:00	15	12	3	52	64	9	72.0	10.3
	12:10:00	10.00								

*Porchet Method

Cmltv. Time (hr)	Perc. (in/hr)	Inf. (in/hr)
0	72.00	10.3
0.17	72.00	10.3
0.33	72.00	10.3
0.50	72.00	10.3
0.67	72.00	10.3
0.83	72.00	10.3
1.00	72.00	10.3



OWNER'S POLICY OF TITLE INSURANCE

ISSUED BY

First American Title Insurance Company

Any notice of claim and any other notice or statement in writing required to be given to the Company under this policy must be given to the Company at the address shown in Section 18 of the Conditions.

COVERED RISKS

SUBJECT TO THE EXCLUSIONS FROM COVERAGE, THE EXCEPTIONS FROM COVERAGE CONTAINED IN SCHEDULE B AND THE CONDITIONS, FIRST AMERICAN TITLE INSURANCE COMPANY, a Nebraska corporation (the "Company") insures, as of Date of Policy and, to the extent stated in Covered Risks 9 and 10, after Date of Policy, against loss or damage, not exceeding the Amount of Insurance, sustained or incurred by the Insured by reason of:

1. Title being vested other than as stated in Schedule A.
2. Any defect in or lien or encumbrance on the Title. This Covered Risk includes but is not limited to insurance against loss from
   (a) A defect in the Title caused by
      (i) forgery, fraud, undue influence, duress, incompetency, incapacity, or impersonation;
      (ii) failure of any person or Entity to have authorized a transfer or conveyance;
      (iii) a document affecting Title not properly created, executed, witnessed, sealed, acknowledged, notarized, or delivered;
      (iv) failure to perform those acts necessary to create a document by electronic means authorized by law;
      (v) a document executed under a falsified, expired, or otherwise invalid power of attorney;
      (vi) a document not properly filed, recorded, or indexed in the Public Records including failure to perform those acts by electronic means authorized by law; or
      (vii) a defective judicial or administrative proceeding.
   (b) The lien of real estate taxes or assessments imposed on the Title by a governmental authority due or payable, but unpaid.
   (c) Any encroachment, encumbrance, violation, variation, or adverse circumstance affecting the Title that would be disclosed by an accurate and complete land survey of the Land. The term "encroachment" includes encroachments of existing improvements located on the Land onto adjoining land, and encroachments onto the Land of existing improvements located on adjoining land.
3. Unmarketable Title.
4. No right of access to and from the Land.
5. The violation or enforcement of any law, ordinance, permit, or governmental regulation (including those relating to building and zoning) restricting, regulating, prohibiting, or relating to
   (a) the occupancy, use, or enjoyment of the Land;
   (b) the character, dimensions, or location of any improvement erected on the Land;
   (c) the subdivision of land; or
   (d) environmental protection

   if a notice, describing any part of the Land, is recorded in the Public Records setting forth the violation or intention to enforce, but only to the extent of the violation or enforcement referred to in that notice.
6. An enforcement action based on the exercise of a governmental police power not covered by Covered Risk 5 if a notice of the enforcement action, describing any part of the Land, is recorded in the Public Records, but only to the extent of the enforcement referred to in that notice.
7. The exercise of the rights of eminent domain if a notice of the exercise, describing any part of the Land, is recorded in the Public Records.
8. Any taking by a governmental body that has occurred and is binding on the rights of a purchaser for value without Knowledge.
9. Title being vested other than as stated in Schedule A or being defective
   (a) as a result of the avoidance in whole or in part, or from a court order providing an alternative remedy, of a transfer of all or any part of the title to or any interest in the Land occurring prior to the transaction vesting Title as shown in Schedule A because that prior transfer constituted a fraudulent or preferential transfer under federal bankruptcy, state insolvency, or similar creditors' rights laws; or
   (b) because the instrument of transfer vesting Title as shown in Schedule A constitutes a preferential transfer under federal bankruptcy, state insolvency, or similar creditors' rights laws by reason of the failure of its recording in the Public Records
      (i) to be timely, or
      (ii) to impart notice of its existence to a purchaser for value or to a judgment or lien creditor.
10. Any defect in or lien or encumbrance on the Title or other matter included in Covered Risks 1 through 9 that has been created or attached or has been filed or recorded in the Public Records subsequent to Date of Policy and prior to the recording of the deed or other instrument of transfer in the Public Records that vests Title as shown in Schedule A.

The Company will also pay the costs, attorneys' fees, and expenses incurred in defense of any matter insured against by this policy, but only to the extent provided in the Conditions.

First American Title Insurance Company

Dennis J. Gilmore
President

Jeffrey S. Robinson
Secretary

EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy, and the Company will not pay loss or damage, costs, attorneys' fees, or expenses that arise by reason of:

1. (a) Any law, ordinance, permit, or governmental regulation (including those relating to building and zoning) restricting, regulating, prohibiting, or relating to
   (i) the occupancy, use, or enjoyment of the Land;
   (ii) the character, dimensions, or location of any improvement erected on the Land;
   (iii) the subdivision of land; or
   (iv) environmental protection;

   or the effect of any violation of these laws, ordinances, or governmental regulations. This Exclusion 1(a) does not modify or limit the coverage provided under Covered Risk 5.
   (b) Any governmental police power. This Exclusion 1(b) does not modify or limit the coverage provided under Covered Risk 6.
2. Rights of eminent domain. This Exclusion does not modify or limit the coverage provided under Covered Risk 7 or 8.
3. Defects, liens, encumbrances, adverse claims, or other matters
   (a) created, suffered, assumed, or agreed to by the Insured Claimant;
   (b) not Known to the Company, not recorded in the Public Records at Date of Policy, but Known to the Insured Claimant and not disclosed in writing to the Company by the Insured Claimant prior to the date the Insured Claimant became an Insured under this policy;
   (c) resulting in no loss or damage to the Insured Claimant;
   (d) attaching or created subsequent to Date of Policy (however, this does not modify or limit the coverage provided under Covered Risks 9 and 10); or
   (e) resulting in loss or damage that would not have been sustained if the Insured Claimant had paid value for the Title.
4. Any claim, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors' rights laws, that the transaction vesting the Title as shown in Schedule A, is
   (a) a fraudulent conveyance or fraudulent transfer; or
   (b) a preferential transfer for any reason not stated in Covered Risk 9 of this policy.
5. Any lien on the Title for real estate taxes or assessments imposed by governmental authority and created or attaching between Date of Policy and the date of recording of the deed or other instrument of transfer in the Public Records that vests Title as shown in Schedule A.

CONDITIONS

1. DEFINITION OF TERMS

The following terms when used in this policy mean:

(a) "Amount of Insurance": The amount stated in Schedule A, as may be increased or decreased by endorsement to this policy, increased by Section 8(b), or decreased by Sections 10 and 11 of these Conditions.
(b) "Date of Policy": The date designated as "Date of Policy" in Schedule A.
(c) "Entity": A corporation, partnership, trust, limited liability company, or other similar legal entity.
(d) "Insured": The Insured named in Schedule A.
   (i) The term "Insured" also includes
      (A) successors to the Title of the Insured by operation of law as distinguished from purchase, including heirs, devisees, survivors, personal representatives, or next of kin;
      (B) successors to an Insured by dissolution, merger, consolidation, distribution, or reorganization;
      (C) successors to an Insured by its conversion to another kind of Entity;
      (D) a grantee of an Insured under a deed delivered without payment of actual valuable consideration conveying the Title
         (1) if the stock, shares, memberships, or other equity interests of the grantee are wholly-owned by the named Insured,
         (2) if the grantee wholly owns the named Insured,
         (3) if the grantee is wholly-owned by an affiliated Entity of the named Insured, provided the affiliated Entity and the named Insured are both wholly-owned by the same person or Entity, or
         (4) if the grantee is a trustee or beneficiary of a trust created by a written instrument established by the Insured named in Schedule A for estate planning purposes.
   (ii) With regard to (A), (B), (C), and (D) reserving, however, all rights and defenses as to any successor that the Company would have had against any predecessor Insured.
(e) "Insured Claimant": An Insured claiming loss or damage.
(f) "Knowledge" or "Known": Actual knowledge, not constructive knowledge or notice that may be imputed to an Insured by reason of the Public Records or any other records that impart constructive notice of matters affecting the Title.
(g) "Land": The land described in Schedule A, and affixed improvements that by law constitute real property. The term "Land" does not include any property beyond the lines of the area described in Schedule A, nor any right, title, interest, estate, or easement in abutting streets, roads, avenues, alleys, lanes, ways, or waterways, but this does not modify or limit the extent that a right of access to and from the Land is insured by this policy.
(h) "Mortgage": Mortgage, deed of trust, trust deed, or other security instrument, including one evidenced by electronic means authorized by law.
(i) "Public Records": Records established under state statutes at Date of Policy for the purpose of imparting constructive notice of matters relating to real property to purchasers for value and without Knowledge. With respect to Covered Risk 5(d), "Public Records" shall also include environmental protection liens filed in the records of the clerk of the United States District Court for the district where the Land is located.
(j) "Title": The estate or interest described in Schedule A.
(k) "Unmarketable Title": Title affected by an alleged or apparent matter that would permit a prospective purchaser or lessee of the Title or lender on the Title to be released from the obligation to purchase, lease, or lend if there is a contractual condition requiring the delivery of marketable title.

2. CONTINUATION OF INSURANCE

The coverage of this policy shall continue in force as of Date of Policy in favor of an Insured, but only so long as the Insured retains an estate or interest in the Land, or holds an obligation secured by a purchase money Mortgage given by a purchaser from the Insured, or only so long as the Insured shall have liability by reason of warranties in any transfer or conveyance of the Title. This policy shall not continue in force in favor of any purchaser from the Insured of either (i) an estate or interest in the Land, or (ii) an obligation secured by a purchase money Mortgage given to the Insured.

3. NOTICE OF CLAIM TO BE GIVEN BY INSURED CLAIMANT

The Insured shall notify the Company promptly in writing (i) in case of any litigation as set forth in Section 5(a) of these Conditions, (ii) in case Knowledge shall come to an Insured hereunder of any claim of title or interest that is adverse to the Title, as insured, and that might cause loss or damage for which the Company may be liable by virtue of this policy, or (iii) if the Title, as insured, is rejected as Unmarketable Title. If the Company is prejudiced by the failure of the Insured Claimant to provide prompt notice, the Company's liability to the Insured Claimant under the policy shall be reduced to the extent of the prejudice.

4. PROOF OF LOSS

In the event the Company is unable to determine the amount of loss or damage, the Company may, at its option, require as a condition of payment that the Insured Claimant furnish a signed proof of loss. The proof of loss must describe the defect, lien, encumbrance, or other matter insured against by this policy that constitutes the basis of loss or damage and shall state, to the extent possible, the basis of calculating the amount of the loss or damage.

5. DEFENSE AND PROSECUTION OF ACTIONS

(a) Upon written request by the Insured, and subject to the options contained in Section 7 of these Conditions, the Company, at its own cost and without unreasonable delay, shall provide for the defense of an Insured in litigation in which any third party asserts a claim covered by this policy adverse to the Insured. This obligation is limited to only those stated causes of action alleging matters insured against by this policy. The Company shall have the right to select counsel of its choice (subject to the right of the Insured to object for reasonable cause) to represent the Insured as to those stated causes of action. It shall not be liable for and will not pay the fees of any other counsel. The Company will not pay any fees, costs, or expenses incurred by the Insured in the defense of those causes of action that allege matters not insured against by this policy.
(b) The Company shall have the right, in addition to the options contained in

Section 7 of these Conditions, at its own cost, to institute and prosecute any action or proceeding or to do any other act that in its opinion may be necessary or desirable to establish the Title, as insured, or to prevent or reduce loss or damage to the Insured. The Company may take any appropriate action under the terms of this policy, whether or not it shall be liable to the Insured. The exercise of these rights shall not be an admission of liability or waiver of any provision of this policy. If the Company exercises its rights under this subsection, it must do so diligently.

(c) Whenever the Company brings an action or asserts a defense as required or permitted by this policy, the Company may pursue the litigation to a final determination by a court of competent jurisdiction, and it expressly reserves the right, in its sole discretion, to appeal any adverse judgment or order.

6. DUTY OF INSURED CLAIMANT TO COOPERATE

(a) In all cases where this policy permits or requires the Company to prosecute or provide for the defense of any action or proceeding and any appeals, the Insured shall secure to the Company the right to so prosecute or provide defense in the action or proceeding, including the right to use, at its option, the name of the Insured for this purpose. Whenever requested by the Company, the Insured, at the Company's expense, shall give the Company all reasonable aid (i) in securing evidence, obtaining witnesses, prosecuting or defending the action or proceeding, or effecting settlement, and (ii) in any other lawful act that in the opinion of the Company may be necessary or desirable to establish the Title or any other matter as insured. If the Company is prejudiced by the failure of the Insured to furnish the required cooperation, the Company's obligations to the Insured under the policy shall terminate, including any liability or obligation to defend, prosecute, or continue any litigation, with regard to the matter or matters requiring such cooperation.

(b) The Company may reasonably require the Insured Claimant to submit to examination under oath by any authorized representative of the Company and to produce for examination, inspection, and copying, at such reasonable times and places as may be designated by the authorized representative of the Company, all records, in whatever medium maintained, including books, ledgers, checks, memoranda, correspondence, reports, e-mails, disks, tapes, and videos whether bearing a date before or after Date of Policy, that reasonably pertain to the loss or damage. Further, if requested by any authorized representative of the Company, the Insured Claimant shall grant its permission, in writing, for any authorized representative of the Company to examine, inspect, and copy all of these records in the custody or control of a third party that reasonably pertain to the loss or damage. All information designated as confidential by the Insured Claimant provided to the Company pursuant to this Section shall not be disclosed to others unless, in the reasonable judgment of the Company, it is necessary in the administration of the claim. Failure of the Insured Claimant to submit for examination under oath, produce any reasonably requested information, or grant permission to secure reasonably necessary information from third parties as required in this subsection, unless prohibited by law or governmental regulation, shall terminate any liability of the Company under this policy as to that claim.

7. OPTIONS TO PAY OR OTHERWISE SETTLE CLAIMS; TERMINATION OF LIABILITY

In case of a claim under this policy, the Company shall have the following additional options:

(a) To Pay or Tender Payment of the Amount of Insurance.
To pay or tender payment of the Amount of Insurance under this policy together with any costs, attorneys' fees, and expenses incurred by the Insured Claimant that were authorized by the Company up to the time of payment or tender of payment and that the Company is obligated to pay.
Upon the exercise by the Company of this option, all liability and obligations of the Company to the Insured under this policy, other than to make the payment required in this subsection, shall terminate, including any liability or obligation to defend, prosecute, or continue any litigation.

(b) To Pay or Otherwise Settle With Parties Other Than the Insured or With the Insured Claimant.
(i) To pay or otherwise settle with other parties for or in the name of an Insured Claimant any claim insured against under this policy. In addition, the Company will pay any costs, attorneys' fees, and expenses incurred by the Insured Claimant that were authorized by the Company up to the time of payment and that the Company is obligated to pay; or
(ii) To pay or otherwise settle with the Insured Claimant the loss or damage provided for under this policy, together with any costs, attorneys' fees, and expenses incurred by the Insured Claimant that were authorized by the Company up to the time of payment and that the Company is obligated to pay.

Upon the exercise by the Company of either of the options provided for in subsections (b)(i) or (ii), the Company's obligations to the Insured under this policy for the claimed loss or damage, other than the payments required to be made, shall terminate, including any liability or obligation to defend, prosecute, or continue any litigation.

8. DETERMINATION AND EXTENT OF LIABILITY

This policy is a contract of indemnity against actual monetary loss or damage sustained or incurred by the Insured Claimant who has suffered loss or damage by reason of matters insured against by this policy.

(a) The extent of liability of the Company for loss or damage under this policy shall not exceed the lesser of
(i) the Amount of Insurance; or
(ii) the difference between the value of the Title as insured and the value of the Title subject to the risk insured against by this policy.

(b) If the Company pursues its rights under Section 5 of these Conditions and is unsuccessful in establishing the Title, as insured,
(i) the Amount of Insurance shall be increased by 10%, and
(ii) the Insured Claimant shall have the right to have the loss or damage determined either as of the date the claim was made by the Insured Claimant or as of the date it is settled and paid.

(c) In addition to the extent of liability under (a) and (b), the Company will also pay those costs, attorneys' fees, and expenses incurred in accordance with Sections 5 and 7 of these Conditions.

9. LIMITATION OF LIABILITY

(a) If the Company establishes the Title, or removes the alleged defect, lien, or encumbrance, or cures the lack of a right of access to or from the Land, or cures the claim of Unmarketable Title, all as insured, in a reasonably diligent manner by any method, including litigation and the completion of any appeals, it shall have fully performed its obligations with respect to that matter and shall not be liable for any loss or damage caused to the Insured.

(b) In the event of any litigation, including litigation by the Company or with the Company's consent, the Company shall have no liability for loss or damage until there has been a final determination by a court of competent jurisdiction, and disposition of all appeals, adverse to the Title, as insured.

(c) The Company shall not be liable for loss or damage to the Insured for liability voluntarily assumed by the Insured in settling any claim or suit without the prior written consent of the Company.

10. REDUCTION OF INSURANCE; REDUCTION OR TERMINATION OF LIABILITY

All payments under this policy, except payments made for costs, attorneys' fees, and expenses, shall reduce the Amount of Insurance by the amount of the payment.

11. LIABILITY NONCUMULATIVE

The Amount of Insurance shall be reduced by any amount the Company pays under any policy insuring a Mortgage to which exception is taken in Schedule B or to which the Insured has agreed, assumed, or taken subject, or which is executed by an Insured after Date of Policy and which is a charge or lien on the Title, and the amount so paid shall be deemed a payment to the Insured under this policy.

12. PAYMENT OF LOSS

When liability and the extent of loss or damage have been definitely fixed in accordance with these Conditions, the payment shall be made within 30 days.

13. RIGHTS OF RECOVERY UPON PAYMENT OR SETTLEMENT

(a) Whenever the Company shall have settled and paid a claim under this policy, it shall be subrogated and entitled to the rights of the Insured Claimant in the Title and all other rights and remedies in respect to the claim that the Insured Claimant has against any person or property, to the extent of the amount of any loss, costs, attorneys' fees, and expenses paid by the Company. If requested by the Company, the Insured Claimant shall execute documents to evidence the transfer to the Company of these rights and remedies. The Insured Claimant shall permit the Company to sue, compromise, or settle in the name of the Insured Claimant and to use the name of the Insured Claimant in any transaction or litigation involving these rights and remedies.
If a payment on account of a claim does not fully cover the loss of the Insured Claimant, the Company shall defer the exercise of its right to recover until after the Insured Claimant shall have recovered its loss.

(b) The Company's right of subrogation includes the rights of the Insured to indemnities, guaranties, other policies of insurance, or bonds, notwithstanding any terms or conditions contained in those instruments that address subrogation rights.

14. ARBITRATION

Either the Company or the Insured may demand that the claim or controversy shall be submitted to arbitration pursuant to the Title Insurance Arbitration Rules of the American Land Title Association ("Rules"). Except as provided in the Rules, there shall be no joinder or consolidation with claims or controversies of other persons. Arbitrable matters may include, but are not limited to, any controversy or claim between the Company and the Insured arising out of or relating to this policy, any service in connection with its issuance or the breach of a policy provision, or to any other controversy or claim arising out of the transaction giving rise to this policy. All arbitrable matters when the Amount of Insurance is $2,000,000 or less shall be arbitrated at the option of either the Company or the Insured. All arbitrable matters when the Amount of Insurance is in excess of $2,000,000 shall be arbitrated only when agreed to by both the Company and the Insured. Arbitration pursuant to this policy and under the Rules shall be binding upon the parties. Judgment upon the award rendered by the Arbitrator(s) may be entered in any court of competent jurisdiction.

15. LIABILITY LIMITED TO THIS POLICY; POLICY ENTIRE CONTRACT

(a) This policy together with all endorsements, if any, attached to it by the Company is the entire policy and contract between the Insured and the Company. In interpreting any provision of this policy, this policy shall be construed as a whole.

(b) Any claim of loss or damage that arises out of the status of the Title or by any action asserting such claim shall be restricted to this policy.

(c) Any amendment of or endorsement to this policy must be in writing and authenticated by an authorized person, or expressly incorporated by Schedule A of this policy.

(d) Each endorsement to this policy issued at any time is made a part of this policy and is subject to all of its terms and provisions. Except as the endorsement expressly states, it does not (i) modify any of the terms and provisions of the policy, (ii) modify any prior endorsement, (iii) extend the Date of Policy, or (iv) increase the Amount of Insurance.

16. SEVERABILITY

In the event any provision of this policy, in whole or in part, is held invalid or unenforceable under applicable law, the policy shall be deemed not to include that provision or such part held to be invalid, but all other provisions shall remain in full force and effect.

17. CHOICE OF LAW; FORUM

(a) Choice of Law: The Insured acknowledges the Company has underwritten the risks covered by this policy and determined the premium charged therefore in reliance upon the law affecting interests in real property and applicable to the interpretation, rights, remedies, or enforcement of policies of title insurance of the jurisdiction where the Land is located. Therefore, the court or an arbitrator shall apply the law of the jurisdiction where the Land is located to determine the validity of claims against the Title that are adverse to the Insured and to interpret and enforce the terms of this policy. In neither case shall the court or arbitrator apply its conflicts of law principles to determine the applicable law.

(b) Choice of Forum: Any litigation or other proceeding brought by the Insured against the Company must be filed only in a state or federal court within the United States of America or its territories having appropriate jurisdiction.

18. NOTICES, WHERE SENT

Any notice of claim and any other notice or statement in writing required to be given to the Company under this policy must be given to the Company at 1 First American Way, Santa Ana, CA 92707, Attn: Claims Department.

POLICY OF TITLE INSURANCE

FIRST AMERICAN

SCHEDULE A

First American Title Insurance Company

Name and Address of Title Insurance Company:
First American Title Insurance Company
1 First American Way
Santa Ana, CA 92707

File No.: **OSA-4935627**

Policy No.: **4935627**

Address Reference: No Situs Found, Riverside, CA

Amount of Insurance: $1,085,000.00

Premium: $2,216.00

Date of Policy: August 04, 2015 at 1:36 P.M.

1. Name of Insured:

   BP Riverside Partners, LLC, a limited liability company

2. The estate or interest in the Land that is insured by this policy is:

   A Fee.

3. Title is vested in:

   BP Riverside Partners, LLC, a limited liability company

4. The Land referred to in this policy is described as follows:

   Real property in the City of Riverside, County of Riverside, State of California, described as follows:

   PARCEL 1: (PORTION OF APN 233-180-007-6)

   ALL THAT PORTION OF LOT 1 IN BLOCK 30 OF THE LANDS OF THE RIVERSIDE LAND AND IRRIGATING COMPANY, AS SHOWN BY MAP ON FILE IN BOOK 1 OF MAPS, AT PAGE 70 THEREOF, RECORDS OF SAN BERNARDINO COUNTY, DESCRIBED AS FOLLOWS:

   COMMENCING ON THE NORTHERLY LINE OF LOT ONE (1) IN BLOCK THIRTY (30) OF THE LANDS OF THE RIVERSIDE LAND AND IRRIGATING COMPANY, AS SHOWN BY MAP RECORDED IN BOOK 1 PAGE 70 OF MAPS, RECORDS OF SAN BERNARDINO COUNTY, CALIFORNIA, FOUR HUNDRED THIRTY-FIVE AND SIX-TENTHS (435.6) FEET WESTERLY FROM THE NORTHEASTERLY CORNER OF SAID LOT ONE (1) THENCE WESTERLY ALONG THE NORTHERLY LINE OF SAID LOT ONE (1), NINETY AND FORTY-THREE ONE-HUNDREDTHS (90.43) FEET;
   THENCE AT A RIGHT ANGLE SOUTHERLY FOUR HUNDRED SIXTY-THREE AND TWENTY-EIGHT ONE-HUNDREDTHS (463.28) FEET TO THE RIGHT OF WAY OF THE SOUTHERN CALIFORNIA RAILROAD;
   THENCE EASTERLY ALONG THE NORTHERLY LINE OF SAID RIGHT OF WAY TO A POINT OPPOSITE THE POINT OF BEGINNING;
   THENCE NORTHERLY FIVE HUNDRED AND FIFTEEN ONE-HUNDREDTHS (500.15) FEET TO THE POINT OF BEGINNING.

   PARCEL 2: (PORTION OF APN 233-180-007-6)

   ALL THAT PORTION OF LOT 1 IN BLOCK 30 OF THE LANDS OF THE RIVERSIDE LAND AND IRRIGATING COMPANY, AS SHOWN BY MAP ON FILE IN BOOK 1 OF MAPS, AT PAGE 70

THEREOF, RECORDS OF SAN BERNARDINO COUNTY, DESCRIBED AS FOLLOWS:

THE WESTERLY ONE-HALF (W ½) OF THE FOLLOWING DESCRIBED PARCEL OF LAND:

BEGINNING AT A POINT IN SAID LOT AND BLOCK WHERE THE SOUTHERLY LINE OF INDIANA AVENUE INTERSECTS THE WESTERLY LINE OF JACKSON STREET;
THENCE RUNNING WESTERLY ALONG THE SAID SOUTHERLY LINE OF INDIANA AVENUE, FOUR HUNDRED THIRTY-FIVE AND SIX-TENTHS (435.6) FEET;
THENCE AT A RIGHT ANGLE TO SAID SOUTHERLY LINE OF INDIANA AVENUE AND PARALLEL WITH THE SAID WESTERLY LINE OF JACKSON STREET, FOUR HUNDRED TWENTY-EIGHT AND SEVEN-TENTHS (428.7) FEET IN A SOUTHERLY DIRECTION;
THENCE EASTERLY FOUR HUNDRED THIRTY-NINE (439) FEET TO A POINT ON THE WESTERLY LINE OF JACKSON STREET, THREE HUNDRED FIFTY-SIX AND THREE-TENTHS (356.3) FEET SOUTHERLY FROM THE POINT OF BEGINNING;
THENCE NORTHERLY ALONG THE SAID WESTERLY LINE OF JACKSON STREET, THREE HUNDRED FIFTY-SIX AND THREE TENTHS (356.3) FEET TO THE POINT OF BEGINNING, THE NORTHEASTERLY LINE OF SAID WESTERLY ONE-HALF BEING PARALLEL WITH JACKSON STREET.

PARCEL 3: (ALL OF APN 233-170-001-9 AND PORTION OF APN 233-180-007-6)

ALL THAT PORTION OF LOTS 1 AND 2 IN BLOCK 30 OF THE LANDS OF RIVERSIDE LAND AND IRRIGATION COMPANY, AS SHOWN BY MAP ON FILE IN BOOK 1 OF MAPS, AT PAGE 70 THEREOF, RECORDS OF SAN BERNARDINO COUNTY, DESCRIBED AS FOLLOWS:

BEGINNING AT THE INTERSECTION OF THE SOUTHEASTERLY LINE OF INDIANA AVENUE, AND THE SOUTHWESTERLY LINE OF JACKSON STREET;
THENCE SOUTHWESTERLY ALONG THE SOUTHEASTERLY LINE OF INDIANA AVENUE, A DISTANCE OF 526.03 FEET TO THE TRUE POINT OF BEGINNING OF THE PARCEL OF LAND TO BE DESCRIBED;
THENCE SOUTH 34° 00' EAST, AND PARALLEL WITH THE SOUTHWESTERLY LINE OF JACKSON STREET, A DISTANCE OF 463.28 FEET TO THE NORTHERLY LINE OF THE ATCHESON, TOPEKA AND SANTA FE RAILROAD RIGHT OF WAY;
THENCE SOUTH 78° 12' WEST, ALONG THE NORTHERLY LINE OF SAID ATCHESON TOPEKA AND SANTA FE, RAILROAD RIGHT OF WAY, A DISTANCE OF 493.95 FEET;
THENCE NORTH 34° 00' WEST, A DISTANCE OF 276.65 FEET TO THE SOUTHEASTERLY LINE OF INDIANA AVENUE;
THENCE NORTH 56° 00' EAST, ALONG THE SOUTHEASTERLY LINE OF INDIANA AVENUE, A DISTANCE OF 457.33 FEET TO THE TRUE POINT OF BEGINNING.

SCHEDULE B

File No. **OSA-4935627** Policy No. **4935627**

EXCEPTIONS FROM COVERAGE

This Policy does not insure against loss or damage, and the Company will not pay costs, attorneys' fees, or expenses that arise by reason of:

Part One:

1. (a) Taxes or assessments that are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the Public Records; (b) proceedings by a public agency that may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the Public Records.

2. Any facts, rights, interests, or claims that are not shown by the Public Records but that could be ascertained by an inspection of the Land or that may be asserted by persons in possession of the Land.

3. Easements, liens or encumbrances, or claims thereof, not shown by the Public Records.

4. Any encroachment, encumbrance, violation, variation, or adverse circumstance affecting the Title that would be disclosed by an accurate and complete land survey of the Land and not shown by the Public Records.

5. (a) Unpatented mining claims; (b) reservations or exceptions in patents or in Acts authorizing the issuance thereof; (c) water rights, claims or title to water, whether or not the matters excepted under (a), (b), or (c) are shown by the Public Records.

6. Any lien, or right to a lien for services, labor or material not shown by the public records.

Part Two:

1. General and special taxes and assessments for the fiscal year 2015-2016, a lien not yet due or payable.

2. General and special taxes and assessments for the fiscal year 2014-2015 are exempt.

3. The lien of supplemental taxes, if any, assessed pursuant to Chapter 3.5 commencing with Section 75 of the California Revenue and Taxation Code.

4. A right of way reserved to the Riverside Water Company, its successors or assigns, for the construction and maintenance of all necessary water ditches, pipes, flumes and apparatus for the purpose of irrigation and domestic use; the exact location thereof not being disclosed by the records.

5. An easement for all water pipes, ditches, other conduits and incidental purposes, recorded August 14, 1885 in Book 42 of Deeds, Page 294 and 296 in San Bernardino County Records.

In Favor of: Riverside Water Company, a corporation
Affects: The location of the easement cannot be determined from record information.

6. An easement for water pipes and ditches, flumes, conduits, and purposes incidental thereto, for irrigation and domestic use and incidental purposes, recorded December 26, 1895 in Book 28 of Deeds, Page 385 in Riverside County Records.
   In Favor of: South Riverside Land and Water Company and conveyed to Temescal Water Company
   Affects: The location of the easement cannot be determined from record information.

7. The effect of a map purporting to show the land and other property, filed January 17, 1947 in Book 14, Page 13 of Record of Surveys.

8. The terms and provisions contained in the document entitled "Judgment in Eminent Domain and Final Order of Condemnation" recorded May 23, 1961 as Instrument No. 61-43918 of Official Records.

   Said condemnation was in favor of The City of Riverside for the purpose of conducting, storing, supplying and distributing water.

9. The fact that the land lies within the boundaries of the Arlington Redevelopment Project Area, Amendment No. 2 as disclosed by various documents of record.

10. The fact that the land lies within the boundaries of the La Sierra/Arlanza Redevelopment Project Area, as disclosed by various documents of record.

11. Water rights, claims or title to water, whether or not shown by the public records.

12. Rights of the public in and to that portion of the land lying within any Road, Street, Alley or Highway.

First American Title

Privacy Information

We Are Committed to Safeguarding Customer Information

In order to better serve your needs now and in the future, we may ask you to provide us with certain information. We understand that you may be concerned about what we will do with such information - particularly any personal or financial information. We agree that you have a right to know how we will utilize the personal information you provide to us. Therefore, together with our subsidiaries we have adopted this Privacy Policy to govern the use and handling of your personal information.

Applicability

This Privacy Policy governs our use of the information that you provide to us. It does not govern the manner in which we may use information we have obtained from any other source, such as information obtained from a public record or from another person or entity. First American has also adopted broader guidelines that govern our use of personal information regardless of its source. First American calls these guidelines its Fair Information Values.

Types of Information

Depending upon which of our services you are utilizing, the types of nonpublic personal information that we may collect include:

- Information we receive from you on applications, forms and in other communications to us, whether in writing, in person, by telephone or any other means;
- Information about your transactions with us, our affiliated companies, or others; and
- Information we receive from a consumer reporting agency.

Use of Information

We request information from you for our own legitimate business purposes and not for the benefit of any nonaffiliated party. Therefore, we will not release your information to nonaffiliated parties except: (1) as necessary for us to provide the product or service you have requested of us; or (2) as permitted by law. We may, however, store such information indefinitely, including the period after which any customer relationship has ceased. Such information may be used for any internal purpose, such as quality control efforts or customer analysis. We may also provide all of the types of nonpublic personal information listed above to one or more of our affiliated companies. Such affiliated companies include financial service providers, such as title insurers, property and casualty insurers, and trust and investment advisory companies, or companies involved in real estate services, such as appraisal companies, home warranty companies and escrow companies. Furthermore, we may also provide all the information we collect, as described above, to companies that perform marketing services on our behalf, on behalf of our affiliated companies or to other financial institutions with whom we or our affiliated companies have joint marketing agreements.

Former Customers

Even if you are no longer our customer, our Privacy Policy will continue to apply to you.

Confidentiality and Security

We will use our best efforts to ensure that no unauthorized parties have access to any of your information. We restrict access to nonpublic personal information about you to those individuals and entities who need to know that information to provide products or services to you. We will use our best efforts to train and oversee our employees and agents to ensure that your information will be handled responsibly and in accordance with this Privacy Policy and First American's Fair Information Values. We currently maintain physical, electronic, and procedural safeguards that comply with federal regulations to guard your nonpublic personal information.

Information Obtained Through Our Web Site

First American Financial Corporation is sensitive to privacy issues on the Internet. We believe it is important you know how we treat the information about you we receive on the Internet.

In general, you can visit First American or its affiliates' Web sites on the World Wide Web without telling us who you are or revealing any information about yourself. Our Web servers collect the domain names, not the e-mail addresses, of visitors. This information is aggregated to measure the number of visits, average time spent on the site, pages viewed and similar information. First American uses this information to measure the use of our site and to develop ideas to improve the content of our site.

There are times, however, when we may need information from you, such as your name and email address. When information is needed, we will use our best efforts to let you know at the time of collection how we will use the personal information. Usually, the personal information we collect is used only by us to respond to your inquiry, process an order or allow you to access specific account/profile information. If you choose to share any personal information with us, we will only use it in accordance with the policies outlined above.

Business Relationships

First American Financial Corporation's site and its affiliates' sites may contain links to other Web sites. While we try to link only to sites that share our high standards and respect for privacy, we are not responsible for the content or the privacy practices employed by other sites.

Cookies

Some of First American's Web sites may make use of "cookie" technology to measure site activity and to customize information to your personal tastes. A cookie is an element of data that a Web site can send to your browser, which may then store the cookie on your hard drive.

FirstAm.com uses stored cookies. The goal of this technology is to better serve you when visiting our site, save you time when you are here and to provide you with a more meaningful and productive Web site experience.

Fair Information Values

Fairness We consider consumer expectations about their privacy in all our businesses. We only offer products and services that assure a favorable balance between consumer benefits and consumer privacy.

Public Record We believe that an open public record creates significant value for society, enhances consumer choice and creates consumer opportunity. We actively support an open public record and emphasize its importance and contribution to our economy.

Use We believe we should behave responsibly when we use information about a consumer in our business. We will obey the laws governing the collection, use and dissemination of data.

Accuracy We will take reasonable steps to help assure the accuracy of the data we collect, use and disseminate. Where possible, we will take reasonable steps to correct inaccurate information. When, as with the public record, we cannot correct inaccurate information, we will take all reasonable steps to assist consumers in identifying the source of the erroneous data so that the consumer can secure the required corrections.

Education We endeavor to educate the users of our products and services, our employees and others in our industry about the importance of consumer privacy. We will instruct our employees on our fair information values and on the responsible collection and use of data. We will encourage others in our industry to collect and use information in a responsible manner.

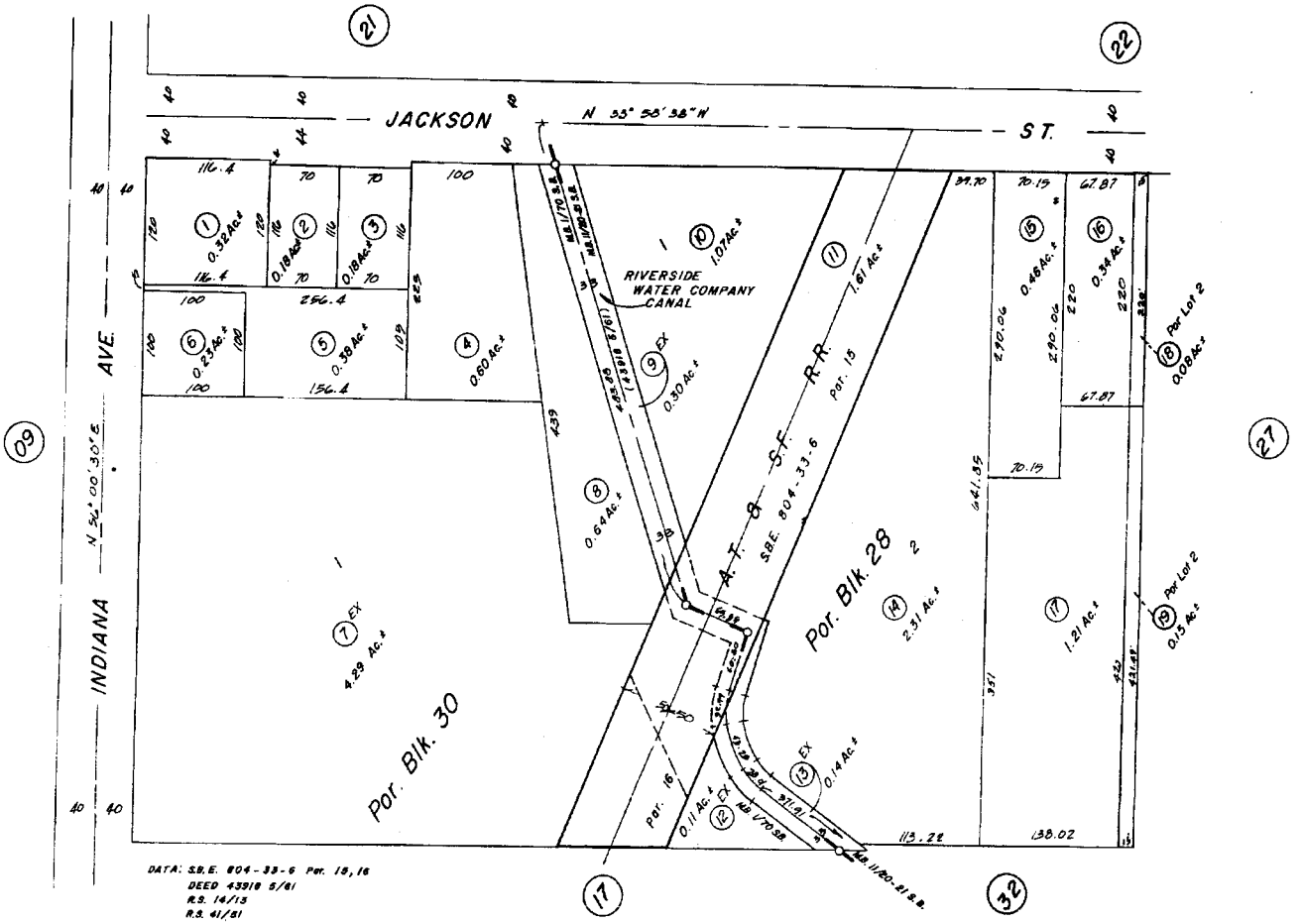
Security We will maintain appropriate facilities and systems to protect against unauthorized access to and corruption of the data we maintain.

Description: Riverside,CA Assessor Map 233.18 Page: 1 of 1
Order: 1kjl;kj Comment:

POR. CITY OF RIVERSIDE
(R.L. & I. T.3S. R.5W.)

T.R.A. 009-139

5-40, 233-20
233-18



DATA: S.B.E. 804-33-6 Por. 15, 16
DEED 43918 5/61
R.S. 14/13
R.S. 41/51

M.B. 1/70 S.B. R.L. & I. Co. Lds.
M.B. 11/20-21 S.B. Arlington Hts.

MAY 1974

DATE	OLD NO.	NEW NO.
3/83	200-38	18
"	200-37	19

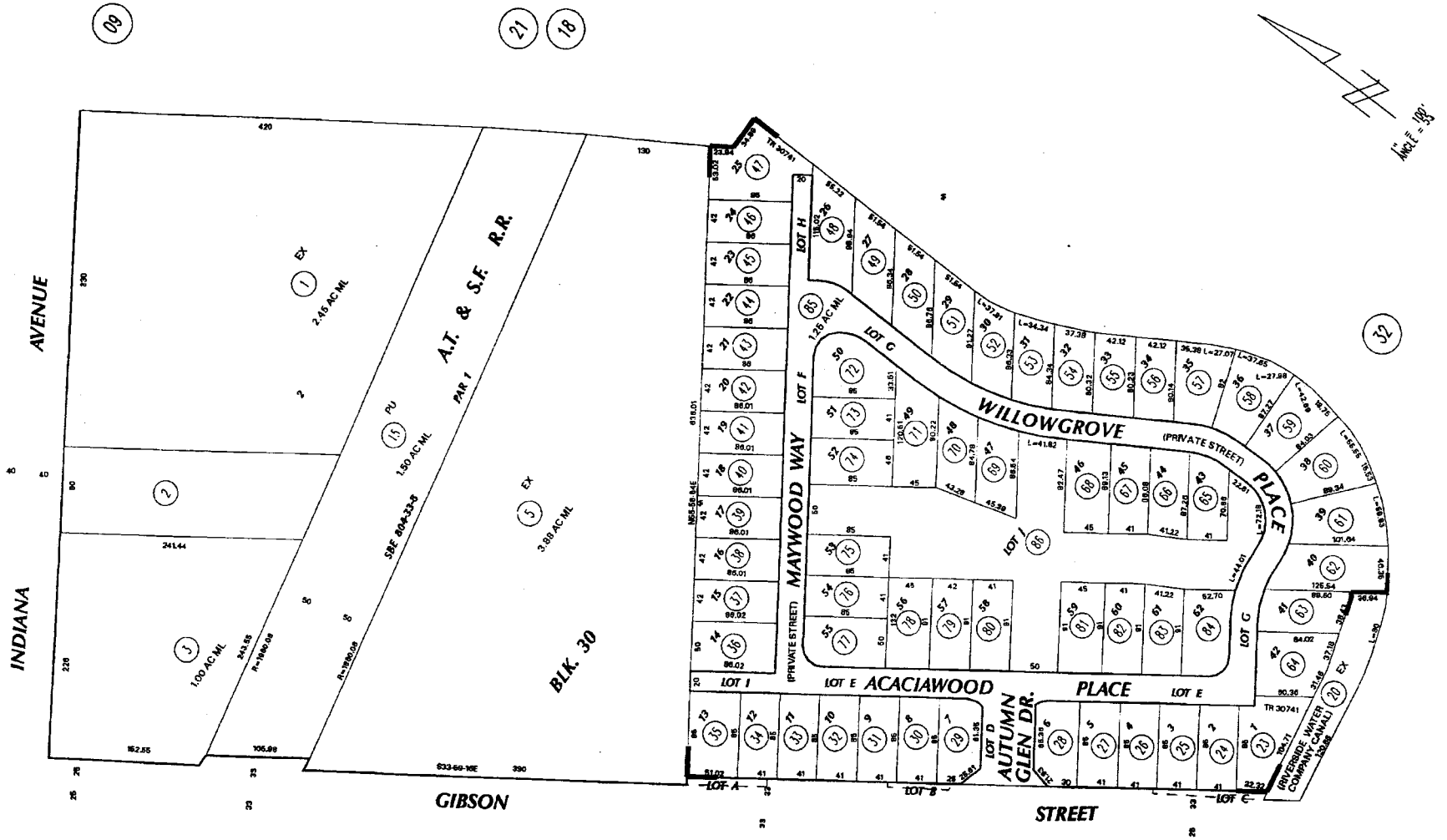
ASSESSOR'S MAP BK. 233 PG. 18
RIVERSIDE COUNTY, CALIF.

S PREPARED FOR ASSESSMENT PURPOSES ONLY. NO LIABILITY
OR THE ACCURACY OF THE DATA SHOWN. ASSESSOR'S PARCEL
LY WITH LOCAL LOT-SPLIT OR BUILDING SITE ORDINANCES.
2004

SEC.17 18 7 8 T.3S.,R.5W
CITY OF RIVERSIDE

T.R.A. 009-139

233-17
5-40



DATA: S.B.E. 804-33-8 PAR. 1
B.S. 14/13
DEED 43918 5/61

DATE	OLD NUMBER	NEW NUMBER
09/74	4	15
12/74	9	16
12/74	9	18
12/74	12	19
12/84	14	20,21
12/84	6,7,8,10,13	22
12/84	16,18,19,21	23
12/84	23	25-88

ASSESSOR'S MAP BK233 PG.17
Riverside County, Calif.

BCB

MB 1/70 S.B. R.L. & I. CO. LDS.
MB 365/49-53 TRACT MAP NO. 30741

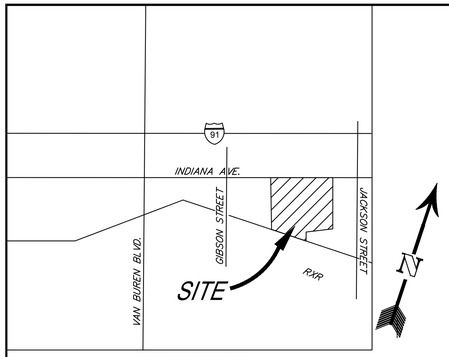
Dec 2004

Description: Riverside,CA Assessor Map 233.17 Selection from page 1
Order: Ikjl;kj Comment:

IN THE CITY RIVERSIDE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA.

TENTATIVE TRACT MAP NO.37032
9170 INDIANA AVENUE

54 LOT PLANNED RESIDENTIAL DEVELOPMENT
CITY OF RIVERSIDE, CA
AUGUST 2016



VICINITY MAP
NOT TO SCALE
THOMAS GUIDE PAGE: 715 GRID: A6

OWNER/APPLICANT
STEVEN WALKER COMMUNITIES, INC.
7161 INDIANA AVE., STE. 300
RIVERSIDE, CA 92504
951-274-3679

ENGINEER
SDH & ASSOCIATES, INC.
5225 CANYON CREST DRIVE 71439
RIVERSIDE, CA. 92507
VOICE: (951) 683-3691
FAX: (951) 788-2314

ASSESSOR'S PARCEL NO.
233-180-007-6
233-170-001-9

PROJECT INFO
AREA OF SITE = 6.85 AC.
NUMBER OF UNITS = 54
LOT AREA = 186,685 S.F.
STREET AREA = 49,697 S.F.
COMMON OPEN SPACE = 52,252 S.F.

GENERAL PLAN DESIGNATION
EXISTING - BUSINESS PARK (B/OP)
PROPOSED - RESIDENTIAL (MHDR)

ZONING
EXISTING - PF-PUBLIC FACILITIES
PROPOSED - R-1-7000

SCHOOL DISTRICT
RIVERSIDE UNIFIED
SCHOOL DISTRICT

UTILITY PURVEYORS
WATER.....CITY OF RIVERSIDE
GAS.....SO. CALIF. GAS
ELECTRICAL.....CITY OF RIVERSIDE
TELEPHONE.....PACIFIC BELL
SEWER.....CITY OF RIVERSIDE
CABLE .....CHARTER COMM.

LEGAL DESCRIPTION
A PORTION OF LOT 1 IN BLOCK 30 OF THE LANDS OF THE RIVERSIDE LAND AND IRRIGATION COMPANY, AS SHOWN BY MAP ON FILE IN BOOK 1 OF MAPS, AT PAGE 70, RECORDS OF SAN BERNARDINO COUNTY.

SOURCE OF TOPO
FIELD SURVEY BY RALSTON SURVEY SEPT. 2015
AERIAL PHOTOGRAMMETRY BY INLAND AERIAL SEPT. 2015

CONSTRUCTION NOTES
1. CONSTRUCT 3" OVER 5" BASE PAVING
2. CONSTRUCT 6" CURB & GUTTER
3. CONSTRUCT 6"-12" DIA RIP RAP
4. CONSTRUCT CROSS GUTTER
5. CONSTRUCT RETAINING WALL (5' MAX)

LOT INFO

LOT	AREA (S.F.)
1	5,880
2	3,510
3	3,510
4	3,510
5	3,510
6	3,510
7	3,735
8	5,661
9	4,809
10	3,272
11	3,285
12	3,285
13	3,285
14	3,285
15	3,285
16	3,285
17	3,150
18	3,150
19	3,256
20	3,375
21	3,750
22	3,285
23	3,285
24	3,285
25	3,285
26	3,285
27	3,285
28	3,285
29	3,285
30	3,370
31	3,199
32	3,212
33	3,212
34	3,212
35	3,212
36	3,285
37	3,285
38	3,212
39	3,212
40	3,212
41	3,212
42	3,199
43	3,199
44	3,212
45	3,212
46	3,212
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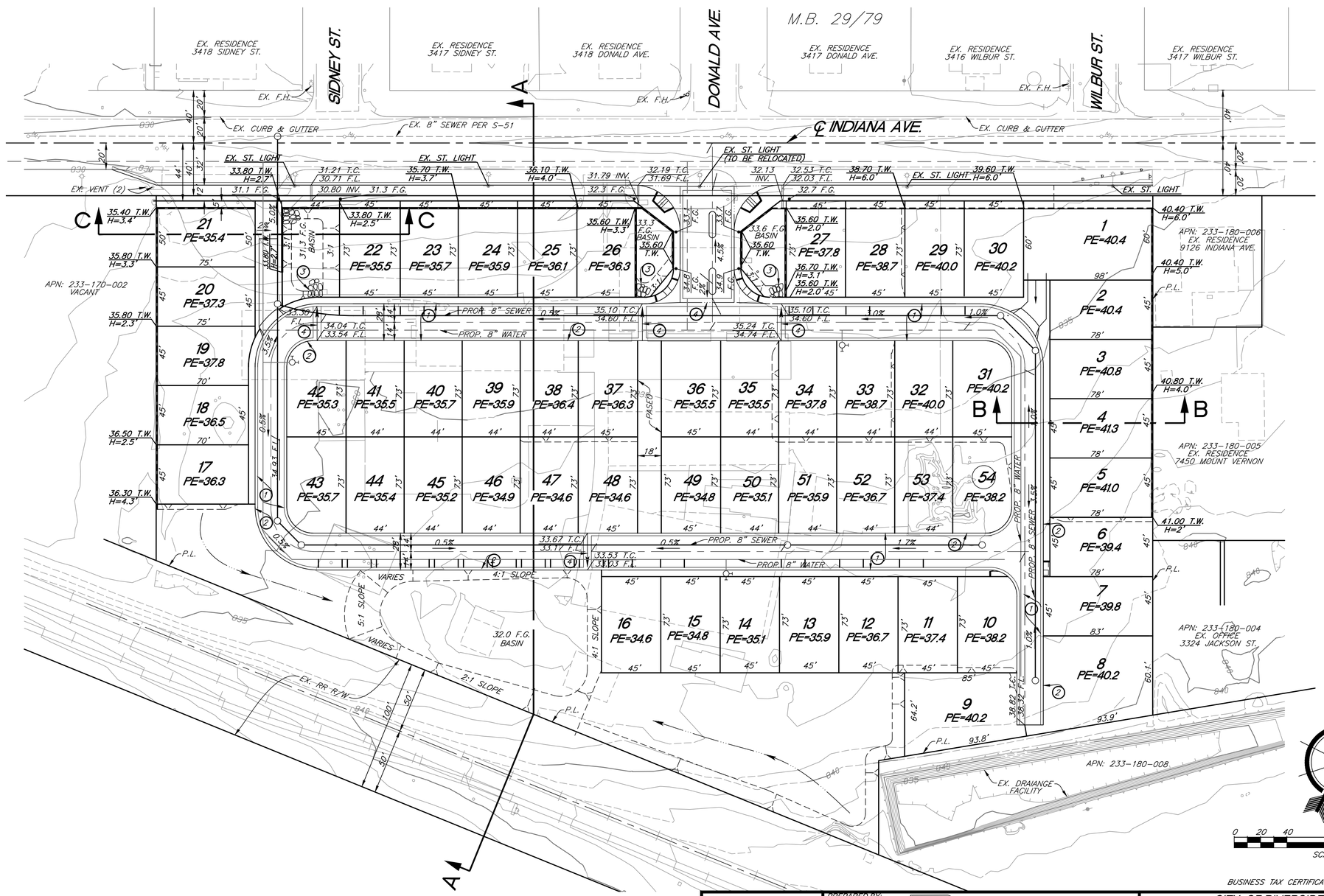
52	3,212
53	3,212
54	3,199



BUSINESS TAX CERTIFICATE NO. 107994 EXP. 6-13-16

SEAL: REGISTERED PROFESSIONAL ENGINEER ROBERT C. VAN ZANTEN No. 62325 Exp. 9-30-17 CIVIL STATE OF CALIFORNIA

PREPARED BY: SDH & ASSOCIATES INCORPORATED
SDH AND ASSOCIATES INC.
5225 CANYON CREST DRIVE 71439
Riverside, California 92507
TEL: (951) 683-3691 FAX (951) 788-2314

SCALE: 1" =40'
DATE: FEBRUARY 2016
BENCHMARK

CITY OF RIVERSIDE
TTM 37032
9170 INDIANA AVENUE

1 OF 2 SHEETS

Appendix F2:
Phase I Sampling and Testing Results

BERKELEY
CARLSBAD
FRESNO
IRVINE
PALM SPRINGS
POINT RICHMOND
RIVERSIDE
ROCKLIN
SAN LUIS OBISPO

PROJECT MEMORANDUM

Date: April 26, 2017

To: Steve Berzansky, Steven Walker Communities

From: Kent Norton, REPA, LSA Associates Riverside

Project: Hawthorne Property City of Riverside Environmental Site Assessment

Subject: Phase II Hazmat Sampling and Testing Results

On November 23, 2016, LSA prepared a Phase I Environmental Site Assessment (ESA) for the 6.85-acre Hawthorne property (APNs 233-170-001 & 233-180-007) located at 9170 Indiana Avenue, near the southwest corner of Indiana Avenue and Jackson Street, in the City of Riverside, western Riverside County, California. The Phase I report concluded that because the site and surrounding area supported agriculture in the past, and the site is adjacent to an active railroad line, LSA recommended surficial soil testing for agricultural pesticides, herbicides, and broad spectrum hydrocarbons as part of Phase II work to determine if any contamination from past agricultural or possible railroad activities exists on the site. The ESA then recommended the following six (6) laboratory tests:

1. EPA Method 8015B (carbon chain analysis)
2. EPA Method 8081A (organochlorine pesticides)
3. EPA Method 8151B (chlorinated herbicides)
4. EPA Test for Arsenic (agricultural pesticides)
5. Asbestos-Containing Materials (ACMs) in the former school buildings
6. Lead-Based Paint (LBP) in the former school buildings

In January to February 2017, GeoMat and Babcock Laboratories Inc. completed Phase II soil sampling and laboratory testing for the Hawthorne property based on the results of the Phase I report. The tests were conducted on soil samples from four (4) locations spread evenly across the site from west to east at depths of one foot and three feet (see map). It should be noted the 3-foot samples were to be tested only if the 1-foot samples showed elevated results. The attached map shows the location of the sampling sites. As indicated by the attached laboratory testing results, none of the sampled locations showed elevated levels of any of the tested species (i.e., above established standards or recommended action levels for residential properties).

Therefore, no **soil** remediation activities are required or recommended as part of demolition, clearing/grubbing, or grading relative to the subject property.

The attached sampling and testing information at the Hawthorne School Site indicates asbestos-containing materials (ACMs) are present in at least some of the former school buildings. However, no specific testing for lead-based paint (LBP) has yet been conducted at this time.

Therefore this Phase II report recommends representative LBP sampling and testing be conducted on the former school buildings prior to demolition. In addition, any demolition actions involving the former school buildings must incorporate appropriate remediation and disposal of ACMs and LBPs by licensed contractors as appropriate.

QUALIFICATIONS OF ENVIRONMENTAL PROFESSIONAL

Mr. Norton has been conducting assessments for hazardous materials for 35 years in Southern California. Until July 2012, Mr. Norton was a Class I Registered Environmental Assessor (R.E.A.) with the State of California (#06827). Mr. Norton was certified in June of 1997 and performed Phase I ESAs for dozens of private properties and hundreds of telecommunication sites throughout Southern California as an REA. In July 2012, the State Department of Toxic Substances Control (DTSC) suspended the REA program. However, Mr. Norton's qualifications are still sufficient to continue preparing Phase 1 ESA reports as an "Environmental Professional" as allowed under ASTM 1527 guidelines.

I declare that, to the best of my professional knowledge and belief, I meet the definition of Environmental Professional as defined in § 312.10 of this part.

I have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. I have developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312."

Kent Norton, Senior Environmental Planner
Environmental Professional[1]

CLASS 1 REGISTERED ENVIRONMENTAL ASSESSOR
KENT K. NORTON
No. 06827
Expires 12 KN
STATE OF CALIFORNIA

Attachments: Babcock Laboratory Results (2 Reports)
Site Sampling Location Map
School District ACM Testing Info 10-16-14
Soil Sampling Report Geomat 1-23-17

[1] Registered Environmental Property Assessor (REPA) and former California DTSC Registered Environmental Assessor #06827

GeoMat Testing Laboratories, Inc.

Soil Engineering, Environmental Engineering, Materials Testing, Geology

January 23, 2017

Project No. 16193-01

TO: Kingsfield Development
7111 Indiana Avenue, Suite 300
Riverside, California 92504

ATTENTION: Ms. Carol Carter

SUBJECT: Preliminary Soil Investigation Report, Hawthorne Heights Project, Single Family Homes, APNs 233-170-001 and 233-180-007, City of Riverside, California

Introduction

In accordance with your authorization, GeoMat Testing Laboratories, Inc. has conducted a preliminary soil investigation for the subject site. This report should be considered only preliminary in nature; its purpose is to determine the general foundation system for the structures described herein. The following presents a summary of our findings, conclusions, recommendations, and limitations of our work for the proposed construction.

Scope of Work

- Review soils, seismic, groundwater data, and maps in our files.
- Exploration of the site at accessible location by means of a drill rig.
- Field engineer for logging, observe drilling resistance/caving.
- Sampling of select soils.
- Conduct laboratory testing of select soil samples for classification, direct shear, soluble sulfate content, and hydrocollapse.
- Prepare CBC seismic design parameters.
- Preparation of a soil investigation report to include: Site preparation recommendations, Liquefaction Analysis, Overexcavation depth, Allowable soil bearing value, Foundation recommendations, Slab-on-grade recommendations, Earth pressures, Grading specifications, Pavement design, Site Class, CBC seismic design parameters.

Existing Site Condition

The subject site is located in a residential neighborhood, on the south side of Indiana Avenue between Jackson Street and Gibson Street, in the city of Riverside, California. Access on site is on Indiana Avenue which is a paved street with concrete curb and gutter.

The site is bordered by a vacant lot on the west, residential homes on the east, and BNSF railroad tracks and Riverside Canal on the south. The geographical relationship of the site and surrounding vicinity is shown on our Site Location Map, Figure 1.

Currently, the site has an old abandoned elementary school on it. The school consists of approximately 6 single story wood framed buildings, asphalt and concrete drives and play areas, and grass fields. There are several mature trees on site. Historic aerial photos (Google Earth) show construction debris, woodchips, sand, and possibly soil stockpiled on site, mostly on the east end. The site is approximately 6.74 acres.

Proposed Development

We understand that the site is proposed for a development of single family homes. The residential structures are expected to be light weight wood frame construction. Proposed site grades are not anticipated to change significantly from existing grades. A grading plan is not available, however based on flat/level site topography, we have assumed that minor cut and/or fill grading not exceeding three feet may be proposed. We should be provided with a copy of the grading plans when available to review the recommendations contained herein.

Our recommendations are based upon the assumed grading information. We should be notified if the actual loads and/or grades change significantly during the project design to either confirm or modify our recommendations

Field Work

Seven exploratory boreholes were drilled on January 14, 18, 19, 20, and 21, 2017, and one borehole drilled on October 24, 2015, to a maximum depth of 50 feet below existing ground surface utilizing a CME 45 equipped with 6-inch hollows stem augers and a Dames and Moore California Ring Sampler. A field engineer from this office observed the drilling and prepared the boring logs. Stratification lines on the logs represent the approximate boundary between soil types, although the transitions may actually be gradual. Refer to Plate 1 for location of exploratory borehole.

Sampling with Drill Rig

Relatively undisturbed samples were obtained with the California Ring Sampler (ASTM D 1587). This sampler has three inches external diameter, 2.5 inches inside diameter, and is lined with one inch high brass rings, with an inside diameter of 2.41-inches. The sample barrel is driven into the ground at the bottom of the boring with 140-pound hammer with a free fall of approximately 30-inches.

Sampler driving resistance, expressed as blows per six inches of penetration, is presented on the boring logs at the respective sampling depths. Ring samples were retained in close-fitting, moisture tight canisters for transport to our laboratory for testing. A bulk sample was also collected from the auger cuttings during drilling. The sample was collected in a plastic bag, tied, and tagged for the location and depth.

Sampling with Dames and Moore

Exploratory boreholes were drilled utilizing a gas operated limited access drill equipped with solid stem augers. Sampling was conducted by Dames and Moore California Ring Sampler (see Exploratory Boring Location Map, Plate 1). This sampler has three inches external diameter, 2.5 inches inside diameter, and is lined with one inch high brass rings, with an inside diameter of 2.41-inches.

The sample barrel was driven into the ground at the bottom of the excavation with 35-pound hammer with a free fall of approximately 36-inches. Sampler driving resistance, expressed as number of blows for 12-inch of penetration, was recorded. Ring samples were retained in close-fitting, moisture tight canisters for transport to our laboratory for testing. A bulk sample was collected in sealable from the auger cuttings during drilling.

To convert the field blow count to an SPT equivalent, we have utilized the conversion formula by D.M. Burmister, 1948, "The importance and practical use of relative density in soil mechanics: *Proceedings of ASTM, v. 48:1249."*

$$N_{(corrected)} = N_{(raw)} \times \frac{W. \times H}{(140)\,(30)} \times \frac{[(2)^2 - (1.375)^2]}{(D_o)^2 - (D_i)^2}$$

W: hammer weight=35 (lb), H: Drop Height 36 in D_o: Diameter of sample barrel= 3 in D_i: Diameter of drive sample= 2.4 in

The geotechnical boring log is presented in Appendix B and may include a description and classification of each stratum, sample locations, blow counts, groundwater conditions encountered during drilling, results from selected types of laboratory tests, and coring information.

Each boring, unless noted otherwise, was backfilled with cuttings at the completion of the logging and sampling. The backfill, however, may settle with time, and it is the responsibility of owner to ensure that such settlement does not become a liability.

Subsurface Findings

Based on our exploratory borings, the exposed surficial material is generally classified as medium dense silty sand (USCS "SM"). Underlying the silty sand is lateral layering of medium dense sand with silt and sand (USCS "SP-SM", "SW-SM", and "SP"), medium dense silty sand (USCS "SM"), and very firm sandy silt (USCS "ML"). No groundwater, or perched water, was encountered during any of the borings.

Loose silty sand was encountered at 5 feet below ground surface on the south end of the site (see borehole B-6). From our past experience, loose sandy soil is anticipated north of the BNSF railroad tracks in this area of riverside.

Approximately one foot thick layer of wood chips was encountered at the surface in borehole B-3, and appeared to be spread out on the northeast section of the site.

Laboratory Testing

Laboratory tests were performed on selected soil samples. The tests consisted primarily of moisture, density, sieve analysis, direct shear, sulfate content, and hydrocollapse.

The soil classifications are in conformance with the Unified Soil Classifications System (USCS), as outlined in the Classification and Symbols Chart (Appendix B). A summary of our laboratory testing and ASTM designation is presented in Appendix C.

Groundwater

Groundwater study is not within the scope of this work. Groundwater was not encountered in our exploratory borings drilled at the site up to 50 feet below ground surface. Depth to groundwater is not expected to impact site grading.

Highest historical groundwater records were researched utilizing the State of California, Department of Water Resources, Steve Mains' Cooperative Well Measuring Program, USGS Groundwater Watch, and USGS National Water Information System. The following information was obtained:

Resource	Well No.	Highest Historical Depth (ft)	Water Surface Elevation (ft)	Date
Steve Mains	3S5W7J002S	43	768	01/24/2001
	3S5W18B	40	780	04/01/1994
CDWR	3S5W8E002S	30	755	11/29/2012
USGS	No Pertinent Information obtained			
Site's lowest elevation is approximately 835 feet (Google Earth)				

A contour map showing minimum depths to ground water in the Santa Ana River Valley Region was constructed by the United States Geological Survey (USGS) and subsequently, a report (USGS Map MF-1802) was published in 1985. The map was constructed by contouring the shallowest water level measurements reported to the California Department of Water Resources (CDWR) for the period from 1973-1979. Based on our review of the map, the minimum depth to ground water in the project site area, during this period, was indicated to be around 30 feet below ground surface.

Please note that the potential for rain or irrigation water locally seeping through from elevated areas and showing up near grades cannot be precluded. Our experience indicates that surface or near-surface groundwater conditions can develop in areas where groundwater conditions did not exist prior to site development, especially in areas where a substantial increase in surface water infiltration results from landscape irrigation. Fluctuations in perched water elevations are likely to occur in the future due to variations in precipitation, temperature, consumptive uses, and other factors including mounding of perched water over bedrock. Mitigation for nuisance shallow seeps moving from elevated lower areas will be needed if encountered. These mitigations may include subdrains, horizontal drains, toe drains, french drains, heel drains or other devices.

Shrinkage

Based on laboratory test results, we estimate that shrinkage of soils onsite should be approximately 12 (±5) percent. Shrinkage is defined as the decrease in volume of soil upon removal and recompaction expressed as a percentage of the in-place volume. This shrinkage is exclusive of any losses due to removal of roots or any underground structures and is based on an average 92 percent relative compaction. An increase in relative compaction obtained would increase the shrinkage factor.

Furthermore, a subsidence of approximately 0.10 (± 0.05) feet may also be considered during site preparation. The above shrinkage and subsidence estimates should be used with caution since they are not absolute values. We recommend that an earthwork balance area should be designated to allow for variations in the indicated shrinkage and subsidence estimates.

Collapsible Soil

Soil hydroconsolidation is a phenomenon that results in relatively rapid settlement of soil deposits due to addition of water. This generally occurs in soils having a loose particle structure cemented together with soluble minerals or with small quantities of clay. Water infiltration into such soils can break down the interparticle cementation, resulting in collapse of the soil structure. Collapsible soils are found primarily in Holocene alluvial fan deposits.

A representative soil sample representing the upper ten feet of soil was tested in the laboratory for collapse potential. Test result indicates that hydrocollapse potential is less the 1.0%, a negligible value, see Appendix C.

Soil Type

In accordance with OSHA, the surficial older alluvium may be classified as Soil Type “B”.

Excavation Characteristics

The upper subgrade soil is generally medium dense silty sand. This material is not expected to exhibit hard excavation resistance for typical grading equipment.

Temporary Excavations

General

All excavations must comply with applicable local, state, and federal safety regulations including the current OSHA Excavation and Trench Safety Standards. Construction site safety generally is the sole responsibility of the Contractor, who should also be solely responsible for the means, methods, and sequencing of construction operations.

Safe Vertical Cut

Temporary un-surcharged excavations of 7 feet high may be made at a vertical gradient for short period of time. Temporary un-surcharged excavations greater than 7 feet may be trimmed at 1H:1V gradient.

Exposed condition during construction should be verified by the project geotechnical engineer. No excavations should take place without the direct supervision of the project geotechnical engineer.

All applicable requirements of the California Construction and general Industry Safety Orders, the Occupational Safety and Health Act, and current amendments, and the Construction safety Act should be met. Cuts should be observed during excavation by the project's geotechnical consultant. If potentially unstable soil conditions are encountered, modifications of slope ratios for temporary cuts may be required.

Precaution for Excavations

The Contractor should be aware that unsupported excavation depths should in no case exceed those specified in local, state, and/or federal safety regulations (e.g., OSHA Health and Safety Standards for Excavations, 29 CFR Part 1926, or successor regulations).

Such regulations are strictly enforced and, if they are not followed, the Owner, Contractor, and/or earthwork and utility subcontractors could be liable for substantial penalties. The contractor's "responsible person", as defined in 29 CFR Part 1926, should evaluate the soil exposed in the excavations as part of the contractor's safety procedures.

Sloping the sides of temporary excavations should be required beyond the recommended safe cut where trench/excavation is expected to be left open for a long time or where trench/excavation is along foundation or where adjacent utilities exist or public right-of-way. Temporary excavation should not extend below a 1H:1V plane extending beyond and down from the bottom of the existing utility lines or structures.

Geologic Findings

Topographically, the site is relatively flat and slopes down to the north toward Indiana Avenue at a rate of approximately 1.8 percent. Total relief on site is approximately 8 feet. The lot is underlain by alluvial material. Based on the USGS Geologic map of the Riverside West/South 1/2 of Fontana Quadrangles, Figure 2, the regional area prior to development was mapped as old alluvial fan deposits. The alluvium is generally indurated; dissected alluvial fan deposits derived from local terrains of plutonic rocks and generally consist of tan to light reddish brown sand and minor gravel.

Seismicity Considerations

Active faults

The site is not located within an Alquist-Priolo Earthquake Fault Zone. According to the California Department of Conservation, Fault Activity Map, the site is located approximately 9.7 miles northeast of the Elsinore Fault, see Figure 3.

Ground Shaking

Although there are no known active surface faults within or adjacent to the site that will significantly impact the project, the project is located in a region with active earthquakes and strong seismic motion of those earthquakes could affect the project, see Figure 4. The structures that are proposed to be constructed on the site will be required to meet and comply with all applicable city and State building codes to reduce seismic ground shaking at the site to less-than-significant.

Surface Rupture Zones

The site is not within a currently established Earthquake Fault Zone for surface fault rupture hazards. Therefore, the potential for surface rupture is very low. It is probable that not all-active or potentially active faults in the region have been identified. Furthermore, seismic potential of the smaller and less notable faults is not sufficiently developed for assignment of maximum magnitudes and associated levels of ground shaking that might occur at the site due to these faults.

Tsunamis, Seiches

The setting is inland and no large bodies of water are located within the sites vicinity, therefore, the potential of Tsunamis or seiches affecting the site is considered low.

Slope Stability

There are no slopes on site and no slopes are proposed.

Landslides

The site and the surrounding properties are flat and not prone to slope instability hazards, such as landslides. The project will not be impacted by a landslide or impact adjacent properties due to a project generated landslide.

Liquefaction

According to the City of Riverside's General Plan, the site is mapped in an area with high liquefaction potential. The potential for liquefaction and dynamic settlement has been evaluated as outlined in Chapter 6 of the California Division of Mines and Geology (DMC) Special Publication 117 ("Guidelines for Evaluation and Mitigation of Seismic Hazards in California") and "Recommended Procedures for Implementation of DMG Special Publication 117 - Guidelines for Analyzing and Mitigating Liquefaction in California", published by the Southern California Earthquake Center, 2008 edition.

The design and construction recommendations presented below in this report include results of liquefaction and dynamic settlement evaluation. The analysis results are included in Appendix E.

The analysis indicates that 0.31 inch total dynamic settlement is estimated during large earthquake episode. An estimated dynamic differential settlement of 1/2 of total settlement may be anticipated. The safety factor against liquefaction on all layers is above 1 for all layers to a depth of 50 feet below ground surface. Safety factor less than one is an indication for liquefaction potential. The historical high ground water during a seismic event has been assumed at 25 feet below existing ground surface.

Based on SCEC (1999) guidelines, a potential for loss of bearing capacity due to liquefaction is not expected at the site since there is not an upper potentially liquefiable layer at a depth shallower than the estimated depth where the induced vertical stress in the soil is 10% of the bearing pressure imposed by the proposed foundation systems. Furthermore, tied foundation systems are designed to dissipate structural loads. Therefore no loss of bearing capacity is expected for grade beams or lightly loaded slabs-on-grade.

In significant conformance with Youd, Hanson, and Bartlett (ASCE Geotechnical Jr. April 1995, and Lecture by Youd on July 7, 1999), no lateral spreading due to liquefaction is expected at this site due to the following reasons:

- Alluvial subsurface soils are essentially horizontally layered.
- There is not a free-face toward which liquefied soils could move laterally.
- No saturated liquefiable sand with values of N1(60) <15 exist at the site, refer to Geotechnical logs in Appendix B.

If loose clean sand exists between sampling intervals, their occurrence is expected to be thin and considered to be scattered or have minimal occurrence throughout the site, and cannot reasonably be connected_to form a hypothetical "continuous" line of significant length that could reasonably be expected to "exit" on a slope or a free-face, or move significantly below the gentle slope of the site.

Although it is extremely difficult to predict the overall behavior of any site during seismic shaking, it is our opinion that proper design of foundation can substantially improve the structure's resistance to deformation. This is most commonly accomplished by providing adequate lateral connections between all footings with reinforced grade beams and strengthened stem walls. If the owner wishes a higher degree of confidence, then the structures should be designed for higher probable events.

Please note that foundation design is under the purview of the structural engineer. All foundations should be designed by a qualified structural engineer in accordance with the CBC and the latest applicable building codes and structural considerations may govern.

Site Class

The proposed building is less than 25 feet in height, of conventional light frame construction, and a fundamental period of vibration of less than 0.5 seconds. Accordingly site specific evaluation to determine spectral acceleration for liquefiable soils is not required and therefore the structure need not be designed as if it is Seismic Site Class "F:" It is our opinion that structures should be designed in accordance with the current seismic building code for Site Class "D"

Ground Motion And Seismic Design Parameters:

The peak ground acceleration (PGA) and 2013 CBC seismic design parameters are presented in Appendix D.

Expansive Soil Characteristics

Based on visual observations and laboratory classification the upper foundation soils are sandy and considered to be very low in expansion potential.

Conclusions

- Based on laboratory classification, the expansion potential of onsite soils is expected to be very low (EI<20). This would require verification subsequent to completion of new footing excavations.

- The site is located in a region of generally high seismicity, as is all of southern California. During its design life, the site is expected to experience strong ground motions from earthquakes on regional and/or local causative faults. Therefore typical structural design mitigations should be considered by the structural engineer.

- The potential for seismically induced dynamic settlement of the onsite soils is low.

- The use of shallow foundation is feasible for the proposed construction.

- No groundwater and/or seepage were encountered during our subsurface investigation. However, the potential for rain or irrigation water moving through from adjacent and elevated areas cannot be precluded. Our experience indicates that surface or near-surface groundwater conditions can develop in areas where groundwater conditions did not exist prior to site excavation, especially in areas where a substantial increase in surface water infiltration results from landscape irrigation. We therefore recommend that local landscape irrigation and landscape irrigation from surrounding areas be kept to the minimum necessary to maintain plant vigor and that any leaking pipes/sprinklers, etc. should be promptly repaired. We have no way of predicting depth to the groundwater which may fluctuate with seasonal changes and from one year to the next. Subdrains, horizontal drains, French drains or other devices may be recommended in future for graded areas that exhibit nuisance seepage.

- Overall, the geologic setting of the property is favorable for the use intended, provided the engineering designs are properly carried out.

Recommendations

Building Pad Preparation

All grading should be performed in accordance with our General Earthwork and Grading Specifications presented in Appendix F except as modified within the text of this report.

All debris, abandoned utility lines, roots, irrigation appurtenances, underground structures, leach lines, seepage pits, deleterious materials, etc., should be removed and hauled offsite. Seepage pits should be backfilled with one sac sand-cement slurry. Cavities created during site clearance should be backfilled in a controlled manner. Old fills associated with site previous use should be traced and removed prior to its use as compacted fill.

Subsequent to site clearance, proposed building pad area should be overexcavated to a depth of at least seven feet below existing ground surface or proposed finished grade, whichever is greater. This overexcavation may be extended deeper if loose soil is encountered in the bottom of the overexcavation. The lateral extent of overexcavation should be equal to the depth of fill but no less than five feet.

Because loose soil was encountered and is expected on site, special care should be taken to ensure that the bottom of the overexcavations are into firm, competent, native soil, before proceeding with grading operations. A representative from GeoMat will require full-time observation during all grading activities.

After any overexcavation, the exposed surfaces should be observed and then scarified to a depth of at least 12-inches, moisture conditioned as necessary and recompacted to at least 90 percent of the maximum dry density, as determined by ASTM D1557 Test Method; prior to placement of fill.

Compacted Fills/Imported Soils

Any soils to be placed as fill, whether presently onsite or import, should be approved by the soil engineer or his representative prior to its placement. All onsite soils to be used as fill should be cleansed of any roots, or other deleterious materials. Material larger than 6-inches in diameter should not be placed in the vicinity of foundations and utility lines trenches.

All fills should be placed in 6- to -8 inch loose lifts, thoroughly watered, or aerated to near optimum moisture content, mixed and compacted to at least 90 percent relative compaction. This is relative to the maximum dry density determined by ASTM D1557 Test Method.

Any imported soils should be sandy (preferably USCS "SM" or "SW", and very low in expansion potential) and approved by the soil engineer. The soil engineer or his representative should observe the placement of all fill and take sufficient tests to verify the moisture content and the uniformity and degree of compaction obtained.

Tentative Foundation Recommendations

The use of shallow spread footings in compacted fill is feasible. A maximum allowable bearing value of 2000 psf is recommended for the following residential footing system.

- Footing system soil should be designed and constructed in a manner that will minimize damage to structure from movement of the soil that occur in the moisture variation depth zone.
- Depth of continuous footings below natural and finish grade in liquefaction zones should be at least 24 inches. Pad footings should be at least 24 inch square and 24 inches below lowest adjacent firm grade.
- Footing reinforcement should be determined by the structural engineer; however, minimum reinforcement should be at least two No. 4 reinforcing bars, top and bottom.
- Expansion potential of foundation soils should be verified subsequent to completion of rough grading.
- The above recommended bearing value may be increased by one third for temporary (wind or seismic) loads.

Resistance to lateral footing will be provided by passive earth pressure and base friction. For footings bearing against firm native material, passive earth pressure may be considered to be developed at a rate of 260 psf per foot of depth to a maximum of 2000 psf. Base friction may be computed at 0.40 times the normal load. If passive earth pressure and friction are combined to provide required resistance to lateral forces, the value of the passive pressure should be reduced to two-thirds the value.

Foundation design comes under the purview of the structural engineer. The above recommendations should not preclude more restrictive structural requirements. The structural engineer should determine the actual footing sizes and reinforcement to resist vertical, horizontal, and uplift forces under static and seismic conditions.

Reinforcement and size recommendations presented in this report are considered the minimum necessary for the soil conditions present at foundation level and are not intended to supersede the design of the project structural engineer or criteria of the governing agencies for the project.

Retaining Walls

The following lateral earth pressures and soil parameters in conjunction with the above allowable soil bearing value for shallow foundation may be used for design of conventional retaining walls with free draining compacted backfills.

If passive earth pressure and friction are combined to provide required resistance to lateral forces, the value of the passive pressure should be reduced to two-thirds the following recommendations.

Active Earth Pressure with level backfill (P_a)	37 psf (EFP) drained, yielding
At Rest Pressure (P_0)	56 psf (EFP), drained, non-yielding (part of building wall)
Passive Earth Pressure (P_p)	260 psf (EFP), drained, maximum of 1800 psf
Horizontal Coefficient of Friction (μ)	0.40
Unit Soil Weight (γ_t)	110 pcf

We recommend drainage for retaining walls to be provided in accordance with the attached Plate 2. Drainage pipes and ditches should be connected to an approved drainage device. Maximum precautions should be taken when placing drainage materials and during backfilling.

Wall backfill should be properly compacted to at least 90 percent relative compaction. Back-cut distance behind the top of wall should be at least 18 inches or other practical distance to facilitate compaction. Retaining walls part of building walls should be provided with waterproofing per the project Architect recommendations.

Slabs-on-Grade

Interior slabs-on-grade may be at least four inches thick, reinforced with at least No 4 bars at 12-inches on-center both ways, properly centered in mid thickness of slabs. Slab-on-grades should be underlain with four inches of sand. If moisture intrusion is objectionable, the concrete slab should be provided by a 10-mil Visqueen moisture barrier placed and sealed over the sand. This slab recommendation meets California Green Residential Code.

Slab-on-grade thickness and reinforcement should be evaluated by the structural engineer and designed in compliance with applicable codes. Excess soils generated from foundation excavations should not be placed on any building pads without proper moisture and compaction.

All slab subgrades should be verified to be saturated to a depth of 12 inches prior to placement of slab building materials. Moisture content should be tested in the field by the soil engineer. Slabs subgrade should be kept moist and the surface should not be allowed to desiccate.

The addition of fiber mesh in the concrete and careful control of water/cement ratios may lessen the potential for slab cracking. In hot or windy weather, the contractor must take appropriate curing precautions after the placement of concrete.

The use of mechanically compacted low slump concrete (not exceeding 4 inches at the time of placement) is recommended. We recommend that a slipsheet (or equivalent) be utilized if grouted tiles or other crack sensitive flooring (such as marble tiles) is planned directly on concrete slabs.

Total Settlement

The foundation will be embedded into compacted fill. Native soils below the fill possess relatively high strengths and will not be subject to significant stress increases from the foundations of the new structure. Therefore settlements are expected to be within tolerable limits. Total long-term settlement between similarly loaded adjacent foundation systems should not exceed one inch. The structures should be designed to tolerate a differential settlement on the order of 1/2 to 3/4-inch.

Cement Type

Laboratory testing conducted for a soil sample showed that water soluble sulfate is less than 0.015 percent (negligible sulfate exposure risk). We recommend Type II cement for all concrete work in contact with soil. Ferrous metal pipes should be protected from potential corrosion by bituminous coating, etc. We recommend that all utility pipes be nonmetallic and/or corrosion resistant.

Recommendations should be verified by soluble sulfate and corrosion testing of soil samples obtained from specific locations at the completion of grading.

Trench Backfill

All utility trenches and retaining wall backfills should be mechanically compacted to the minimum requirements of at least 90 percent relative compaction.

Onsite soils derived from trench excavations can be used as trench backfill. Backfills should be placed in thin lifts and compacted by mechanical means. Material with sand equivalent of at least 30 should be utilized for the pipe zone. No jetting, ponding, or flooding should be permitted within the building area or where trenches are in zone of influence of footing loads. Excavated material from footing trenches should not be placed in slab-on-grade areas unless properly compacted and tested.

Site Drainage

Positive drainage should be provided and maintained for the life of the project around the perimeter of all structures and all foundations toward streets or approved drainage devices to minimize water infiltrating into the underlying natural and engineered fill soils, and prevent erosion. In addition, finish subgrade adjacent to exterior footings should be sloped down (at least 2%) and away to facilitate surface drainage. Roof drainage should be collected and directed away from foundations via nonerosive devices. Water, either natural or by irrigation, should not be permitted to pond or saturate the foundation soils.

Planter areas and large trees adjacent to the foundations are not recommended. All planters and terraces should be provided with drainage devices. Internal drainage should be directed to approve drainage collection devices, per the civil engineer recommendations. Location of drainage devices should be in accordance with the design civil engineers drainage and erosion control recommendations.

The owner should be made aware of the potential problems, which may develop when drainage is altered through construction of retaining walls, patios and other devices. Ponded water, leaking irrigation systems, over watering or other conditions which could lead to ground saturation should be avoided. Surface and subsurface runoff from adjacent properties should be controlled. Area drainage collection should be directed away from structures through approved drainage devices. Drainage devices should be maintained.

Tentative Asphalt Pavement

On the basis of classifications of onsite soils, an assumed Traffic Indices, and estimated R-value of 15, the minimum recommended pavement thickness is as follows:

Location	Traffic Index	Minimum Recommended Pavement Section
Private Drives	5.0	3.0” AC over 8.5” Class 2 Base

Street subgrade should be overexcavated 12 inches below proposed grade or existing grade, whichever is deeper. The exposed bottom should be scarified an additional 12 inches, watered as necessary, and compacted to at least 90 percent of the maximum density as determined by ASTM D1557 test method. Aggregate base should be compacted to at least 95 percent of the maximum density as determined by ASTM D1557 test method.

Final pavement design recommendations should be based on laboratory test results of representative pavement subgrade soils upon the completion of rough grading.

We Should be Retained for Plan Reviews

The recommendations provided in this report are based on preliminary information and subsurface conditions as interpreted from limited exploratory boreholes at the site. We should be retained to review final grading and foundation plans to revise our conclusions and recommendations, as necessary. Professional fees will apply for each review.

Our conclusions and recommendations should also be reviewed and verified during site grading, and revised accordingly if exposed geotechnical conditions vary from our preliminary findings and interpretations.

Additional Observation and/or Testing

GeoMat Testing Laboratories, Inc. should observe and/or test at the following stages of construction.

- During overexcavation and backfills.
- Following footing excavation and prior to placement of footing materials.
- During wetting of slab subgrade and prior to placement of slab materials.
- During all trench and wall backfill.
- When any unusual conditions are encountered.

Final Report of Compaction During Grading

A final report of compaction control should be prepared subsequent to the completion of grading. The report should include a summary of work performed, laboratory test results, and the results and locations of field density tests performed during grading.

Geotechnical Risk

The concept of risk is an important aspect of the geotechnical evaluation. The primary reason for this is that the analytical methods used to develop geotechnical recommendations do not comprise an exact science. The analytical tools which geotechnical engineers use are generally empirical and must be used in conjunction with engineering judgment and experience. Therefore, the solutions and recommendations presented in the geotechnical evaluation should not be considered risk-free and, more importantly, are not a guarantee that the interaction between the soils and the proposed structure will perform as planned.

The engineering recommendations presented in the preceding sections constitute GeoMat Testing Laboratories professional estimate of those measures that are necessary for the proposed structure to perform according to the proposed design based on the information generated and referenced during this evaluation, and GeoMat Testing Laboratories experience in working with these conditions.

Limitation Of Investigation

This report was prepared for the exclusive use on the subject site. The use by others, or for the purposes other than intended, is at the user's sole risk.

Our investigation was performed using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable Geotechnical Engineers practicing in this or similar locations within the limitations of scope, schedule, and budget. No other warranty, expressed or implied, is made as to the conclusions and professional advice included in this report.

The field and laboratory test data are believed representative of the project site; however, soil conditions can vary significantly. As in most projects, conditions revealed during grading may be at variance with preliminary findings. If this condition occurs, the possible variations must be evaluated by the Project Geotechnical Engineer and adjusted as required or alternate design recommended.

This report is issued with the understanding that it is the responsibility of the owner, or his representative, to ensure that the information and recommendations contained herein are brought to the attention of the architect and engineer for the project and incorporated into the plans, and the necessary steps are taken to see that the contractor and subcontractor carry out such recommendations in the field. This firm does not practice or consult in the field of safety engineering. We do not direct the contractor's operations, and we cannot be responsible for other than our own personnel on the site; therefore, the safety of others is the responsibility of the contractor.

The contractor should notify the owner if he considers any of the recommended actions presented herein to be unsafe. The findings, conclusions, and recommendations presented herein are based on our understanding of the project and on subsurface conditions observed during our site work, and are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether they be due to natural processes or the works of man on this or adjacent properties. In additions, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge.

If you should have any questions regarding this report, please do not hesitate to call our office. We appreciate this opportunity to be of service.

Submitted for GeoMat Testing Laboratories, Inc.

Haytham Nabilsi, GE 2375
Principal Engineer

REGISTERED PROFESSIONAL ENGINEER
HAYTHAM NABILSI
No. 2375
Exp. 12/31/18
GEOTECHNICAL
STATE OF CALIFORNIA

Art Martinez
Staff Engineer

Distribution: [3] Addressee

Attachments:

Figure 1	Site Location Map
Figure 2	Geologic Map
Figure 3	Regional Fault Map
Figure 4	Ground Shaking Map
Plate 1	Exploratory Borehole Location Map
Plate 2	Retaining Wall Drainage Detail
Appendix A	References
Appendix B	Exploratory Borehole Logs
Appendix C	Laboratory Test Results
Appendix D	2013 CBC Seismic Design Parameters
Appendix E	Liquefaction Analysis
Appendix F	General Earthwork and Grading Specifications

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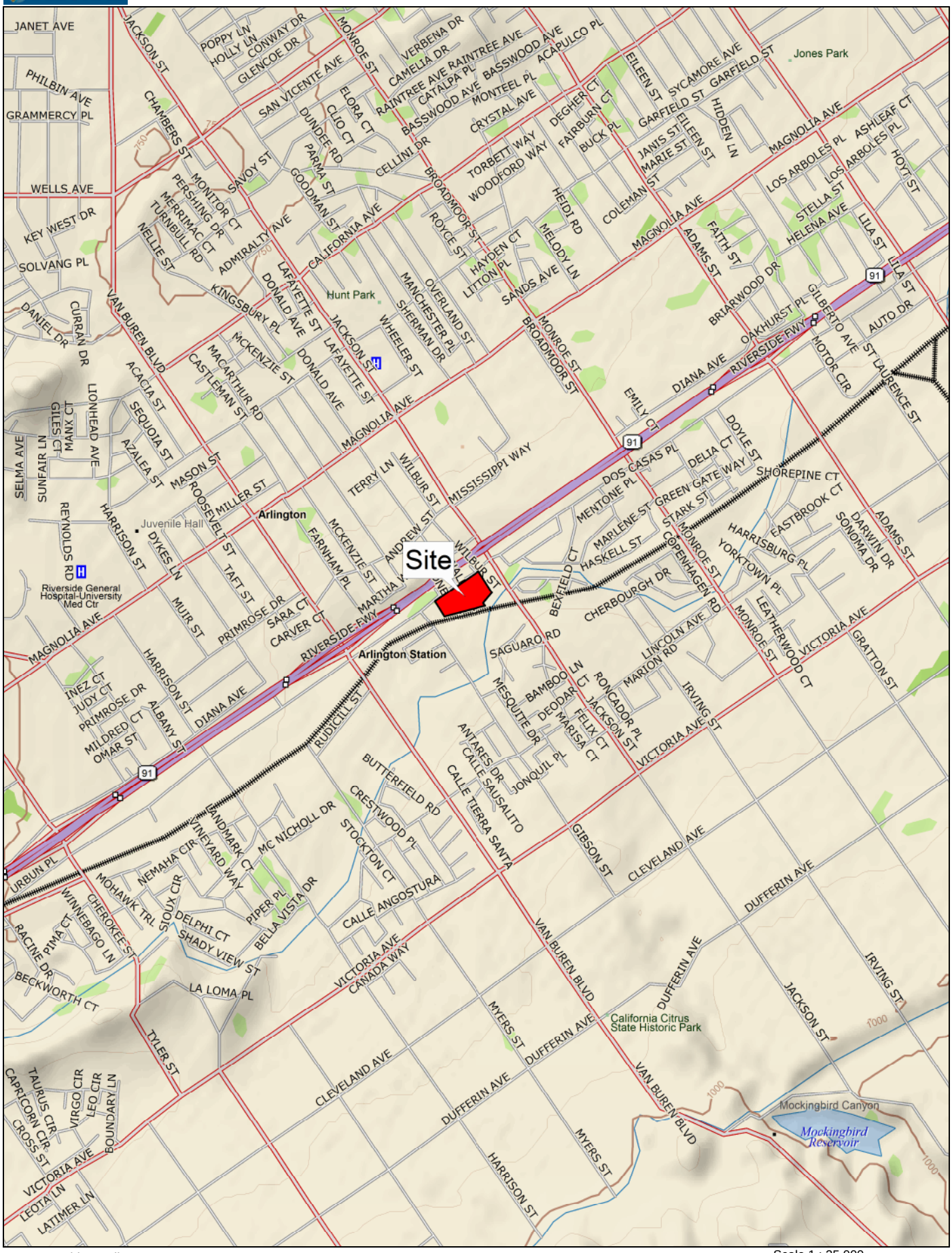

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TN

MN (11.9°E)

Figure 1

Scale 1 : 25,000

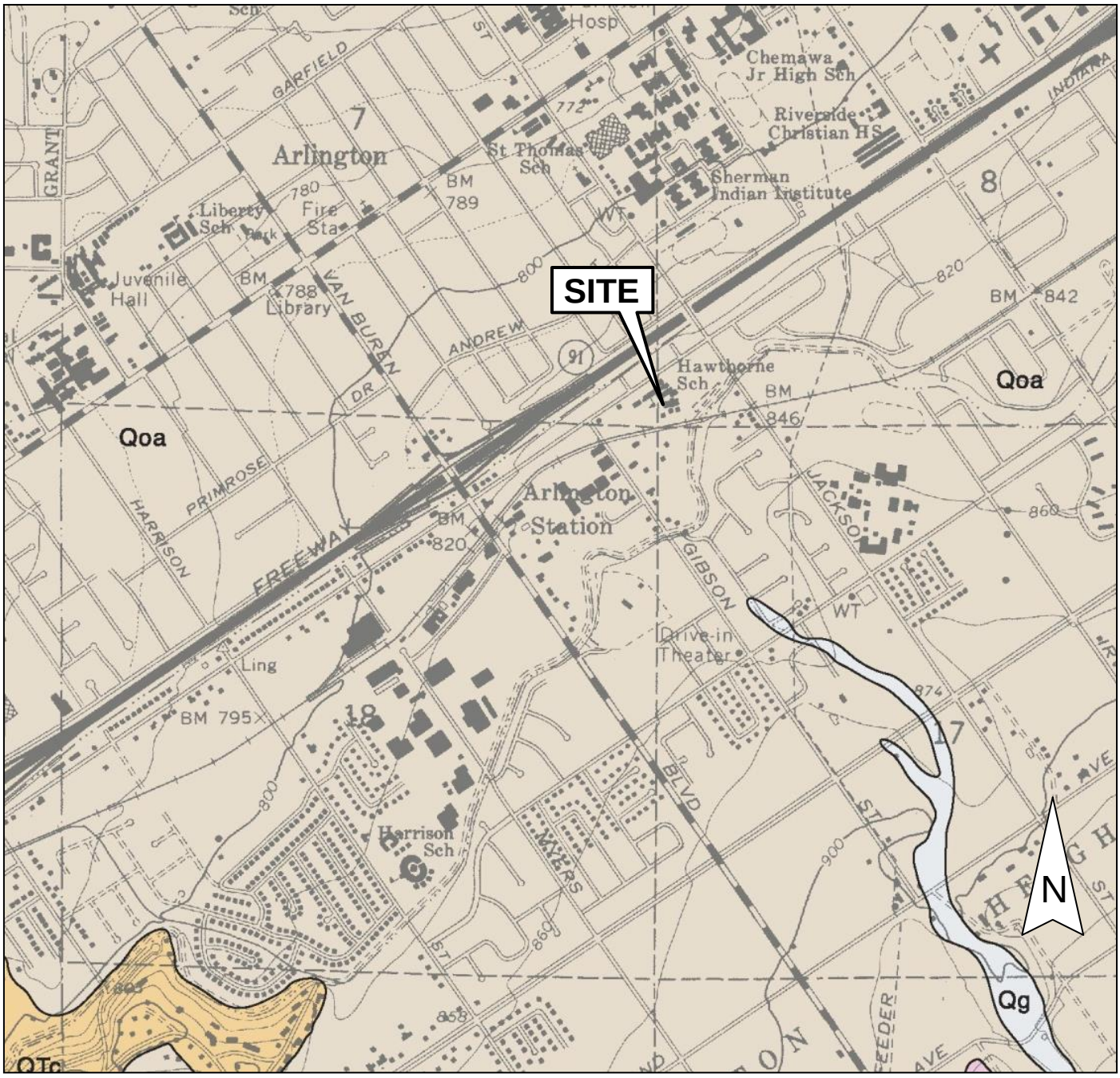
0 600 1200 1800 2400 3000 ft

0 200 400 600 800 1000 m

1" = 2,083.3 ft

Data Zoom 13-0

REGIONAL GEOLOGY MAP



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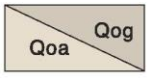
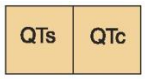


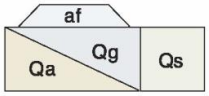
OLDER SURFICIAL SEDIMENTS
Weakly indurated dissected alluvial fan deposits derived from local terrains of plutonic rocks

Qoa *Alluvial fan deposits of sand, minor gravel, tan to light reddish brown, top surfaces slope slightly from sounce areas and dissected by stream channels from source areas*

Qog *High remnants of elevated older alluvial gravel, including coarse boulder gravel*



UNNAMED SEDIMENTARY DEPOSITS



SURFICIAL DEPOSITS
Unindurated, undissected

From: "Dibblee, T.W., and Minch, J.A., 2004, Geologic map of the Riverside West/south 1/2 of Fontana quadrangles, San Bernardino and Riverside County, California: Dibblee Geological Foundation, Dibblee Foundation Map DF-128, scale 1:24,000"

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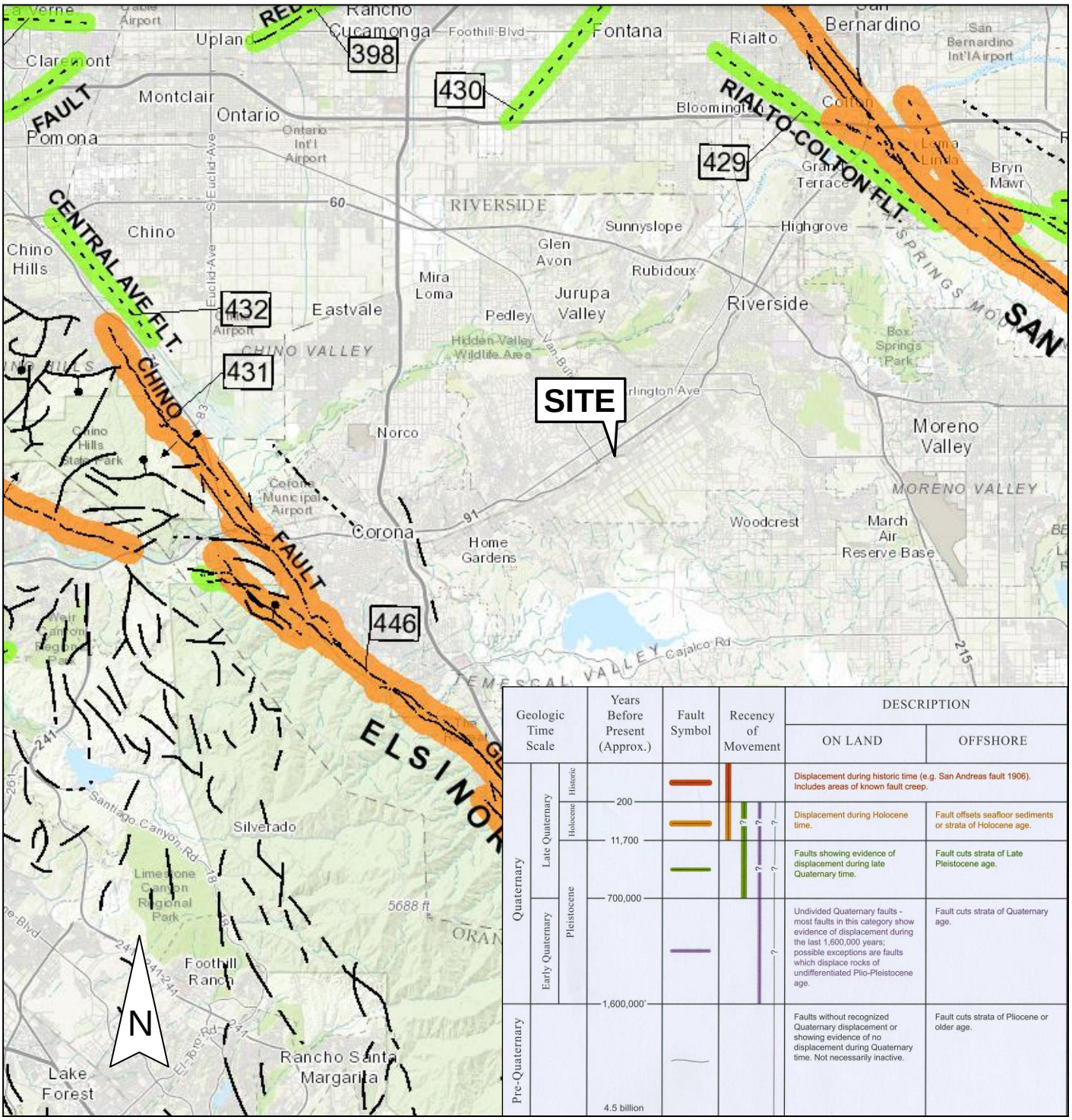
DATE: January 19, 2017

FIGURE 2

REGIONAL FAULT MAP



From: "Fault Activity Map of California," compiled by Charles W. Jennings and William A. Bryant, California Geological Survey, Map No. 6, California Geologic Data Map Series, 2010

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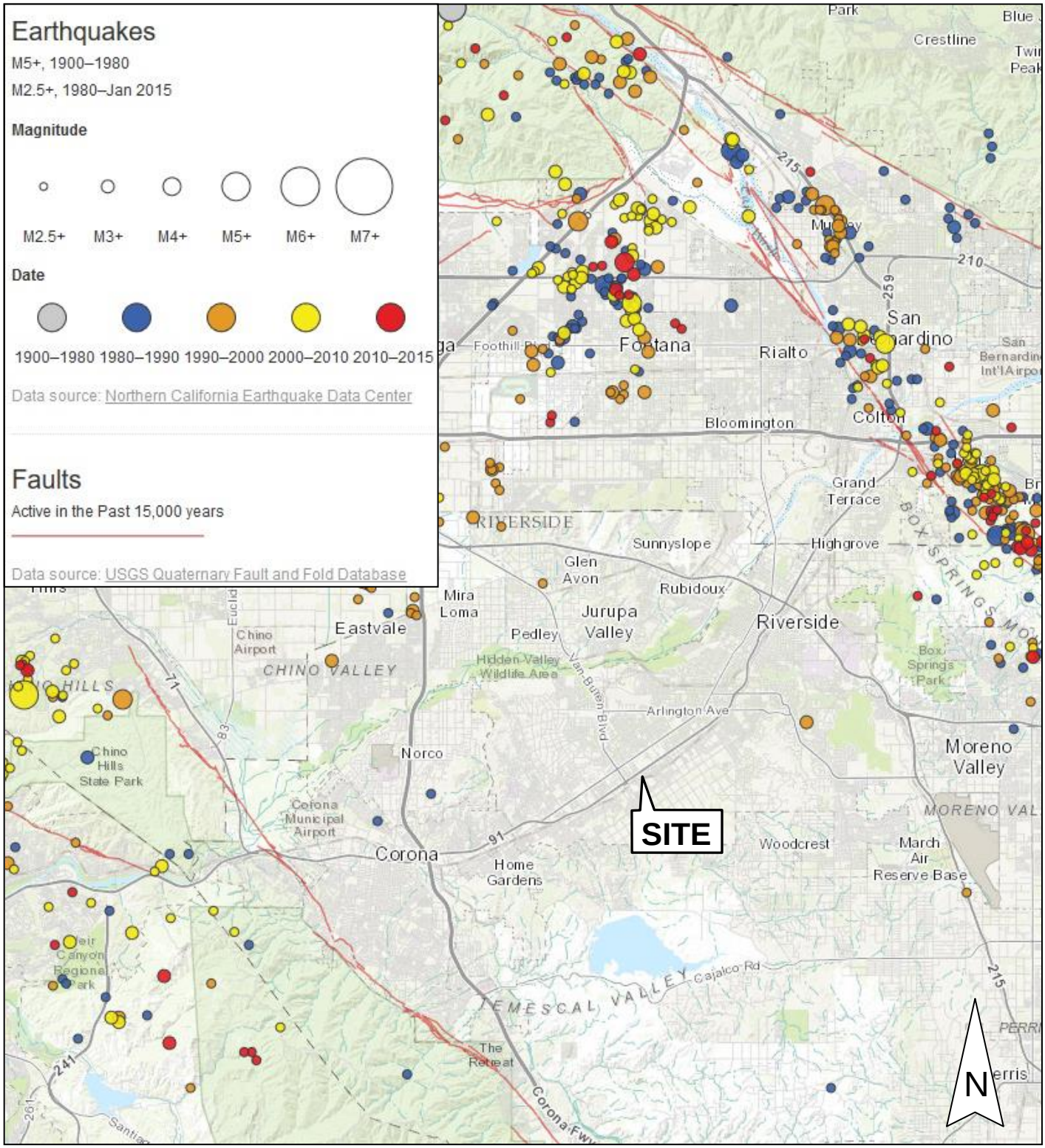
FIGURE 3

GROUND SHAKING MAP



From: USGS, Earthquake Hazards Program, Faults and Earthquake Probability Maps

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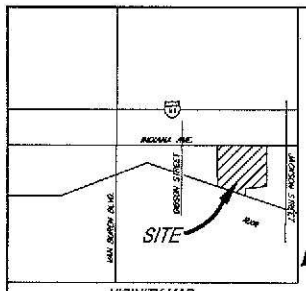
DATE: January 19, 2017

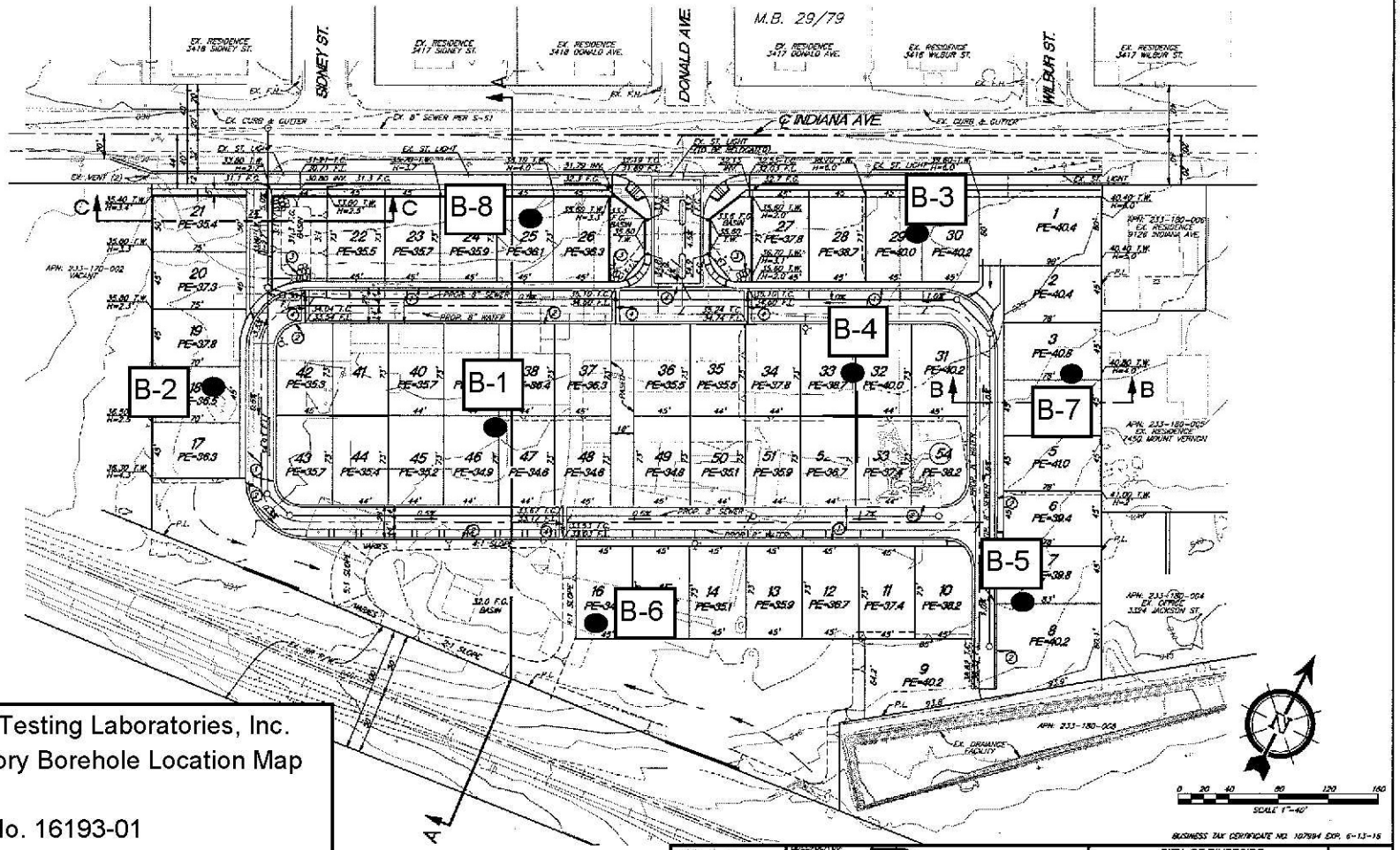
FIGURE 4

IN THE CITY RIVERSIDE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA.

TENTATIVE TRACT MAP NO.37032
9170 INDIANA AVENUE
54 LOT PLANNED RESIDENTIAL DEVELOPMENT
CITY OF RIVERSIDE, CA
AUGUST 2016



VICINITY MAP
NOT TO SCALE
THOMAS GUIDE PAGE: 715 GRID: A6



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RIVERSIDE, CA. 92507
VOICE: (951) 683-3931
FAX: (951) 785-2314

ASSESSOR'S PARCEL NO.
233-180-007-6
233-170-001-9

PROJECT INFO
AREA OF SITE = 6.85 AC.
NUMBER OF UNITS = 54
LOT AREA = 198,935 S.F.
STREET AREA = 49,697 S.F.
COMMON OPEN SPACE = 52,252 S.F.

GENERAL PLAN DESIGNATION
EXISTING - BUSINESS PARK (B/OP)
PROPOSED - RESIDENTIAL (MHDR)

ZONING
EXISTING - RP-PUBLIC FACILITIES
PROPOSED - R-1-7200

SCHOOL DISTRICT
RIVERSIDE UNIFIED SCHOOL DISTRICT

UTILITY PURVEYORS
WATER.....CITY OF RIVERSIDE
GAS.....SO. CALIF. GAS
ELECTRICAL.....CITY OF RIVERSIDE
TELEPHONE.....PACIFIC BELL
SEWER.....CITY OF RIVERSIDE
CABLE.....CHARTER COMM.

LEGAL DESCRIPTION
A PORTION OF LOT 1 IN BLOCK 30 OF THE LANDS OF THE RIVERSIDE LAND AND IRRIGATION COMPANY, AS SHOWN BY MAP ON FILE IN BOOK 1 OF MAPS, AT PAGE 70, RECORDS OF SAN BERNARDINO COUNTY.

SOURCE OF TOPO
FIELD SURVEY BY RALSTON SURVEY SEPT. 2015
AERIAL PHOTOGRAMMETRY BY INLAND AERIAL SEPT. 2015

CONSTRUCTION NOTES
1. CONSTRUCT 3" OVER 5" BASE PAVING
2. CONSTRUCT 6" CURB & GUTTER
3. CONSTRUCT 6"-12" DIA RIP RAP
4. CONSTRUCT CROSS GUTTER
5. CONSTRUCT RETAINING WALL (5' MAX)

LEGEND
T.S. - TOP OF BERM
F.G. - FINISHED GRADE
F.L. - FLOW LINE
H.P. - HIGH POINT
EXIST. - EXISTING
P.E. - PAD ELEVATION
G.B. - GRADE BREAK

TRACT BOUNDARY
CENTERLINE
CURB AND GUTTER
1280 EXISTING CONTOUR LINE
LOT LINE
SLOPE

LOT INFO

LOT	AREA (S.F.)
1	5,890
2	3,510
3	3,510
4	3,510
5	3,510
6	3,510
7	3,735
8	5,551
9	4,809
10	3,272
11	3,285
12	3,285
13	3,285
14	3,285
15	3,285
16	3,285
17	3,150
18	3,150
19	3,150
20	3,175
21	3,750
22	3,285
23	3,285
24	3,285
25	3,285
26	3,285
27	3,285
28	3,285
29	3,285
30	3,170
31	3,199
32	3,212
33	3,212
34	3,212
35	3,212
36	3,285
37	3,285
38	3,212
39	3,212
40	3,212
41	3,212
42	3,199
43	3,199
44	3,212
45	3,212
46	3,212
47	3,212
48	3,285
49	3,285
50	3,212
51	3,212
52	3,212
53	3,212
54	3,199

GeoMat Testing Laboratories, Inc.
Exploratory Borehole Location Map
Plate 1
Project No. 16193-01
January 23, 2017

BUSINESS TAX CERTIFICATE NO. 107594 EXP. 6-13-16

SEAL: REGISTERED PROFESSIONAL ENGINEER — ROBERT E. VAN FRANKEN — No. 61,035 — Exp. 9-30-17 — CIVIL — STATE OF CALIFORNIA

PREPARED BY: SDH ASSOCIATES INC. — 5225 CANYON CREST DRIVE #1439, Riverside, California 92507 — TEL (951) 683-3931 / FAX (951) 785-2314

BENCHMARK

SCALE 1"=40'

DATE FEBRUARY 2016

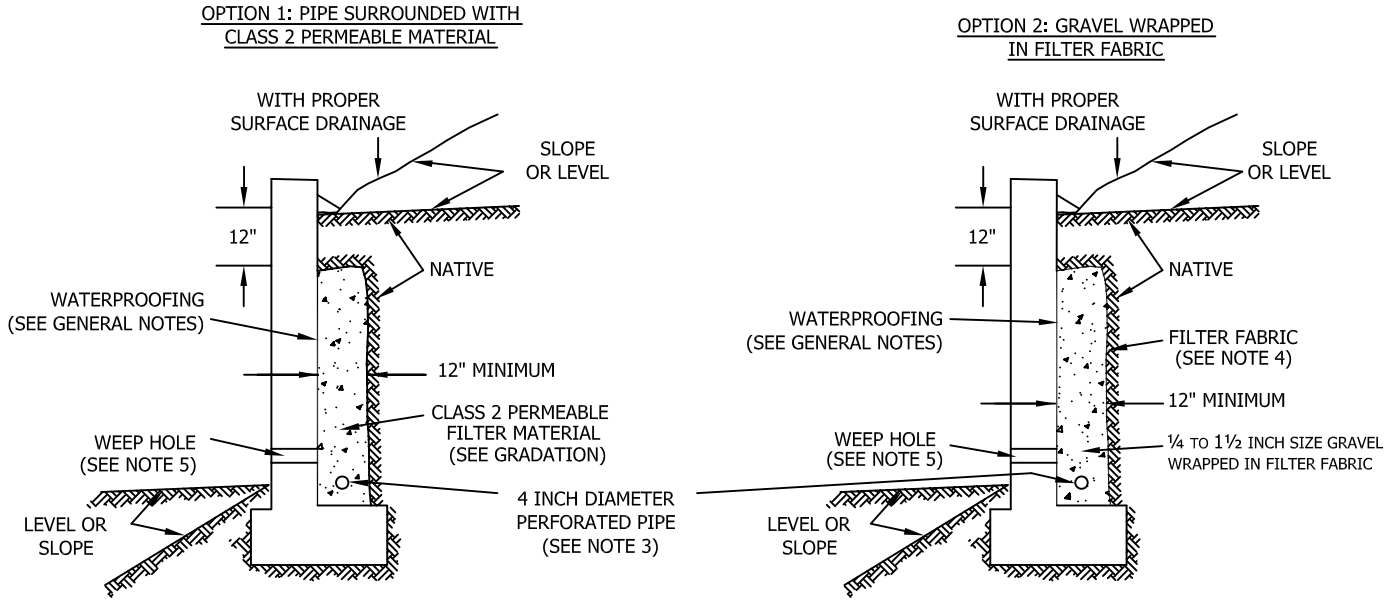
CITY OF RIVERSIDE

TTM 37032

9170 INDIANA AVENUE

1 OF 2 SHEETS

SUBDRAIN OPTIONS AND BACKFILL WHEN NATIVE MATERIAL HAS EXPANSION INDEX OF ≤50



Class 2 Filter Permeable Material Gradation
Per Caltrans Specifications

Sieve Size	Percent Passing
1"	100
3/4"	90-100
3/8"	40-100
No. 4	25-40
No. 8	18-33
No. 30	5-15
No. 50	0-7
No. 200	0-3

GENERAL NOTES:

* Waterproofing should be provided where moisture nuisance problem through the wall is undesirable.
* Water proofing of the walls is not under purview of the geotechnical engineer
* All drains should have a gradient of 1 percent minimum
*Outlet portion of the subdrain should have a 4-inch diameter solid pipe discharged into a suitable disposal area designed by the project engineer. The subdrain pipe should be accessible for maintenance (rodding)
*Other subdrain backfill options are subject to the review by the geotechnical engineer and modification of design parameters.

Notes:
1) Sand should have a sand equivalent of 30 or greater and may be densified by water jetting.
2) 1 Cu. ft. per ft. of 1/4- to 1 1/2-inch size gravel wrapped in filter fabric
3) Pipe type should be ASTM D1527 Acrylonitrile Butadiene Styrene (ABS) SDR35 or ASTM D1785 Polyvinyl Chloride plastic (PVC), Schedule 40, Armco A2000 PVC, or approved equivalent. Pipe should be installed with perforations down. Perforations should be 3/8 inch in diameter placed at the ends of a 120-degree arc in two rows at 3-inch on center (staggered)
4) Filter fabric should be Mirafi 140NC or approved equivalent.
5) Weephole should be 3-inch minimum diameter and provided at 10-foot maximum intervals. If exposure is permitted, weepholes should be located 12 inches above finished grade. If exposure is not permitted such as for a wall adjacent to a sidewalk/curb, a pipe under the sidewalk to be discharged through the curb face or equivalent should be provided. For a basement-type wall, a proper subdrain outlet system should be provided.
6) Retaining wall plans should be reviewed and approved by the geotechnical engineer.
7) Walls over six feet in height are subject to a special review by the geotechnical engineer and modifications to the above requirements.

RETAINING WALL BACKFILL AND SUBDRAIN DETAIL

WHEN NATIVE MATERIAL HAS EXPANSION INDEX OF ≤50

Plate 2

Appendix A

REFERENCES

Dibblee, T.W., and Minch, J.A., 2004, Geologic map of the Riverside West/south 1/2 of Fontana Quadrangles, San Bernardino and Riverside County, California: Dibblee Geological Foundation, Dibblee Foundation Map DF-128, scale 1:24,000

City of Riverside, General Plan, Safety Element.

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USGS, National Water Information System

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USGS, Contour Map Showing Minimum Depth to Ground Water, Upper Santa Ana River Valley, California, 1973-1979, Scott E. Carson and Jonathan C. Matti, 1985.

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Bay Area Earthquake Alliance, California Map of Earthquake Magnitudes and Faults Compiled from the Northern California Earthquake Data Center and USGS Quaternary Fault and Fold Database.

State of California, Department of Conservation, CGS Information Warehouse: Regulatory Maps

USGS, Earthquake Hazards Program, U.S. Seismic Design Maps

Department of the Navy, Design Manual 7.01, Soil Mechanics, September 1986.

Department of the Navy, Design Manual 7.02, Foundation and Earth Structures, September 1986.

Department of the Army, US Army Corps of Engineers, Engineering and Design, Bearing Capacity of Soils, EM 1110-1-1905.

ASCE, Journal of Geotechnical Engineering, Vol 118, 1987, "Evaluation of Settlements in Sand Due to Earthquake Shaking.", by K. Tokimatsu and H.B. Seed, p. 871, 876.

Foundation Design, D. Cudoto, Second Edition, 2000.

Principals of Foundation Design, Braja Das.

Foundation Analysis and Design, Ed. 5 by Joseph E. Bowles.

Robert Day, Geotechnical Engineer's Portable Handbook.

Robert Day, Geotechnical Foundation Handbook.

Appendix B

GENERAL NOTES

DRILLING NOTES

WATER LEVEL MEASUREMENTS

Water levels indicated on the boring logs are levels measured in the borings at the times indicated. In permeable materials, the indicated levels may reflect the location of groundwater. In low permeability soils, the accurate determination of groundwater levels is not possible with only short-term observations.

WATER LEVEL OBSERVATION DESIGNATION

W.D.	While Drilling
A.B.	After Boring
B.C.R.	Before Casing Removal
A.C.R.	After Casing Removal
24 hr.	Water level taken approximately 24 hrs. after boring completion

DRILLING AND SAMPLING SYMBOLS

AS	Auger Sample
CS	Continuous Sampler
DB	Diamond Bit -NX unless otherwise noted
HA	Hand Auger
HS	Hollow Stem Auger
PA	Power Auger
RB	Rock Bit
SS*	Split-Barrel
ST	Shelby Tube - 2" (51mm) unless otherwise noted
WB	Wash Bore
CR	Calfornia Ring Sampler 3" O.D., Lined with 2.5"X1" Rings

*The Standard Penetration Test is conducted in conjunction with the split-barrel sampling procedure. The "N" value corresponds to the number of blows required to drive the last 1 foot (0.3m) of an 18 in. (0.46m) long, 2 in. (51mm) O.D. split-barrel sampler with a 140 lb. (63.5 kg) hammer falling a distance of 30 in. (0.76m). The Standard Penetration Test is carried out according to ASTM D-1586. (See "N" Value below.)

SOIL PROPERTIES & DESCRIPTIONS

TEXTURE

PARTICLE	SIZE	
Clay	< 0.002 mm	(< 0.002 mm)
Silt	< #200 Sieve	(0.075 mm)
Sand	#4 to #200 Sieve	(4.75 to 0.075 mm)
Gravel	3 in. to #4 Sieve	(75 mm to 4.75 mm)
Cobbles	12 in. to 3 in.	(300 mm to 75 mm)
Boulders	> 12 in.	(300 mm)

COMPOSITION

SAND & GRAVEL

Description	% by Dry Weight
trace	< 15
with	15 - 29
modifer	> 30

FINES

Description	% by Dry Weight
trace	< 5
with	5 - 12
modifier	> 12

Soil descriptions are based on the Unified Soil Classification System (USCS) as outlined in ASTM Designations D-2487 and D-2488. The USCS group symbol shown on the boring logs correspond to the group names listed below. The description includes soil constituents, consistency, relative density, color and other appropriate descriptive terms. Geologic description of bedrock, when encountered, also is shown in the description column.

GROUP SYMBOL	GROUP NAME	GROUP SYMBOL	GROUP NAME
GW	Well Graded Gravel	CL	Lean Clay
GP	Poorly Graded Gravel	ML	Silt
GM	Silty Gravel	OL	Organic Clay or Silt
GC	Clayey Gravel	CH	Fat Clay
SW	Well Graded Sand	MH	Elastic Silt
SP	Poorly Graded Sand	OH	Organic Clay or Silt
SM	Silty Sand	PT	Peat
SC	Clayey Sand	CL-CH	Lean to Fat Clay

COHESIVE SOILS

CONSISTENCY	UNCONFINED COMPRESSIVE STRENGTH (Qu) (psf)	(kPa)
Very Soft	< 500	(< 24)
Soft	500 - 1000	(24 - 48)
Medium	1001 - 2000	(48 - 96)
Stiff	2001 - 4000	(96 - 192)
Very Stiff	4001 - 8000	(192 - 383)
Hard	> 8001	(> 383)

PLASTICITY Description	Liquid Limit (%)
Lean	< 45%
Lean to Fat	45 to 49%
Fat	≥ 50%

Cohessive Soils Consistenacy	"N" value
Very Soft	<2
Soft	2-4
Medium	4-8
Stiff (Firm)	8-15
Very Stiff (Very Firm)	15-30
Hard	>30

COHESIONLESS SOILS

RELATIVE DENSITY	"N" VALUE*
Very Loose	0 - 3
Loose	4 - 9
Medium Dense	10 - 29
Dense	30 - 49
Very Dense	≥ 50

BEDROCK PROPERTIES & DESCRIPTIONS

ROCK QUALITY DESIGNATION (RQD**)

DESCRIPTION OF ROCK QUALITY	RQD (%)
Very Poor	0 - 25
Poor	25 - 50
Fair	50 - 75
Good	75 - 90
Excellent	90 - 100

**RQD is defined as the total length of sound core pieces, 4 inches (102mm) or greater in length, expressed as a percentage of the total length cored. RQD provides an indication of the integrity of the rock mass and relative extent of seams and bedding planes.

DEGREE OF WEATHERING

Slightly Weathered	Slight decomposition of parent material in joints and seams.
Weathered	Well-developed and decomposed joints and seams.
Highly Weathered	Rock highly decomposed, may be extremely broken.

SOLUTION AND VOID CONDITIONS

Solid	Contains no voids.
Vuggy	Containing small pits or cavities < 1/2" (13mm).
Porous	Containing numerous voids which may be interconnected.
Cavernous	Containing cavities, sometimes quite large.

When classification of rock materials has been estimated from disturbed samples, core samples and petrographic analysis may reveal other rock types.

HARDNESS & DEGREE OF CEMENTATION

LIMESTONE

Hard	Difficult to scratch with knife.
Moderately Hard	Can scratch with knife but not with fingernail.
Soft	Can be scratched with fingernail.

SHALE

Hard	Can scratch with knife but not with fingernail.
Moderately Hard	Can be scratched with fingernail.
Soft	Can be molded easily with fingers.

SANDSTONE

Well Cemented	Capable of scratching a knife blade.
Cemented	Can be scratched with knife.
Poorly Cemented	Can be broken apart easily with fingers.

BEDDING CHARACTERISTICS

TERM	THICKNESS (inches)	THICKNESS (mm)
Very Thick Bedded	> 36	> 915
Thick Bedded	12 - 36	305 - 915
Medium Bedded	4 - 12	102 - 305
Thin Bedded	1 - 4	25 - 102
Very Thin Bedded	0.4 - 1	10 - 25
Laminated	0.1 - 0.4	2.5 - 10
Thinly Laminated	< 0.1	< 2.5

Bedding Planes	Planes dividing the individual layers, beds or strata of rocks.
Joint	Fracture in rock, generally more or less vertical or transverse to the bedding.
Seam	Applies to bedding plane with an unspecified degree of weathering.

geomat	Project Name: Hawthorne Heights Project, Riverside, CA Project No.: 16193-01	Boring No.: **B-1**	Page 1 of 2

Boring Location:	See Plate 1	Drilling Co.	GeoMat	Logged By:	AM
Drilling Date(s):	1/14/2017	Drill Rig:	CME 45	Groundwater Depth:	-- ft
Drilling Method:	Hollow Stem Auger			Depth to Bedrock:	-- ft
Hammer Weight/Drop:	140 lbs./30-inches	Hammer Type:	Automatic	Total Depth:	50 ft

Sampler Type: Auger Cuttings (C) California Ring (R) Split Spoon (S)

DEPTH (feet)	SAMPLES Sample Type	SAMPLES Sample	BLOWCOUNTS 0 - 6"	BLOWCOUNTS 6" - 12"	BLOWCOUNTS 12" - 18"	SPT "N" Value	USGS	MATERIAL DESCRIPTION	LABORATORY TEST DATA Moisture Content (%)	Dry Density (pcf)	Fines (%)	Liquid Limit	Plastic Limit	Plast. Index
1							SM	**SILTY SAND (SM)**						
2								medium brown silty fine grained sand						
3								becoming coarse to fine grained silty sand						
4														
5	R	☒	8	16	21	24		medium dense	7	107				
6														
7														
8														
9														
10	S	▒	5	6	7	13		medium dense	3		29			
11														
12														
13														
14														
15							SPSM	**SAND WITH SILT**						
16	R	☒	15	20	23	28		gray poorly-graded sand with silt	3	114				
17								medium dense						
18														
19														
20	S	▒	5	6	7	13	SWSM	gray well-graded sand with silt	4		12			
21								medium dense						
22														
23														
24														
25	S	▒	5	7	8	15	SM	**SILTY SAND (SM)**	5		27			
26								medium brown silty fine grained sand						
27								medium dense						
28														
29														
30	S	▒	7	7	11	18		medium dense						
31														
32														
33														
34														

The stratification lines represent the approximate boundary lines between soil and rock types. In-situ, the transition may be gradual.

geomat	Project Name: Hawthorne Heights Project, Riverside, CA Project No.: 16193-01	Boring No.: **B-1**	Page 2 of 2

Boring Location:	See Plate 1	Drilling Co.	GeoMat	Logged By:	AM
Drilling Date(s):	1/14/2017	Drill Rig:	CME 45	Groundwater Depth:	-- ft
Drilling Method:	Hollow Stem Auger			Depth to Bedrock:	-- ft
Hammer Weight/Drop:	140 lbs./30-inches	Hammer Type:	Automatic	Total Depth:	50 ft

Sampler Type: Auger Cuttings (C) California Ring (R) Split Spoon (S)

DEPTH (feet)	SAMPLES Sample Type	SAMPLES Sample	BLOWCOUNTS 0 - 6"	BLOWCOUNTS 6" - 12"	BLOWCOUNTS 12" - 18"	SPT "N" Value	USGS	MATERIAL DESCRIPTION	LABORATORY TEST DATA Moisture Content (%)	Dry Density (pcf)	Fines (%)	Liquid Limit	Plastic Limit	Plast. Index
36	S		10	12	15	27	SPSM	**SAND WITH SILT (SP-SM)** gray poorly-graded sand with silt medium dense	2		5			
37														
38														
39														
40														
41	S		10	13	15	28	SM	**SILTY SAND (SM)** gray-brown silty sand medium dense	6		27			
42														
43														
44														
45														
46	S		9	11	13	24	ML	**SANDY SILT (ML)** gray sandy silt, moist very firm	13		60			
47														
48														
49														
50	S		7	13	15	28		very firm						
51														
52								TD = 50'						
53														
54														
55														
56														
57														
58														
59														
60														
61														
62														
63														
64														
65														
66														
67														
68														
69														

The stratification lines represent the approximate boundary lines between soil and rock types. In-situ, the transition may be gradual.

geomat	Project Name: Hawthorne Heights Project, Riverside, CA Project No.: 16193-01	Boring No.: **B-2**	Page 1 of 1

Boring Location:	See Plate 1	Drilling Co.	GeoMat	Logged By:	AM
Drilling Date(s):	1/19/2017	Drill Rig:	--	Groundwater Depth:	-- ft
Drilling Method:	Manual with Dames and Moore			Depth to Bedrock:	-- ft
Hammer Weight/Drop:	35 lbs./36-inches	Hammer Type:	Automatic	Total Depth:	15 ft

Sampler Type: Auger Cuttings (C) ☒ California Ring (R) Split Spoon (S)

DEPTH (feet)	SAMPLES Sample Type	SAMPLES Sample	BLOWCOUNTS 0 - 6"	BLOWCOUNTS 6" - 12"	BLOWCOUNTS 12" - 18"	SPT "N" Value	USGS	MATERIAL DESCRIPTION	LABORATORY TEST DATA Moisture Content (%)	Dry Density (pcf)	Fines (%)	Liquid Limit	Plastic Limit	Plast. Index
1							SM	**SILTY SAND (SM)**						
2								medium brown silty fine grained sand						
3														
4														
5	R	☒				27		medium dense	4	100				
6								becoming coarse to fine grained silty sand						
7														
8														
9														
10														
11														
12							SP	**SAND WITH SILT (SP)**						
13	R	☒				13		poorly-graded sand	2	110	2			
14								medium dense, dry						
15														
16								TD = 15'						
17														
18														
19														
20														
21														
22														
23														
24														
25														
26														
27														
28														
29														
30														
31														
32														
33														
34														

The stratification lines represent the approximate boundary lines between soil and rock types. In-situ, the transition may be gradual.

geomat	Project Name: Hawthorne Heights Project, Riverside, CA Project No.: 16193-01	Boring No.: **B-3**	Page 1 of 1

Boring Location:	See Plate 1	Drilling Co.	GeoMat	Logged By:	AM
Drilling Date(s):	1/18/2017	Drill Rig:	--	Groundwater Depth:	-- ft
Drilling Method:	Manual with Dames and Moore			Depth to Bedrock:	-- ft
Hammer Weight/Drop:	35 lbs./36-inches	Hammer Type:	Automatic	Total Depth:	6 ft

Sampler Type: Auger Cuttings (C) California Ring (R) Split Spoon (S)

DEPTH (feet)	SAMPLES: Sample Type	SAMPLES: Sample	BLOWCOUNTS: 0 - 6"	BLOWCOUNTS: 6" - 12"	BLOWCOUNTS: 12" - 18"	SPT "N" Value	USGS	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Moisture Content (%)	Dry Density (pcf)	Fines (%)	Liquid Limit	Plastic Limit	Plast. Index
								FILL (WOODCHIPS)						
1														
2							SM	**SILTY SAND (SM)**						
3								medium brown silty fine grained sand						
4														
5								becoming coarse to fine grained silty sand						
6	R	☒				23		medium dense	5	102				
7														
8								TD = 6'						
9														
10														
11														
12														
13														
14														
15														
16														
17														
18														
19														
20														
21														
22														
23														
24														
25														
26														
27														
28														
29														
30														
31														
32														
33														
34														

The stratification lines represent the approximate boundary lines between soil and rock types. In-situ, the transition may be gradual.

geomat	Project Name: Hawthorne Heights Project, Riverside, CA Project No.: 16193-01	Boring No.: **B-4**	Page 1 of 1

Boring Location:	See Plate 1	Drilling Co.	GeoMat	Logged By:	AM
Drilling Date(s):	1/18/2017	Drill Rig:	--	Groundwater Depth:	-- ft
Drilling Method:	Manual with Dames and Moore			Depth to Bedrock:	-- ft
Hammer Weight/Drop:	35 lbs./36-inches	Hammer Type:	Automatic	Total Depth:	12' ft

Sampler Type: Auger Cuttings (C) | California Ring (R) | Split Spoon (S)

DEPTH (feet)	SAMPLES: Sample Type	SAMPLES: Sample	BLOWCOUNTS: 0 - 6"	BLOWCOUNTS: 6" - 12"	BLOWCOUNTS: 12" - 18"	SPT "N" Value	USGS	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Moisture Content (%)	Dry Density (pcf)	Fines (%)	Liquid Limit	Plastic Limit	Plast. Index
1							SM	**SILTY SAND (SM)**						
2								medium brown silty fine grained sand						
3														
4								becoming coarse to fine grained silty sand						
5														
6														
7	R	☒				22		medium dense						
8								sample disturbed						
9														
10														
11														
12	R	☒				18		medium dense	6	107				
13														
14								TD = 12'						
15														
16														
17														
18														
19														
20														
21														
22														
23														
24														
25														
26														
27														
28														
29														
30														
31														
32														
33														
34														

The stratification lines represent the approximate boundary lines between soil and rock types. In-situ, the transition may be gradual.

geomat	Project Name: Hawthorne Heights Project, Riverside, CA Project No.: 16193-01	Boring No.: **B-5**	Page 1 of 1

Boring Location:	See Plate 1	Drilling Co.	GeoMat	Logged By:	AM
Drilling Date(s):	1/18/2017	Drill Rig:	--	Groundwater Depth:	-- ft
Drilling Method:	Manual with Dames and Moore			Depth to Bedrock:	-- ft
Hammer Weight/Drop:	35 lbs./36-inches	Hammer Type:	Automatic	Total Depth:	13' ft

Sampler Type: Auger Cuttings (C) ☒ California Ring (R) Split Spoon (S)

DEPTH (feet)	SAMPLES Sample Type	SAMPLES Sample	BLOWCOUNTS 0 - 6"	BLOWCOUNTS 6" - 12"	BLOWCOUNTS 12" - 18"	SPT "N" Value	USGS	MATERIAL DESCRIPTION	LABORATORY TEST DATA Moisture Content (%)	Dry Density (pcf)	Fines (%)	Liquid Limit	Plastic Limit	Plast. Index
1							SM	**SILTY SAND (SM)**						
2								medium brown silty fine grained sand						
3														
4								becoming coarse to fine grained silty sand						
5	R	☒				28		medium dense	5	108				
6														
7														
8														
9														
10														
11														
12														
13	R	☒				20		**SAND WITH SILT (SP-SM)**	3	109				
14								poorly-graded sand with silt						
15								medium dense						
16														
17								TD = 13'						
18														
19														
20														
21														
22														
23														
24														
25														
26														
27														
28														
29														
30														
31														
32														
33														
34														

The stratification lines represent the approximate boundary lines between soil and rock types. In-situ, the transition may be gradual.

geomat	Project Name: Hawthorne Heights Project, Riverside, CA Project No.: 16193-01	Boring No.: **B-6**	Page 1 of 1

Boring Location:	See Plate 1	Drilling Co.	GeoMat	Logged By:	AM
Drilling Date(s):	1/21/2017	Drill Rig:	CME 45	Groundwater Depth:	-- ft
Drilling Method:	Hollow Stem Auger			Depth to Bedrock:	-- ft
Hammer Weight/Drop:	140 lbs./30-inches	Hammer Type:	Automatic	Total Depth:	15' ft

Sampler Type: Auger Cuttings (C) California Ring (R) Split Spoon (S)

DEPTH (feet)	SAMPLES Sample Type	SAMPLES Sample	BLOWCOUNTS 0 - 6"	BLOWCOUNTS 6" - 12"	BLOWCOUNTS 12" - 18"	SPT "N" Value	USGS	MATERIAL DESCRIPTION	LABORATORY TEST DATA Moisture Content (%)	Dry Density (pcf)	Fines (%)	Liquid Limit	Plastic Limit	Plast. Index
1							SM	**SILTY SAND (SM)**						
2								medium brown silty fine grained sand						
3								becoming more coarse grained						
4														
5	S		2	3	4	7		loose						
6														
7														
8							SPSM	**SAND WITH SILT (SP-SM)**						
9								brown poorly-graded sand with silt						
10								dry						
11	S		8	11	12	23	SM	**SILTY SAND (SM)**						
12								medium brown silty fine grained sand						
13								medium dense						
14														
15	S		7	9	10	19		medium dense						
16														
17								TD = 15'						
18														
19														
20														
21														
22														
23														
24														
25														
26														
27														
28														
29														
30														
31														
32														
33														
34														

The stratification lines represent the approximate boundary lines between soil and rock types. In-situ, the transition may be gradual.

geomat	Project Name: Hawthorne Heights Project, Riverside, CA Project No.: 16193-01	Boring No.: **B-7**	Page 1 of 1

Boring Location:	See Plate 1	Drilling Co.	GeoMat	Logged By:	AM
Drilling Date(s):	1/21/2017	Drill Rig:	CME 45	Groundwater Depth:	-- ft
Drilling Method:	Hollow Stem Auger			Depth to Bedrock:	-- ft
Hammer Weight/Drop:	140 lbs./30-inches	Hammer Type:	Automatic	Total Depth:	15' ft

Sampler Type: Auger Cuttings (C) California Ring (R) Split Spoon (S)

DEPTH (feet)	SAMPLES Sample Type	SAMPLES Sample	BLOWCOUNTS 0 - 6"	BLOWCOUNTS 6" - 12"	BLOWCOUNTS 12" - 18"	SPT "N" Value	USGS	MATERIAL DESCRIPTION	LABORATORY TEST DATA Moisture Content (%)	Dry Density (pcf)	Fines (%)	Liquid Limit	Plastic Limit	Plast. Index
1							SM	**SILTY SAND (SM)**						
2								medium brown silty fine grained sand						
3														
4								becoming more coarse grained						
5	S		9	11	11	22		medium dense						
6														
7														
8														
9														
10	S		8	7	8	15		medium dense						
11														
12							SPSM	**SAND WITH SILT (SP-SM)**						
13								brown poorly-graded sand with silt						
14								dry						
15	S		5	6	7	13	SM	**SILTY SAND (SM)**						
16								medium brown silty fine grained sand						
17														
18								TD = 15'						
19														
20														
21														
22														
23														
24														
25														
26														
27														
28														
29														
30														
31														
32														
33														
34														

The stratification lines represent the approximate boundary lines between soil and rock types. In-situ, the transition may be gradual.

BORHOLE LOG — BH-8

Sheet	1 OF 1		
Date	10/24/2015		
Project No.	16193-01	Drilling Co.	GeoMat
Project	Steven Walker Homes - Hawthorne Heights	Sampler	Cal Mod. And SPT
Client	Steven Walker Homes	Method	Hollow Stem
Location	APN 233-170-001 and 233-180-007, Riverside, California	Hammer Type	140 lb
Coodinate		Surface Elev.	
Notes		Total Depth	15'

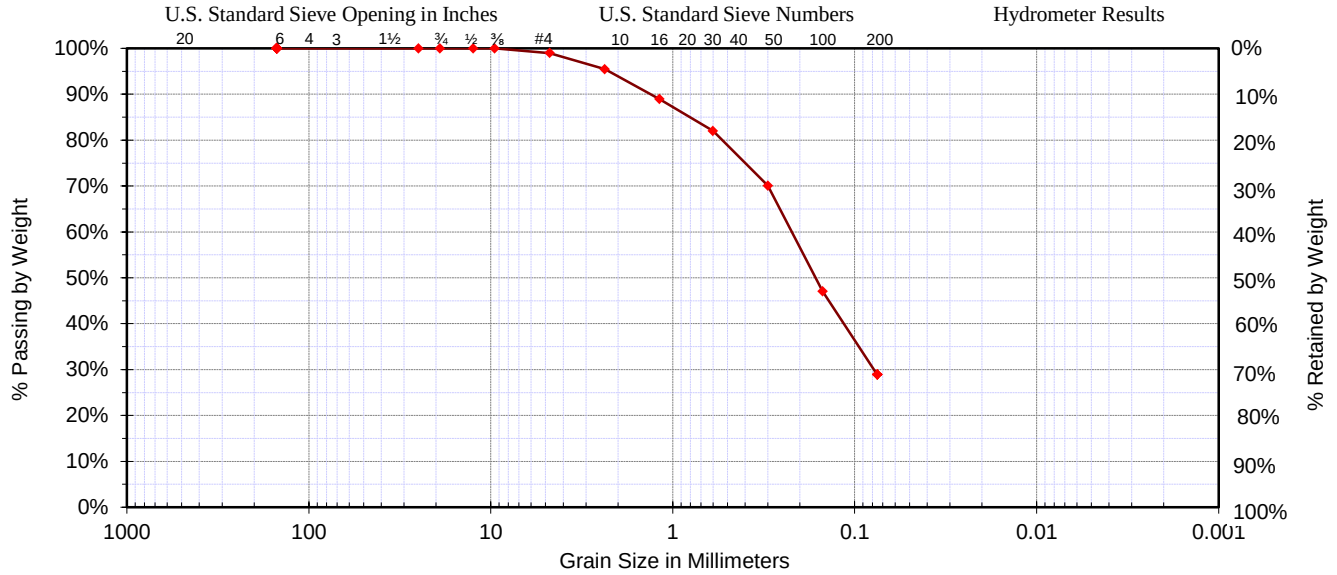
Type/Symbol	Casing	Split Spoon	Ring Sampler	Cutting	Date	Time	Water Depth (ft)	Casing Size (in)	Casing Depth (ft)	Hole Depth (ft)	Symbol
I.D.		S	R	C							
O.D.					10/24/2015		None				
Length											
Hammer Wt.											
Hammer Fall											

Depth Below Surface (ft)	Elevation (ft)	Graphic	Soil Sample Type	Number	Symbol	Depth	Blows 0-152.4 mm	152.4-304.8 mm	304.8-457.2 mm	N-Value	N60	(N1)60	VISUAL MATERIAL CLASSIFICATION AND REMARKS	Moisture (%)	Dry Density (pcf)	Test
0													**SILTY SAND (SM)**			
1													medium brown silty sand, moist			
2																
3																
4																
5			R				4	5	7	8			loose	8	124	
6													becoming more coarse grained			
7																
8													**WELL-GRADED SAND (SW)**			
9													gray-brown sand with silt, dry			
10			R				5	8	11	12			medium dense	2	111	
11													% Passing No. 200 Sieve = 3			
12																
13																
14													**SILTY SAND (SM)**			
15			S				8	10	10	20			medium brown silty sand, moist	6		
16													medium dense			
17													% Passing No. 200 Sieve = 21			
18																
19																
20																
21																
22																
23																
24																

The stratification lines represent the approximate boundary lines between soil and rock types. In-situ, the transition may be gradual.

Appendix C

LABORATORY TEST RESULTS



Date :	01/14/17	D_{10} =	0.03	**Classification**	% Gravel
Sample #:		D_{30} =	0.08	SM, Silty Sand	1.04%
Sample ID:	B1 @ 10'	D_{60} =	0.23		% Sand
Source:	SPT	C_C =	1.04	**Specifications**	70.08%
Project:	APNs 233-180-007 & 233-170-001	C_U =	9.02	custom specs 1	% Silt & Clay
Location:	Riverside, California	Liquid Limit=	n/a		28.88%
Boring #:	B1	Plastic Limit=	n/a	Fineness Modulus	Sample Moisture
Depth:	10'	Plasticity Index=	n/a	1.18	**3.4%**

Coarse Section Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min	**Fines Section** Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
6.00"	150.00		100.0%			#4	4.750	99.0%	99.0%		
4.00"	100.00		100.0%			#8	2.360	95.5%	95.5%		
3.00"	75.00		100.0%			#10	2.000		93.5%		
2.50"	63.00		100.0%			#16	1.180	88.9%	88.9%		
2.00"	50.00		100.0%			#20	0.850		85.0%		
1.75"	45.00		100.0%			#30	0.600	82.0%	82.0%		
1.50"	37.50		100.0%			#40	0.425		75.0%		
1.25"	31.50		100.0%			#50	0.300	70.1%	70.1%		
1.00"	25.00	100.0%	100.0%			#60	0.250		62.4%		
7/8"	22.40		100.0%			#80	0.180		51.7%		
3/4"	19.00	100.0%	100.0%			#100	0.150	47.1%	47.1%		
5/8"	16.00		100.0%			#140	0.106		36.4%		
1/2"	12.50	100.0%	100.0%			#170	0.090		32.5%		
3/8"	9.50	100.0%	100.0%			#200	0.075	28.9%	28.9%		
1/4"	6.30		99.3%			#270	0.053				
#4	4.75	99.0%	99.0%								

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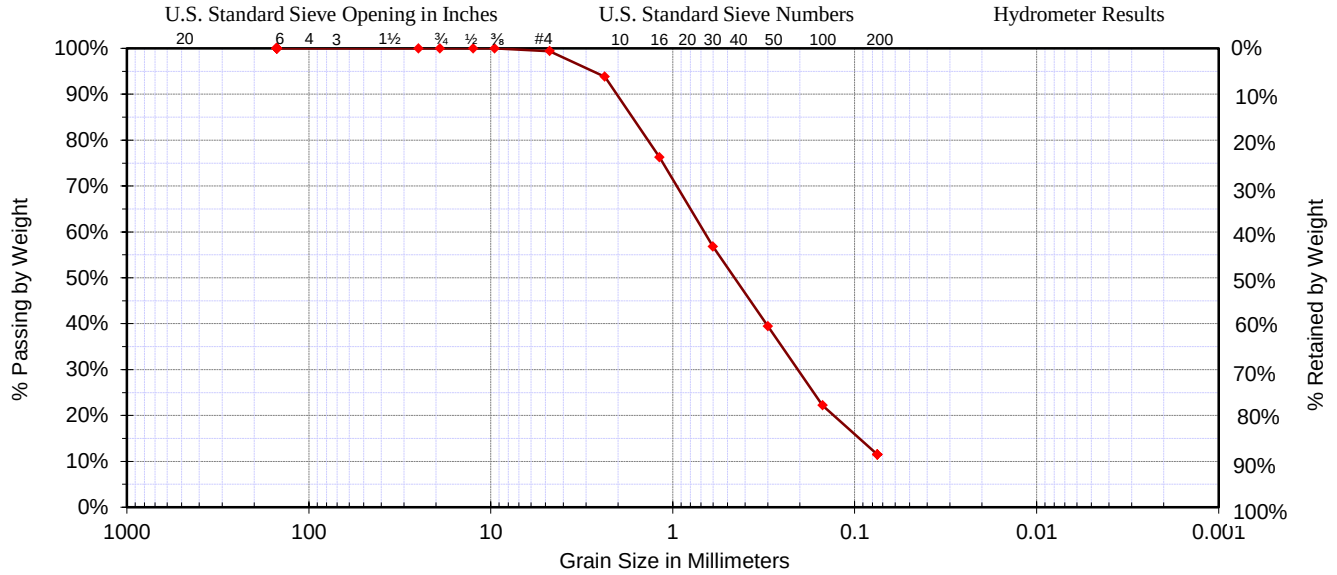
LABORATORY TEST RESULTS



Date :	01/14/17	D_{10} =	0.07	**Classification**	% Gravel
Sample #:		D_{30} =	0.22	SW-SM, Well-graded Sand with Silt	0.62%
Sample ID:	B1 @ 20'	D_{60} =	0.70		% Sand
Source:	SPT	C_C =	1.05	**Specifications**	87.89%
Project:	APNs 233-180-007 & 233-170-001	C_U =	10.65	custom specs 1	% Silt & Clay
Location:	Riverside, California	Liquid Limit=	n/a		11.48%
Boring #:	B1	Plastic Limit=	n/a	Fineness Modulus	Sample Moisture
Depth:	20'	Plasticity Index=	n/a	2.12	**3.8%**

Coarse Section Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min	**Fines Section** Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
6.00"	150.00		100.0%			#4	4.750	99.4%	99.4%		
4.00"	100.00		100.0%			#8	2.360	93.8%	93.8%		
3.00"	75.00		100.0%			#10	2.000		88.5%		
2.50"	63.00		100.0%			#16	1.180	76.3%	76.3%		
2.00"	50.00		100.0%			#20	0.850		65.2%		
1.75"	45.00		100.0%			#30	0.600	56.8%	56.8%		
1.50"	37.50		100.0%			#40	0.425		46.7%		
1.25"	31.50		100.0%			#50	0.300	39.5%	39.5%		
1.00"	25.00	100.0%	100.0%			#60	0.250		33.7%		
7/8"	22.40		100.0%			#80	0.180		25.6%		
3/4"	19.00	100.0%	100.0%			#100	0.150	22.2%	22.2%		
5/8"	16.00		100.0%			#140	0.106		15.9%		
1/2"	12.50	100.0%	100.0%			#170	0.090		13.6%		
3/8"	9.50	100.0%	100.0%			#200	0.075	11.5%	11.5%		
1/4"	6.30		99.6%			#270	0.053				
#4	4.75	99.4%	99.4%								

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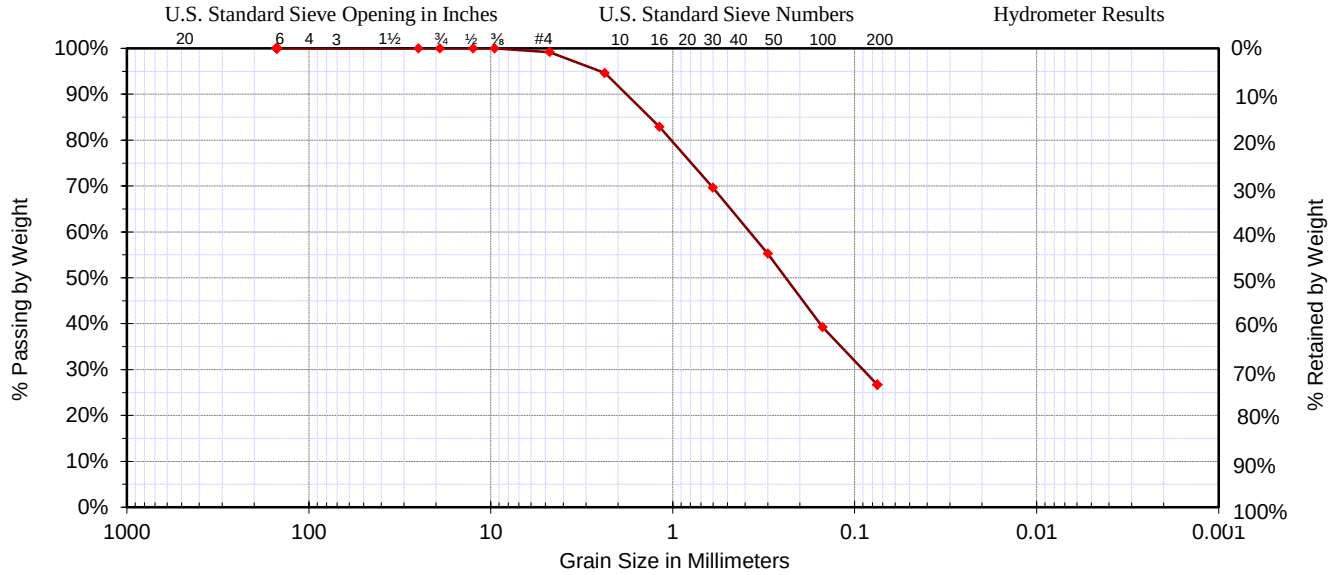
LABORATORY TEST RESULTS



Date :	01/14/17	D_{10} =	0.03	**Classification**	% Gravel
Sample #:		D_{30} =	0.09	SM, Silty Sand	0.82%
Sample ID:	B1 @ 25'	D_{60} =	0.40		% Sand
Source:	SPT	C_C =	0.80	**Specifications**	72.48%
Project:	APNs 233-180-007 & 233-170-001	C_U =	14.21	custom specs 1	% Silt & Clay
Location:	Riverside, California	Liquid Limit=	n/a		26.71%
Boring #:	B1	Plastic Limit=	n/a	Fineness Modulus	Sample Moisture
Depth:	25'	Plasticity Index=	n/a	1.59	**5.3%**

Coarse Section Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min	**Fines Section** Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
6.00"	150.00		100.0%			#4	4.750	99.2%	99.2%		
4.00"	100.00		100.0%			#8	2.360	94.6%	94.6%		
3.00"	75.00		100.0%			#10	2.000		91.0%		
2.50"	63.00		100.0%			#16	1.180	82.9%	82.9%		
2.00"	50.00		100.0%			#20	0.850		75.3%		
1.75"	45.00		100.0%			#30	0.600	69.6%	69.6%		
1.50"	37.50		100.0%			#40	0.425		61.2%		
1.25"	31.50		100.0%			#50	0.300	55.2%	55.2%		
1.00"	25.00	100.0%	100.0%			#60	0.250		49.9%		
7/8"	22.40		100.0%			#80	0.180		42.4%		
3/4"	19.00	100.0%	100.0%			#100	0.150	39.2%	39.2%		
5/8"	16.00		100.0%			#140	0.106		31.9%		
1/2"	12.50	100.0%	100.0%			#170	0.090		29.2%		
3/8"	9.50	100.0%	100.0%			#200	0.075	26.7%	26.7%		
1/4"	6.30		99.5%			#270	0.053				
#4	4.75	99.2%	99.2%								

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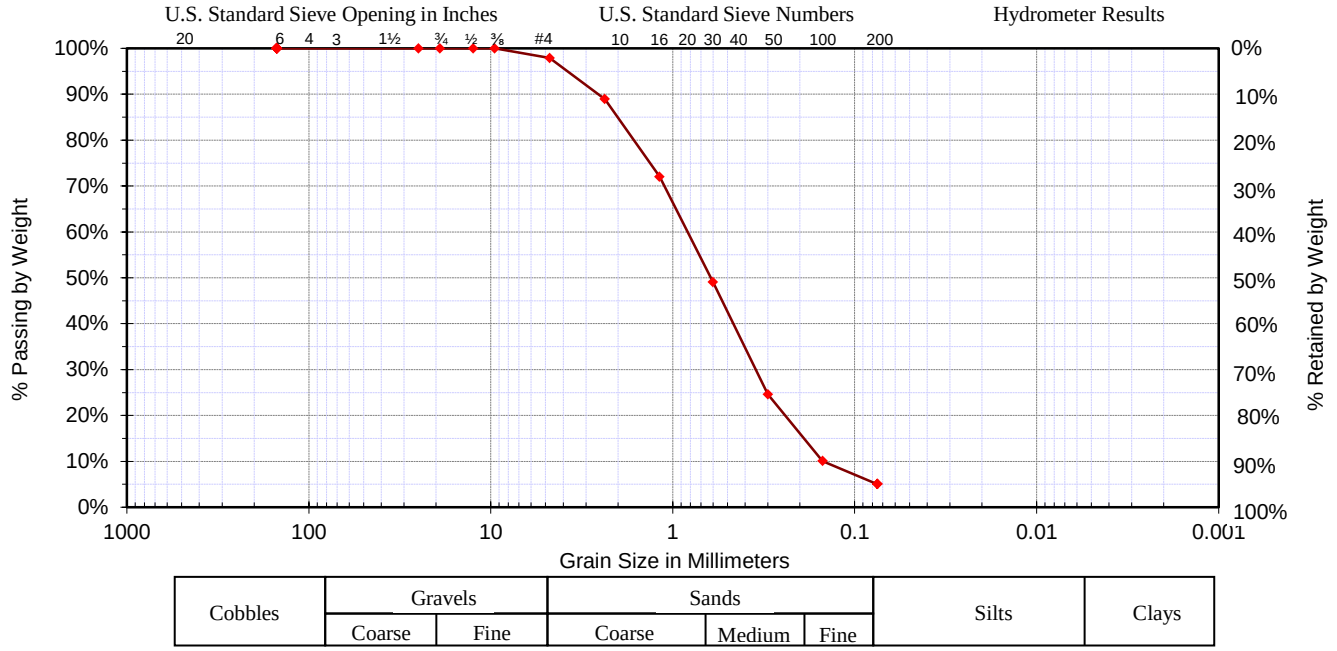
LABORATORY TEST RESULTS



Date :	01/14/17	D_{10} =	0.15	**Classification**	% Gravel
Sample #:		D_{30} =	0.37	SP-SM, Poorly graded Sand with Silt	2.13%
Sample ID:	B1 @ 35'	D_{60} =	0.88		% Sand
Source:	SPT	C_C =	1.03	**Specifications**	92.85%
Project:	APNs 233-180-007 & 233-170-001	C_U =	5.87	custom specs 1	% Silt & Clay
Location:	Riverside, California	Liquid Limit=	n/a		5.03%
Boring #:	B1	Plastic Limit=	n/a	Fineness Modulus	Sample Moisture
Depth:	35'	Plasticity Index=	n/a	2.57	**2.2%**

Coarse Section Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min	**Fines Section** Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
6.00"	150.00		100.0%			#4	4.750	97.9%	97.9%		
4.00"	100.00		100.0%			#8	2.360	88.9%	88.9%		
3.00"	75.00		100.0%			#10	2.000		83.8%		
2.50"	63.00		100.0%			#16	1.180	72.0%	72.0%		
2.00"	50.00		100.0%			#20	0.850		58.9%		
1.75"	45.00		100.0%			#30	0.600	49.0%	49.0%		
1.50"	37.50		100.0%			#40	0.425		34.8%		
1.25"	31.50		100.0%			#50	0.300	24.6%	24.6%		
1.00"	25.00	100.0%	100.0%			#60	0.250		19.8%		
7/8"	22.40		100.0%			#80	0.180		13.0%		
3/4"	19.00	100.0%	100.0%			#100	0.150	10.1%	10.1%		
5/8"	16.00		100.0%			#140	0.106		7.1%		
1/2"	12.50	100.0%	100.0%			#170	0.090		6.0%		
3/8"	9.50	100.0%	100.0%			#200	0.075	5.0%	5.0%		
1/4"	6.30		98.6%			#270	0.053				
#4	4.75	97.9%	97.9%								

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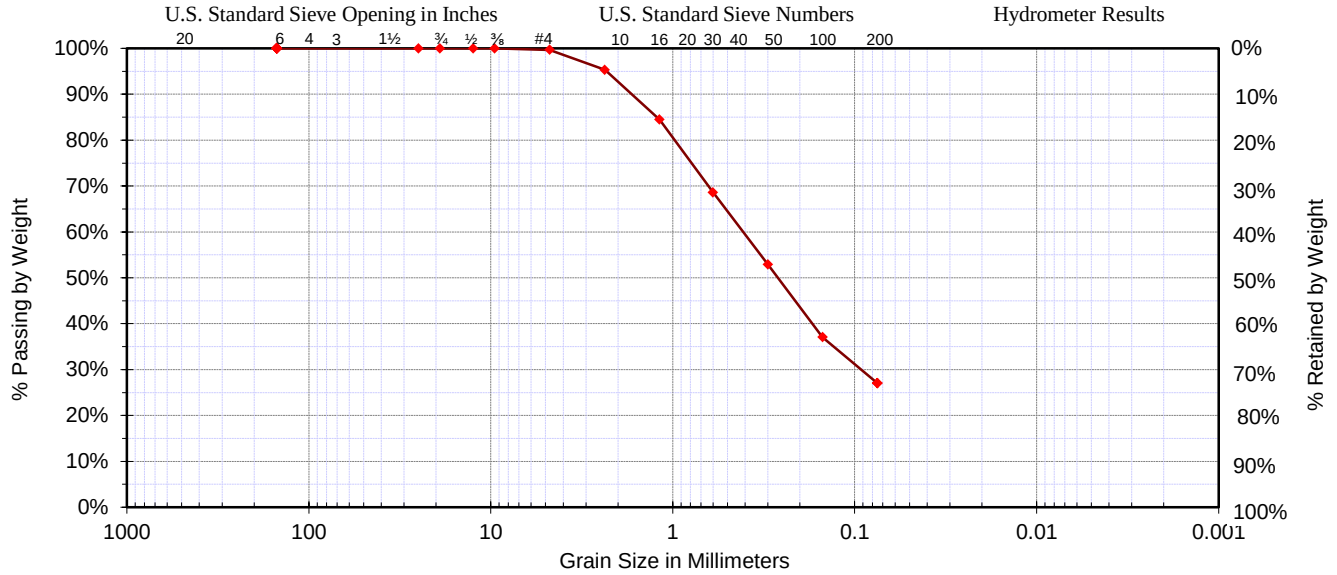
LABORATORY TEST RESULTS



Date :	01/14/17	D_{10} =	0.03	**Classification**	% Gravel
Sample #:		D_{30} =	0.10	SM, Silty Sand	0.33%
Sample ID:	B1 @ 40'	D_{60} =	0.44		% Sand
Source:	SPT	C_C =	0.78	**Specifications**	72.62%
Project:	APNs 233-180-007 & 233-170-001	C_U =	15.70	custom specs 1	% Silt & Clay
Location:	Riverside, California	Liquid Limit=	n/a		27.05%
Boring #:	B1	Plastic Limit=	n/a	Fineness Modulus	Sample Moisture
Depth:	40'	Plasticity Index=	n/a	1.62	**6.3%**

Coarse Section Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min	**Fines Section** Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
6.00"	150.00		100.0%			#4	4.750	99.7%	99.7%		
4.00"	100.00		100.0%			#8	2.360	95.3%	95.3%		
3.00"	75.00		100.0%			#10	2.000		92.0%		
2.50"	63.00		100.0%			#16	1.180	84.5%	84.5%		
2.00"	50.00		100.0%			#20	0.850		75.5%		
1.75"	45.00		100.0%			#30	0.600	68.6%	68.6%		
1.50"	37.50		100.0%			#40	0.425		59.5%		
1.25"	31.50		100.0%			#50	0.300	52.9%	52.9%		
1.00"	25.00	100.0%	100.0%			#60	0.250		47.6%		
7/8"	22.40		100.0%			#80	0.180		40.2%		
3/4"	19.00	100.0%	100.0%			#100	0.150	37.1%	37.1%		
5/8"	16.00		100.0%			#140	0.106		31.2%		
1/2"	12.50	100.0%	100.0%			#170	0.090		29.0%		
3/8"	9.50	100.0%	100.0%			#200	0.075	27.0%	27.0%		
1/4"	6.30		99.8%			#270	0.053				
#4	4.75	99.7%	99.7%								

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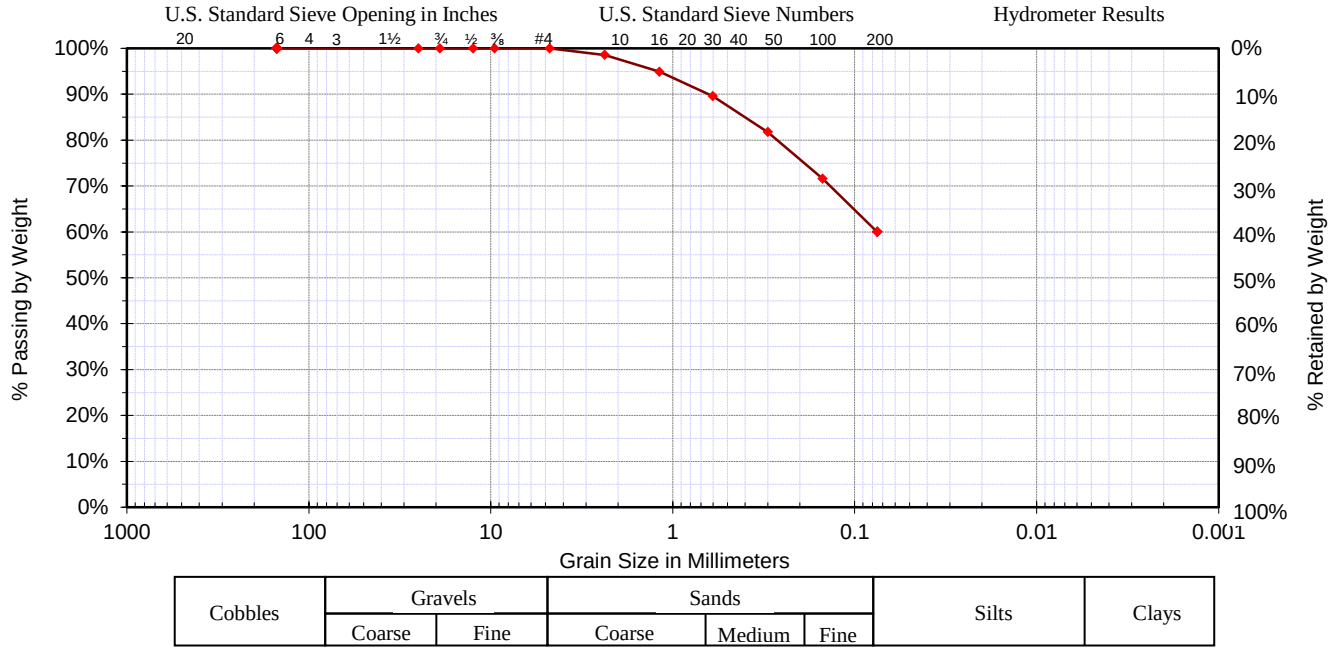
LABORATORY TEST RESULTS



Date :	01/14/17	D_{10} =	0.01	**Classification**	% Gravel
Sample #:		D_{30} =	0.04	ML, Sandy Silt	0.00%
Sample ID:	B1 @ 45'	D_{60} =	0.08		% Sand
Source:	SPT	C_C =	1.50	**Specifications**	40.00%
Project:	APNs 233-180-007 & 233-170-001	C_U =	6.00	custom specs 1	% Silt & Clay
Location:	Riverside, California	Liquid Limit=	n/a		60.00%
Boring #:	B1	Plastic Limit=	n/a	Fineness Modulus	Sample Moisture
Depth:	45'	Plasticity Index=	n/a	0.64	**13.4%**

Coarse Section Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min	**Fines Section** Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
6.00"	150.00		100.0%			#4	4.750	100.0%	100.0%		
4.00"	100.00		100.0%			#8	2.360	98.6%	98.6%		
3.00"	75.00		100.0%			#10	2.000		97.4%		
2.50"	63.00		100.0%			#16	1.180	94.9%	94.9%		
2.00"	50.00		100.0%			#20	0.850		91.9%		
1.75"	45.00		100.0%			#30	0.600	89.6%	89.6%		
1.50"	37.50		100.0%			#40	0.425		85.0%		
1.25"	31.50		100.0%			#50	0.300	81.7%	81.7%		
1.00"	25.00	100.0%	100.0%			#60	0.250		78.4%		
7/8"	22.40		100.0%			#80	0.180		73.6%		
3/4"	19.00	100.0%	100.0%			#100	0.150	71.6%	71.6%		
5/8"	16.00		100.0%			#140	0.106		64.8%		
1/2"	12.50	100.0%	100.0%			#170	0.090		62.3%		
3/8"	9.50	100.0%	100.0%			#200	0.075	60.0%	60.0%		
1/4"	6.30		100.0%			#270	0.053				
#4	4.75	100.0%	100.0%								

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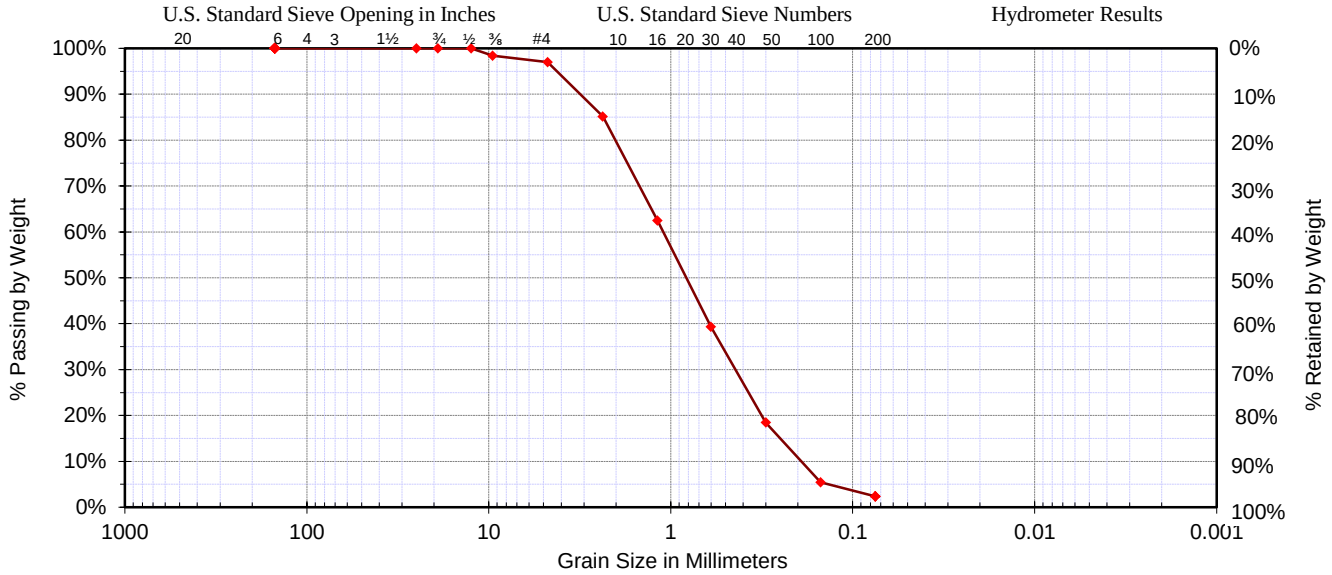
LABORATORY TEST RESULTS



Cobbles	Gravels		Sands			Silts	Clays
	Coarse	Fine	Coarse	Medium	Fine		

Date :	01/19/17	D_{10} =	0.20	**Classification**	% Gravel
Sample #:		D_{30} =	0.47	SP, Poorly graded Sand	3.00%
Sample ID:	B2 @ 12'	D_{60} =	1.12		% Sand
Source:	Ring	C_C =	0.96	**Specifications**	94.64%
Project:	APNs 233-180-007 & 233-170-001	C_U =	5.52	custom specs 1	% Silt & Clay
Location:	Riverside, California	Liquid Limit=	n/a		2.35%
Boring #:	B2	Plastic Limit=	n/a	Fineness Modulus	Sample Moisture
Depth:	12'	Plasticity Index=	n/a	2.94	**2.1%**

Coarse Section Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min	**Fines Section** Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
6.00"	150.00		100.0%			#4	4.750	97.0%	97.0%		
4.00"	100.00		100.0%			#8	2.360	85.1%	85.1%		
3.00"	75.00		100.0%			#10	2.000		78.2%		
2.50"	63.00		100.0%			#16	1.180	62.4%	62.4%		
2.00"	50.00		100.0%			#20	0.850		49.3%		
1.75"	45.00		100.0%			#30	0.600	39.3%	39.3%		
1.50"	37.50		100.0%			#40	0.425		27.1%		
1.25"	31.50		100.0%			#50	0.300	18.4%	18.4%		
1.00"	25.00	100.0%	100.0%			#60	0.250		14.1%		
7/8"	22.40		100.0%			#80	0.180		8.0%		
3/4"	19.00	100.0%	100.0%			#100	0.150	5.4%	5.4%		
5/8"	16.00		100.0%			#140	0.106		3.6%		
1/2"	12.50	100.0%	100.0%			#170	0.090		3.0%		
3/8"	9.50	98.4%	98.4%			#200	0.075	2.4%	2.4%		
1/4"	6.30		97.4%			#270	0.053				
#4	4.75	97.0%	97.0%								

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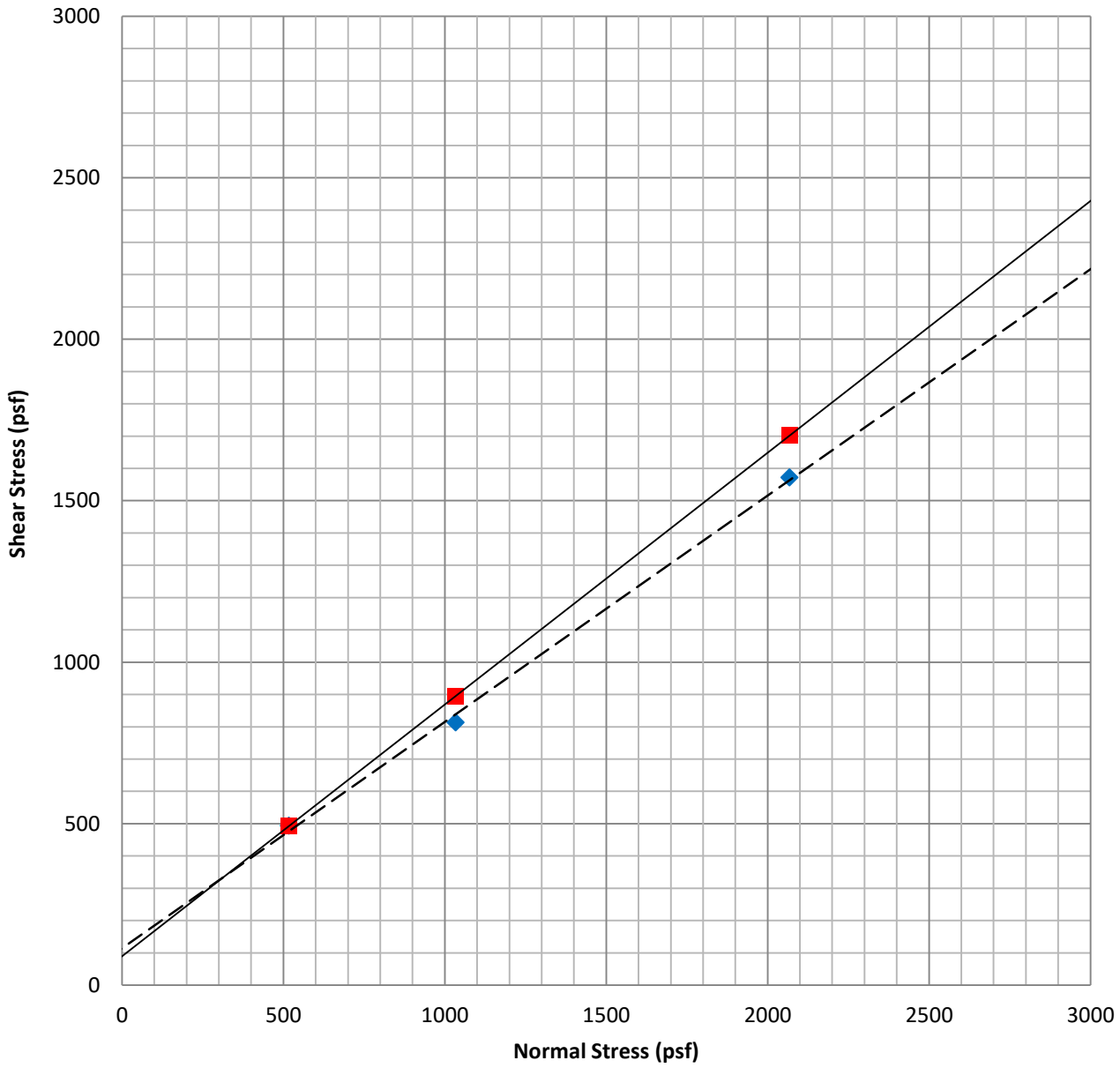
DIRECT SHEAR TEST RESULTS

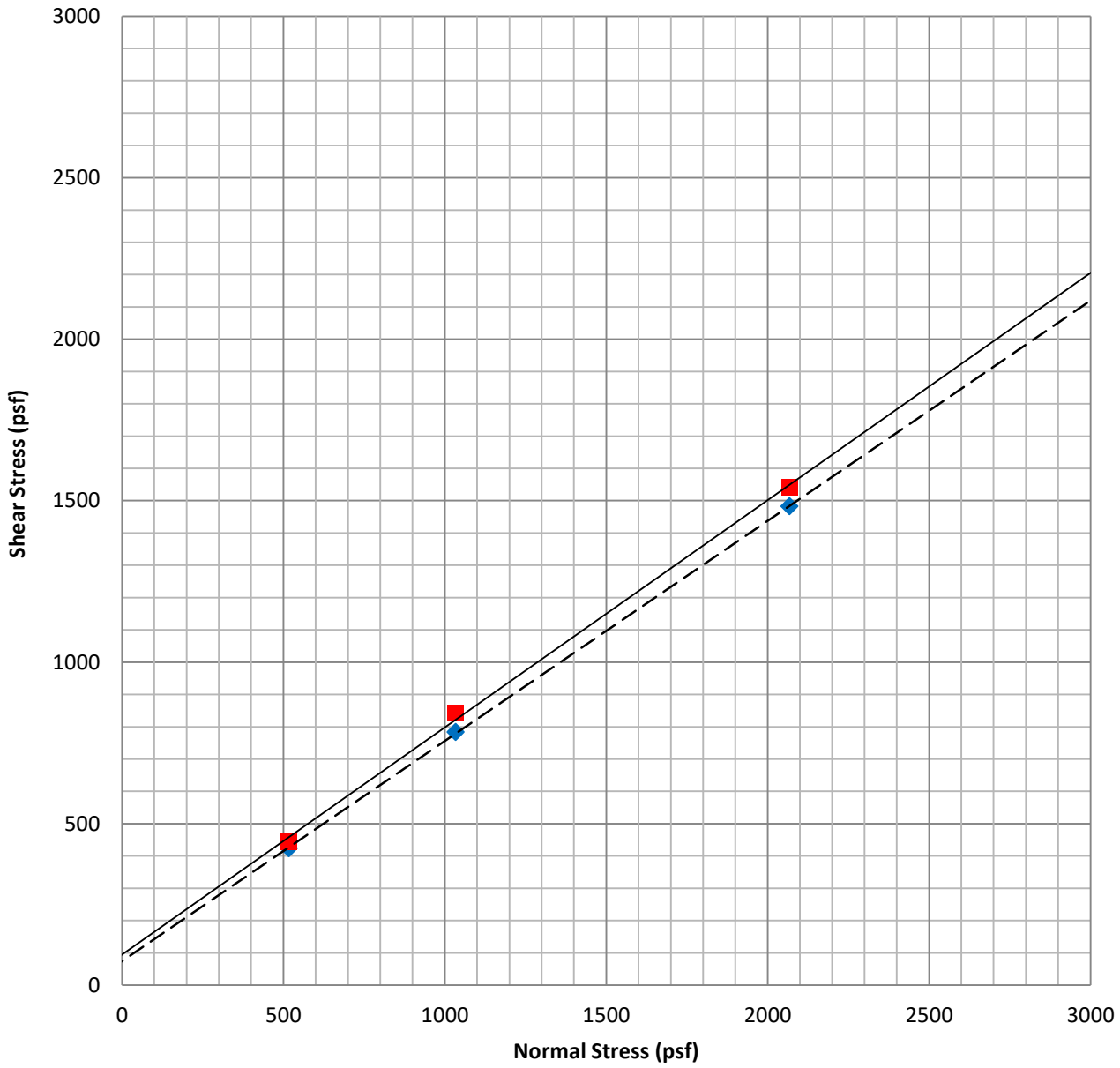


Sample	Symbol	Description	Soil Type [USCS]	Shear Strength	Friction Angle, ϕ [degrees]	Cohesion, c [psf]
B1 @ 5'	—■—	Medium Brown	SM	Peak	37.9	89
B1 @ 5'	– –◆– –	Medium Brown	SM	Ultimate	35.0	114

Sample Moisture [%]	Saturated Moisture [%]	Dry Unit Weight [pcf]
6.6	19.8	107.1
ASTM D-3080		

geomat

DIRECT SHEAR TEST RESULTS

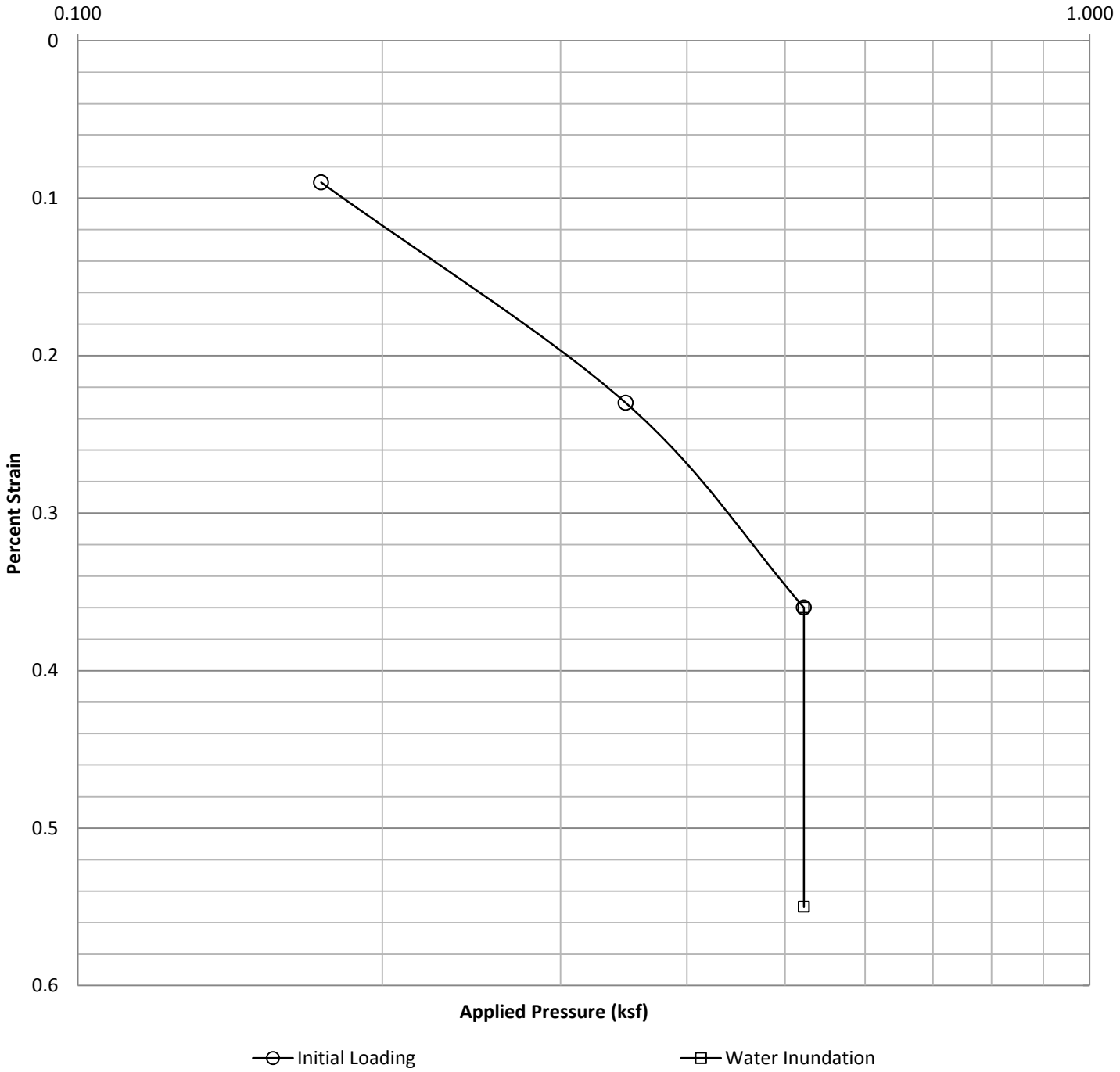


Sample	Symbol	Description	Soil Type [USCS]	Shear Strength	Friction Angle, ϕ [degrees]	Cohesion, c [psf]
B2 @ 5'	—■—	Brown Silty Sine Sand	SM	Peak	35.1	94
B2 @ 5'	– –◆– –	Brown Silty Sine Sand	SM	Ultimate	34.3	74

Sample Moisture [%]	Saturated Moisture [%]	Dry Unit Weight [pcf]
7.3	24.3	97.0
ASTM D-3080		

geomat

CONSOLIDATION TEST REPORT



Sampler Type:	California Ring Sampler			Condition:	Before Test			After Test		
Diameter(in):	2.41	Height(in):	1.0	Water Content:	w_0	3.5	%	w_f	23.2	%
Overburden Pressure, P_0	0.275	tsf		Void Ratio:	e_0	0.637		e_f	0.628	
Preconsol. Pressure, P_c	--	ksf		Saturation:	S_0	14.4	%	S_f	100.0	%
LL: --	PL: --	PI: --		Dry Density:	γ_d	99.0	pcf	γ_d	99.0	pcf
% Collapse:	0.19 %			Specific Gravity, G_S		2.6		(Assumed)		
Sample Location:	B2 @ 5'			Collapse Test				geomat		
Soil Classification:	SM									

GeoMat Testing Laboratories, Inc.

Soil Engineering, Environmental Engineering, Materials Testing, Geology

SOLUBLE SULFATEAND CHLORIDE TEST RESULTS

Project Name	Hawthorne Heights Project, Riverside, CA	**Test Date**	1/18/2017
Project No.	16193-01	**Date Sampled**	1/14/2017
Project Location	Hawthorne Heights Project, Riverside, CA	**Sampled By**	MN
Location in Structure	B1 @ 0-3'	**Sample Type**	Bulk
Sampled Classification	SM	**Tested By**	AM

TESTING INFORMATION

Sample weight before drying _____
Sample weight after drying _____
Sample Weight Passing No. 10 Sieve _____
Moisture _____

Location	Mixing Ratio	Dilution Factor	Sulfate Reading (ppm)	Sulfate Content (ppm)	Sulfate Content (%)
B1	3	1	<50	<150	<0.015
			Average		

Chloride Reading (ppm)	Chloride Content (ppm)	Chloride Content (%)
Average		

pH	
Average	

ACI 318-05 Table 4.3.1 Requirements for Concrete Exposed to Sulfate-Containing Solutions

Sulfate Exposure	Water-Soluble Sulfate (SO_4) In Soil, % by Mass	Sulfate (SO_4) In Water ppm	Cement Type	Maximum w/cm by Mass	Minimum Design Compressive Strength fc, MPa (psi)
Negligible	< 0.10	< 150	No Special Type	--	--
Moderate (see water)	0.10 to 0.20	150 to 1500	II IP(MS), IS(MS), P(MS), I(PM)(MS), I(SM)(MS)	0.50	28 (4000)
Severe	0.20 to 2.00	1500 to 10,000	V	0.45	31 (4500)
Very Severe	> 2.00	>10,000	V + pozz	0.45	31 (4500)

Caltrans classifies a site as corrosive to structural concrete as an area where soil and/or water contains >500pp chloride, >2000ppm sulfate, or has a pH <5.5. A minimum resistivity of less than 1000 ohm-cm indicates the potential for corrosive environment requiring testing for the above criteria.

The 2007 CBC Section 1904A references ACI 318 for material selection and mix design for reinforced concrete dependant on the onsite corrosion potential, soluble chloride content, and soluble sulfate content in soil

Comments: Sec 4.3 of ACI 318 (2005) Soil environment is detrimental to concrete if it has soluble sulfate >1000ppm and/or pH<5.5. Soil environment is corrosive to reinforcement and steel pipes if Chloride ion >500ppm or pH <4.0.

The information in this form is not intended for corrosion engineering design. If corrosion is critical, a corrosion specialist should be contacted to provide further recommendations.

Signature _____ Date _____

Print Name _____ Title _____

9980 Indiana Avenue ● Suite 14 ● Riverside ● California ● 92503 ● Phone (951) 688-5400 ● Fax (951) 688-5200
www.geomatlabs.com, contact: e-mail: geomatlabs@sbcglobal.net

Appendix D

USGS Design Maps Detailed Report

ASCE 7-10 Standard (33.91714°N, 117.43535°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 = 1.500 g

From Figure 22-2 [2] S_1 = 0.600 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 ≥ 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 = 1.500 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 = 0.600 g, F_v = 1.500

Equation (11.4–1): $S_{MS} = F_a S_S = 1.000 \times 1.500 = 1.500$ g

Equation (11.4–2): $S_{M1} = F_v S_1 = 1.500 \times 0.600 = 0.900$ g

Section 11.4.4 — Design Spectral Acceleration Parameters

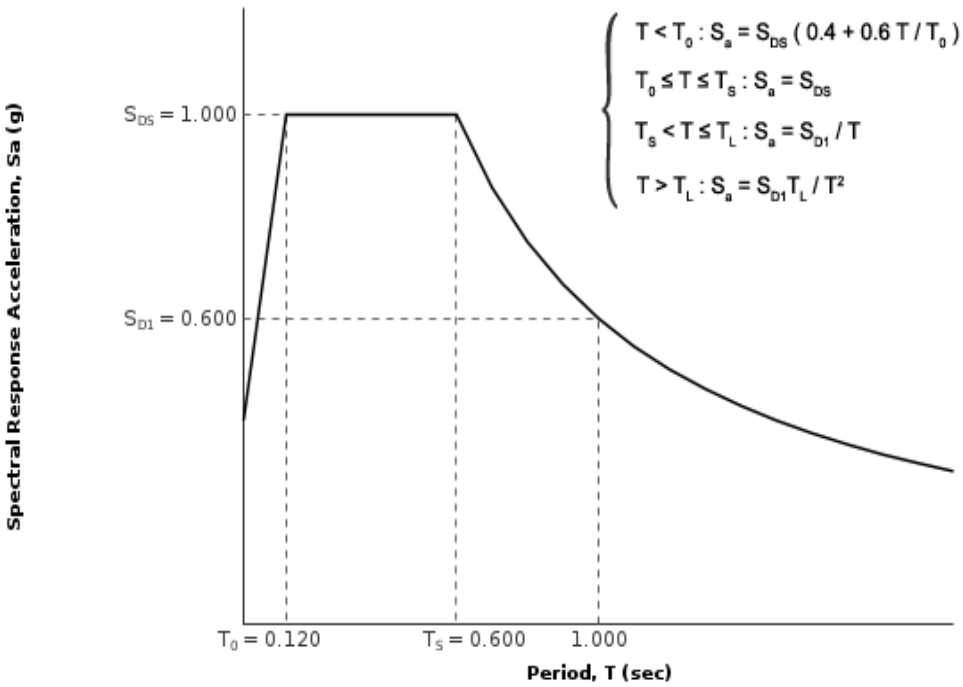
Equation (11.4–3): $S_{DS} = ⅔\ S_{MS} = ⅔ \times 1.500 = 1.000$ g

Equation (11.4–4): $S_{D1} = ⅔\ S_{M1} = ⅔ \times 0.900 = 0.600$ g

Section 11.4.5 — Design Response Spectrum

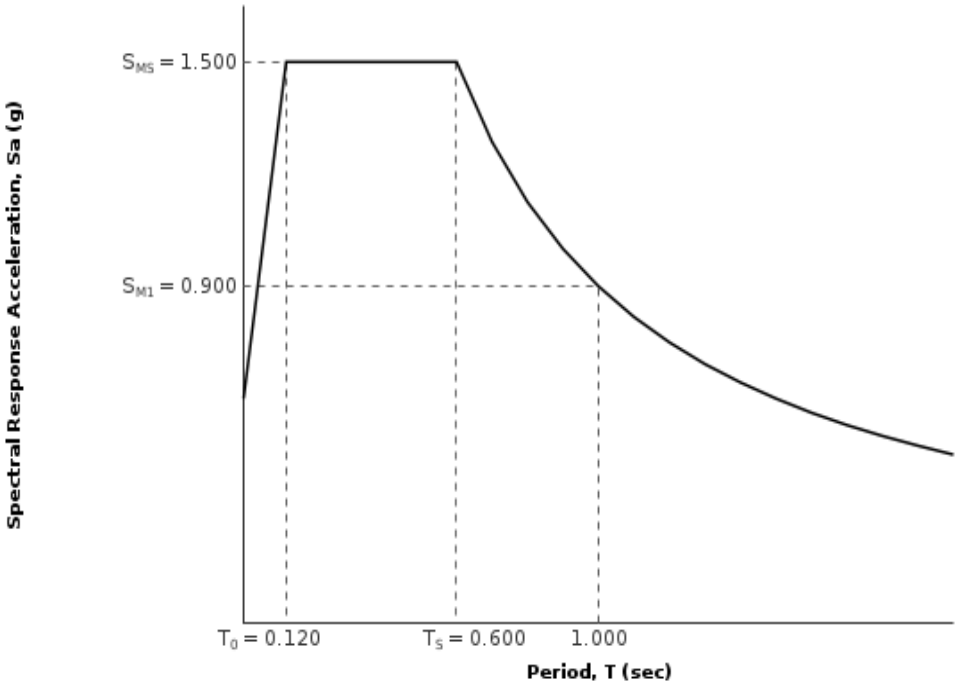
From Figure 22-12 [3] $T_L = 8$ seconds

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 = 0.500

Equation (11.8–1): $PGA_M = F_{PGA}PGA = 1.000 \times 0.500 = 0.5$ 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 = 0.500 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} = 1.100

From Figure 22-18 [6] C_{R1} = 1.072

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} = 1.000 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} = 0.600 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*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-1.pdf
2. *Figure 22-2*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-2.pdf
3. *Figure 22-12*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-12.pdf
4. *Figure 22-7*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-7.pdf
5. *Figure 22-17*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-17.pdf
6. *Figure 22-18*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-18.pdf

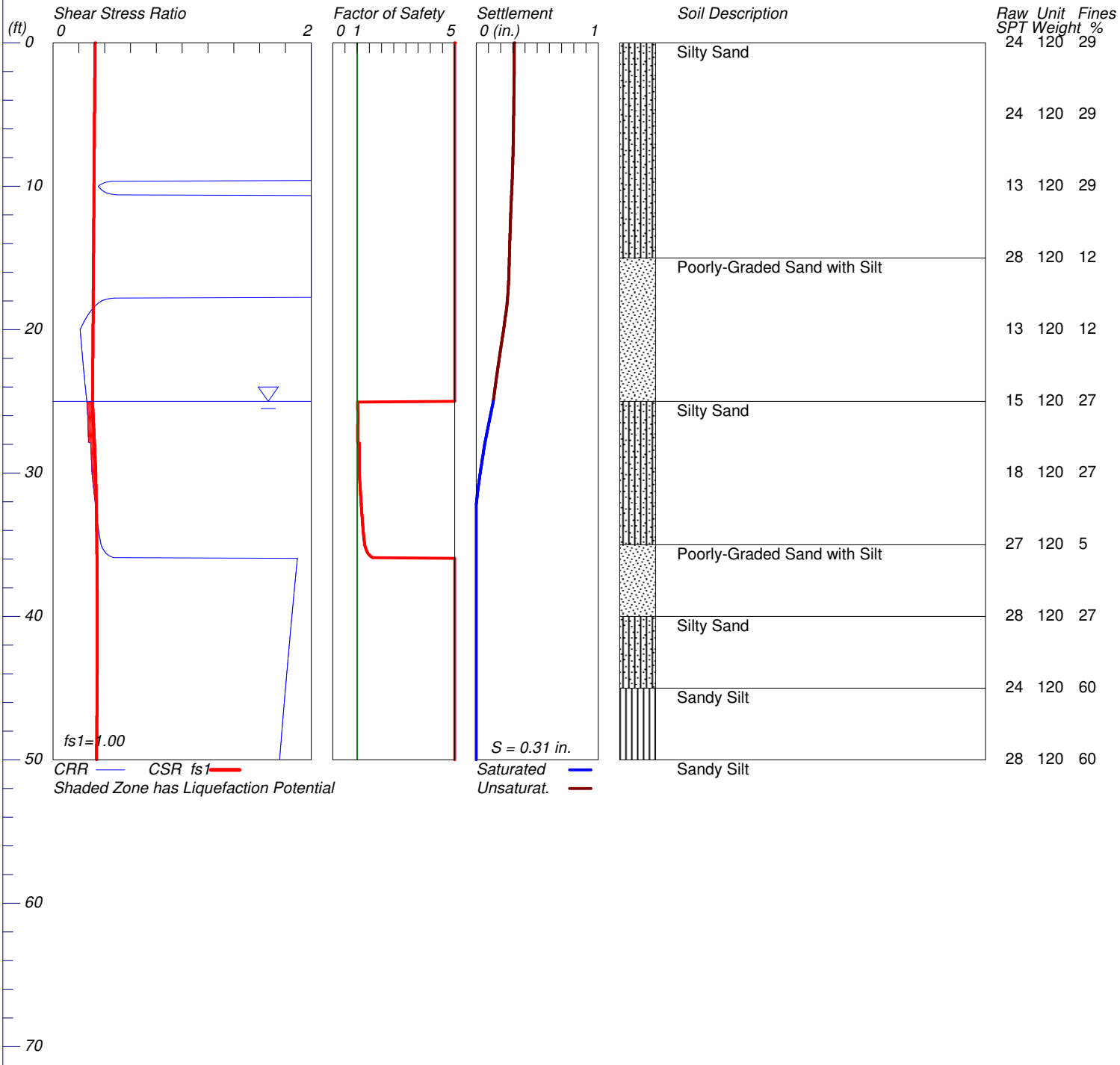
Appendix E

LIQUEFACTION ANALYSIS

Hawthorne Heights

Hole No.=B-1 Water Depth=25 ft

Magnitude=7
Acceleration=0.5g



LiquefyPro CivilTech Software USA www.civiltech.com

GeoMat Testing Laboratories, Inc.

LIQUEFACTION ANALYSIS CALCULATION SUMMARY SHEET

Title: Hawthorne Heights
Subtitle: 16193-01

Input Data:

Surface Elev.=
Hole No.=B-1
Depth of Hole=50.0 ft
Water Table during Earthquake= 25.0 ft
Water Table during In-Situ Testing= 50.0 ft
Max. Acceleration=0.5 g
Earthquake Magnitude=7.0

1. SPT or BPT Calculation.
2. Settlement Analysis Method: Tokimatsu / Seed
3. Fines Correction for Liquefaction: Stark/Olson et al.*
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1.25
7. Borehole Diameter, Cb= 1.05
8. Sampling Method, Cs= 1.2
9. User request factor of safety (apply to CSR) , User= 1.0
   Plot one CSR curve (fs1=User)
10. Use Curve Smoothing: Yes*

* Recommended Options

In-Situ Test Data:

Depth ft	SPT	gamma pcf	Fines %
0.0	24.0	120.0	29.0
5.0	24.0	120.0	29.0
10.0	13.0	120.0	29.0
15.0	28.0	120.0	12.0
20.0	13.0	120.0	12.0
25.0	15.0	120.0	27.0
30.0	18.0	120.0	27.0
35.0	27.0	120.0	5.0
40.0	28.0	120.0	27.0
45.0	24.0	120.0	60.0
50.0	28.0	120.0	60.0

Output Results:

Settlement of Saturated Sands=0.14 in.
Settlement of Unsaturated Sands=0.17 in.
Total Settlement of Saturated and Unsaturated Sands=0.31 in.
Differential Settlement=0.156 to 0.206 in.

Depth ft	CRRv	CSRm	F.S.	S_sat. in.	in.	S_dry in.	S_all
0.00	2.00	0.32	5.00	0.14	0.17	0.31	
1.00	2.00	0.32	5.00	0.14	0.17	0.31	
2.00	2.00	0.32	5.00	0.14	0.17	0.31	
3.00	2.00	0.32	5.00	0.14	0.17	0.31	
4.00	2.00	0.32	5.00	0.14	0.17	0.31	
5.00	2.00	0.32	5.00	0.14	0.17	0.31	
6.00	2.00	0.32	5.00	0.14	0.17	0.31	
7.00	2.00	0.32	5.00	0.14	0.16	0.30	
8.00	2.00	0.32	5.00	0.14	0.16	0.30	
9.00	2.00	0.32	5.00	0.14	0.16	0.30	
10.00	0.35	0.32	5.00	0.14	0.15	0.29	
11.00	2.00	0.32	5.00	0.14	0.15	0.29	
12.00	2.00	0.32	5.00	0.14	0.14	0.28	
13.00	2.00	0.32	5.00	0.14	0.14	0.28	
14.00	2.00	0.31	5.00	0.14	0.14	0.27	
15.00	2.00	0.31	5.00	0.14	0.13	0.27	
16.00	2.00	0.31	5.00	0.14	0.13	0.27	
17.00	2.00	0.31	5.00	0.14	0.12	0.26	
18.00	0.38	0.31	5.00	0.14	0.12	0.25	
19.00	0.27	0.31	5.00	0.14	0.10	0.24	
20.00	0.21	0.31	5.00	0.14	0.09	0.22	
21.00	0.22	0.31	5.00	0.14	0.07	0.21	
22.00	0.23	0.31	5.00	0.14	0.05	0.19	
23.00	0.24	0.31	5.00	0.14	0.03	0.17	
24.00	0.25	0.31	5.00	0.14	0.02	0.16	
25.00	0.26	0.31	5.00	0.14	0.00	0.14	
26.00	0.27	0.31	1.03	0.12	0.00	0.12	
27.00	0.27	0.32	1.02	0.09	0.00	0.09	
28.00	0.29	0.32	1.08	0.07	0.00	0.07	
29.00	0.30	0.33	1.08	0.05	0.00	0.05	
30.00	0.30	0.33	1.09	0.03	0.00	0.03	
31.00	0.31	0.33	1.12	0.02	0.00	0.02	
32.00	0.33	0.33	1.16	0.00	0.00	0.00	
33.00	0.34	0.34	1.20	0.00	0.00	0.00	
34.00	0.35	0.34	1.25	0.00	0.00	0.00	
35.00	0.37	0.34	1.31	0.00	0.00	0.00	
36.00	1.89	0.34	5.00	0.00	0.00	0.00	
37.00	1.88	0.34	5.00	0.00	0.00	0.00	
38.00	1.87	0.34	5.00	0.00	0.00	0.00	
39.00	1.86	0.34	5.00	0.00	0.00	0.00	
40.00	1.85	0.34	5.00	0.00	0.00	0.00	
41.00	1.84	0.34	5.00	0.00	0.00	0.00	
42.00	1.83	0.34	5.00	0.00	0.00	0.00	
43.00	1.82	0.34	5.00	0.00	0.00	0.00	
44.00	1.81	0.34	5.00	0.00	0.00	0.00	
45.00	1.80	0.34	5.00	0.00	0.00	0.00	
46.00	1.79	0.34	5.00	0.00	0.00	0.00	
47.00	1.78	0.34	5.00	0.00	0.00	0.00	
48.00	1.77	0.34	5.00	0.00	0.00	0.00	
49.00	1.76	0.34	5.00	0.00	0.00	0.00	
50.00	1.75	0.34	5.00	0.00	0.00	0.00	

* F.S.<1, Liquefaction Potential Zone
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

Depth = ft, Stress or Pressure = tsf (atm), Unit Weight = pcf, Settlement = in.

CRRv	Cyclic resistance ratio from soils
CSRm	Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S.	Factor of Safety against liquefaction, F.S.=CRRv/CSRm
S_sat	Settlement from saturated sands
S_dry	Settlement from Unsaturated Sands
S_all	Total Settlement from Saturated and Unsaturated Sands
NoLiq	No-Liquefy Soils

LIQUEFACTION ANALYSIS CALCULATION DETAIL SHEET

Title: Hawthorne Heights
Subtitle: 16193-01

Input Data:

Surface Elev.=
Hole No.=B-1
Depth of Hole=50.0 ft
Water Table during Earthquake= 25.0 ft
Water Table during In-Situ Testing= 50.0 ft
Max. Acceleration=0.5 g
Earthquake Magnitude=7.0

1. SPT or BPT Calculation.
2. Settlement Analysis Method: Tokimatsu / Seed
3. Fines Correction for Liquefaction: Stark/Olson et al.*
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1.25
7. Borehole Diameter, Cb= 1.05
8. Sampling Method, Cs= 1.2
9. User request factor of safety (apply to CSR) , User= 1.0
   Plot one CSR curve (fs1=User)
10. Use Curve Smoothing: Yes*

* Recommended Options

In-Situ Test Data:

Depth ft	SPT	Gamma pcf	Fines %
0.0	24.0	120.0	29.0
5.0	24.0	120.0	29.0
10.0	13.0	120.0	29.0
15.0	28.0	120.0	12.0
20.0	13.0	120.0	12.0
25.0	15.0	120.0	27.0
30.0	18.0	120.0	27.0
35.0	27.0	120.0	5.0
40.0	28.0	120.0	27.0
45.0	24.0	120.0	60.0
50.0	28.0	120.0	60.0

Output Results:

Calculation segment, dz=0.050 ft
User defined Print Interval, dp=1.00 ft

CSR Calculation:

Depth ft	gamma pcf	sigma tsf	gamma' pcf	sigma' tsf	rd	CSR	fs1	CSRfs *fs1
0.00	120.0	0.000	120.0	0.000	1.00	0.32	1.0	0.32
1.00	120.0	0.060	120.0	0.060	1.00	0.32	1.0	0.32
2.00	120.0	0.120	120.0	0.120	1.00	0.32	1.0	0.32
3.00	120.0	0.180	120.0	0.180	0.99	0.32	1.0	0.32
4.00	120.0	0.240	120.0	0.240	0.99	0.32	1.0	0.32
5.00	120.0	0.300	120.0	0.300	0.99	0.32	1.0	0.32
6.00	120.0	0.360	120.0	0.360	0.99	0.32	1.0	0.32
7.00	120.0	0.420	120.0	0.420	0.98	0.32	1.0	0.32
8.00	120.0	0.480	120.0	0.480	0.98	0.32	1.0	0.32
9.00	120.0	0.540	120.0	0.540	0.98	0.32	1.0	0.32
10.00	120.0	0.600	120.0	0.600	0.98	0.32	1.0	0.32
11.00	120.0	0.660	120.0	0.660	0.97	0.32	1.0	0.32
12.00	120.0	0.720	120.0	0.720	0.97	0.32	1.0	0.32
13.00	120.0	0.780	120.0	0.780	0.97	0.32	1.0	0.32
14.00	120.0	0.840	120.0	0.840	0.97	0.31	1.0	0.31
15.00	120.0	0.900	120.0	0.900	0.97	0.31	1.0	0.31
16.00	120.0	0.960	120.0	0.960	0.96	0.31	1.0	0.31
17.00	120.0	1.020	120.0	1.020	0.96	0.31	1.0	0.31
18.00	120.0	1.080	120.0	1.080	0.96	0.31	1.0	0.31
19.00	120.0	1.140	120.0	1.140	0.96	0.31	1.0	0.31
20.00	120.0	1.200	120.0	1.200	0.95	0.31	1.0	0.31
21.00	120.0	1.260	120.0	1.260	0.95	0.31	1.0	0.31
22.00	120.0	1.320	120.0	1.320	0.95	0.31	1.0	0.31
23.00	120.0	1.380	120.0	1.380	0.95	0.31	1.0	0.31
24.00	120.0	1.440	120.0	1.440	0.94	0.31	1.0	0.31
25.00	120.0	1.500	120.0	1.500	0.94	0.31	1.0	0.31
26.00	120.0	1.560	57.6	1.530	0.94	0.31	1.0	0.31
27.00	120.0	1.620	57.6	1.559	0.94	0.32	1.0	0.32
28.00	120.0	1.680	57.6	1.588	0.93	0.32	1.0	0.32
29.00	120.0	1.740	57.6	1.617	0.93	0.33	1.0	0.33
30.00	120.0	1.800	57.6	1.646	0.93	0.33	1.0	0.33
31.00	120.0	1.860	57.6	1.674	0.92	0.33	1.0	0.33
32.00	120.0	1.920	57.6	1.703	0.91	0.33	1.0	0.33
33.00	120.0	1.980	57.6	1.732	0.91	0.34	1.0	0.34
34.00	120.0	2.040	57.6	1.761	0.90	0.34	1.0	0.34
35.00	120.0	2.100	57.6	1.790	0.89	0.34	1.0	0.34
36.00	120.0	2.160	57.6	1.818	0.88	0.34	1.0	0.34
37.00	120.0	2.220	57.6	1.847	0.87	0.34	1.0	0.34
38.00	120.0	2.280	57.6	1.876	0.86	0.34	1.0	0.34
39.00	120.0	2.340	57.6	1.905	0.86	0.34	1.0	0.34
40.00	120.0	2.400	57.6	1.934	0.85	0.34	1.0	0.34
41.00	120.0	2.460	57.6	1.962	0.84	0.34	1.0	0.34
42.00	120.0	2.520	57.6	1.991	0.83	0.34	1.0	0.34
43.00	120.0	2.580	57.6	2.020	0.82	0.34	1.0	0.34
44.00	120.0	2.640	57.6	2.049	0.82	0.34	1.0	0.34
45.00	120.0	2.700	57.6	2.078	0.81	0.34	1.0	0.34
46.00	120.0	2.760	57.6	2.106	0.80	0.34	1.0	0.34
47.00	120.0	2.820	57.6	2.135	0.79	0.34	1.0	0.34
48.00	120.0	2.880	57.6	2.164	0.78	0.34	1.0	0.34
49.00	120.0	2.940	57.6	2.193	0.78	0.34	1.0	0.34
50.00	120.0	3.000	57.6	2.222	0.77	0.34	1.0	0.34

CSR is based on water table at 25.0 during earthquake

CRR Calculation from SPT or BPT data:

Depth ft	SPT	Cebs	Cr	sigma' tsf	Cn	(N1)60	Fines %	d(N1)60	(N1)60f	CRR7.5
0.00	24.00	1.58	0.75	0.000	1.70	48.20	29.00	5.76	53.96	2.00
1.00	24.00	1.58	0.75	0.060	1.70	48.20	29.00	5.76	53.96	2.00
2.00	24.00	1.58	0.75	0.120	1.70	48.20	29.00	5.76	53.96	2.00
3.00	24.00	1.58	0.75	0.180	1.70	48.20	29.00	5.76	53.96	2.00
4.00	24.00	1.58	0.75	0.240	1.70	48.20	29.00	5.76	53.96	2.00
5.00	24.00	1.58	0.75	0.300	1.70	48.19	29.00	5.76	53.96	2.00
6.00	21.80	1.58	0.75	0.360	1.67	42.92	29.00	5.76	48.68	2.00
7.00	19.60	1.58	0.75	0.420	1.54	35.72	29.00	5.76	41.48	2.00
8.00	17.40	1.58	0.75	0.480	1.44	29.67	29.00	5.76	35.43	2.00
9.00	15.20	1.58	0.85	0.540	1.36	27.69	29.00	5.76	33.45	2.00
10.00	13.00	1.58	0.85	0.600	1.29	22.47	29.00	5.76	28.23	0.35
11.00	16.00	1.58	0.85	0.660	1.23	26.37	25.60	4.94	31.31	2.00
12.00	19.00	1.58	0.85	0.720	1.18	29.98	22.20	4.13	34.10	2.00
13.00	22.00	1.58	0.85	0.780	1.13	33.35	18.80	3.31	36.66	2.00
14.00	25.00	1.58	0.85	0.840	1.09	36.52	15.40	2.50	39.01	2.00
15.00	28.00	1.58	0.95	0.900	1.05	44.16	12.00	1.68	45.84	2.00
16.00	25.00	1.58	0.95	0.960	1.02	38.18	12.00	1.68	39.86	2.00
17.00	22.00	1.58	0.95	1.020	0.99	32.59	12.00	1.68	34.27	2.00
18.00	19.00	1.58	0.95	1.080	0.96	27.36	12.00	1.68	29.04	0.38
19.00	16.00	1.58	0.95	1.140	0.94	22.42	12.00	1.68	24.10	0.27
20.00	13.00	1.58	0.95	1.200	0.91	17.76	12.00	1.68	19.44	0.21
21.00	13.40	1.58	0.95	1.260	0.89	17.86	15.00	2.40	20.26	0.22
22.00	13.80	1.58	0.95	1.320	0.87	17.97	18.00	3.12	21.09	0.23
23.00	14.20	1.58	0.95	1.380	0.85	18.09	21.00	3.84	21.93	0.24
24.00	14.60	1.58	0.95	1.440	0.83	18.20	24.00	4.56	22.76	0.25
25.00	15.00	1.58	0.95	1.500	0.82	18.33	27.00	5.28	23.61	0.26
26.00	15.60	1.58	0.95	1.560	0.80	18.69	27.00	5.28	23.97	0.27
27.00	16.20	1.58	0.95	1.620	0.79	19.04	27.00	5.28	24.32	0.27
28.00	16.80	1.58	1.00	1.680	0.77	20.41	27.00	5.28	25.69	0.29
29.00	17.40	1.58	1.00	1.740	0.76	20.78	27.00	5.28	26.06	0.30
30.00	18.00	1.58	1.00	1.800	0.75	21.13	27.00	5.28	26.41	0.31
31.00	19.80	1.58	1.00	1.860	0.73	22.87	22.60	4.22	27.09	0.32
32.00	21.60	1.58	1.00	1.920	0.72	24.55	18.20	3.17	27.72	0.34
33.00	23.40	1.58	1.00	1.980	0.71	26.19	13.80	2.11	28.30	0.35
34.00	25.20	1.58	1.00	2.040	0.70	27.79	9.40	1.06	28.84	0.37
35.00	27.00	1.58	1.00	2.100	0.69	29.34	5.00	0.00	29.34	0.39
36.00	27.20	1.58	1.00	2.160	0.68	29.15	9.40	1.06	30.20	2.00
37.00	27.40	1.58	1.00	2.220	0.67	28.96	13.80	2.11	31.08	2.00
38.00	27.60	1.58	1.00	2.280	0.66	28.79	18.20	3.17	31.96	2.00
39.00	27.80	1.58	1.00	2.340	0.65	28.62	22.60	4.22	32.85	2.00
40.00	28.00	1.58	1.00	2.400	0.65	28.47	27.00	5.28	33.75	2.00
41.00	27.20	1.58	1.00	2.460	0.64	27.31	33.60	6.86	34.18	2.00
42.00	26.40	1.58	1.00	2.520	0.63	26.19	40.20	7.20	33.39	2.00
43.00	25.60	1.58	1.00	2.580	0.62	25.10	46.80	7.20	32.30	2.00
44.00	24.80	1.58	1.00	2.640	0.62	24.04	53.40	7.20	31.24	2.00
45.00	24.00	1.58	1.00	2.700	0.61	23.00	60.00	7.20	30.20	2.00
46.00	24.80	1.58	1.00	2.760	0.60	23.51	60.00	7.20	30.71	2.00
47.00	25.60	1.58	1.00	2.820	0.60	24.01	60.00	7.20	31.21	2.00
48.00	26.40	1.58	1.00	2.880	0.59	24.50	60.00	7.20	31.70	2.00
49.00	27.20	1.58	1.00	2.940	0.58	24.98	60.00	7.20	32.18	2.00
50.00	28.00	1.58	1.00	3.000	0.58	25.46	60.00	7.20	32.66	2.00

CRR is based on water table at 50.0 during In-Situ Testing

Factor of Safety, - Earthquake Magnitude= 7.0:

Depth ft	sigC' tsf	CRR7.5 tsf	Ksigma	CRRv tsf	CSRfs tsf	MSF	CSRm tsf	F.S. CRRv/CSRm
0.00	0.00	2.00	1.00	2.00	0.32	1.19	0.27	5.00
1.00	0.04	2.00	1.00	2.00	0.32	1.19	0.27	5.00
2.00	0.08	2.00	1.00	2.00	0.32	1.19	0.27	5.00
3.00	0.12	2.00	1.00	2.00	0.32	1.19	0.27	5.00
4.00	0.16	2.00	1.00	2.00	0.32	1.19	0.27	5.00
5.00	0.20	2.00	1.00	2.00	0.32	1.19	0.27	5.00
6.00	0.23	2.00	1.00	2.00	0.32	1.19	0.27	5.00
7.00	0.27	2.00	1.00	2.00	0.32	1.19	0.27	5.00
8.00	0.31	2.00	1.00	2.00	0.32	1.19	0.27	5.00
9.00	0.35	2.00	1.00	2.00	0.32	1.19	0.27	5.00
10.00	0.39	0.35	1.00	0.35	0.32	1.19	0.27	5.00
11.00	0.43	2.00	1.00	2.00	0.32	1.19	0.27	5.00
12.00	0.47	2.00	1.00	2.00	0.32	1.19	0.26	5.00
13.00	0.51	2.00	1.00	2.00	0.32	1.19	0.26	5.00
14.00	0.55	2.00	1.00	2.00	0.31	1.19	0.26	5.00
15.00	0.59	2.00	1.00	2.00	0.31	1.19	0.26	5.00
16.00	0.62	2.00	1.00	2.00	0.31	1.19	0.26	5.00
17.00	0.66	2.00	1.00	2.00	0.31	1.19	0.26	5.00
18.00	0.70	0.38	1.00	0.38	0.31	1.19	0.26	5.00
19.00	0.74	0.27	1.00	0.27	0.31	1.19	0.26	5.00
20.00	0.78	0.21	1.00	0.21	0.31	1.19	0.26	5.00
21.00	0.82	0.22	1.00	0.22	0.31	1.19	0.26	5.00
22.00	0.86	0.23	1.00	0.23	0.31	1.19	0.26	5.00
23.00	0.90	0.24	1.00	0.24	0.31	1.19	0.26	5.00
24.00	0.94	0.25	1.00	0.25	0.31	1.19	0.26	5.00
25.00	0.98	0.26	1.00	0.26	0.31	1.19	0.26	5.00
26.00	1.01	0.27	1.00	0.27	0.31	1.19	0.26	1.03
27.00	1.05	0.27	1.00	0.27	0.32	1.19	0.27	1.02
28.00	1.09	0.29	0.99	0.29	0.32	1.19	0.27	1.08
29.00	1.13	0.30	0.99	0.30	0.33	1.19	0.27	1.08
30.00	1.17	0.31	0.98	0.30	0.33	1.19	0.28	1.09
31.00	1.21	0.32	0.97	0.31	0.33	1.19	0.28	1.12
32.00	1.25	0.34	0.97	0.33	0.33	1.19	0.28	1.16
33.00	1.29	0.35	0.96	0.34	0.34	1.19	0.28	1.20
34.00	1.33	0.37	0.96	0.35	0.34	1.19	0.28	1.25
35.00	1.37	0.39	0.95	0.37	0.34	1.19	0.28	1.31
36.00	1.40	2.00	0.95	1.89	0.34	1.19	0.29	5.00
37.00	1.44	2.00	0.94	1.88	0.34	1.19	0.29	5.00
38.00	1.48	2.00	0.94	1.87	0.34	1.19	0.29	5.00
39.00	1.52	2.00	0.93	1.86	0.34	1.19	0.29	5.00
40.00	1.56	2.00	0.92	1.85	0.34	1.19	0.29	5.00
41.00	1.60	2.00	0.92	1.84	0.34	1.19	0.29	5.00
42.00	1.64	2.00	0.91	1.83	0.34	1.19	0.29	5.00
43.00	1.68	2.00	0.91	1.82	0.34	1.19	0.29	5.00
44.00	1.72	2.00	0.91	1.81	0.34	1.19	0.29	5.00
45.00	1.76	2.00	0.90	1.80	0.34	1.19	0.29	5.00
46.00	1.79	2.00	0.90	1.79	0.34	1.19	0.29	5.00
47.00	1.83	2.00	0.89	1.78	0.34	1.19	0.28	5.00
48.00	1.87	2.00	0.89	1.77	0.34	1.19	0.28	5.00
49.00	1.91	2.00	0.88	1.76	0.34	1.19	0.28	5.00
50.00	1.95	2.00	0.88	1.75	0.34	1.19	0.28	5.00

* F.S.<1: Liquefaction Potential Zone. (If above water table: F.S.=5)
^ No-liquefiable Soils.
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

CPT convert to SPT for Settlement Analysis:
Fines Correction for Settlement Analysis:

Depth ft	Ic	qc/N60	qc1 tsf	(N1)60	Fines %	d(N1)60	(N1)60s
0.00	-	-	-	53.96	29.0	0.00	53.96
1.00	-	-	-	53.96	29.0	0.00	53.96
2.00	-	-	-	53.96	29.0	0.00	53.96
3.00	-	-	-	53.96	29.0	0.00	53.96
4.00	-	-	-	53.96	29.0	0.00	53.96
5.00	-	-	-	53.96	29.0	0.00	53.96
6.00	-	-	-	48.68	29.0	0.00	48.68
7.00	-	-	-	41.48	29.0	0.00	41.48
8.00	-	-	-	35.43	29.0	0.00	35.43
9.00	-	-	-	33.45	29.0	0.00	33.45
10.00	-	-	-	28.23	29.0	0.00	28.23
11.00	-	-	-	31.31	25.6	0.00	31.31
12.00	-	-	-	34.10	22.2	0.00	34.10
13.00	-	-	-	36.66	18.8	0.00	36.66
14.00	-	-	-	39.01	15.4	0.00	39.01
15.00	-	-	-	45.84	12.0	0.00	45.84
16.00	-	-	-	39.86	12.0	0.00	39.86
17.00	-	-	-	34.27	12.0	0.00	34.27
18.00	-	-	-	29.04	12.0	0.00	29.04
19.00	-	-	-	24.10	12.0	0.00	24.10
20.00	-	-	-	19.44	12.0	0.00	19.44
21.00	-	-	-	20.26	15.0	0.00	20.26
22.00	-	-	-	21.09	18.0	0.00	21.09
23.00	-	-	-	21.93	21.0	0.00	21.93
24.00	-	-	-	22.76	24.0	0.00	22.76
25.00	-	-	-	23.61	27.0	0.00	23.61
26.00	-	-	-	23.97	27.0	0.00	23.97
27.00	-	-	-	24.32	27.0	0.00	24.32
28.00	-	-	-	25.69	27.0	0.00	25.69
29.00	-	-	-	26.06	27.0	0.00	26.06
30.00	-	-	-	26.41	27.0	0.00	26.41
31.00	-	-	-	27.09	22.6	0.00	27.09
32.00	-	-	-	27.72	18.2	0.00	27.72
33.00	-	-	-	28.30	13.8	0.00	28.30
34.00	-	-	-	28.84	9.4	0.00	28.84
35.00	-	-	-	29.34	5.0	0.00	29.34
36.00	-	-	-	30.20	9.4	0.00	30.20
37.00	-	-	-	31.08	13.8	0.00	31.08
38.00	-	-	-	31.96	18.2	0.00	31.96
39.00	-	-	-	32.85	22.6	0.00	32.85
40.00	-	-	-	33.75	27.0	0.00	33.75
41.00	-	-	-	34.18	33.6	0.00	34.18
42.00	-	-	-	33.39	40.2	0.00	33.39
43.00	-	-	-	32.30	46.8	0.00	32.30
44.00	-	-	-	31.24	53.4	0.00	31.24
45.00	-	-	-	30.20	60.0	0.00	30.20
46.00	-	-	-	30.71	60.0	0.00	30.71
47.00	-	-	-	31.21	60.0	0.00	31.21
48.00	-	-	-	31.70	60.0	0.00	31.70
49.00	-	-	-	32.18	60.0	0.00	32.18
50.00	-	-	-	32.66	60.0	0.00	32.66

(N1)60s has been fines corrected in liquefaction analysis, therefore d(N1)60=0.
Fines=NoLiq means the soils are not liquefiable.

Settlement of Saturated Sands:
Settlement Analysis Method: Tokimatsu / Seed

Depth ft	CSRm	F.S.	Fines %	(N1)60s	Dr %	ec %	dsz in.	dsp in.	S in.
49.95	0.28	5.00	60.0	32.64	96.35	0.000	0.0E0	0.000	0.000
49.00	0.28	5.00	60.0	32.18	95.22	0.000	0.0E0	0.000	0.000
48.00	0.28	5.00	60.0	31.70	94.03	0.000	0.0E0	0.000	0.000
47.00	0.28	5.00	60.0	31.21	92.86	0.000	0.0E0	0.000	0.000
46.00	0.29	5.00	60.0	30.71	91.69	0.000	0.0E0	0.000	0.000
45.00	0.29	5.00	60.0	30.20	90.52	0.000	0.0E0	0.000	0.000
44.00	0.29	5.00	53.4	31.24	92.93	0.000	0.0E0	0.000	0.000
43.00	0.29	5.00	46.8	32.30	95.51	0.000	0.0E0	0.000	0.000
42.00	0.29	5.00	40.2	33.39	98.29	0.000	0.0E0	0.000	0.000
41.00	0.29	5.00	33.6	34.18	100.00	0.000	0.0E0	0.000	0.000
40.00	0.29	5.00	27.0	33.75	99.21	0.000	0.0E0	0.000	0.000
39.00	0.29	5.00	22.6	32.85	96.88	0.000	0.0E0	0.000	0.000
38.00	0.29	5.00	18.2	31.96	94.66	0.000	0.0E0	0.000	0.000
37.00	0.29	5.00	13.8	31.08	92.54	0.000	0.0E0	0.000	0.000
36.00	0.29	5.00	9.4	30.20	90.52	0.000	0.0E0	0.000	0.000
35.00	0.28	1.31	5.0	29.34	88.60	0.000	0.0E0	0.000	0.000
34.00	0.28	1.25	9.4	28.84	87.51	0.000	0.0E0	0.000	0.000
33.00	0.28	1.20	13.8	28.30	86.35	0.000	0.0E0	0.000	0.000
32.00	0.28	1.16	18.2	27.72	85.13	0.104	6.2E-4	0.002	0.002
31.00	0.28	1.12	22.6	27.09	83.83	0.125	7.5E-4	0.014	0.016
30.00	0.28	1.09	27.0	26.41	82.47	0.148	8.9E-4	0.016	0.033
29.00	0.27	1.08	27.0	26.06	81.77	0.151	9.1E-4	0.018	0.051
28.00	0.27	1.08	27.0	25.69	81.06	0.155	9.3E-4	0.018	0.069
27.00	0.27	1.02	27.0	24.32	78.44	0.198	1.2E-3	0.023	0.092
26.00	0.26	1.03	27.0	23.97	77.77	0.199	1.2E-3	0.024	0.116
25.05	0.26	1.02	27.0	23.62	77.12	0.201	1.2E-3	0.023	0.139

Settlement of Saturated Sands=0.139 in.
qc1 and (N1)60 is after fines correction in liquefaction analysis
dsz is per each segment, dz=0.05 ft
dsp is per each print interval, dp=1.00 ft
S is cumulated settlement at this depth

Settlement of Unsaturated Sands:

Depth ft	sigma' tsf	sigC' tsf	(N1)60s	CSRfs	Gmax tsf	g*Ge/Gm	g_eff	ec7.5 %	Cec	ec %	dsz in.	dsp in.	S in.
25.00	1.50	0.98	23.61	0.31	1265.4	3.6E-4	0.0881	0.0699	0.93	0.0650	7.80E-4	0.001	0.001
24.00	1.44	0.94	22.76	0.31	1225.0	3.6E-4	0.0869	0.0723	0.93	0.0672	8.06E-4	0.016	0.017
23.00	1.38	0.90	21.93	0.31	1184.3	3.6E-4	0.0856	0.0748	0.93	0.0695	8.34E-4	0.016	0.033
22.00	1.32	0.86	21.09	0.31	1143.4	3.6E-4	0.0843	0.0774	0.93	0.0719	8.63E-4	0.017	0.050
21.00	1.26	0.82	20.26	0.31	1102.3	3.5E-4	0.0828	0.0802	0.93	0.0745	8.94E-4	0.018	0.068
20.00	1.20	0.78	19.44	0.31	1060.9	3.5E-4	0.0813	0.0831	0.93	0.0771	9.26E-4	0.018	0.086
19.00	1.14	0.74	24.10	0.31	1110.8	3.2E-4	0.1078	0.0832	0.93	0.0773	9.28E-4	0.016	0.102
18.00	1.08	0.70	29.04	0.31	1150.4	2.9E-4	0.0808	0.0483	0.93	0.0449	5.38E-4	0.014	0.116
17.00	1.02	0.66	34.27	0.31	1181.4	2.7E-4	0.0638	0.0290	0.93	0.0269	3.23E-4	0.008	0.124
16.00	0.96	0.62	39.86	0.31	1205.3	2.5E-4	0.0521	0.0166	0.93	0.0154	1.85E-4	0.005	0.129
15.00	0.90	0.59	45.84	0.31	1222.6	2.3E-4	0.0438	0.0138	0.93	0.0129	1.54E-4	0.003	0.133
14.00	0.84	0.55	39.01	0.31	1119.4	2.4E-4	0.0459	0.0155	0.93	0.0144	1.73E-4	0.003	0.136
13.00	0.78	0.51	36.66	0.32	1056.6	2.3E-4	0.0445	0.0176	0.93	0.0163	1.96E-4	0.004	0.140
12.00	0.72	0.47	34.10	0.32	991.0	2.3E-4	0.0432	0.0198	0.93	0.0184	2.21E-4	0.004	0.144
11.00	0.66	0.43	31.31	0.32	922.2	2.3E-4	0.0421	0.0224	0.93	0.0208	2.50E-4	0.005	0.149
10.00	0.60	0.39	28.23	0.32	849.4	2.2E-4	0.0412	0.0256	0.93	0.0238	2.86E-4	0.005	0.154
9.00	0.54	0.35	33.45	0.32	852.7	2.0E-4	0.0336	0.0160	0.93	0.0148	1.78E-4	0.005	0.158
8.00	0.48	0.31	35.43	0.32	819.5	1.9E-4	0.0359	0.0153	0.93	0.0142	1.70E-4	0.004	0.162
7.00	0.42	0.27	41.48	0.32	807.9	1.7E-4	0.0304	0.0096	0.93	0.0089	1.07E-4	0.003	0.165
6.00	0.36	0.23	48.68	0.32	788.9	1.5E-4	0.0256	0.0081	0.93	0.0075	9.04E-5	0.002	0.167
5.00	0.30	0.20	53.96	0.32	745.3	1.3E-4	0.0219	0.0069	0.93	0.0064	7.73E-5	0.002	0.168
4.00	0.24	0.16	53.96	0.32	666.6	1.2E-4	0.0192	0.0061	0.93	0.0056	6.75E-5	0.001	0.170
3.00	0.18	0.12	53.96	0.32	577.3	1.0E-4	0.0202	0.0064	0.93	0.0059	7.10E-5	0.002	0.171
2.00	0.12	0.08	53.96	0.32	471.4	8.2E-5	0.0146	0.0046	0.93	0.0043	5.16E-5	0.001	0.172
1.00	0.06	0.04	53.96	0.32	333.3	5.8E-5	0.0089	0.0028	0.93	0.0026	3.14E-5	0.001	0.173
0.00	0.00	0.00	53.96	0.32	4.3	7.6E-7	0.0010	0.0003	0.93	0.0003	3.58E-6	0.000	0.174

Settlement of Unsaturated Sands=0.174 in.
dsz is per each segment, dz=0.05 ft
dsp is per each print interval, dp=1.00 ft
S is cumulated settlement at this depth

Total Settlement of Saturated and Unsaturated Sands=0.312 in.
Differential Settlement=0.156 to 0.206 in.

Depth = ft, Stress or Pressure = tsf (atm), Unit Weight = pcf, Settlement = in.

SPT	Field data from Standard Penetration Test (SPT)
BPT	Field data from Becker Penetration Test (BPT)
qc	Field data from Cone Penetration Test (CPT)
fs	Friction from CPT testing
gamma	Total unit weight of soil
gamma'	Effective unit weight of soil
Fines	Fines content [%]
D50	Mean grain size
Dr	Relative Density
sigma	Total vertical stress [tsf]
sigma'	Effective vertical stress [tsf]
sigC'	Effective confining pressure [tsf]
rd	Stress reduction coefficient
CRR7.5	Cyclic resistance ratio (M=7.5)
Ksigma	Overburden stress correction factor for CRR7.5
CRRv	CRR after overburden stress correction, CRRv=CRR7.5 * Ksigma
F.S.	Calculated factor of safety against liquefaction F.S.=CRRv/CSRm
User	User request factor of safety, which may apply to CSR
fs1	First CSR curve in graphic defined in #9 of Advanced page
fs2	2nd CSR curve in graphic defined in #9 of Advanced page
CSR	Cyclic stress ratio induced by earthquake
CSRfs	CSRfs=CSR*fs1, fs1=1 or User, defined in #9 of Advanced page
MSF	Magnitude scaling factor for CSR
CSRm	After magnitude scaling correction CSRm=CSRfs/MSF
Cebs	Energy Ratio, Borehole Dia., and Sampling Method Corrections
Cr	Rod Length Corrections
Cn	Overburden Pressure Correction
(N1)60	SPT after corrections, (N1)60=SPT * Cr * Cn * Cebs
d(N1)60	Fines correction of SPT
(N1)60f	(N1)60 after fines corrections, (N1)60f=(N1)60 + d(N1)60
Cq	Overburden stress correction factor
qc1	CPT after Overburden stress correction
dqc1	Fines correction of CPT
qc1f	CPT after Fines and Overburden correction, qc1f=qc1 + dqc1
qc1n	CPT after normalization in Robertson's method
Kc	Fine correction factor in Robertson's Method
qc1f	CPT after Fines correction in Robertson's Method
Ic	Soil type index in Suzuki's and Robertson's Methods
(N1)60s	(N1)60 after settlement fines corrections
ec	Volumetric strain for saturated sands
dz	Calculation segment, dz=0.050 ft
dsz	Settlement in each segment, dz
dp	User defined print interval
dsp	Settlement in each print interval, dp
Gmax	Shear Modulus at low strain
g_eff	gamma_eff, Effective shear Strain
g*Ge/Gm	gamma_eff * G_eff/G_max, Strain-modulus ratio
ec7.5	Volumetric Strain for magnitude=7.5
Cec	Magnitude correction factor for any magnitude
ec	Volumetric strain for unsaturated sands, ec=Cec * ec7.5
NoLiq	No-Liquefy Soils

References:

1. NCEER Workshop on Evaluation of Liquefaction Resistance of Soils. Youd, T.L., and Idriss, I.M., eds., Technical Report NCEER 97-0022.

SP117. Southern California Earthquake Center. Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Liquefaction in California. University of Southern California. March 1999.

2. RECENT ADVANCES IN SOIL LIQUEFACTION ENGINEERING AND SEISMIC SITE RESPONSE EVALUATION, Paper No. SPL-2, PROCEEDINGS: Fourth International Conference on Recent Advances in Geotechnical Earthquake Engineering and Soil Dynamics, San Diego, CA, March 2001.

3. RECENT ADVANCES IN SOIL LIQUEFACTION ENGINEERING: A UNIFIED AND CONSISTENT FRAMEWORK, Earthquake Engineering Research Center, Report No. EERC 2003-06 by R.B Seed and etc. April 2003.

Appendix F

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GENERAL

The guidelines contained herein and the standard details attached hereto represent this firm's standard recommendation for grading and other associated operations on construction projects. These guidelines should be considered a portion of the project specifications.
All plates attached hereto shall be considered as part of these guidelines.
The Contractor should not vary from these guidelines without prior recommendation by the Geotechnical Consultant and the approval of the Client or his authorized representative. Recommendation by the Geotechnical Consultant and/or Client should not be considered to preclude requirements for the approval by the controlling agency prior to the execution of any changes.
These Standard Grading Guidelines and Standard Details may be modified and/or superseded by recommendations contained in the text of the preliminary Geotechnical Report and/or subsequent reports.
If disputes arise out of the interpretation of these grading guidelines or standard details, the Geotechnical Consultant shall provide the governing interpretation.

DEFINITION OF TERMS

ALLUVIUM
Unconsolidated soil deposits resulting from flow of water, including sediments deposited in river beds, canyons, flood plains, lakes, fans and estuaries.
AS-GRADED (AS-BUILT): The surface and subsurface conditions at completion of grading.
BACKCUT: A temporary construction slope at the rear of earth retaining structures such as buttresses, shear keys, stabilization fills or retaining walls.
BACKDRAIN: Generally a pipe and gravel or similar drainage system placed behind earth retaining structures such buttresses, stabilization fills, and retaining walls.
BEDROCK: Relatively undisturbed formational rock, more or less solid, either at the surface or beneath superficial deposits of soil.
BENCH: A relatively level step and near vertical rise excavated into sloping ground on which fill is to be placed.
BORROW (Import): Any fill material hauled to the project site from off-site areas.
BUTTRESS FILL::A fill mass, the configuration of which is designed by engineering calculations to retain slope conditions containing adverse geologic features. A buttress is generally specified by minimum key width and depth and by maximum backcut angle. A buttress normally contains a back-drainage system.
CIVIL ENGINEER: The Registered Civil Engineer or consulting firm responsible for preparation of the grading plans, surveying and verifying as-graded topographic conditions.
CLIENT: The Developer or his authorized representative who is chiefly in charge of the project. He shall have the responsibility of reviewing the findings and recommendations made by the Geotechnical Consultant and shall authorize the Contractor and/or other consultants to perform work and/or provide services.
COLLUVIUM: Generally loose deposits usually found near the base of slopes and brought there chiefly by gravity through slow continuous downhill creep (also see Slope Wash).
COMPACTION : Densification of man-placed fill by mechanical means.
CONTRACTOR – A person or company under contract or otherwise retained by the Client to perform demolition, grading and other site improvements.
DEBRIS: All products of clearing, grubbing, demolition, and contaminated soil materials unsuitable for reuse as compacted fill, and/or any other material so designated by the Geotechnical Consultant.
ENGINEERING GEOLOGIST: A Geologist holding a valid certificate of registration in the specialty of Engineering Geology.
ENGINEERED FILL: A fill of which the Geotechnical Consultant or his representative, during grading, has made sufficient tests to enable him to conclude that the fill has been placed in substantial compliance with the recommendations of the Geotechnical Consultant and the governing agency requirements.
EROSION: The wearing away of ground surface as a result of the movement of wind, water, and/or ice.
EXCAVATION: The mechanical removal of earth materials.
EXISTING GRADE: The ground surface configuration prior to grading.
FILL: Any deposits of soil, rock, soil-rock blends or other similar materials placed by man.
FINISH GRADE: The ground surface configuration at which time the surface elevations conform to the approved plan.

GEOFABRIC: Any engineering textile utilized in geotechnical applications including subgrade stabilization and filtering.
GEOLOGIST: A representative of the Geotechnical Consultant educated and trained in the field of geology.
GEOTECHNICAL CONSULTANT: The Geotechnical Engineering and Engineering Geology consulting firm retained to provide technical services for the project. For the purpose of these specifications, observations by the Geotechnical Consultant include observations by the Soil Engineer, Geotechnical Engineer, Engineering Geologist and those performed by persons employed by and responsible to the Geotechnical Consultants.
GEOTECHNICAL ENGINEER: A licensed Geotechnical Engineer or Civil Engineer who applies scientific methods, engineering principles and professional experience to the acquisition, interpretation and use of knowledge of materials of the earth's crust for the evaluation of engineering problems. Geotechnical Engineering encompasses many of the engineering aspects of soil mechanics, rock mechanics, geology, geophysics, hydrology and related sciences.
GRADING: Any operation consisting of excavation, filling or combinations thereof and associated operations.
LANDSIDE DEBRIS: Material, generally porous and of low density, produced from instability of natural or man-made slopes.
MAXIMUM DENSITY: Standard laboratory test for maximum dry unit weight. Unless otherwise specified, the maximum dry unity weight shall be determined in accordance with ASTM Method of Test D 1557-91.
OPTIMUM MOISTURE – Soil moisture content at the test maximum density.
RELATIVE COMPACTION: The degree of compaction (expressed as a percentage) of dry unit weight of a material as compared to the maximum dry unit weight of the material.
ROUGH GRADE: The ground surface configuration at which time the surface elevations approximately conform to the approved plan.
SITE: The particular parcel of land where grading is being performed.
SHEAR KEY: Similar to buttress, however, it is generally constructed by excavating a slot within a natural slope, in order to stabilize the upper portion of the slope without grading encroaching into the lower portion of the slope.
SLOPE: An inclined ground surface, the steepness of which is generally specified as a ration of horizontal:vertical (e.g., 2:1)
SLOPE WASH: Soil and/or rock material that has been transported down a slope by action of gravity assisted by runoff water not confined by channels (also see Colluvium).
SOIL: Naturally occurring deposits of sand, silt, clay, etc., or combinations thereof.
SOIL ENGINEER: Licensed Geotechnical Engineer or Civil Engineer experienced in soil mechanics (also see Geotechnical Engineer).
STABILIZATION FILL: A fill mass, the configuration of which is typically related to slope height and specified by the standards of practice for enhancing the stability of locally adverse conditions. A stabilization fill is normally specified by minimum key width and depth and by maximum backcut angle. A stabilization fill may or may not have a backdrainage system specified.
SUBDRAIN: Generally a pipe and gravel or similar drainage system placed beneath a fill in the alignment of canyons or formed drainage channels.
SLOUGH: Loose, non-compacted fill material generated during grading operations.
TAILINGS: Non-engineered fill which accumulates on or adjacent to equipment haul-roads.
TERRACE: Relatively level step constructed in the face of a graded slope surface for drainage control and maintenance purposes.
TOPSOIL: The presumable fertile upper zone of soil, which is usually darker in color and loose.
WINDROW: A string of large rocks buried within engineered fill in accordance with guidelines set forth by the Geotechnical Consultant.

OBLIGATIONS OF PARTIES

The Geotechnical Consultant should provide observation and testing services and should make evaluations in order to advise the Client on Geotechnical matters. The Geotechnical Consultant should report his findings and recommendations to the Client or his authorized representative.
The client should be chiefly responsible for all aspects of the project. He or his authorized representative has the responsibility of reviewing the findings and recommendations of the Geotechnical Consultant. He shall authorize or cause to have authorized the Contractor and/or other consultants to perform work and/or provide services.

During grading the Client or his authorized representative should remain on-site or should remain reasonably accessible to all concerned parties in order to make decisions necessary to maintain the flow of the project.
The Contractor should be responsible for the safety of the project and satisfactory completion of all grading and other associated operations on construction projects, including but not limited to, earthwork in accordance with the project plans, specifications and controlling agency requirements. During grading, the Contractor or his authorized representative should remain on-site. Overnight and on days off, the Contractor should remain accessible.

SITE PREPARATION

The Client, prior to any site preparation or grading, should arrange and attend a meeting among the Grading Contractor, the Design Engineer, the Geotechnical Consultant, representatives of the appropriate governing authorities as well as any other concerned parties. All parties should be given at least 48 hours notice.
Clearing and grubbing should consist of the removal of vegetation such as brush, grass, woods, stumps, trees, roots of trees and otherwise deleterious natural materials from the areas to be graded. Clearing and grubbing should extend to the outside of all proposed excavation and fill areas.
Demolition should include removal of buildings, structures, foundations, reservoirs, utilities (including underground pipelines, septic tanks, leach fields, seepage pits, cisterns, mining shafts, tunnels, etc.) and man-made surface and subsurface improvements from the areas to be graded. Demolition of utilities should include proper capping and/or re-routing pipelines at the project perimeter and cutoff and capping of wells in accordance with the requirements of the governing authorities and the recommendations of the Geotechnical Consultant at the time of the demolition.
Trees, plants or man-made improvements not planned to be removed or demolished should be protected by the Contractor from damage or injury.
Debris generated during clearing, grubbing and/or demolition operations should be wasted from areas to be graded and disposed off-site. Clearing, grubbing and demolition operations should be performed under the observation of the Geotechnical Consultant.
The Client or Contractor should obtain the required approvals for the controlling authorities for the project prior, during and/or after demolition, site preparation and removals, etc. The appropriate approvals should be obtained prior to proceeding with grading operations.

SITE PROTECTION

Protection of the site during the period of grading should be the responsibility of the Contractor. Unless other provisions are made in writing and agreed upon among the concerned parties, completion of a portion of the project should not be considered to preclude that portion or adjacent areas from the requirements for site protection until such time as the entire project is complete as identified by the Geotechnical Consultant, the Client and the regulating agencies.
The Contractor should be responsible for the stability of all temporary excavations. Recommendations by the Geotechnical Consultant pertaining to temporary excavations (e.g., backcuts) are made in consideration of stability of the completed project and therefore, should not be considered to preclude the responsibilities of the Contractor. Recommendations by the Geotechnical Consultant should not be considered to preclude more restrictive requirements by the regulating agencies.
Precautions should be taken during the performance of site clearing, excavations and grading to protect the work site from flooding, ponding, or inundation by poor or improper surface drainage. Temporary provisions should be made during the rainy season to adequately direct surface drainage away from and off the work site. Where low areas can not be avoided, pumps should be kept on hand to continually remove water during periods of rainfall.
During periods of rainfall, plastic sheeting should be kept reasonably accessible to prevent unprotected slopes from becoming saturated. Where necessary during periods of rainfall, the Contractor should install check-dams de-silting basins, rip-rap, sandbags or other devices or methods necessary to control erosion and provide safe conditions.
During periods of rainfall, the Geotechnical Consultant should be kept informed by the Contractor as to the nature of remedial or preventative work being performed (e.g., pumping, placement of sandbags or plastic sheeting, other labor, dozing, etc.).

Following periods of rainfall, the Contractor should contact the Geotechnical Consultant and arrange a walk-over of the site in order to visually assess rain related damage. The Geotechnical Consultant may also recommend excavations and testing in order to aid in his assessments. At the request of the Geotechnical Consultant, the Contractor shall make excavations in order to evaluate the extent of rain related damage.
Rain-related damage should be considered to include, but may not be limited to, erosion, silting, saturation, swelling, structural distress and other adverse conditions identified by the Geotechnical Consultant. Soil adversely affected should be classified as Unsuitable Materials and should be subject to overexcavation and replaced with compacted fill or other remedial grading as recommended by the Geotechnical Consultant.
Relatively level areas, where saturated soils and/or erosion gullies exist to depths greater then 1 foot, should be overexcavated to unaffected, competent material. Where less than 1 foot in depth, unsuitable materials may be processed in-place to achieve near optimum moisture conditions, then thoroughly recompacted in accordance with the applicable specifications. If the desired results are not achieved, the affected materials should be overexcavated then replaced in accordance with the applicable specifications.
In slope areas, where saturated soil and/or erosion gullies exist to depths of greater than 1 foot, should be over-excavated to unaffected, competent material. Where affected materials exist to depths of 1 foot or less below proposed finished grade, remedial grading by moisture conditioning in-place, followed by thorough recompaction in accordance with the applicable grading guidelines herein may be attempted. If the desired results are not achieved, all affected materials should be overexcavated and replaced as compacted fill in accordance with the slope repair recommendations herein. As field conditions dictate, other slope repair procedures may be recommended by the Geotechnical Consultant.

EXCAVATIONS

UNSUITABLE MATERIALS:
Materials which are unsuitable should be excavated under observation and recommendations of the Geotechnical Consultant. Unsuitable materials include, but may not be limited to dry, loose, soft, wet, organic compressible natural soils and fractured, weathered, soft, bedrock and nonengineered or otherwise deleterious fill materials.
Materials identified by the Geotechnical Consultant as unsatisfactory due to its moisture conditions should be overexcavated, watered or dried, as needed, and thoroughly blended to uniform near optimum moisture condition (per Moisture guidelines presented herein) prior to placement as compacted fill.

CUT SLOPES:
Unless otherwise recommended by the Geotechnical Consultant and approved by the regulating agencies, permanent cut slopes should not be steeper than 2:1 (horizontal:vertical).
If excavations for cut slopes expose loose, cohesionless, significantly fractured or otherwise suitable material, overexcavation and replacement of the unsuitable materials with a compacted stabilization fill should be accomplished as recommended by the Geotechnical Consultant. Unless otherwise specified by the Geotechnical Consultant, stabilization fill construction should conform to the requirements of the Standard Details.
The Geotechnical Consultant should review cut slopes during excavation. The Geotechnical Consultant should be notified by the contractor prior to beginning slope excavations.
If during the course of grading, adverse or potentially adverse geotechnical conditions are encountered which were not anticipated in the preliminary report, the Geotechnical Consultant should explore, analyze and make recommendations to treat these problems.
When cuts slopes are made in the direction of the prevailing drainage, a non-erodible diversion swale (brow ditch) should be provided at the top-of-cut.

PAD AREAS:
All lot pad areas, including side yard terraces, above stabilization fills or buttresses should be over-excavated to provide for a minimum of 3-feet (refer to Standard Details) of compacted fill over the entire pad area. Pad areas with both fill and cut materials exposed and pad areas containing both very shallow (less than 3-feet) and deeper fill should be over- thickness (refer to Standard Details).
Cut areas exposing significantly varying material types should also be overexcavated to provide for at least a 3-foot thick compacted fill blanket. Geotechnical conditions may require greater depth of overexcavation. The actual depth should be delineated by the Geotechnical Consultant during grading.

For pad areas created above cut or natural slopes, positive drainage should be established away from the top-of-slope. This may be accomplished utilizing a berm and/or an appropriate pad gradient. A gradient in soil areas away from the top-of-slope of 2 percent or greater is recommended.

COMPACTED FILL

All fill materials should be compacted as specified below or by other methods specifically recommended by the Geotechnical Consultant. Unless otherwise specified, the minimum degree of compaction (relative compaction) should be 90 percent of the laboratory maximum density.

PLACEMENT

Prior to placement of compacted fill, the Contractor should request a review by the Geotechnical Consultant of the exposed ground surface. Unless otherwise recommended, the exposed ground surface should then be scarified (6-inches minimum), watered or dried as needed, thoroughly blended to achieve near optimum moisture conditions, then thoroughly compacted to a minimum of 90 percent of the maximum density. The review by the Geotechnical Consultants should not be considered to preclude requirements of inspection and approval by the governing agency.

Compacted fill should be placed in thin horizontal lifts not exceeding 8-inches in loose thickness prior to compaction. Each lift should be watered or dried as needed, thoroughly blended to achieve near optimum moisture conditions then thoroughly compacted by mechanical methods to a minimum of 90 percent of laboratory maximum dry density. Each lift should be treated in a like manner until the desired finished grades are achieved.

The Contractor should have suitable and sufficient mechanical compaction equipment and watering apparatus on the job site to handle the amount of fill being placed in consideration of moisture retention properties of the materials. If necessary, excavation equipment should be “shut down” temporarily in order to permit proper compaction of fills. Earth moving equipment should only be considered a supplement and not substituted for conventional compaction equipment.

When placing fill in horizontal lifts adjacent to areas sloping steeper than 5:1 (horizontal:vertical), horizontal keys and vertical benches should be excavated into the adjacent slope area. Keying and benching should be sufficient to provide at least 6-foot wide benches and minimum of 4-feet of vertical bench height within the firm natural ground, firm bedrock or engineered compacted fill. No compacted fill should be placed in an area subsequent to keying and benching until the area has been reviewed by the Geotechnical Consultant. Material generated by the benching operation should be moved sufficiently away from the bench area to allow for the recommended review of the horizontal bench prior to placement of fill. Typical keying and benching details have been included within the accompanying Standard Details.

Within a single fill area where grading procedures dictate two or more separate fills, temporary slopes (false slopes) may be created. When placing fill adjacent to a false slope, benching should be conducted in the same manner as above described. At least a 3-foot vertical bench should be established within the firm core of adjacent approved compacted fill prior to placement of additional fill. Benching should proceed in at least 3-foot vertical increments until the desired finished grades are achieved.

Fill should be tested for compliance with the recommended relative compaction and moisture conditions. Field density testing should conform to ASTM Method of Testing D 1556-64, D 2922-78 and/or D2937-71. Tests should be provided for about every 2 vertical feet or 1,000 cubic yards of fill placed. Actual test intervals may vary as field conditions dictate. Fill found not to be in conformance with the grading recommendations should be removed or otherwise handled as recommended by the Geotechnical Consultant.

The Contractor should assist the Geotechnical Consultant and/or his representative by digging test pits for removal determinations and/or for testing compacted fill.

As recommended by the Geotechnical Consultant, the Contractor should “shutdown” or remove any grading equipment from an area being tested.

The Geotechnical Consultant should maintain a plan with estimated locations of field tests. Unless the client provides for actual surveying of test locations, by the Geotechnical Consultant should only be considered rough estimates and should not be utilized for the purpose of preparing cross sections showing test locations or in any case for the purpose of after-the-fact evaluating of the sequence of fill placement.

MOISTURE

For field testing purposes, “near optimum” moisture will vary with material type and other factors including compaction procedures. “Near optimum” may be specifically recommended in Preliminary Investigation Reports and/or may be evaluated during grading.

Prior to placement of additional compacted fill following an overnight or other grading delay, the exposed surface of previously compacted fill should be processed by scarification, watered or dried as needed, thoroughly blended to near-optimum moisture conditions, then recompacted to a minimum of 90 percent of laboratory maximum dry density. Where wet or other dry or other unsuitable materials exist to depths of greater than one foot, the unsuitable materials should be overexcavated.

Following a period of flooding, rainfall or overwatering by other means, no additional fill should be placed until damage assessments have been made and remedial grading performed as described herein.

FILL MATERIAL

Excavated on-site materials which are acceptable to the Geotechnical Consultant may be utilized as compacted fill, provided trash, vegetation and other deleterious materials are removed prior to placement.

Where import materials are required for use on-site, the Geotechnical Consultant should be notified at least 72 hours in advance of importing, in order to sample and test materials from proposed borrow sites. No import materials should be delivered for use on-site without prior sampling and testing by Geotechnical Consultant.

Where oversized rock or similar irreducible material is generated during grading, it is recommended, where practical, to waste such material off-site or on-site in areas designated as “nonstructural rock disposal areas”. Rock placed in disposal areas should be placed with sufficient fines to fill voids. The rock should be compacted in lifts to an unyielding condition. The disposal area should be covered with at least 3-feet of compacted fill, which is free of oversized material. The upper 3-feet should be placed in accordance with the guidelines for compacted fill herein.

Rocks 3 inches in maximum dimension and smaller may be utilized within the compacted fill, provided they are placed in such a manner that nesting of the rock in avoided. Fill should be placed and thoroughly compacted over and around all rock. The amount of rock should not exceed 40 percent by dry weight passing the $^{3}/_{4}$-inch sieve size. The 3-inch and 40 percent recommendations herein may vary as field conditions dictate.

During the course of grading operations, rocks or similar irreducible materials greater than 3-inch maximum dimension (oversized material) may be generated. These rocks should not be placed within the compacted fill unless placed as recommended by the Geotechnical Consultant.

Where rocks or similar irreducible materials of greater that 3-inches but less than 4-feet of maximum dimension are generated during grading, or otherwise desired to be placed within an engineered fill, special handling in accordance with the accompanying Standard Details is recommended. Rocks greater than 4 feet should be broken down or disposed off-site. Rocks up to 4-feet maximum dimension should be placed below the upper 10-feet of any fill and should not be closer than 20-feet to any slope face. These recommendations could vary as locations of improvements dictate. Where practical, oversized material should not be placed below areas where structures of deep utilities are proposes.

Oversized material should be placed in windrows on a clean, overexcavated or unyielding compacted fill or firm natural ground surface. Select native or imported granular soil (S.E. 30 or higher) should be placed and thoroughly flooded over and around all windrowed rock, such that voids are filled. Windrows of oversized material should be staggered so that successive strata of oversized material are not in the same vertical plane.

It may be possible to dispose of individual larger rock as field conditions dictate and as recommended by the Geotechnical Consultant at time of placement.

Material that is considered unsuitable by the Geotechnical Consultant should not be utilized in the compacted fill.

During grading operations, placing and mixing the materials from the cut and/or borrow areas may result in soil mixtures which possess unique physical properties. Testing may be required of samples obtained directly from the fill areas in order to verify conformance with the specifications. Processing of these additional samples may take two or more working days. The Contractor may elect to move the operation to other areas within the project, or may continue placing compacted fill pending laboratory and field test results. Should he elect the second alternative, fill placed is done so at the Contractor’s risk.

Any fill placed in areas not previously reviewed and evaluated by the Geotechnical Consultant, and/or in other areas, without prior notification to the Geotechnical Consultant may require removal and recompaction at the Contractor's expense. Determination of overexcavations should be made upon review of field conditions by the Geotechnical Consultant.

FILL SLOPES

Unless otherwise recommended by the Geotechnical Consultant and approved by the regulating agencies, permanent fill slopes should not be steeper than 2:1 (horizontal to vertical).

Except as specifically recommended otherwise or as otherwise provided for in these grading guidelines (Reference Fill Materials), compacted fill slopes should be overbuilt and cut back to grade, exposing the firm, compacted fill inner core. The actual amount of overbuilding may vary as field conditions dictate. If the desired results are not achieved, the existing slopes should be overexcavated and reconstructed under the guidelines of the Geotechnical Consultant. The degree of overbuilding shall be increased until the desired compacted slope surface condition is achieved. Care should be taken by the Contractor to provide thorough mechanical compaction to the outer edge of the overbuilt slope surface.

Although no construction procedure produces a slope free from risk of future movement, overfilling and cutting back of slope to a compacted inner core is, given no other constraints, the most desirable procedure. Other constraints, however, must often be considered. These constraints may include property line situations, access, the critical nature of the development, and cost. Where such constraints are identified, slope face compaction may be attempted by conventional construction procedures including backrolling techniques upon specific recommendations by the Geotechnical Consultant.

As a second best alternative for slopes of 2:1 (horizontal to vertical) or flatter, slope construction may be attempted as outlined herein. Fill placement should proceed in thin lifts, (i.e., 6 to 8 inch loose thickness). Each lift should be moisture conditioned and thoroughly compacted. The desired moisture condition should be maintained and/or reestablished, where necessary, during the period between successive lifts. Selected lifts should be tested to ascertain that desired compaction is being achieved. Care should be taken to extend compactive effort to the outer edge of the slope. Each lift should extend horizontally to the desired finished slope surface or more as needed to ultimately establish desired grades. Grade during construction should not be allowed to roll off at the edge of the slope. It may be helpful to elevate slightly the outer edge of the slope. Slough resulting from the placement of individual lifts should not be allowed to drift down over previous lifts. At intervals not exceeding 4-feet in vertical slope height or the capability of available equipment, whichever is less, fill slopes should be thoroughly backrolled utilizing a conventional sheepsfoot-type roller. Care should be taken to maintain the desired moisture conditions and/or reestablishing same as needed prior to backrolling. Upon achieving final grade, the slopes should again be moisture conditioned and thoroughly backrolled. The use of a side-boom roller will probably be necessary and vibratory methods are strongly recommended. Without delay, so as to avoid (if possible) further moisture conditioning, the slopes should then be grid-rolled to achieve a relatively smooth surface and uniformly compact condition.

In order to monitor slope construction procedures, moisture and density tests will be taken at regular intervals. Failure to achieve the desired results will likely result in a recommendation by the Geotechnical Consultant to overexcavate the slope surfaces followed by reconstruction of the slopes utilizing overfilling and cutting back procedures and/or further attempt at the conventional backrolling approach. Other recommendations may also be provided which would be commensurate with field conditions.

Where placement of fill above a natural slope or above a cut slope is proposed, the fill slope configuration as presented in the accompanying standard Details should be adopted.

For pad areas above fill slopes, positive drainage should be established away from the top-of-slope. This may be accomplished utilizing a berm and pad gradients of at least 2-percent in soil area.

OFF-SITE FILL

Off-site fill should be treated in the same manner as recommended in these specifications for site preparation, excavation, drains, compaction, etc.

Off-site canyon fill should be placed in preparation for future additional fill, as shown in the accompanying Standard Details.

Off-site fill subdrains temporarily terminated (up canyon) should be surveyed for future relocation and connection.

DRAINAGE

Canyon sub-drain systems specified by the Geotechnical Consultant should be installed in accordance with the Standard Details.
Typical sub-drains for compacted fill buttresses, slope stabilization or sidehill masses, should be installed in accordance with the specifications of the accompanying Standard Details.
Roof, pad and slope drainage should be directed away from slopes and areas of structures to suitable disposal areas via non-erodible devices (i.e., gutters, downspouts, concrete swales).
For drainage over soil areas immediately away from structures (i.e., within 4-feet), a minimum of 4 percent gradient should be maintained. Pad drainage of at least 2 percent should be maintained over soil areas. Pad drainage may be reduced to at least 1 percent for projects where no slopes exist, either natural or man-made, or greater than 10-feet in height and where no slopes are planned, either natural or man-made, steeper than 2:1 (horizontal to vertical slope ratio).
Drainage patterns established at the time of fine grading should be maintained throughout the life of the project. Property owners should be made aware that altering drainage patterns can be detrimental to slope stability and foundation performance.

STAKING

In all fill areas, the fill should be compacted prior to the placement of the stakes. This particularly is important on fill slopes. Slope stakes should not be placed until the slope is thoroughly compacted (backrolled). If stakes must be placed prior to the completion of compaction procedures, it must be recognized that they will be removed and/or demolished at such time as compaction procedures resume.
In order to allow for remedial grading operations, which could include overexcavations or slope stabilization, appropriate staking offsets should be provided. For finished slope and stabilization backcut areas, we recommend at least 10-feet setback from proposed toes and tops-of-cut.

SLOPE MAINTENANCE LANDSCAPE PLANTS

In order to enhance superficial slope stability, slope planting should be accomplished at the completion of grading. Slope planting should consist of deep-rooting vegetation requiring little watering. Plants native to the Southern California area and plants relative to native plants are generally desirable. Plants native to other semiarid and arid areas may also be appropriate. A Landscape Architect would be the best party to consult regarding actual types of plants and planting configuration.

IRRIGATION

Irrigation pipes should be anchored to slope faces, not placed in trenches excavated into slope faces.
Slope irrigation should be minimized. If automatic timing devices are utilized on irrigation systems, provisions should be made for interrupting normal irrigation during periods of rainfall.
Though not a requirement, consideration should be give to the installation of near-surface moisture monitoring control devices. Such devices can aid in the maintenance of relatively uniform and reasonably constant moisture conditions.
Property owners should be made aware that overwatering of slopes is detrimental to slope stability.

MAINTENANCE

Periodic inspections of landscaped slope areas should be planned and appropriate measures should be taken to control weeds and enhance growth of the landscape plants. Some areas may require occasional replanting and/or reseeding.
Terrace drains and downdrains should be periodically inspected and maintained free of debris. Damage to drainage improvements should be repaired immediately.
Property owners should be made aware that burrowing animals can be detrimental to slope stability. A preventative program should be established to control burrowing animals.
As a precautionary measure, plastic sheeting should be readily available, or kept on hand, to protect all slope areas from saturation by periods of heavy or prolonged rainfall. This measure is strongly recommended, beginning with the period of time prior to landscape planting.

REPAIRS

If slope failures occur, the Geotechnical Consultant should be contacted for a field review of site conditions and development of recommendations for evaluation and repair.

If slope failure occurs as a result of exposure to periods of heavy rainfall, the failure areas and currently unaffected areas should be covered with plastic sheeting to protect against additional saturation.

In the accompanying Standard Details, appropriate repair procedures are illustrated for superficial slope failures (i.e., occurring typically within the outer 1 foot to 3 feet of a slope face).

TRENCH BACKFILL

Utility trench backfill should, unless otherwise recommended, be compacted by mechanical means. Unless otherwise recommended, the degree of compaction should be a minimum of 95 percent of the laboratory maximum density.

Approved granular material (sand equivalent greater than 30) should be used to bed and backfill utilities to a depth of at least 1 foot over the pipe. This backfill should be uniformly watered, compacted and/or wheel-rolled from the surface to a firm condition for pipe support.

The remainder of the backfill shall be typical on-site soil or imported soil which should be placed in lifts not exceeding 8 inches in thickness, watered or aerated to at least 3 percent above the optimum moisture content, and mechanically compacted to at least 95 percent of maximum dry density (based on ASTM D1557).

Backfill of exterior and interior trenches extending below a 1:1 projection from the outer edge of foundations should be mechanically compacted to a minimum of 95 percent of the laboratory maximum density.

Within slab areas, but outside the influence of foundations, trenches up to 1 foot wide and 2 feet deep may be backfilled with sand and consolidated by uniformly watering or by mechanical means. If on-site materials are utilized, they should be wheel-rolled, tamped or otherwise compacted to a firm condition. For minor interior trenches, density testing may be deleted or spot testing may be elected if deemed necessary, based on review of back-fill operations during construction.

If utility contractors indicate that it is undesirable to use compaction equipment in close proximity to a buried conduit, the Contractor may elect the utilization of light weight compaction equipment and/or shading of the conduit with clean, granular material, which should be thoroughly jetted in-place above the conduit, prior to initiating mechanical compaction procedures. Other methods of utility trench compaction may also be appropriate, upon review by the Geotechnical Consultant at the time of construction.

In cases where clean granular materials are proposed for use in lieu of native materials or where flooding or jetting is proposed, the procedures should be considered subject to review by the Geotechnical Consultant.

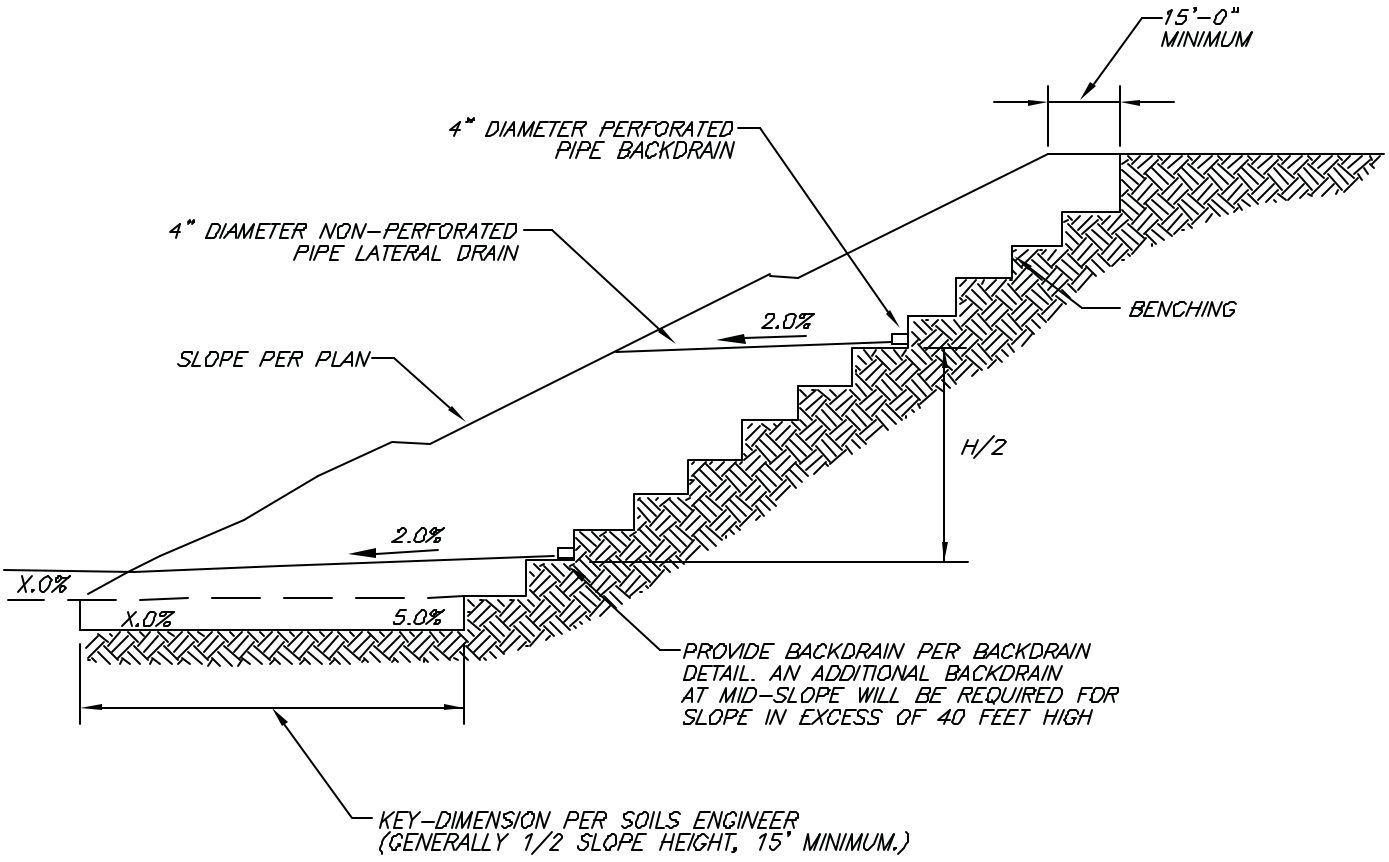
Clean Granular backfill and/or bedding are not recommended in slope areas unless provisions are made for a drainage system to mitigate the potential build-up of seepage forces.

STATUS OF GRADING

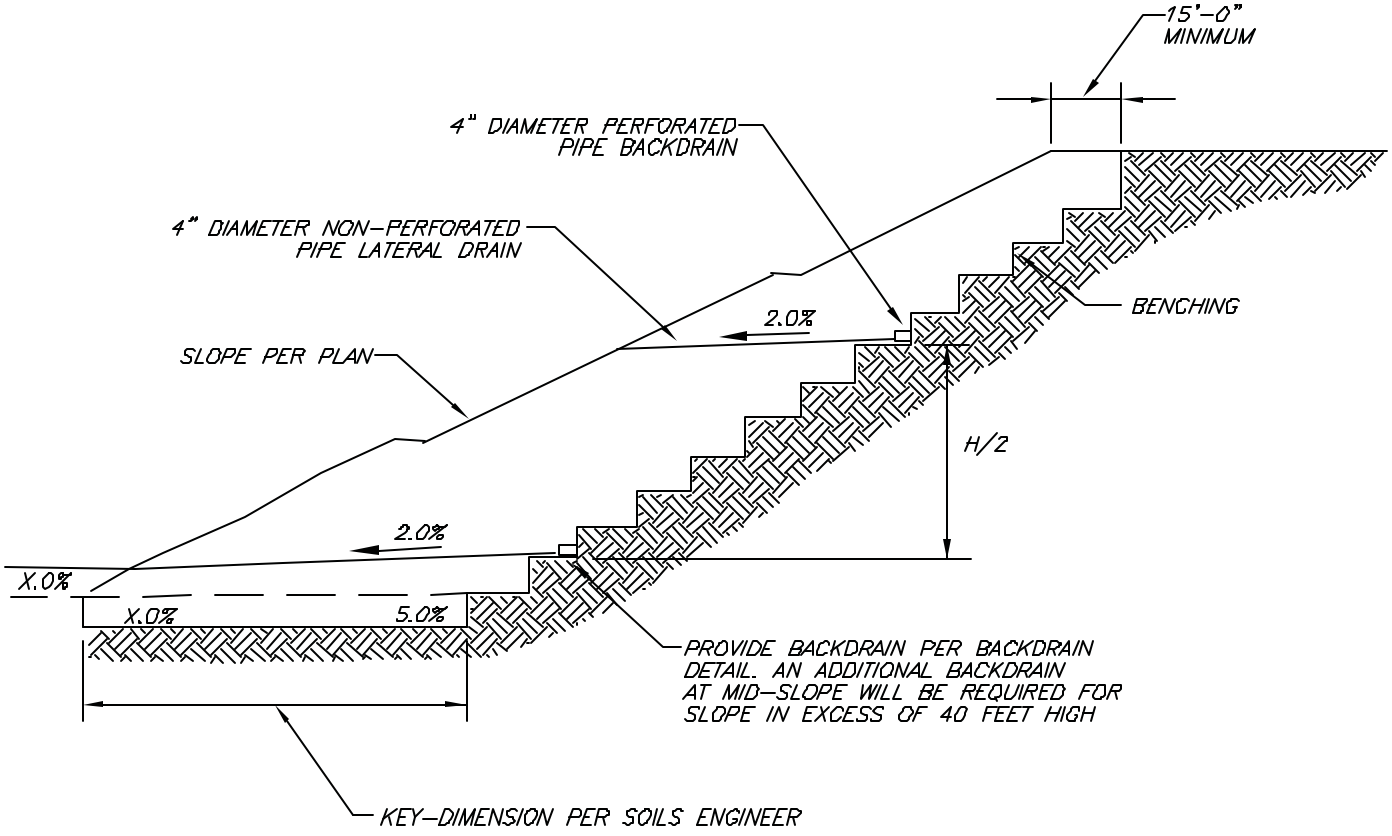
Prior to proceeding with any grading operation, the Geotechnical Consultant should be notified at least two working days in advance in order to schedule the necessary observation and testing services.

Prior to any significant expansion of cut back in the grading operation, the Geotechnical Consultant should be provided with adequate notice (i.e., two days) in order to make appropriate adjustments in observation and testing services.

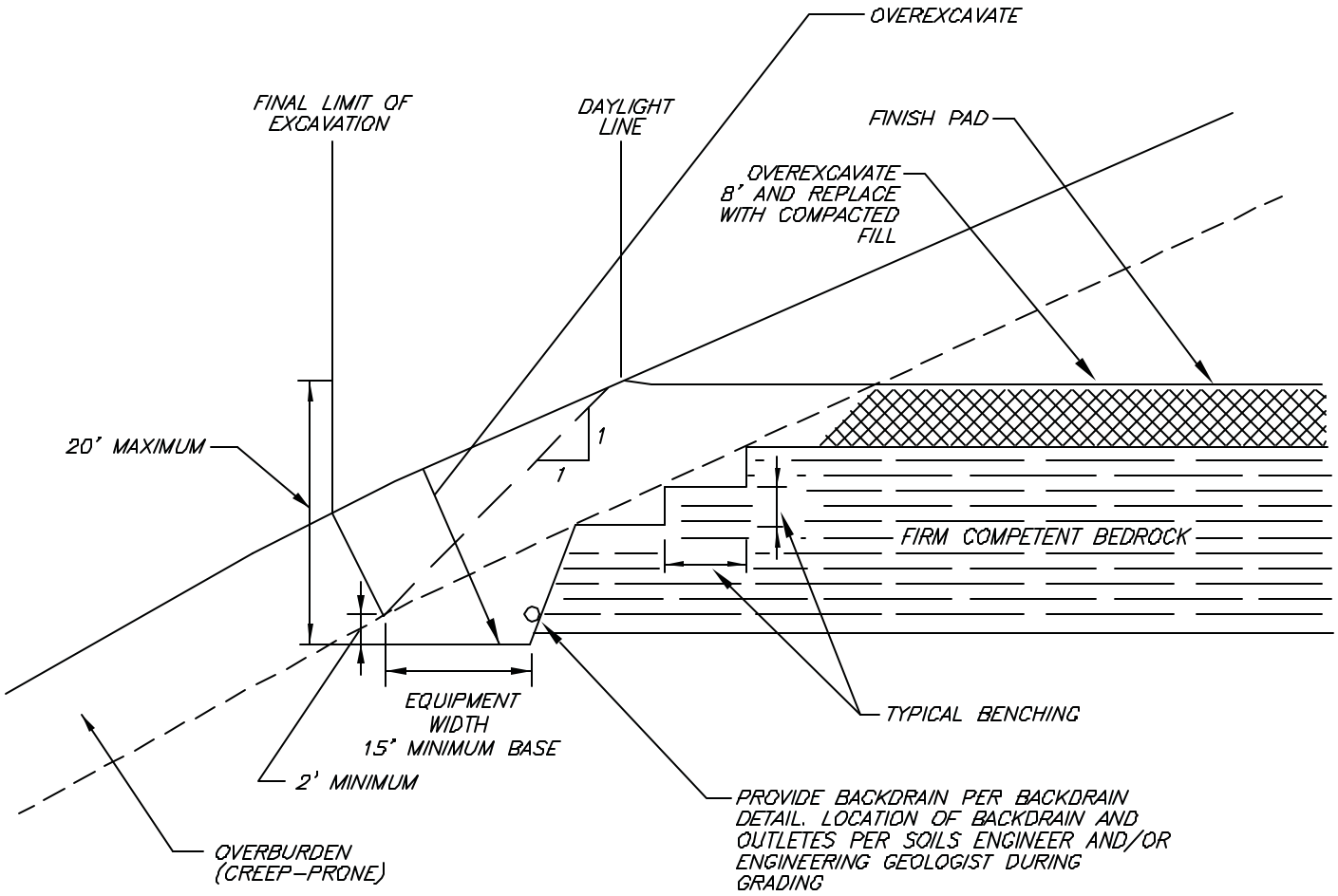
Following completion of grading operations and/or between phases of a grading operation, the Geotechnical Consultant should be provided with at least two working days notice in advance of commencement of additional grading operations.



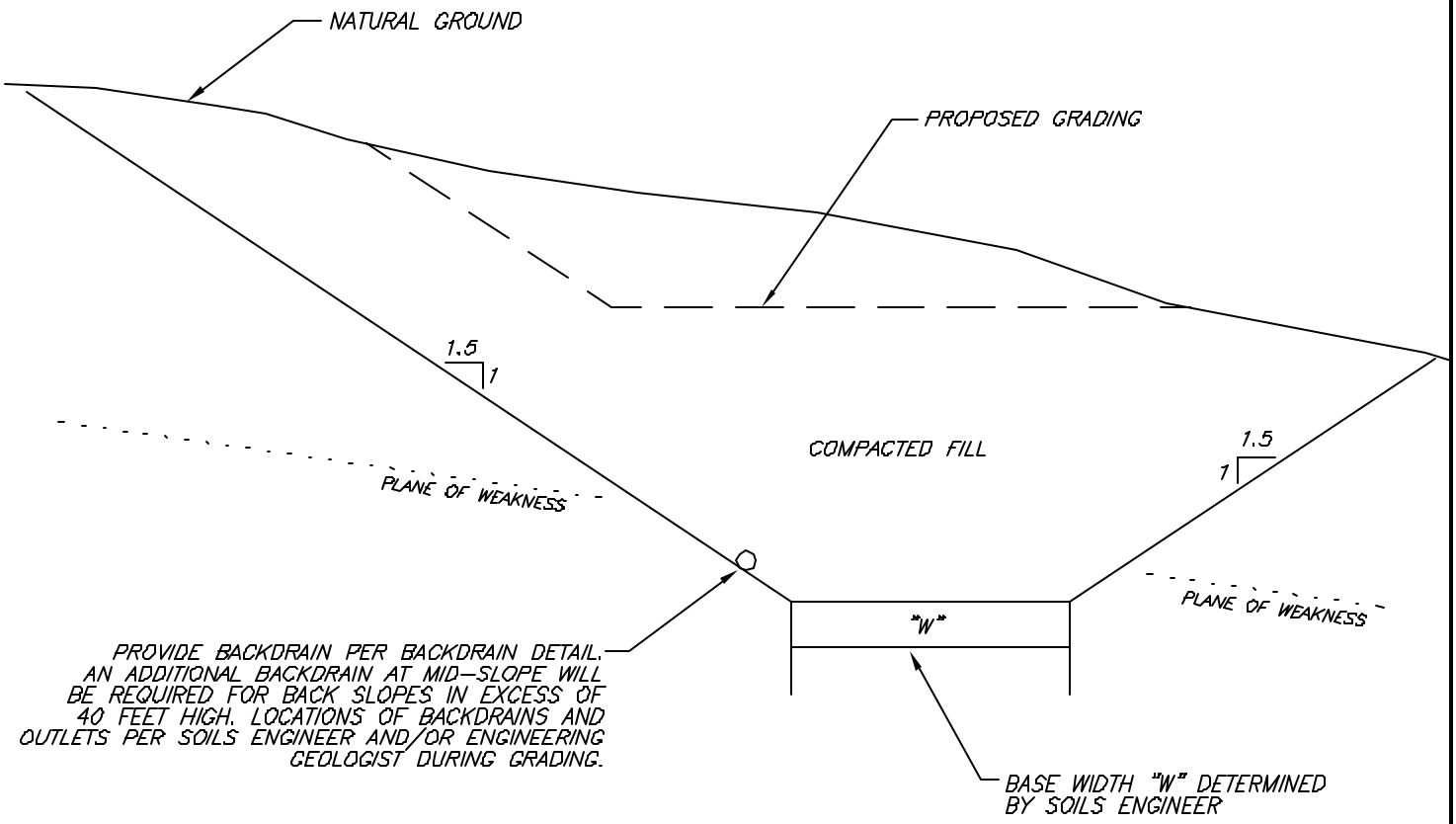
TYPICAL STABILIZATION FILL DETAIL



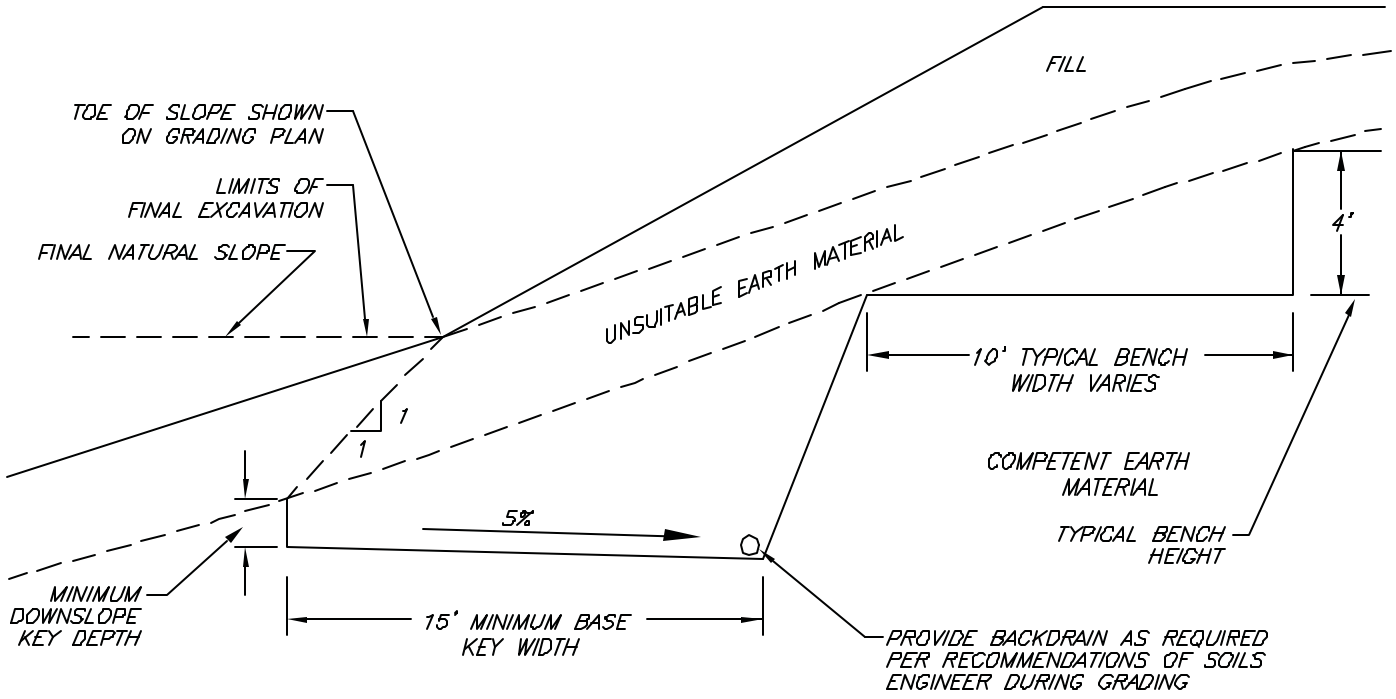
TYPICAL BUTTRESS FILL DETAIL



DAYLIGHT SHEAR KEY DETAIL

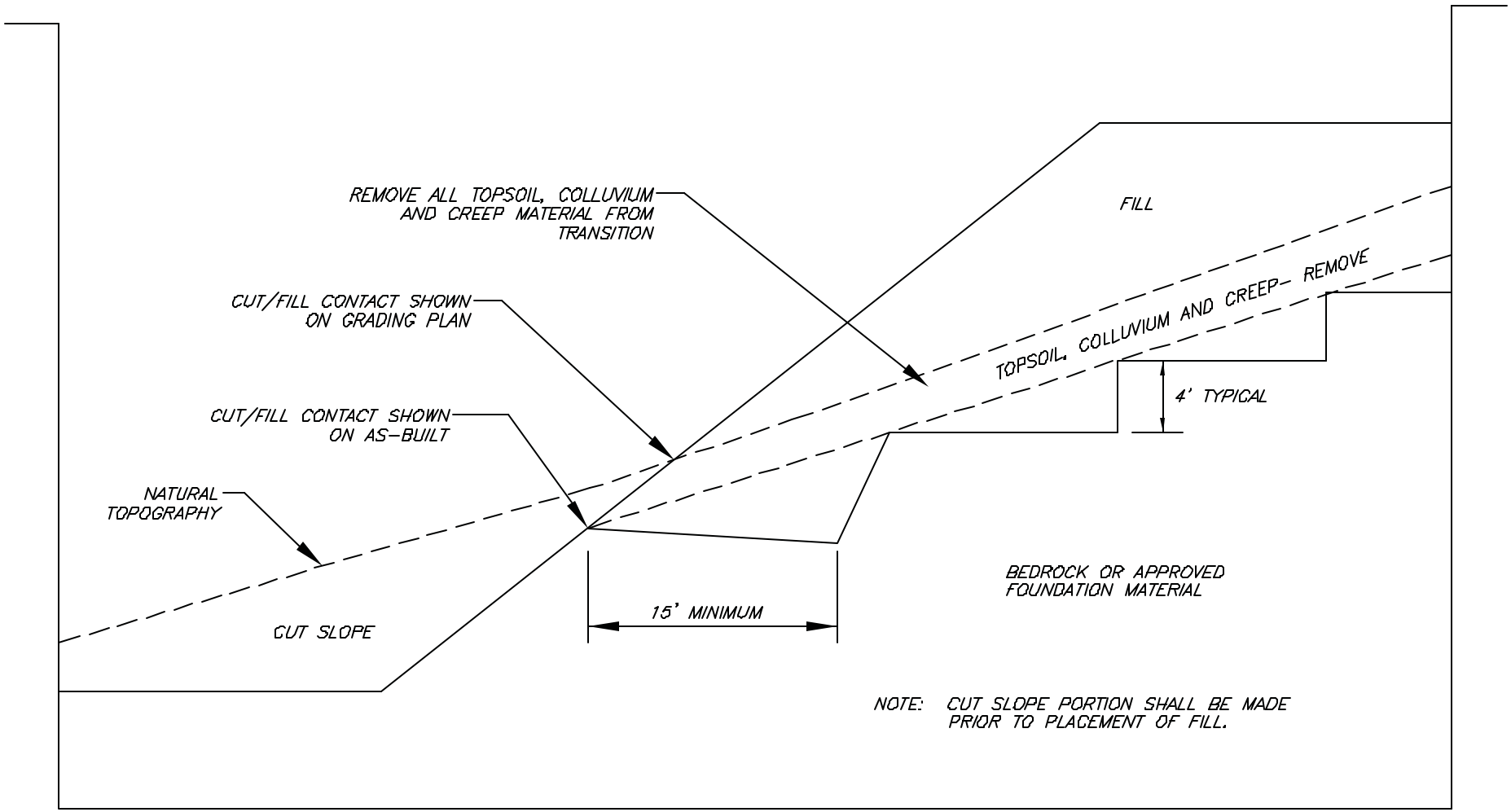


TYPICAL SHEAR KEY DETAIL

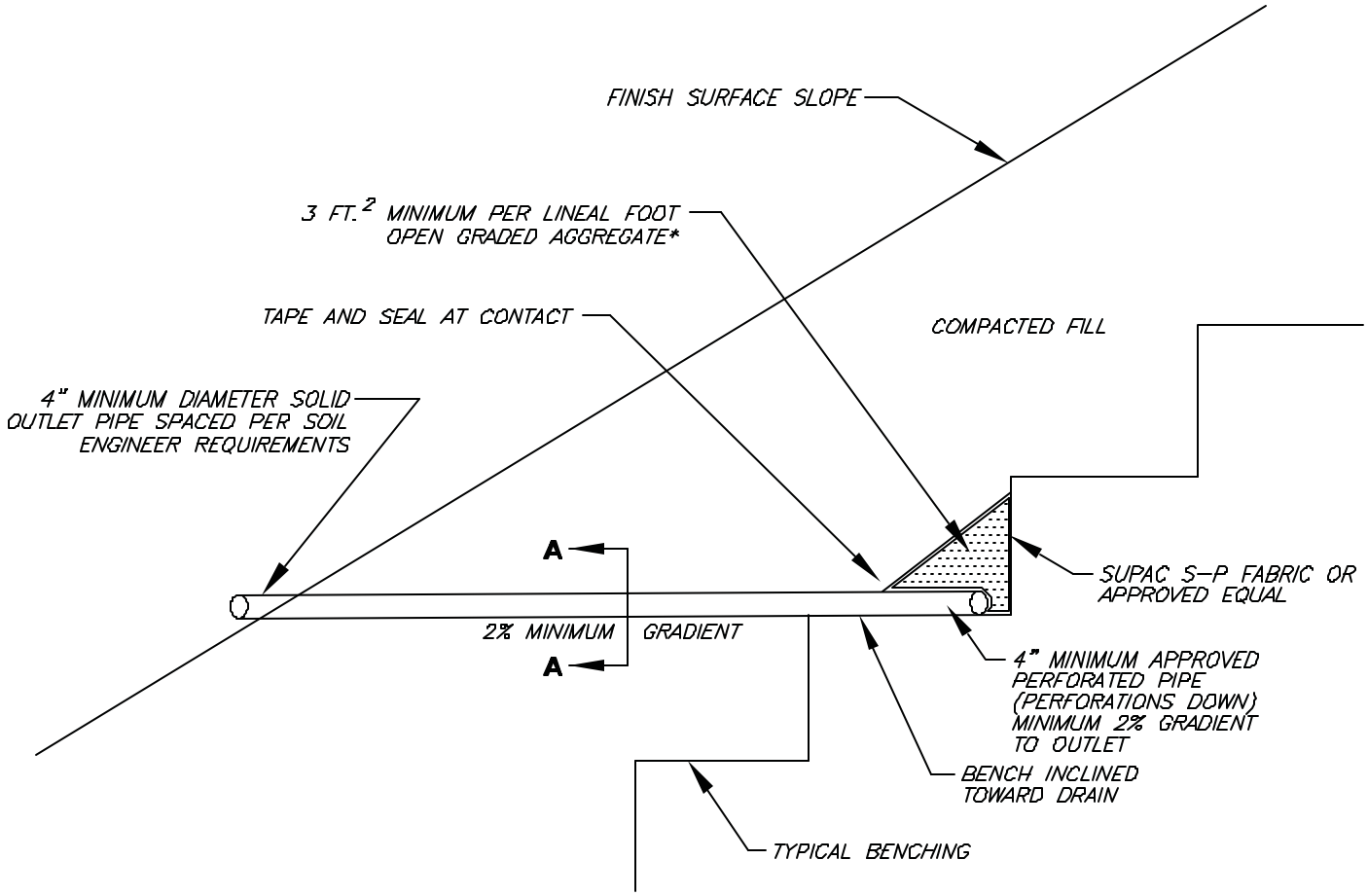


WHERE NATURAL SLOPE IS 5:1 OR LESS, BENCHING IS NOT NECESSARY, HOWEVER, FILL IS NOT TO BE PLACED ON COMPRESSIBLE OR UNSUITABLE MATERIAL.

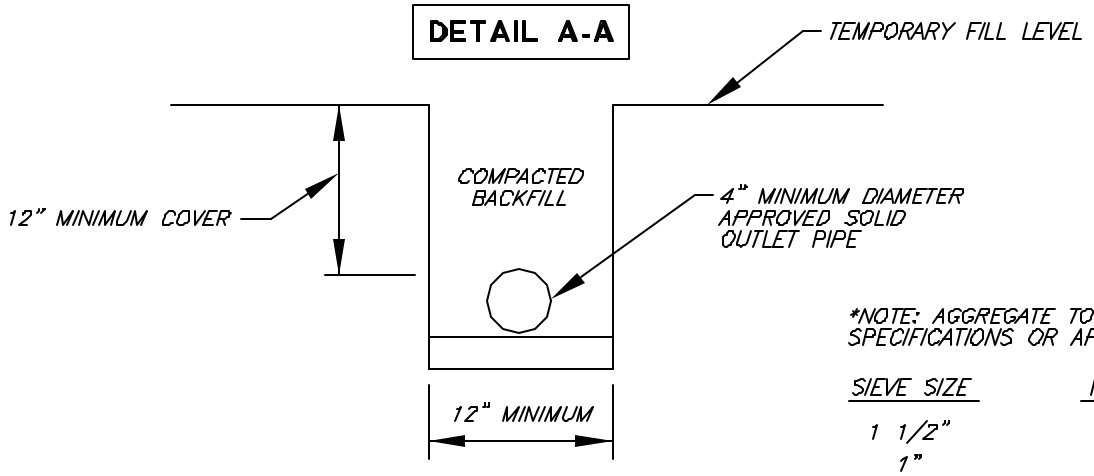
FILL SLOPE ABOVE NATURAL GROUND DETAIL



FILL SLOPE ABOVE CUT SLOPE DETAIL



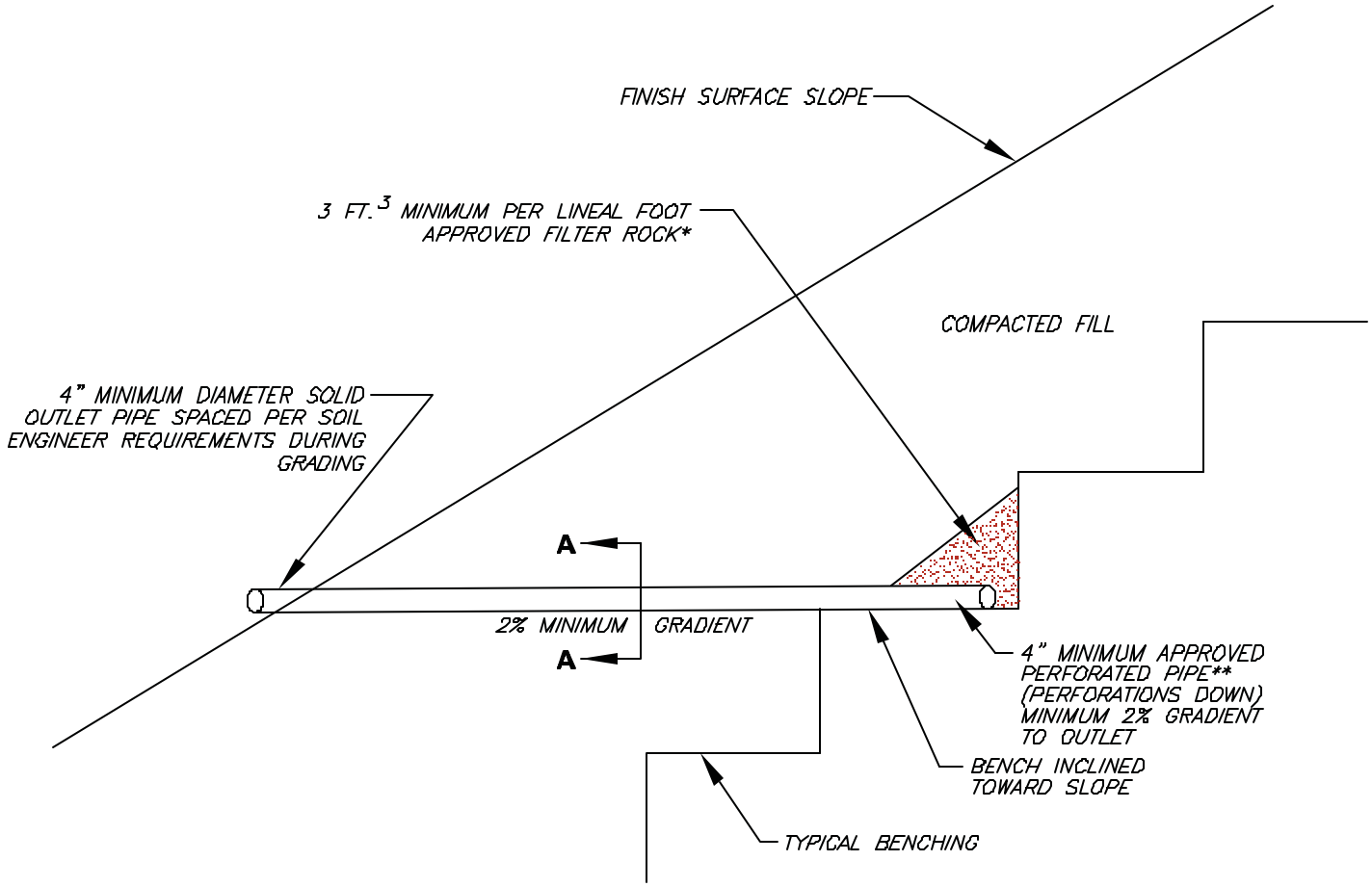
DETAIL A-A



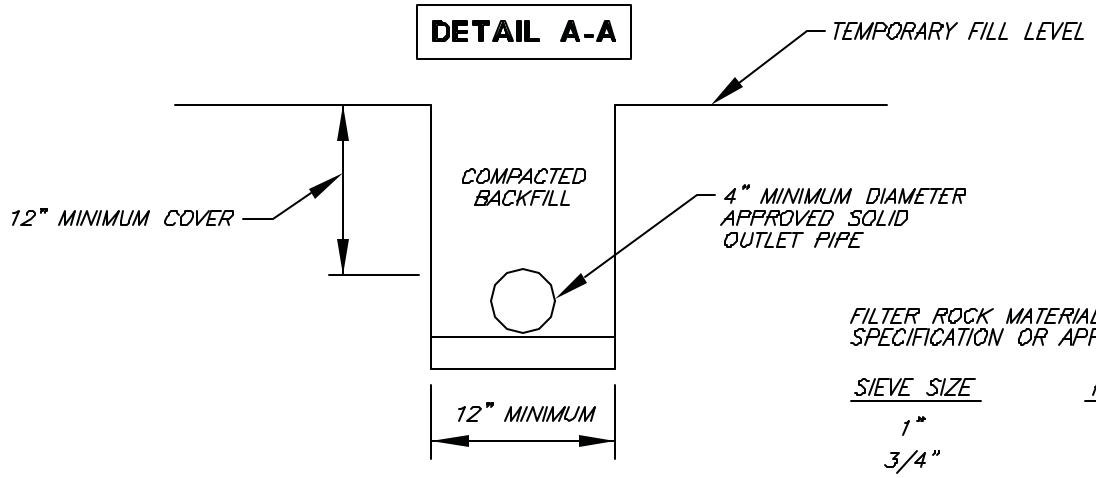
*NOTE: AGGREGATE TO MEET FOLLOWING SPECIFICATIONS OR APPROVED EQUAL:

SIEVE SIZE	PERCENTAGE PASSING
1 1/2"	100
1"	5-40
3/4"	0-17
3/8"	0-7
NO. 200	0-3

BACKDRAIN DETAIL (GEOFABRIC)



DETAIL A-A



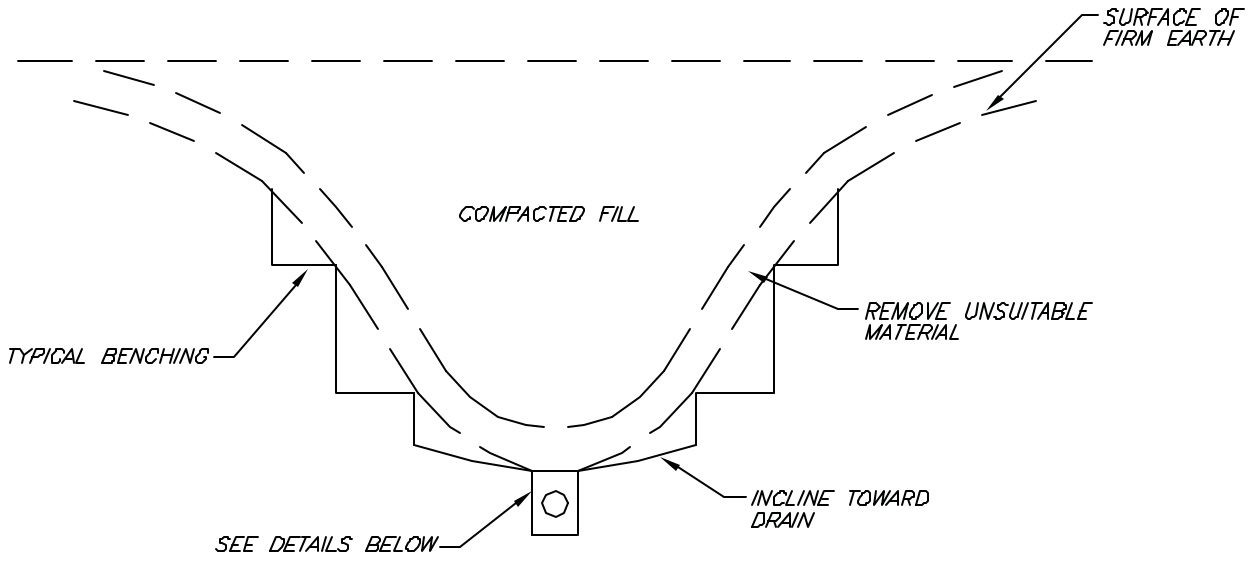
FILTER ROCK MATERIAL TO MEET FOLLOWING SPECIFICATION OR APPROVED EQUAL:

SIEVE SIZE	PERCENTAGE
1"	100
3/4"	90–100
3/8"	40–100
NO. 4	25–40
NO. 30	5–15
NO. 50	0–7
NO. 200	0–3

**APPROVED PIPE TYPE:

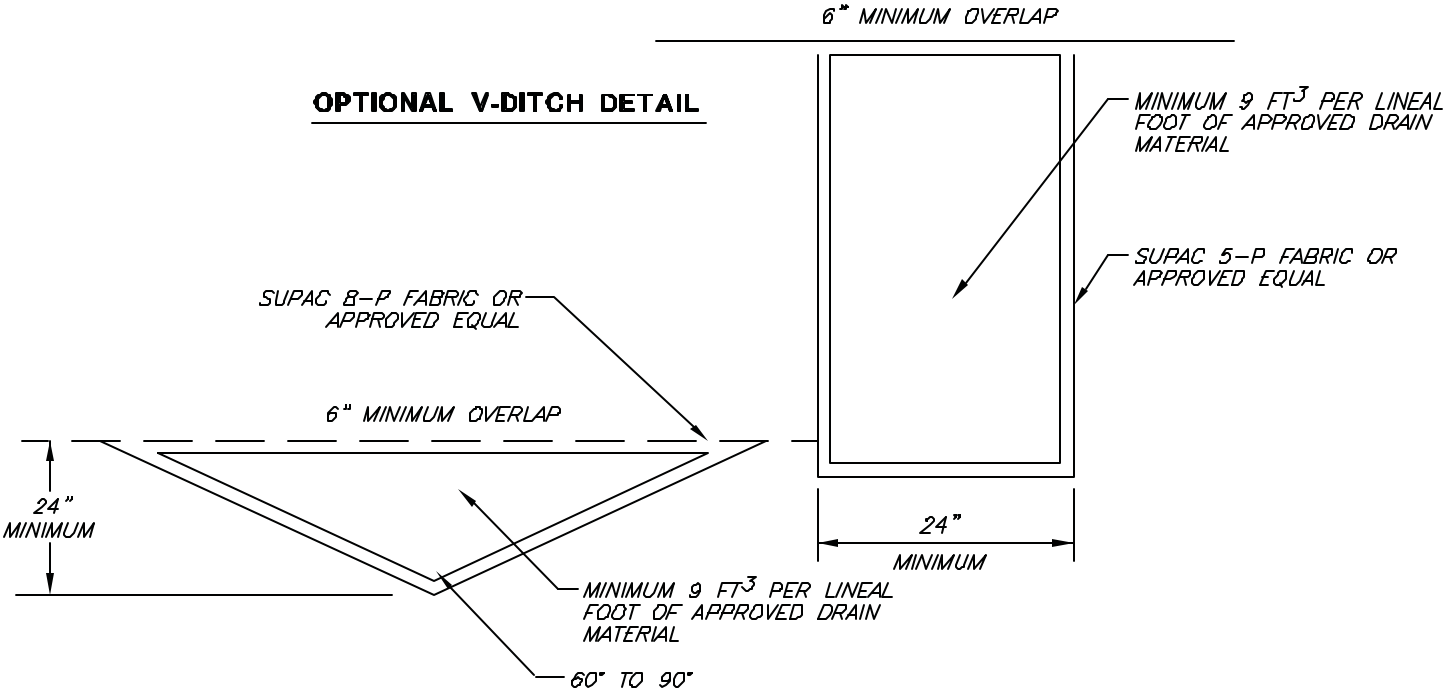
SCHEDULE 40 POLYVINYL CHLORIDE (P.V.C.) OR APPROVED EQUAL. MINIMUM CRUSH STRENGTH 1000 PSI.

TYPICAL BACKDRAIN DETAIL



TRENCH DETAIL

OPTIONAL V-DITCH DETAIL



DRAIN MATERIAL TO MEET FOLLOWING SPECIFICATION OR APPROVED EQUAL:

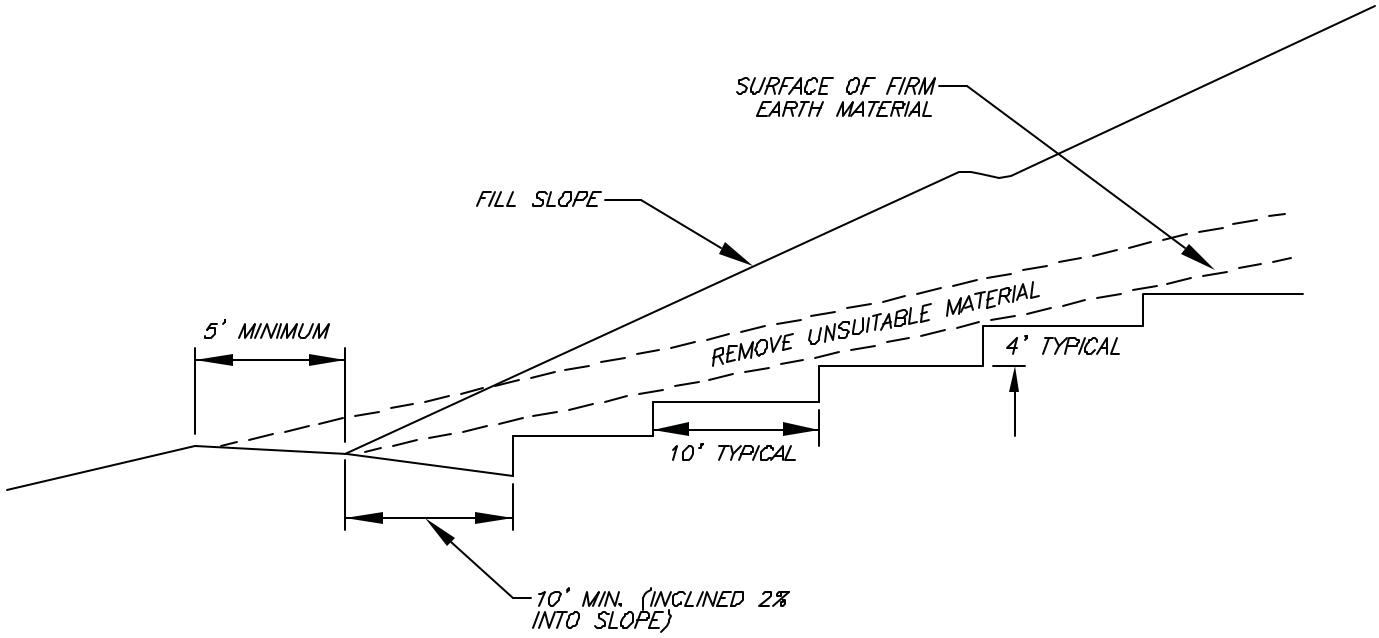
SIEVE SIZE	PERCENTAGE PASSING
1-1/2"	88-100
1"	5-40
3/4"	0-17
3/8"	0-7
NO.:200	0-3

ADD MINIMUM 4" DIAMETER APPROVED PERFORATED PIPE WHEN GRADIENT IS LESS THAN 2%

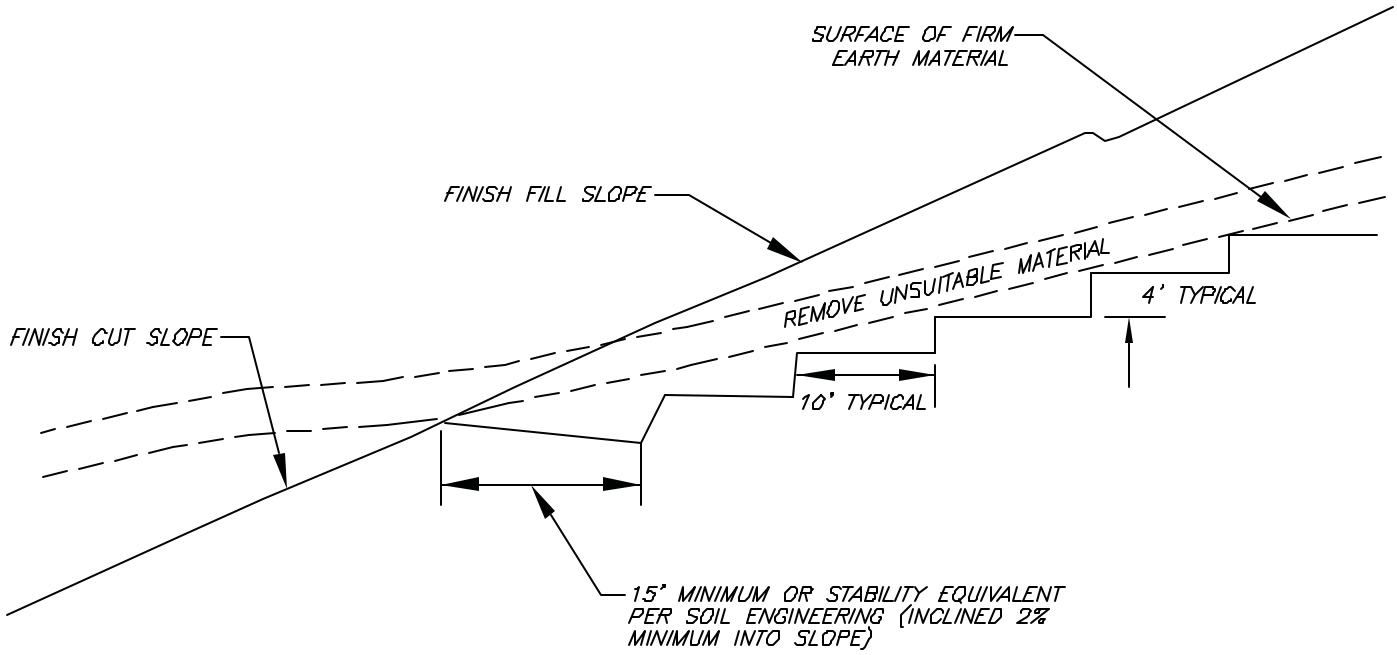
APPROVED PIPE TO BE SCHEDULE 40 POLY-VINYL-CHLORIDE (P.V.C.) OR APPROVED EQUAL. MINIMUM CRUSH STRENGTH 1000 psi.

GEOFABRIC SUBDRAIN DETAIL

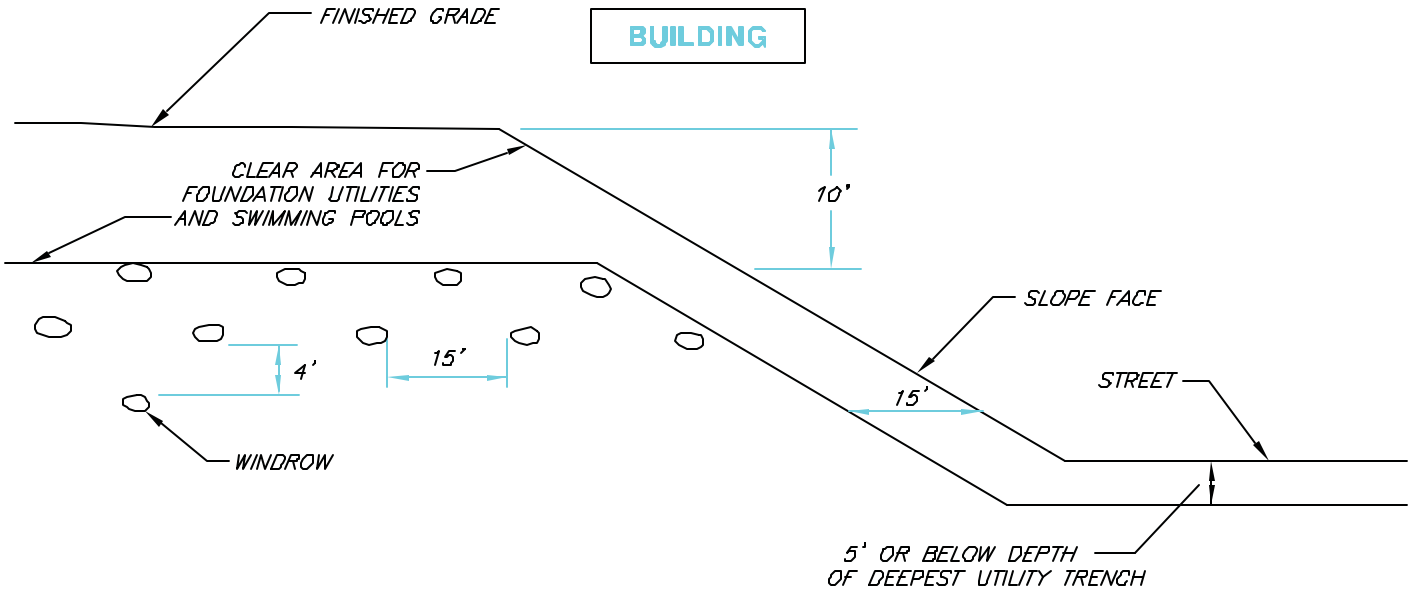
BENCHING FILL OVER NATURAL



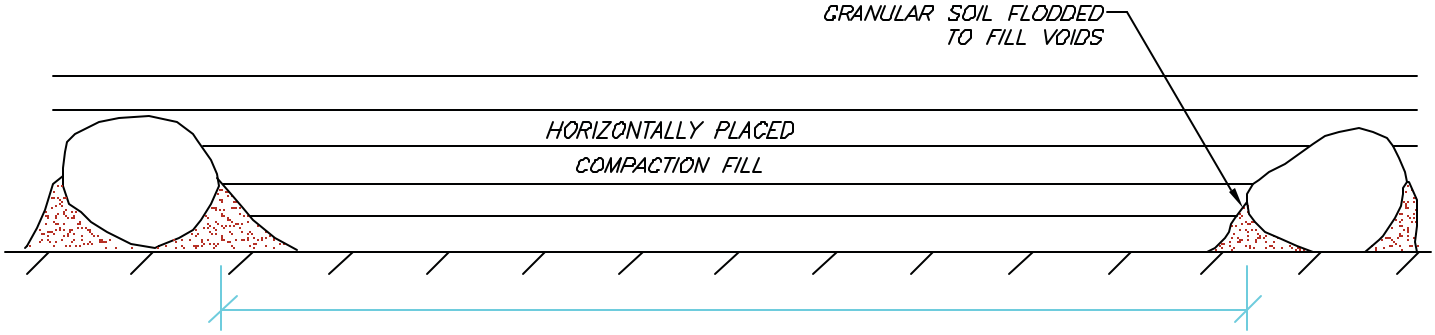
BENCHING FILL OVER CUT



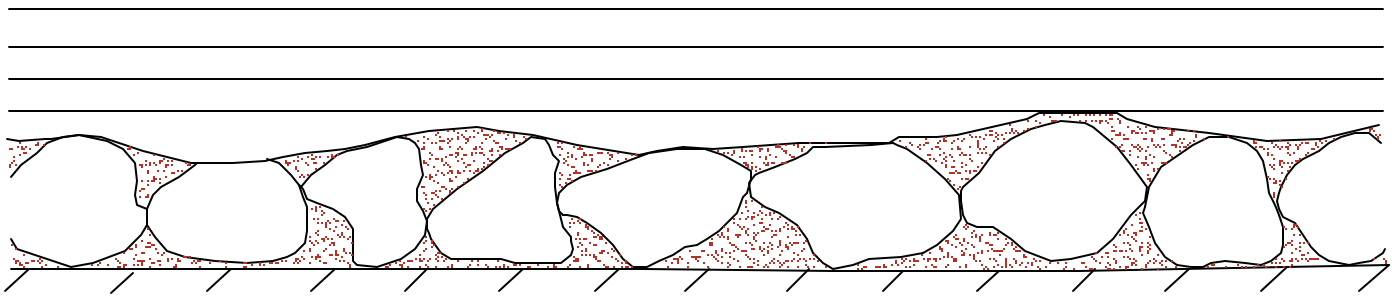
BENCHING FOR COMPACTED FILL DETAIL



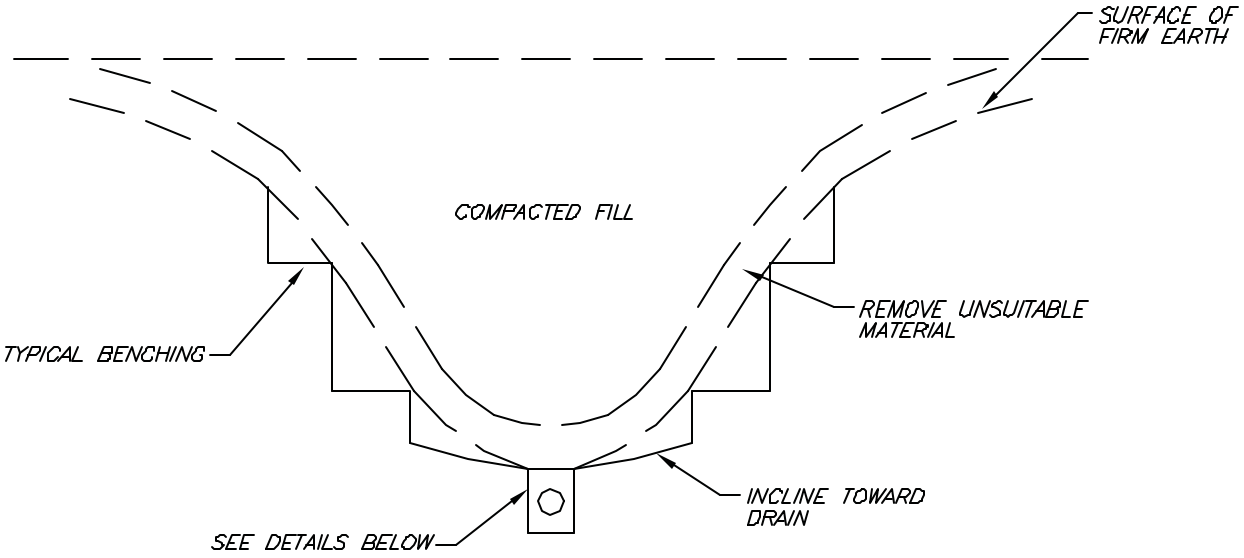
TYPICAL WINDROW DETAIL (EDGE VIEW)



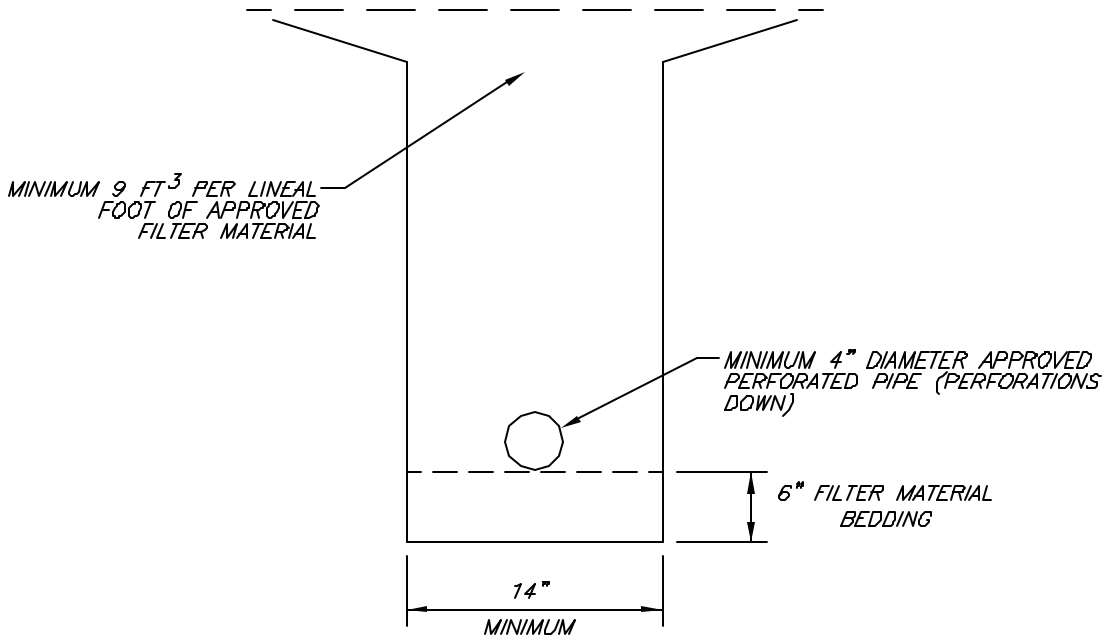
PROFILE VIEW



ROCK DISPOSAL DETAIL



TRENCH DETAIL



FILTER MATERIAL TO MEET FOLLOWING SPECIFICATION OR APPROVED EQUAL:

SIEVE SIZE	PERCENTAGE
1"	100
3/4"	90–100
3/8"	40–100
NO. 4	25–40
NO. 30	5–15
NO. 50	0–7
NO. 200	0–3

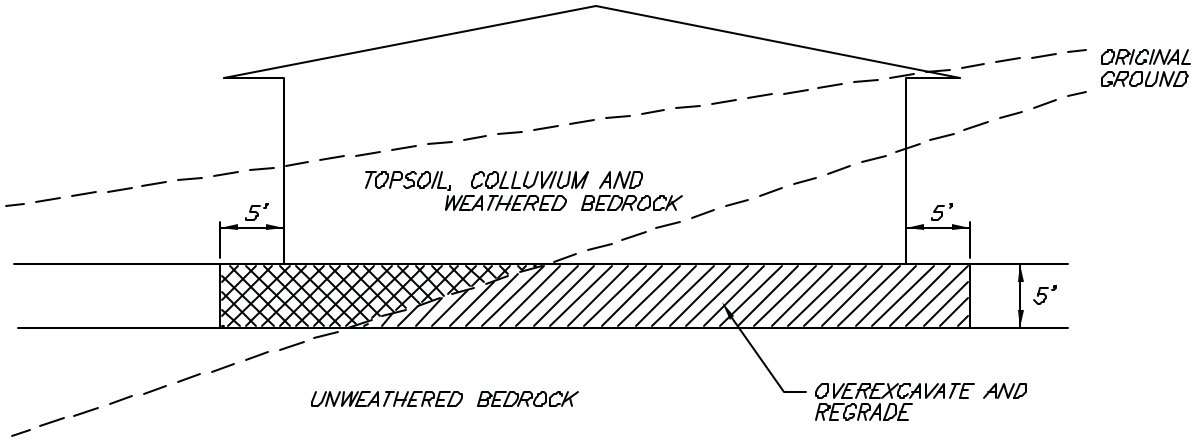
APPROVED PIPE TO BE SCHEDULE 40 POLY-VINYL-CHLORIDE (P.V.C.) OR APPROVED EQUAL. MINIMUM CRUSH STRENGTH 1000 psi.

PIPE DIAMETER TO MEET THE FOLLOWING CRITERIA. SUBJECT TO FIELD REVIEW BASED ON ACTUAL GEOTECHNICAL CONDITIONS ENCOUNTERED DURING GRADING.

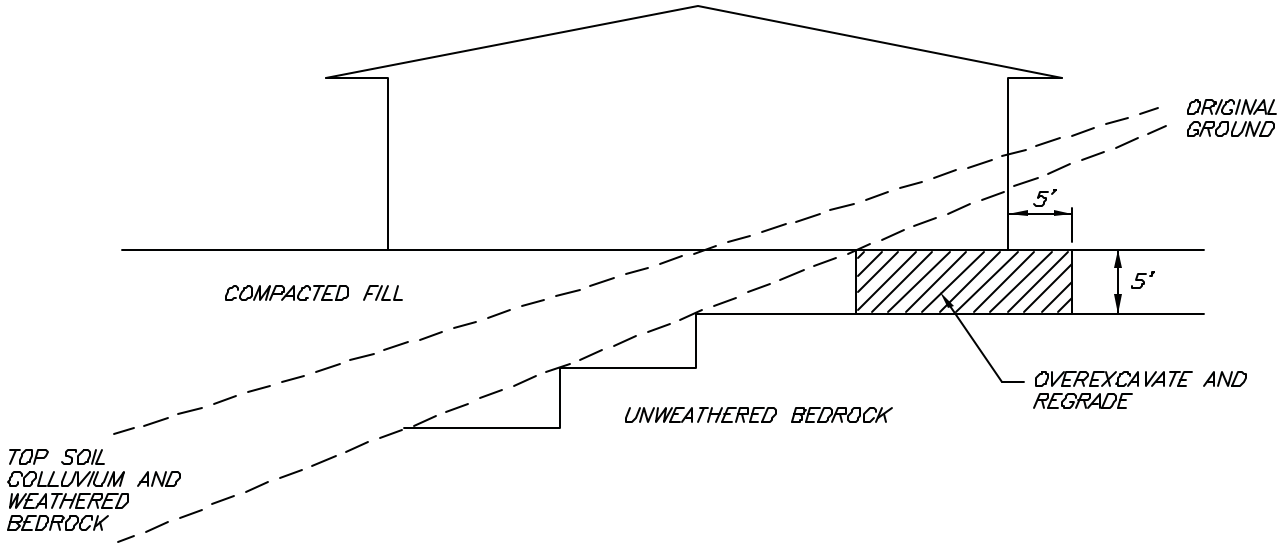
LENGTH OF RUN	PIPE DIAMETER
UPPER 500'	4"
NEXT 1000'	6"
> 1500'	8"

TYPICAL CANYON SUBDRAIN DETAIL

CUT LOT



CUT/FILL LOT (TRANSITION)



TRANSITION LOT DETAIL

BABCOCK Laboratories, Inc.
The Standard of Excellence for Over 100 Years

Client Name:	GeoMat Testing Laboratories, Inc.	Analytical Report:	Page 1 of 7
Contact:	Haytham Nabilsi, GE	Project Name:	Geomat Soils Testing for Herbicides and Pesticides
Address:	9980 Indiana Ave., Suite 14 Riverside, CA 92503	Project Number:	Kingsfield - Hawthorne, APN 227-130-025, Riverside
Report Date:	27-Jan-2017	**Work Order Number:**	**B7A0932**

Received on Ice (Y/N): Yes Temp: 3 °C

Attached is the analytical report for the sample(s) received for your project. Below is a list of the individual sample descriptions with the corresponding laboratory number(s). Also, enclosed is a copy of the Chain of Custody document (if received with your sample(s)). Please note any unused portion of the sample(s) may be responsibly discarded after 30 days from the above report date, unless you have requested otherwise.

Thank you for the opportunity to serve your analytical needs. If you have any questions or concerns regarding this report please contact our client service department.

Sample Identification

Lab Sample #	Client Sample ID	Matrix	Date Sampled	By	Date Submitted	By
B7A0932-01	A - S1 @ 1- Kingsfield - Hawthorne, Riverside	Solid	01/10/17 11:36	Art Martinez	01/10/17 13:30	Mahmood
B7A0932-02	A - S2 @ 1 - Kingsfield - Hawthorne, Riverside	Solid	01/10/17 11:54	Art Martinez	01/10/17 13:30	Mahmood
B7A0932-03	B - S1 @ 1 - Kingsfield - Hawthorne, Riverside	Solid	01/10/17 12:11	Art Martinez	01/10/17 13:30	Mahmood
B7A0932-04	B - S2 @ 1 - Kingsfield - Hawthorne, Riverside	Solid	01/10/17 12:30	Art Martinez	01/10/17 13:30	Mahmood

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Client Name:	GeoMat Testing Laboratories, Inc.	Analytical Report:	Page 2 of 7
Contact:	Haytham Nabilsi, GE	Project Name:	Geomat Soils Testing for Herbicides and Pesticides
Address:	9980 Indiana Ave., Suite 14 Riverside, CA 92503	Project Number:	Kingsfield - Hawthorne, APN 227-130-025, Riverside
Report Date:	27-Jan-2017	**Work Order Number:**	**B7A0932**

Received on Ice (Y/N): Yes Temp: 3 °C

Laboratory Reference Number

B7A0932-01

Sample Description	Matrix	Sampled Date/Time	Received Date/Time
A - S1 @ 1- Kingsfield - Hawthorne, Riverside	Solid	01/10/17 11:36	01/10/17 13:30

Analyte(s)	Result		RDL	Units	Method	Analysis Date	Analyst	Flag
Diesel Range Organics by EPA 8015								
DRO (C10-C28)	ND		10	mg/kg	EPA 8015B	01/19/17 15:08	naa	
ORO (C29-C44)	ND		10	mg/kg	EPA 8015B	01/19/17 15:08	naa	
Surrogate: o-Terphenyl	83.1	%	16-159		EPA 8015B	01/19/17 15:08	naa	
Surrogate: n-Triacontane	50.1	%	19-150		EPA 8015B	01/19/17 15:08	naa	
Gasoline Range Organics by EPA 8015								
Gasoline Range Organics	ND		5.0	mg/kg	EPA 8015B	01/18/17 21:01	jes	
Surrogate: a,a,a-Trifluorotoluene	63.5	%	10-148		EPA 8015B	01/18/17 21:01	jes	

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Client Name:	GeoMat Testing Laboratories, Inc.	Analytical Report:	Page 3 of 7
Contact:	Haytham Nabilsi, GE	Project Name:	Geomat Soils Testing for Herbicides and Pesticides
Address:	9980 Indiana Ave., Suite 14 Riverside, CA 92503	Project Number:	Kingsfield - Hawthorne, APN 227-130-025, Riverside
Report Date:	27-Jan-2017	**Work Order Number:**	**B7A0932**

Received on Ice (Y/N): Yes Temp: 3 °C

Laboratory Reference Number

B7A0932-02

Sample Description	Matrix	Sampled Date/Time	Received Date/Time
A - S2 @ 1 - Kingsfield - Hawthorne, Riverside	Solid	01/10/17 11:54	01/10/17 13:30

Analyte(s)	Result		RDL	Units	Method	Analysis Date	Analyst	Flag
Diesel Range Organics by EPA 8015								
DRO (C10-C28)	ND		10	mg/kg	EPA 8015B	01/19/17 16:23	naa	
ORO (C29-C44)	ND		10	mg/kg	EPA 8015B	01/19/17 16:23	naa	
Surrogate: o-Terphenyl	87.5	%	16-159		EPA 8015B	01/19/17 16:23	naa	
Surrogate: n-Triacontane	58.1	%	19-150		EPA 8015B	01/19/17 16:23	naa	
Gasoline Range Organics by EPA 8015								
Gasoline Range Organics	ND		5.0	mg/kg	EPA 8015B	01/18/17 21:35	jes	
Surrogate: a,a,a-Trifluorotoluene	63.6	%	10-148		EPA 8015B	01/18/17 21:35	jes	

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Client Name:	GeoMat Testing Laboratories, Inc.	Analytical Report:	Page 4 of 7
Contact:	Haytham Nabilsi, GE	Project Name:	Geomat Soils Testing for Herbicides and Pesticides
Address:	9980 Indiana Ave., Suite 14 Riverside, CA 92503	Project Number:	Kingsfield - Hawthorne, APN 227-130-025, Riverside
Report Date:	27-Jan-2017	**Work Order Number:**	**B7A0932**

Received on Ice (Y/N): Yes Temp: 3 °C

Laboratory Reference Number

B7A0932-03

Sample Description	Matrix	Sampled Date/Time	Received Date/Time
B - S1 @ 1 - Kingsfield - Hawthorne, Riverside	Solid	01/10/17 12:11	01/10/17 13:30

Analyte(s)	Result		RDL	Units	Method	Analysis Date	Analyst	Flag
Organochlorine Pesticides and PCBs by EPA 8000 Series								
4,4'-DDD	ND		4.0	ug/kg	EPA 8081A	01/22/17 20:48	jhr	
4,4'-DDE	ND		3.0	ug/kg	EPA 8081A	01/22/17 20:48	jhr	
4,4'-DDT	ND		4.0	ug/kg	EPA 8081A	01/22/17 20:48	jhr	
a-BHC	ND		4.0	ug/kg	EPA 8081A	01/22/17 20:48	jhr	
Aldrin	ND		2.0	ug/kg	EPA 8081A	01/22/17 20:48	jhr	
b-BHC	ND		4.0	ug/kg	EPA 8081A	01/22/17 20:48	jhr	
Chlordane	ND		25	ug/kg	EPA 8081A	01/22/17 20:48	jhr	
d-BHC	ND		7.0	ug/kg	EPA 8081A	01/22/17 20:48	jhr	
Dieldrin	ND		3.0	ug/kg	EPA 8081A	01/22/17 20:48	jhr	
Endosulfan I	ND		3.0	ug/kg	EPA 8081A	01/22/17 20:48	jhr	
Endosulfan II	ND		4.0	ug/kg	EPA 8081A	01/22/17 20:48	jhr	
Endosulfan Sulfate	ND		10	ug/kg	EPA 8081A	01/22/17 20:48	jhr	
Endrin	ND		3.0	ug/kg	EPA 8081A	01/22/17 20:48	jhr	
Endrin Aldehyde	ND		7.0	ug/kg	EPA 8081A	01/22/17 20:48	jhr	
Heptachlor	ND		3.0	ug/kg	EPA 8081A	01/22/17 20:48	jhr	
Heptachlor Epoxide	ND		3.0	ug/kg	EPA 8081A	01/22/17 20:48	jhr	
Hexachlorobenzene	ND		40	ug/kg	EPA 8081A	01/22/17 20:48	jhr	
Lindane	ND		4.0	ug/kg	EPA 8081A	01/22/17 20:48	jhr	
Methoxychlor	ND		27	ug/kg	EPA 8081A	01/22/17 20:48	jhr	
Toxaphene	ND		80	ug/kg	EPA 8081A	01/22/17 20:48	jhr	
Surrogate: Decachlorobiphenyl	90.4	%	10-169		EPA 8081A	01/22/17 20:48	jhr	
Chlorinated Herbicides by EPA 8151A								
2,4,5-T	ND		100	ug/kg	EPA 8151A	01/24/17 18:55	jhr	NRPDc
2,4-D	ND		100	ug/kg	EPA 8151A	01/24/17 18:55	jhr	
2,4,5-TP Silvex	ND		100	ug/kg	EPA 8151A	01/24/17 18:55	jhr	NRPDc
2,4-DB	ND		400	ug/kg	EPA 8151A	01/24/17 18:55	jhr	NRPDc, NRPDo
Dalapon	ND		200	ug/kg	EPA 8151A	01/24/17 18:55	jhr	
Dicamba	ND		80	ug/kg	EPA 8151A	01/24/17 18:55	jhr	
Dichlorprop	ND		400	ug/kg	EPA 8151A	01/24/17 18:55	jhr	NRPDc
Dinoseb	ND		100	ug/kg	EPA 8151A	01/24/17 18:55	jhr	
Surrogate: DCAA	67.8	%	31-114		EPA 8151A	01/24/17 18:55	jhr	

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Client Name:	GeoMat Testing Laboratories, Inc.	Analytical Report:	Page 5 of 7
Contact:	Haytham Nabilsi, GE	Project Name:	Geomat Soils Testing for Herbicides and Pesticides
Address:	9980 Indiana Ave., Suite 14 Riverside, CA 92503	Project Number:	Kingsfield - Hawthorne, APN 227-130-025, Riverside
Report Date:	27-Jan-2017	**Work Order Number:**	**B7A0932**

Received on Ice (Y/N): Yes Temp: 3 °C

Laboratory Reference Number

B7A0932-04

Sample Description	Matrix	Sampled Date/Time	Received Date/Time
B - S2 @ 1 - Kingsfield - Hawthorne, Riverside	Solid	01/10/17 12:30	01/10/17 13:30

Analyte(s)	Result		RDL	Units	Method	Analysis Date	Analyst	Flag
Organochlorine Pesticides and PCBs by EPA 8000 Series								
4,4'-DDD	ND		4.0	ug/kg	EPA 8081A	01/22/17 21:03	jhr	
4,4'-DDE	ND		3.0	ug/kg	EPA 8081A	01/22/17 21:03	jhr	
4,4'-DDT	ND		4.0	ug/kg	EPA 8081A	01/22/17 21:03	jhr	
a-BHC	ND		4.0	ug/kg	EPA 8081A	01/22/17 21:03	jhr	
Aldrin	ND		2.0	ug/kg	EPA 8081A	01/22/17 21:03	jhr	
b-BHC	ND		4.0	ug/kg	EPA 8081A	01/22/17 21:03	jhr	
Chlordane	ND		25	ug/kg	EPA 8081A	01/22/17 21:03	jhr	
d-BHC	ND		7.0	ug/kg	EPA 8081A	01/22/17 21:03	jhr	
Dieldrin	ND		3.0	ug/kg	EPA 8081A	01/22/17 21:03	jhr	
Endosulfan I	ND		3.0	ug/kg	EPA 8081A	01/22/17 21:03	jhr	
Endosulfan II	ND		4.0	ug/kg	EPA 8081A	01/22/17 21:03	jhr	
Endosulfan Sulfate	ND		10	ug/kg	EPA 8081A	01/22/17 21:03	jhr	
Endrin	ND		3.0	ug/kg	EPA 8081A	01/22/17 21:03	jhr	
Endrin Aldehyde	ND		7.0	ug/kg	EPA 8081A	01/22/17 21:03	jhr	
Heptachlor	ND		3.0	ug/kg	EPA 8081A	01/22/17 21:03	jhr	
Heptachlor Epoxide	ND		3.0	ug/kg	EPA 8081A	01/22/17 21:03	jhr	
Hexachlorobenzene	ND		40	ug/kg	EPA 8081A	01/22/17 21:03	jhr	
Lindane	ND		4.0	ug/kg	EPA 8081A	01/22/17 21:03	jhr	
Methoxychlor	ND		27	ug/kg	EPA 8081A	01/22/17 21:03	jhr	
Toxaphene	ND		80	ug/kg	EPA 8081A	01/22/17 21:03	jhr	
Surrogate: Decachlorobiphenyl	94.0	%	10-169		EPA 8081A	01/22/17 21:03	jhr	
Chlorinated Herbicides by EPA 8151A								
2,4,5-T	ND		100	ug/kg	EPA 8151A	01/24/17 19:27	jhr	NRPDc
2,4-D	ND		100	ug/kg	EPA 8151A	01/24/17 19:27	jhr	
2,4,5-TP Silvex	ND		100	ug/kg	EPA 8151A	01/24/17 19:27	jhr	NRPDc
2,4-DB	ND		400	ug/kg	EPA 8151A	01/24/17 19:27	jhr	NRPDc
Dalapon	ND		200	ug/kg	EPA 8151A	01/24/17 19:27	jhr	
Dicamba	ND		80	ug/kg	EPA 8151A	01/24/17 19:27	jhr	
Dichlorprop	ND		400	ug/kg	EPA 8151A	01/24/17 19:27	jhr	NRPDc
Dinoseb	ND		100	ug/kg	EPA 8151A	01/24/17 19:27	jhr	
Surrogate: DCAA	55.5	%	31-114		EPA 8151A	01/24/17 19:27	jhr	

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Client Name:	GeoMat Testing Laboratories, Inc.	Analytical Report:	Page 6 of 7
Contact:	Haytham Nabilsi, GE	Project Name:	Geomat Soils Testing for Herbicides and Pesticides
Address:	9980 Indiana Ave., Suite 14 Riverside, CA 92503	Project Number:	Kingsfield - Hawthorne, APN 227-130-025, Riverside
Report Date:	27-Jan-2017	**Work Order Number:**	**B7A0932**

Received on Ice (Y/N): Yes Temp: 3 °C

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Client Name:	GeoMat Testing Laboratories, Inc.	Analytical Report:	Page 7 of 7
Contact:	Haytham Nabilsi, GE	Project Name:	Geomat Soils Testing for Herbicides and Pesticides
Address:	9980 Indiana Ave., Suite 14 Riverside, CA 92503	Project Number:	Kingsfield - Hawthorne, APN 227-130-025, Riverside
Report Date:	27-Jan-2017	**Work Order Number:**	**B7A0932**

Received on Ice (Y/N): Yes Temp: 3 °C

Notes and Definitions

NRPDc	The RPD value for the LCS/LCSD did not meet laboratory acceptance criteria.
NRPDo	The RPD/precision of replicate analyses performed on this sample did not meet laboratory acceptance criteria.
ND:	Analyte NOT DETECTED at or above the Method Detection Limit **(if MDL is reported)**, otherwise at or above the Reportable Detection Limit (RDL)
NR:	Not Reported
RDL:	Reportable Detection Limit
MDL:	Method Detection Limit
* / ''' :	NELAP does not offer accreditation for this analyte/method/matrix combination

Approval

Enclosed are the analytical results for the submitted sample(s). Babcock Laboratories certify the data presented as part of this report meet the minimum quality standards in the referenced analytical methods. Any exceptions have been noted.

Nancy H. Boulineau For Cindy A. Waddell

cc:

e-Short_No Alias.rpt

This report applies only to the sample(s) analyzed. As a mutual protection to clients, the public, and Babcock Laboratories, Inc., this report is submitted and accepted for the exclusive use of the Client to whom it is addressed. Interpretation and use of the information contained within this report are the sole responsibility of the Client. Babcock Laboratories, Inc. is not responsible for any misinformation or consequences that may result from misinterpretation or improper use of this report. This report is not to be modified or abbreviated in any way. Additionally, this report is not to be used, in whole or in part, in any advertising or publicity matter without written authorization from Babcock Laboratories, Inc. The liability of Babcock Laboratories, Inc. is limited to the actual cost of the requested analyses, unless otherwise agreed upon in writing. There is no other warranty expressed or implied.

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EPA No. CA00102
NELAP No. OR4035
LACSD No. 10119

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Client Name: GeoMat Testing Laboratories, Inc.
Contact: Haytham Nabilsi, GE
Address: 9980 Indiana Ave., Suite 14
Riverside, CA 92503

Report Date: 27-Jan-2017

Analytical Report: Page 1 of 1
Project Name: Geomat Soils Testing for Herbicides and Pesticides
Project Number: Kingsfield - Hawthorne, APN 227-130-025, Riverside

Work Order Number: B7A0932

Received on Ice (Y/N): Yes Temp: 3 °C

E.S.BABCOCK&Sons,Inc.
Environmental Laboratories est 1906
6100 Quail Valley Court Riverside, CA 92507
(951) 653-3351 • FAX (951) 653-1662
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Chain of Custody & Sample Information Record

Client: GeoMat Testing Laboratories, Inc Contact: Art Martinez Fax No.
Phone No. 951-663-2651 email: Art@geomatlabs.com
Project Name: Kingsfield - Hawthorne
Project Location: APN. 227-130-025, Riverside
Turn Around Time: (Routine) *72 Hour Rush *48 Hour Rush *24 Hour Rush
*Lab TAT Approval: By: *Additional Charges Apply

Additional Reporting Requests (Include Source Number in Notes): Include QC Data Package: ☑ Yes ☐ No; FAX Results: ☐ Yes ☐ No; Email Results: ☑ Yes ☐ No; State EDT: ☐ Yes ☐ No

Sampler Information
Name: Art Martinez
Employer: GeoMat
Signature: Art Martinez

Sample ID	Date	Time	Unpreserved	H_2SO_4	HCl	HNO_3	$Na_2S_2O_3$	NaOH	NaOH/Zn Acetate	NH_4Cl	MCAA	Total # of Containers	Routine	Resample	Special	8015B - Carbon Chain	8081A - Organochlorine Pesticides	8151B - Chlor. Herbicides	Arsenic (Kemar Test)	Matrix	Notes
A-S1 e1	1/10/17	11:36 am														✓				S	
A-S2 e1	↓	11:54 am														✓				S	
B-S1 e1	↓	12:11 pm															✓	✓	✓	S	
B-S2 e1	↓	12:30 pm															✓	✓	✓	S	

Matrix: DW = Drinking Water, WW = Waste Water, GW = Ground Water, S = Soil, SG = Sludge, L = Liquid, M = Miscellaneous

Notes: *Babcock Labs does not do this analysis - Client notified. AB 01/10/17

Relinquished By (sign)	Print Name / Company	Date / Time	Received By (sign)	Print Name / Company
			MAHMOOD	
		01/10/17 13:30	Angie Brown	Angie Brown/ESB

(For Lab Use Only) Sample Integrity Upon Receipt

Sample(s) Submitted on Ice? (Yes) No
Custody Seal(s) Intact? Yes No (NA)
Sample(s) Intact? (Yes) No
Temperature 3 °C
☐ Cooler Blank

Lab Notes

Lab No. B7A0932 AB
Page 1 of 1
Rev. 1/07

JAN 10 2017

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Client Name:	GeoMat Testing Laboratories, Inc.	Analytical Report:	Page 1 of 6
Contact:	Haytham Nabilsi, GE	Project Name:	Geomat Soils Testing for Herbicides and Pesticides
Address:	9980 Indiana Ave., Suite 14 Riverside, CA 92503	Project Number:	Kingsfield - Hawthorne, APN 227-130-025, Riverside
Report Date:	23-Feb-2017	**Work Order Number:**	**B7B1480**

Received on Ice (Y/N): Yes Temp: 3 °C

Attached is the analytical report for the sample(s) received for your project. Below is a list of the individual sample descriptions with the corresponding laboratory number(s). Also, enclosed is a copy of the Chain of Custody document (if received with your sample(s)). Please note any unused portion of the sample(s) may be responsibly discarded after 30 days from the above report date, unless you have requested otherwise.

Thank you for the opportunity to serve your analytical needs. If you have any questions or concerns regarding this report please contact our client service department.

Sample Identification

Lab Sample #	Client Sample ID	Matrix	Date Sampled	By	Date Submitted	By
B7B1480-01	A - S1 @ 1- Kingsfield - Hawthorne, Riverside	Solid	01/10/17 11:36	Art Martinez	01/10/17 13:30	Mahmood
B7B1480-02	A - S2 @ 1 - Kingsfield - Hawthorne, Riverside	Solid	01/10/17 11:54	Art Martinez	01/10/17 13:30	Mahmood
B7B1480-03	B - S1 @ 1 - Kingsfield - Hawthorne, Riverside	Solid	01/10/17 12:11	Art Martinez	01/10/17 13:30	Mahmood
B7B1480-04	B - S2 @ 1 - Kingsfield - Hawthorne, Riverside	Solid	01/10/17 12:30	Art Martinez	01/10/17 13:30	Mahmood

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Client Name:	GeoMat Testing Laboratories, Inc.	Analytical Report:	Page 2 of 6
Contact:	Haytham Nabilsi, GE	Project Name:	Geomat Soils Testing for Herbicides and Pesticides
Address:	9980 Indiana Ave., Suite 14 Riverside, CA 92503	Project Number:	Kingsfield - Hawthorne, APN 227-130-025, Riverside
Report Date:	23-Feb-2017	**Work Order Number:**	**B7B1480**

Received on Ice (Y/N): Yes Temp: 3 °C

Laboratory Reference Number

B7B1480-01

Sample Description	Matrix	Sampled Date/Time	Received Date/Time
A - S1 @ 1- Kingsfield - Hawthorne, Riverside	Solid	01/10/17 11:36	01/10/17 13:30

Analyte(s)	Result	RDL	Units	Method	Analysis Date	Analyst	Flag
Metals and Metalloids; EPA SW846 Series							
Arsenic	ND	10	mg/kg	EPA 6020	02/21/17 17:51	ap	

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Client Name:	GeoMat Testing Laboratories, Inc.	Analytical Report:	Page 3 of 6
Contact:	Haytham Nabilsi, GE	Project Name:	Geomat Soils Testing for Herbicides and Pesticides
Address:	9980 Indiana Ave., Suite 14 Riverside, CA 92503	Project Number:	Kingsfield - Hawthorne, APN 227-130-025, Riverside
Report Date:	23-Feb-2017	**Work Order Number:**	**B7B1480**

Received on Ice (Y/N): Yes Temp: 3 °C

Laboratory Reference Number

B7B1480-02

Sample Description	Matrix	Sampled Date/Time	Received Date/Time
A - S2 @ 1 - Kingsfield - Hawthorne, Riverside	Solid	01/10/17 11:54	01/10/17 13:30

Analyte(s)	Result	RDL	Units	Method	Analysis Date	Analyst	Flag
Metals and Metalloids; EPA SW846 Series							
Arsenic	ND	10	mg/kg	EPA 6020	02/21/17 17:53	ap	

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Client Name:	GeoMat Testing Laboratories, Inc.	Analytical Report:	Page 4 of 6
Contact:	Haytham Nabilsi, GE	Project Name:	Geomat Soils Testing for Herbicides and Pesticides
Address:	9980 Indiana Ave., Suite 14 Riverside, CA 92503	Project Number:	Kingsfield - Hawthorne, APN 227-130-025, Riverside
Report Date:	23-Feb-2017	**Work Order Number:**	**B7B1480**

Received on Ice (Y/N): Yes Temp: 3 °C

Laboratory Reference Number

B7B1480-03

Sample Description	Matrix	Sampled Date/Time	Received Date/Time
B - S1 @ 1 - Kingsfield - Hawthorne, Riverside	Solid	01/10/17 12:11	01/10/17 13:30

Analyte(s)	Result	RDL	Units	Method	Analysis Date	Analyst	Flag
Metals and Metalloids; EPA SW846 Series							
Arsenic	ND	10	mg/kg	EPA 6020	02/21/17 18:02	ap	

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Client Name:	GeoMat Testing Laboratories, Inc.	Analytical Report:	Page 5 of 6
Contact:	Haytham Nabilsi, GE	Project Name:	Geomat Soils Testing for Herbicides and Pesticides
Address:	9980 Indiana Ave., Suite 14 Riverside, CA 92503	Project Number:	Kingsfield - Hawthorne, APN 227-130-025, Riverside
Report Date:	23-Feb-2017	**Work Order Number:**	**B7B1480**

Received on Ice (Y/N): Yes Temp: 3 °C

Laboratory Reference Number

B7B1480-04

Sample Description	Matrix	Sampled Date/Time	Received Date/Time
B - S2 @ 1 - Kingsfield - Hawthorne, Riverside	Solid	01/10/17 12:30	01/10/17 13:30

Analyte(s)	Result	RDL	Units	Method	Analysis Date	Analyst	Flag
Metals and Metalloids; EPA SW846 Series							
Arsenic	ND	10	mg/kg	EPA 6020	02/21/17 18:04	ap	

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Client Name:	GeoMat Testing Laboratories, Inc.	Analytical Report:	Page 6 of 6
Contact:	Haytham Nabilsi, GE	Project Name:	Geomat Soils Testing for Herbicides and Pesticides
Address:	9980 Indiana Ave., Suite 14 Riverside, CA 92503	Project Number:	Kingsfield - Hawthorne, APN 227-130-025, Riverside
Report Date:	23-Feb-2017	**Work Order Number:**	**B7B1480**

Received on Ice (Y/N): Yes Temp: 3 °C

Notes and Definitions

ND:	Analyte NOT DETECTED at or above the Method Detection Limit **(if MDL is reported)**, otherwise at or above the Reportable Detection Limit (RDL)
NR:	Not Reported
RDL:	Reportable Detection Limit
MDL:	Method Detection Limit
* / ''' :	NELAP does not offer accreditation for this analyte/method/matrix combination

Approval

Enclosed are the analytical results for the submitted sample(s). Babcock Laboratories certify the data presented as part of this report meet the minimum quality standards in the referenced analytical methods. Any exceptions have been noted.

Nancy H. Boulineau For Cindy A. Waddell

cc:

e-Short_No Alias.rpt

This report applies only to the sample(s) analyzed. As a mutual protection to clients, the public, and Babcock Laboratories, Inc., this report is submitted and accepted for the exclusive use of the Client to whom it is addressed. Interpretation and use of the information contained within this report are the sole responsibility of the Client. Babcock Laboratories, Inc. is not responsible for any misinformation or consequences that may result from misinterpretation or improper use of this report. This report is not to be modified or abbreviated in any way. Additionally, this report is not to be used, in whole or in part, in any advertising or publicity matter without written authorization from Babcock Laboratories, Inc. The liability of Babcock Laboratories, Inc. is limited to the actual cost of the requested analyses, unless otherwise agreed upon in writing. There is no other warranty expressed or implied.

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CA ELAP No. 2698
EPA No. CA00102
NELAP No. OR4035
LACSD No. 10119

BABCOCK Laboratories, Inc.
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Client Name:	GeoMat Testing Laboratories, Inc.	Analytical Report:	Page 1 of 1
Contact:	Haytham Nabilsi, GE	Project Name:	Geomat Soils Testing for Herbicides and Pesticides
Address:	9980 Indiana Ave., Suite 14 Riverside, CA 92503	Project Number:	Kingsfield - Hawthorne, APN 227-130-025, Riverside
Report Date:	23-Feb-2017	**Work Order Number:**	**B7B1480**

Received on Ice (Y/N): Yes Temp: 3 °C

E.S.BABCOCK&Sons,Inc.
Environmental Laboratories est 1906

RELOG Request

Client: GeoMat Testing Labs

Person Requesting Relog: Haytham

Previous Work Order #: B7A0932-01 thru -04

Analysis Requested: AS (TAT)

TAT: 5day

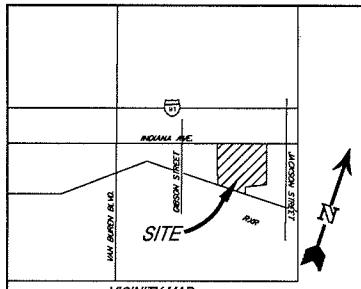
Notes:

Date/Signature: 2.15.17

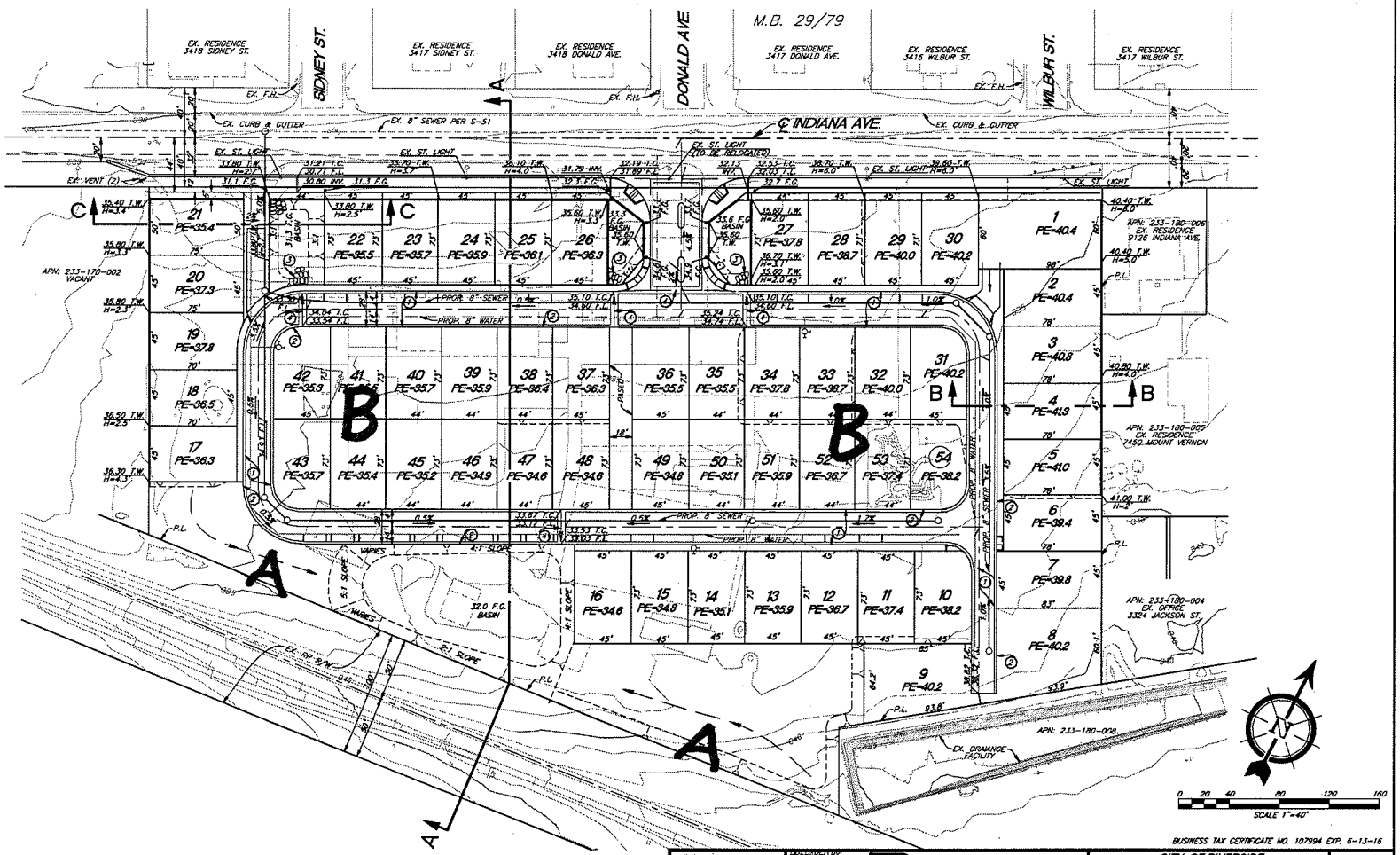
NEW WORK ORDER # B7B1480 AB
FEB 15 2017

IN THE CITY RIVERSIDE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

TENTATIVE TRACT MAP NO.37032
9170 INDIANA AVENUE
54 LOT PLANNED RESIDENTIAL DEVELOPMENT
CITY OF RIVERSIDE, CA
AUGUST 2016



VICINITY MAP
NOT TO SCALE
THOMAS GUIDE PAGE: 715 GRID: A6



OWNER/APPLICANT
STEVEN WALKER COMMUNITIES, INC.
7161 INDIANA AVE., STE. 300
RIVERSIDE, CA 92504
951-274-3679

ENGINEER
SDH & ASSOCIATES, INC.
5225 CANYON CREST DRIVE 71439
RIVERSIDE, CA. 92507
VOICE: (951) 683-3691
FAX: (951) 788-2314

ASSESSOR'S PARCEL NO.
233-180-007-6
233-170-001-9

PROJECT INFO
AREA OF SITE = 6.85 AC.
NUMBER OF UNITS = 54
LOT AREA = 186,685 S.F.
STREET AREA = 40,697 S.F.
COMMON OPEN SPACE = 52,252 S.F.

GENERAL PLAN DESIGNATION
EXISTING - BUSINESS PARK (B/OP)
PROPOSED - RESIDENTIAL (MHDR)

ZONING
EXISTING - PF-PUBLIC FACILITIES
PROPOSED - R-1-7000

SCHOOL DISTRICT
RIVERSIDE UNIFIED SCHOOL DISTRICT

UTILITY PURVEYORS
WATER.....CITY OF RIVERSIDE
GAS.....SO. CALIF. GAS
ELECTRICAL.....CITY OF RIVERSIDE
TELEPHONE.....PACIFIC BELL
SEWER.....CITY OF RIVERSIDE
CABLE.....CHARTER COMM.

LEGAL DESCRIPTION
A PORTION OF LOT 1 IN BLOCK 30 OF THE LANDS OF THE RIVERSIDE LAND AND IRRIGATION COMPANY, AS SHOWN BY MAP ON FILE IN BOOK 1 OF MAPS, AT PAGE 70, RECORDS OF SAN BERNARDINO COUNTY.

SOURCE OF TOPO
FIELD SURVEY BY RALSTON SURVEY SEPT. 2015
AERIAL PHOTOGRAMMETRY BY INLAND AERIAL SEPT. 2015

CONSTRUCTION NOTES
1. CONSTRUCT 3" OVER 5" BASE PAVING
2. CONSTRUCT 6" CURB & GUTTER
3. CONSTRUCT 6"-12" DIA RIP RAP
4. CONSTRUCT CROSS GUTTER
5. CONSTRUCT RETAINING WALL (5' MAX)

LEGEND
T.B. - TOP OF BERM
F.G. - FINISHED GRADE
F.L. - FLOW LINE
H.P. - HIGH POINT
EXIST. - EXISTING
P.E. - PAD ELEVATION
G.B. - GRADE BREAK
TRACT BOUNDARY
CENTERLINE
CURB AND GUTTER
1280 EXISTING CONTOUR LINE
LOT LINE
SLOPE

LOT INFO

LOT	AREA (S.F.)
1	5,880
2	3,510
3	3,510
4	3,510
5	3,510
6	3,510
7	3,735
8	5,661
9	4,809
10	3,272
11	3,285
12	3,285
13	3,285
14	3,285
15	3,285
16	3,285
17	3,150
18	3,150
19	3,258
20	3,175
21	3,750
22	3,285
23	3,285
24	3,285
25	3,285
26	3,285
27	3,285
28	3,285
29	3,285
30	3,370
31	3,199
32	3,212
33	3,212
34	3,212
35	3,212
36	3,285
37	3,285
38	3,212
39	3,212
40	3,212
41	3,212
42	3,199
43	3,199
44	3,212
45	3,212
46	3,212
47	3,212
48	3,285
49	3,285
50	3,212
51	3,212
52	3,212
53	3,212
54	3,199

BUSINESS TAX CERTIFICATE NO. 107994 EXP. 6-13-16

SEAL: REGISTERED PROFESSIONAL ENGINEER ROBERT C. VAN ANTWERP No. 62325 Exp. 6-30-17 CIVIL STATE OF CALIFORNIA

PREPARED BY: SDH ASSOCIATES INC. 5225 CANYON CREST DRIVE 71439 Riverside, California 92507 TEL: (951) 683-3691 FAX (951) 788-2314

BENCHMARK

SCALE: 1"=40'

DATE: FEBRUARY 2016

CITY OF RIVERSIDE

TTM 37032

9170 INDIANA AVENUE

1 OF 2 SHEETS

Soil Sampling Guide

A = Ag. Chems + Arsenic B = Carbon Chain C = School Blds (ACM + LBP)

Riverside Unified School District **RUSD** **Inspection Date: 10/16/2014**

HAWTHORNE ELEMENTARY/HAWTHORNE **20**

Building	A: KINDERGARTEN	**Quantity**	N/A	**Comments**
Location	EXTERIOR, UNDER WINDOWS	**Condition**	**GOOD**	NO SIGNIFICANT DAMAGE, VERIFY ACM
		Potential for Disturbance	LOW	
Description	TRANSITE PANELS	**Hazard Ranking**	*	**Recommended Response Action**
		Type	MISC	ROUTINE OPERATION & MAINTENANCE
		Friable Non-Friable	NF	
Building	A: KINDERGARTEN	**Quantity**	N/A	**Comments**
Location	K-2	**Condition**	**REMOVED**	REMOVED 6/98
		Potential for Disturbance	N/A	
Description	VINYL FLOOR TILE: 9x9	**Hazard Ranking**	*	**Recommended Response Action**
		Type	MISC	N/A
		Friable Non-Friable	NF	
Building	A: KINDERGARTEN	**Quantity**	N/A	**Comments**
Location	MECHANICAL ROOM	**Condition**	**REMOVED**	REMOVED 7/90
		Potential for Disturbance	N/A	
Description	FLEX DUCT	**Hazard Ranking**	*	**Recommended Response Action**
		Type	TSI	N/A
		Friable Non-Friable	F	
Building	A: KINDERGARTEN	**Quantity**	N/A	**Comments**
Location	MECHANICAL ROOM	**Condition**	**REMOVED**	REMOVED 7/90
		Potential for Disturbance	N/A	
Description	ROUND DUCT WRAP EXHAUST	**Hazard Ranking**	*	**Recommended Response Action**
		Type	TSI	N/A
		Friable Non-Friable	F	
Building	A: KINDERGARTEN	**Quantity**	N/A	**Comments**
Location	WORKROOM	**Condition**	**REMOVED**	REMOVED 6/98
		Potential for Disturbance	N/A	
Description	VINYL FLOOR TILE: 9x9 BROWN	**Hazard Ranking**	*	**Recommended Response Action**
		Type	MISC	N/A
		Friable Non-Friable	NF	
Building	B: ADMINISTRATION	**Quantity**	N/A	**Comments**
Location	MECHANICAL ROOM	**Condition**	**REMOVED**	REMOVED 12/95
		Potential for Disturbance	N/A	
Description	INSULATION ON ROUND DUCT WRAP EXHAUST	**Hazard Ranking**	*	**Recommended Response Action**
		Type	TSI	N/A
		Friable Non-Friable	F	

*** Hazard Ranking is a function of condition and potential for disturbance (1=lowest, 7=highest). Applies only to friable materials.**

"Verify ACM" = Possible asbestos-containing material not yet sampled.

Riverside Unified School District **RUSD** **Inspection Date: 10/16/2014**

HAWTHORNE ELEMENTARY/HAWTHORNE **20**

Building	B: ADMINISTRATION	**Quantity**	N/A	**Comments**
Location	ROOM 15	**Condition**	**REMOVED**	REMOVED 6/98
		Potential for Disturbance	N/A	
Description	VINYL FLOOR TILE	**Hazard Ranking**	*	**Recommended Response Action**
		Type	MISC	N/A
		Friable Non-Friable	NF	
Building	B: ADMINISTRATION	**Quantity**	N/A	**Comments**
Location	THROUGHOUT	**Condition**	**REMOVED**	REMOVED 6/98
		Potential for Disturbance	N/A	
Description	VINYL FLOOR TILE: 9x9 RED	**Hazard Ranking**	*	**Recommended Response Action**
		Type	MISC	N/A
		Friable Non-Friable	NF	
Building	D: OFFICE, RESTROOMS	**Quantity**	180 SF	**Comments**
Location	OFFICE	**Condition**	**ENCLOSED**	CARPETED; VERIFY ACM
		Potential for Disturbance	LOW	
Description	VINYL FLOOR TILE: 9x9	**Hazard Ranking**	*	**Recommended Response Action**
		Type	MISC	ROUTINE OPERATIONS & MAINTEANANCE
		Friable Non-Friable	NF	
Building	E: ROOMS 5-11 & IMC	**Quantity**	N/A	**Comments**
Location	THROUTHOUT	**Condition**	**REMOVED**	REMOVED 10/98
		Potential for Disturbance	N/A	
Description	VINYL FLOOR TILE	**Hazard Ranking**	*	**Recommended Response Action**
		Type	MISC	N/A
		Friable Non-Friable	NF	
Building	G: MULTIPURPOSE	**Quantity**	350 SF	**Comments**
Location	KITCHEN AND STORAGE	**Condition**	**GOOD**	LIFTING UNDER EQUIPMENT & 1/2 TILE MISSING BY BACK DOOR. NO TILE IN STORAGE.
		Potential for Disturbance	HIGH	
Description	VINYL FLOOR TILE: LIGHT GREEN	**Hazard Ranking**	*	**Recommended Response Action**
		Type	MISC	MONITOR DAMAGE
		Friable Non-Friable	NF	

*** Hazard Ranking is a function of condition and potential for disturbance (1=lowest, 7=highest). Applies only to friable materials.**

"Verify ACM" = Possible asbestos-containing material not yet sampled.

Riverside Unified School District **RUSD** **Inspection Date: 10/16/2014**

HAWTHORNE ELEMENTARY/HAWTHORNE **20**

Building	G: MULTIPURPOSE	**Quantity**	45 SF	**Comments**
Location	KITCHEN RESTROOM	**Condition**	**ENCLOSED**	ENCLOSED BY NEW 12X12
		Potential for Disturbance	LOW	
Description	FLOOR TILE MASTIC	**Hazard Ranking**	*	**Recommended Response Action**
		Type	SURF	ROUTINE OPERATION & MAINTENANCE
		Friable Non-Friable	NF	
Building	G: MULTIPURPOSE	**Quantity**	4	**Comments**
Location	KITCHEN, STORAGE, RESTROOM	**Condition**	**ENCLOSED**	ENCLOSED BY LIGHT FIXTURE
		Potential for Disturbance	LOW	
Description	LIGHT INSULATION	**Hazard Ranking**	*	**Recommended Response Action**
		Type	MISC	ROUTINE OPERATION & MAINTENANCE
		Friable Non-Friable	F	
Building	G: MULTIPURPOSE	**Quantity**	4	**Comments**
Location	KITCHEN, STORAGE, RESTROOM	**Condition**	**ENCLOSED**	ENCLOSED IN LIGHT FIXTURE; 1 EXPOSED. INNACC. 03/12
		Potential for Disturbance	LOW	
Description	LIGHT INSULATION	**Hazard Ranking**	1	**Recommended Response Action**
		Type	MISC	ROUTINE OPERATION & MAINTENANCE
		Friable Non-Friable	NF	
Building	G: MULTIPURPOSE	**Quantity**	N/A	**Comments**
Location	KITCHEN, STORAGE, RESTROOM	**Condition**	**ENCLOSED**	ENCLOSED BY COVE BASE
		Potential for Disturbance	LOW	
Description	COVEBASE MASTIC	**Hazard Ranking**	*	**Recommended Response Action**
		Type	SURF	ROUTINE OPERATION & MAINTENANCE
		Friable Non-Friable	NF	
Building	G: MULTIPURPOSE	**Quantity**	4 ELBOWS	**Comments**
Location	MECHANICAL ROOM ON BACK OF BLDG.	**Condition**	**GOOD**	NO SIGNIFICANT DAMAGE.
		Potential for Disturbance	LOW	
Description	INSULATION ON HW ELBOWS	**Hazard Ranking**	1	**Recommended Response Action**
		Type	TSI	ROUTINE OPERATION & MAINTENANCE
		Friable Non-Friable	F	
Building	G: MULTIPURPOSE	**Quantity**	2700 SF	**Comments**
Location	MULTIPURPOSE ROOM	**Condition**	**REMOVED**	REMOVED 4/04
		Potential for Disturbance	N/A	
Description	VINYL FLOOR TILE: 9X9 GREEN	**Hazard Ranking**	*	**Recommended Response Action**
		Type	MISC	N/A
		Friable Non-Friable	NF	

*** Hazard Ranking is a function of condition and potential for disturbance (1=lowest, 7=highest). Applies only to friable materials.**

"Verify ACM" = Possible asbestos-containing material not yet sampled.

Riverside Unified School District **RUSD** **Inspection Date: 10/16/2014**

HAWTHORNE ELEMENTARY/HAWTHORNE **20**

Building	G: MULTIPURPOSE	**Quantity**	250 SF	**Comments**
Location	STORAGE, WEST & EAST	**Condition**	**REMOVED**	REMOVED 4/04
		Potential for Disturbance	N/A	
Description	TILE, VINYL FLOOR 9X9 GREY/GREEN	**Hazard Ranking**	*	**Recommended Response Action**
		Type	MISC	N/A
		Friable Non-Friable	NF	
Building	PORTABLE 13	**Quantity**	N/A	**Comments**
Location	ROOMS 12 AND 14	**Condition**	**ENCLOSED**	ENCLOSED BY CARPET
		Potential for Disturbance	LOW	
Description	VINYL FLOOR TILE	**Hazard Ranking**	*	**Recommended Response Action**
		Type	MISC	USE CAUTION REMOVING CARPET
		Friable Non-Friable	NF	
Building	THROUGHOUT	**Quantity**	N/A	**Comments**
Location	WINDOWS	**Condition**	**GOOD**	UNREPLACED WINDOWS MAY HAVE ACM PUTTY.
		Potential for Disturbance	LOW	
Description	PUTTY	**Hazard Ranking**	*	**Recommended Response Action**
		Type	MISC	ROUTINE OPERATION & MAINTENANCE
		Friable Non-Friable	NF	

Ronald McDaniel Asbestos Consultant 01-2865

Inspector Signature

*** Hazard Ranking is a function of condition and potential for disturbance (1=lowest, 7=highest). Applies only to friable materials.**

"Verify ACM" = Possible asbestos-containing material not yet sampled.

Appendix G:
Project Specific Water Quality Management Plan

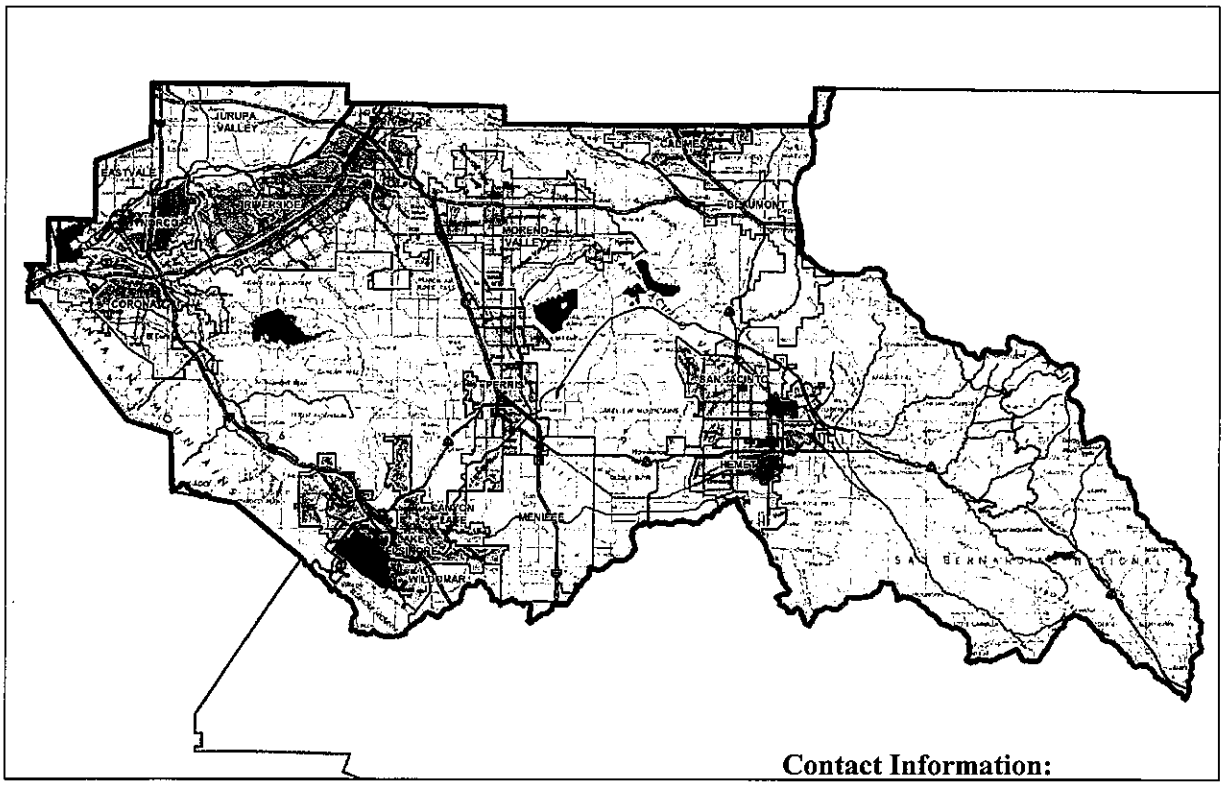
Project Specific Water Quality Management Plan

*A Template for Projects located within the **Santa Ana Watershed** Region of Riverside County*

Project Title: Tentative Tract Map No. 37032

Public Works No:_____

Design Review/Case No: P16-0111



Contact Information:

Prepared for:
Steven Walker Communities
7111 Indiana Ave.
Riverside, Ca. 92504
(951) 784-0840

Prepared by:
Dane Sommers
SDH & Associates, Inc.
5225 Canyon Crest Dr. Ste. 71439
Riverside, Ca 92507
(951) 683-3691

☒ **Preliminary**
☐ **Final**

Original Date Prepared: February 2016

Revision Date(s): November 2016, April 2017, May 2017

Prepared for Compliance with
Regional Board Order No. **R8-2010-0033**

OWNER'S CERTIFICATION

This Project-Specific Water Quality Management Plan (WQMP) has been prepared for Steven Walker Communities by SDH & Associates, Inc. for Tentative Tract Map No. 37032.

This WQMP is intended to comply with the requirements of the City of Riverside for the subdivision of approximately 6.8 acres into 54 Single Family Residential (SFR) lots, Planning Case No. P16-0111, 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 City of Riverside Water Quality Ordinance (Municipal Code Section 14.12.315).

"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

5/31/17
Date

Steve Berzansky
Owner's Printed Name

VP
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."

Tory R Walker
Preparer's Signature

5/15/17
Date

Tory R. Walker
Preparer's Printed Name

Preparer's Title/Position

Preparer's Licensure:

REGISTERED PROFESSIONAL ENGINEER
TORY R. WALKER
No. 45005
Exp. 3/31/18
CIVIL
STATE OF CALIFORNIA

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Section A: Project and Site Information

This project proposes a 54 lot detached single family subdivision on a 6.85 acre site on Indiana Avenue. Runoff from this site will be treated by four infiltration basins. The 54 proposed lots have been broken up into 9 drainage management areas: D.M.A 1, 2, 7, 9, 10, 11, 12, 13 & 14. In addition to the infiltration basins that treat these areas, each lot will also be pre-treated individually by a shallow vegetated swale around the perimeter of each house to intercept runoff from the roof of the house and surrounding walkways.

The private streets onsite have also been broken up into drainage management areas based on the proposed grades: D.M.A. 3, 4, 5, 6, 8 & 15.

There are also two linear landscape areas, D.M.A.s 18 & 19, along the frontage of Indiana Avenue and the main entrance, D.MA. 6 (which will be constructed with pervious pavers) that are self-treating. D.M.A.s 20 &21, a small portion of the entrance and handicap ramps, will remain untreated because of grade matchup constraints.

There are four main treatment areas proposed for this project:

- B.M.P. 1, a 2,835 ft^3 infiltration basin, will treat runoff from D.M.A.s 1, 2, 3, 4 & 10. This Basin will require amended soil with a minimum infiltration rate of 10 in/hr. (See Appendix 3)
- B.M.P. 2, a 1,827 ft^3 infiltration basin, will treat runoff from D.M.A.s 5, & 11.
- B.M.P. 3, a 3,255 ft^3 infiltration basin, will treat runoff from D.M.A.s 7, 8 & 9.
- B.M.P. 4, a 15,410 ft^3 infiltration basin, will treat runoff from D.M.A.s 12, 13, 14, 15, 16 & 17.

All BMP features have been designed not only to be effective in removing pollutants, but also to be aesthetically pleasing, easily inspected and easily maintained.

PROJECT INFORMATION	
Type of Project:	Single Family Residential Subdivision
Ward Area:	Ward 5
Community Name:	Arlington South
Development Name:	Tract Map 37032
PROJECT LOCATION	
Latitude & Longitude (DMS): 33°55'00"N - 117°26'07"W	
Project Watershed: Santa Ana River, Reach 3	
Sub-Watershed: Main Street Wash – Temescal Wash	
APN(s): 233-180-007-6 & 233-170-001-9	
Map Book and Page No.: Page 715 Grid: A6	
PROJECT CHARACTERISTICS	
Proposed or Potential Land Use(s)	Single Family Residential
Proposed or Potential SIC Code(s)	N/A
Area of Project Footprint (SF)	291,664
Total Area of proposed Impervious Surfaces within the Project Limits (SF)/or Replacement	129,296
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)	135,575
Is the project located within any MSHCP Criteria Cell?	☐ Y ☒ N
If so, identify the Cell number:	
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)	See Appendix 3
What is the Water Quality Design Storm Depth for the project?	0.54

A.1 Maps and Site Plans

Appendix 1 includes a map of the local vicinity and existing site as well as the WQMP Site Plan, which includes the following:

- Drainage Management Areas
- Proposed Structural BMPs
- Drainage Path
- Drainage Infrastructure, Inlets and Overflows
- Source Control BMPs
- Buildings, Rooflines and Downspouts
- Impervious Surfaces
- Standard Labeling

A.2 Receiving Waters

In order of upstream to downstream, the receiving waters that this project is tributary to are as follows:

Table A.1 Identification of Receiving Waters

Receiving Waters	EPA Approved 303(d) List Impairments	Designated Beneficial Uses	Proximity to RARE Beneficial Use
Temescal Creek	pH	REC2, WARM, WILD	4 miles
Santa Ana River, Reach 3	Copper, Lead, Pathogens	AGR, GWR, REC1, REC2, WARM, WILD, RARE, SPWN	RARE
Santa Ana River, Reach 2	Indicator Bacteria	AGR, GWR, REC1, REC2, WARM, WILD, RARE	RARE
Santa Ana River, Reach 1	None	REC1, REC2, WARM, WILD	Downstream of RARE

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 Riverside Grading Permit	☒ Y	☐ N
City of Riverside Building Permit	☒ Y	☐ N
City of Riverside Design Review	☒ Y	☐ N
City of Riverside Construction Permit	☒ Y	☐ N
City of Riverside Conditional Use Permit	☐ Y	☒ N

Section B: Optimize Site Utilization (LID Principles)

Site Optimization

Does the project identify and preserve existing drainage patterns? If so, how? If not, why?

In its current condition, this site sheet flows to the curb and gutter in Indiana Avenue untreated. The development will alter this pattern by directing water to proposed infiltration areas.

Does the project identify and protect existing vegetation? If so, how? If not, why?

There is little to no existing vegetation on site as it was previously developed as an elementary school. There are a few scatter trees remaining onsite however the remainder of the site has been consistently cleared since the property has been vacant.

Does the project identify and preserve natural infiltration capacity? If so, how? If not, why?

Infiltration and other forms of natural drainage have been heavily incorporated into the design. The site is also designed with as little impervious area as possible and large landscape areas that will be used for infiltration.

Does the project identify and minimize impervious area? If so, how? If not, why?

Impervious areas are only used where absolutely necessary (ie. structures, driveways and walkways). There is no hardscape proposed in the landscape areas. For further detail please refer to the attached site map, calculations and typical lot design. The proposed development actually reduces the impervious area from the site's previous condition.

Does the project identify and disperse runoff to adjacent pervious areas? If so, how? If not, why?

Nearly all of the runoff generated by this project will be routed to a pervious, landscaped area where it will infiltrate into the ground. This site is designed to contain 100% of the runoff generated by an 85TH percentile 100 year storm event.

Section C: Delineate Drainage Management Areas (DMAs)

Table C.1 DMA Classifications

DMA Name or ID	Surface Type(s)[1]	Area (Sq. Ft.)	DMA Type
DMA 1A	Mixed (Roof & Concrete)	4500	Type 'D'
DMA 1B	Ornamental Landscaping	5855	Type 'D'
DMA 2A	Mixed (Roof & Concrete)	7500	Type 'D'
DMA 2B	Ornamental Landscaping	8805	Type 'D'
DMA 3	Asphalt	10653	Type 'D'
DMA 4	Asphalt	1095	Type 'D'
DMA 5	Asphalt	7603	Type 'D'
DMA 6	Pervious Pavers	2294	Type 'B'
DMA 7A	Mixed (Roof & Concrete)	4500	Type 'D'
DMA 7B	Ornamental Landscaping	8647	Type 'D'
DMA 8	Asphalt	6032	Type 'D'
DMA 9A	Mixed (Roof & Concrete)	6000	Type 'D'
DMA 9B	Ornamental Landscaping	10415	Type 'D'
DMA 10A	Mixed (Roof & Concrete)	9000	Type 'D'
DMA 10B	Ornamental Landscaping	10332	Type 'D'
DMA 11A	Mixed (Roof & Concrete)	9000	Type 'D'
DMA 11B	Ornamental Landscaping	11616	Type 'D'
DMA 12A	Mixed (Roof & Concrete)	3000	Type 'D'
DMA 12B	Ornamental Landscaping	3296	Type 'D'
DMA 13A	Mixed (Roof & Concrete)	18000	Type 'D'
DMA 13B	Ornamental Landscaping	22216	Type 'D'
DMA 14A	Mixed (Roof & Concrete)	18000	Type 'D'
DMA 14B	Ornamental Landscaping	27750	Type 'D'
DMA 15	Asphalt	24413	Type 'D'

DMA 16	Ornamental Landscaping	21810	Type 'D'
DMA 17	Ornamental Landscaping	7522	Type 'D'
DMA 18	Ornamental Landscaping	2353	Type 'A'
DMA 19	Ornamental Landscaping	2021	Type 'A'
DMA 20	Concrete	902	No Treatment
DMA 21	Concrete	919	No Treatment
BMP 1	Ornamental Landscaping	3265	Type 'D'
BMP 2	Ornamental Landscaping	1742	Type 'D'
BMP 3	Ornamental Landscaping	2066	Type 'D'
BMP 4	Ornamental Landscaping	17031	Type 'D'

[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)
DMA 18	2353	Drought tolerant landscape	Drip
DMA 19	2021	Drought tolerant landscape	Drip
D.M.A. 6	2294	Pervious Pavers	N/A

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]=[B] + ([B]·[C])/[A]
D.M.A. 6	Pervious Pavers	2294	0.54	N/A		

Table C.4 Type 'D', Areas Draining to BMPs

DMA Name or ID	BMP Name or ID
DMA 1A	BMP 1
DMA 1B	BMP 1
DMA 2A	BMP 1
DMA 2B	BMP 1
DMA 3	BMP 1
DMA 4	BMP 1
DMA 10A	BMP 1
DMA 10B	BMP 1
BMP 1	BMP 1
DMA 5	BMP 2
DMA 11A	BMP 2
DMA 11B	BMP 2
BMP 2	BMP 2
DMA 7A	BMP 3
DMA 7B	BMP 3
DMA 8	BMP 3
DMA 9A	BMP 3
DMA 9B	BMP 3
BMP 3	BMP 3
DMA 12A	BMP 4
DMA 12B	BMP 4
DMA 13A	BMP 4
DMA 13B	BMP 4
DMA 14A	BMP 4
DMA 14B	BMP 4
DMA 15	BMP 4

DMA 16	BMP 4
DMA 17	BMP 4
BMP 4	BMP 4

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 (ref: Chapter 2.4.4 of the WQMP Guidance Document)? ☐ Y ☒ N

Geotechnical Report

A Geotechnical Report is required by the City of Riverside to confirm present and past site characteristics that may affect the use of Infiltration BMPs, see Appendix 3.

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 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: BMP 1 – amended soil proposed, 10 in/hr min. infiltration rate		
...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 identify other site-specific factors that would preclude effective and safe infiltration?		X
Describe here:		

D.2 Harvest and Use Assessment

The following condition 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 City of Riverside).

X The Design Capture Volume will be addressed using Infiltration Only BMPs. (Harvest and Use BMPs are still encouraged, but are not required as the Design Capture Volume will be infiltrated or evapotranspired.)

Harvest and Use BMPs need not be assessed for the site.

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.

For this project, the following applies:

☐ LID Bioretention/Biotreatment BMPs will be used for some or all DMAs of the project as noted below in Section D.4.

☐ A site-specific analysis demonstrating the technical infeasibility of all LID BMPs has been performed and is included in Appendix 5.

X No Bioretention/Biotreatment BMPs will be used (all areas will infiltrate)

D.4 Feasibility Assessment Summaries

Table D.2 LID Prioritization Summary Matrix

DMA Name/ID	LID BMP Hierarchy				No LID (Alternative Compliance)
	1. Infiltration	2. Harvest and use	3. Bioretention	4. Biotreatment	
D.M.A. 1	☒	☐	☐	☐	☐
D.M.A. 2	☒	☐	☐	☐	☐
D.M.A. 3	☒	☐	☐	☐	☐
D.M.A. 4	☒	☐	☐	☐	☐
D.M.A. 5	☒	☐	☐	☐	☐
D.M.A. 6	☒	☐	☐	☐	☐
D.M.A. 7	☒	☐	☐	☐	☐
D.M.A. 8	☒	☐	☐	☐	☐
D.M.A. 9	☒	☐	☐	☐	☐
D.M.A. 10	☒	☐	☐	☐	☐
D.M.A. 11	☒	☐	☐	☐	☐
D.M.A. 12	☒	☐	☐	☐	☐
D.M.A. 13	☒	☐	☐	☐	☐
D.M.A. 14	☒	☐	☐	☐	☐
D.M.A. 15	☒	☐	☐	☐	☐
D.M.A. 16	☒	☐	☐	☐	☐
D.M.A. 17	☒	☐	☐	☐	☐
B.M.P. 1	☒	☐	☐	☐	☐
B.M.P. 2	☒	☐	☐	☐	☐
B.M.P. 3	☒	☐	☐	☐	☐
B.M.P. 4	☒	☐	☐	☐	☐

LID BMPs are feasible for every lot or drainage management area on this site. To reduce urban runoff, hardscape has been minimized and is only used where absolutely necessary. The remainder of each lot has been dedicated to landscaped, pervious areas. Typical lot design will include a shallow vegetated swale around the perimeter of each house to intercept any runoff from the roof of the house and surrounding hardscape. Runoff generated on this site will be routed to and treated by 4 infiltration basins which have been sized for their contributing areas.

BMP NAME	Contributing DMAs	Area (ft^2)	Depth (in)	V_{BMP} (ft^3)	$V_{PROPOSED}$ (ft^3)
B.M.P. 1 (Infiltration Basin 1)	D.M.A. 1, 2, 3, 4 & 10	3,241	24"	1,455	1527
B.M.P. 2 (Infiltration Basin 2)	D.M.A. 5 & 11	1,552	18"	732.8	1746
B.M.P. 3 (Infiltration Basin 3)	D.M.A. 7, 8 & 9	2,017	12"	768.6	1556
B.M.P. 4 (Infiltration Basin 4)	D.M.A. 12, 13, 14, 15, 16 & 17	9,777	24"	3,040.6	7705

D.5 LID BMP Sizing

Table D.3 DCV Calculations for LID BMPs

DMA Type/ID	DMA Area (square feet) [A]	Post-Project Surface Type	Effective Impervious Fraction, I_f [B]	DMA Runoff Factor [C]	DMA Areas x Runoff Factor [A] x [C]	Infiltration Basin 1		
DMA 1A	*4500*	*Mixed Surface Types*	*1*	0.89	4014	**Concrete & Roof**		
DMA 1B	*5855*	*Ornamental Landscaping*	*0.1*	0.11	646.7	**Ornamental Landscaping**		
DMA. 2A	*7500*	*Mixed Surface Types*	*1*	0.89	6690	**Concrete & Roof**		
DMA 2B	*8805*	*Ornamental Landscaping*	*0.1*	0.11	972.6	**Ornamental Landscaping**		
DMA 3	*10653*	*Concrete or Asphalt*	*1*	0.89	9502.5	**Private Street**		
DMA 4	*1095*	*Concrete or Asphalt*	*1*	0.89	976.7	**Private Street**		
DMA 10A	*9000*	*Mixed Surface Types*	*1*	0.89	8028	**Concrete & Roof**		
DMA 10B	*10332*	*Ornamental Landscaping*	*0.1*	0.11	1141.3	**Ornamental Landscaping**		
BMP 1	*3265*	*Ornamental Landscaping*	*0.1*	0.11	360.6	**Ornamental Landscaping**		
						Design Storm Depth (in)	**Design Capture Volume (cubic feet)**	**Proposed Volume (cubic feet)**
	$A_T = \Sigma[A] =$ **61005**				$\Sigma = [D] =$ **32332.4**	**[E] = 0.54**	**[F]=[DxE]/12 = 1455**	**[G] = 1527**

DMA Type/ID	DMA Area (square feet) [A]	Post-Project Surface Type	Effective Impervious Fraction, I_f [B]	DMA Runoff Factor [C]	DMA Areas x Runoff Factor [A] x [C]	Infiltration Basins 2		
DMA 5	*7603*	*Concrete or Asphalt*	*1*	0.89	6781.9	**Private Street**		
DMA 11A	*9000*	*Mixed Surface Types*	*1*	0.89	8028	**Concrete & Roof**		
DMA 11B	*11616*	*Ornamental Landscaping*	*0.1*	0.11	1283.1	**Ornamental Landscaping**		
BMP 2	*1742*	*Ornamental Landscaping*	*0.1*	0.11	192.4	**Ornamental Landscaping**		
						Design Storm Depth (in)	**Design Capture Volume (cubic feet)**	**Proposed Volume (cubic feet)**
	$A_T = \Sigma[A] =$ **29961**				$\Sigma = [D] =$ **16285.4**	**[E] = 0.54**	**[F]=[DxE]/12 = 732.8**	**[G] = 1746**

DMA Type/ID	DMA Area (square feet) [A]	Post-Project Surface Type	Effective Impervious Fraction, I_f [B]	DMA Runoff Factor [C]	DMA Areas x Runoff Factor [A] x [C]	Infiltration Basin 3		
DMA 7A	*4500*	*Mixed Surface Types*	*1*	0.89	4014	**Concrete & Roof**		
DMA 7B	*8647*	*Ornamental Landscaping*	*0.1*	0.11	955	**Ornamental Landscaping**		
DMA 8	*6032*	*Concrete or Asphalt*	*1*	0.89	5381	**Private Street**		
DMA 9A	*6000*	*Mixed Surface Types*	*1*	0.89	5352	**Concrete & Roof**		
DMA 9B	*10415*	*Ornamental Landscaping*	*0.1*	0.11	1150	**Ornamental Landscaping**		
BMP 3	*2066*	*Ornamental Landscaping*	*0.1*	0.11	228	**Ornamental Landscaping**		
						Design Storm Depth (in)	**Design Capture Volume (cubic feet)**	**Proposed Volume (cubic feet)**
	$A_T = \Sigma[A] =$ **37,660**				$\Sigma = [D] =$ **17,080.2**	**[E] = 0.54**	**[F]=[DxE]/12 = 768.6**	**[G] = 1,565**

DMA Type/ID	DMA Area (square feet) [A]	Post-Project Surface Type	Effective Impervious Fraction, I_f [B]	DMA Runoff Factor [C]	DMA Areas x Runoff Factor [A] x [C]	Infiltration Basin 4		
DMA 12A	*3000*	*Mixed Surface Types*	*1*	0.89	2676	**Concrete, Roof & Landscaping**		
DMA 12B	*3296*	*Ornamental Landscaping*	*0.1*	0.11	364.1			
DMA 13A	*18000*	*Mixed Surface Types*	*1*	0.89	16056	**Concrete, Roof & Landscaping**		
DMA 13B	*22216*	*Ornamental Landscaping*	*0.1*	0.11	2453.9			
DMA 14A	*18000*	*Mixed Surface Types*	*1*	0.89	16056	**Concrete, Roof & Landscaping**		
DMA 14B	*27750*	*Ornamental Landscaping*	*0.1*	0.11	3065.2			
DMA 15	*24413*	*Mixed Surface Types*	*1*	0.89	21776.4	**Private Street**		
DMA 16	*21810*	*Ornamental Landscaping*	*0.1*	0.11	2409.1	**Concrete, Roof & Landscaping**		
DMA 17	*7522*	*Ornamental Landscaping*	*0.1*	0.11	830.9	**Ornamental Landscaping**		
BMP 4	*17031*	*Ornamental Landscaping*	*0.1*	0.11	1881.2	**Ornamental Landscaping**		
						Design Storm Depth (in)	**Design Capture Volume (cubic feet)**	**Proposed Volume (cubic feet)**
	$A_T = \Sigma[A] =$ **163038**				$\Sigma = [D] =$ **67568.8**	**[E] = 0.54**	**[F]=[DxE]/12 = 3040.6**	**[G] = 7705**

[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 Regional Board). For this project, the following applies:

X 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 Regional Board 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.

Section F: Hydromodification

F.1 Hydrologic Conditions of Concern (HCOC) Analysis

HCOC EXEMPTION 1: The Priority Development Project disturbs less than one acre. The City of Riverside 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

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 City of Riverside

Does the project qualify for this HCOC Exemption? ☐ Y ☒ N

Table F.1 Hydrologic Conditions of Concern Summary

	2 year – 24 hour		
	Pre-condition	**Post-condition**	**% Difference**
Time of Concentration	5.8	9.2	64% increase
Volume (Cubic Feet)	19,473	22,859	17% increase
Note: In the Post Development Condition, all runoff will be retained onsite, therefore the number above does not reflect the quantity of runoff which is being discharged.			

HCOC EXEMPTION 3: All downstream conveyance channels to an adequate sump (Prado Dam and Santa Ana River) 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

All downstream conveyance channels to the Santa Ana River and are engineered to ensure design flow capacity.

Section G: Source Control BMPs

Potential Sources of Runoff pollutants	Permanent Structural Source Control BMPs	Operational Source Control BMPs
Landscape/ Outdoor Pesticide Use	1. Preserve existing native trees, shrubs, and ground cover to the maximum extent possible. 2. 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. 3. Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions. 4. 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	1. Maintain landscaping using minimum or no pesticides. 2. Prevent erosion of slopes by planting fast-growing, dense ground covering plants. 3. Plant native vegetation to reduce the amount of water, fertilizers, and pesticides applied to the landscape. 4. Do not overwater. Use irrigation practices such as drip irrigation, soaker hoses or micro-spray systems. Periodically inspect and fix Leaks and misdirected sprinklers. 5. 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. Provide IPM information to new owners, lessees and operators.
Plazas & Sidewalks	N/A	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

Section H: Construction Plan Checklist

Table H.1 Construction Plan Cross-reference

BMP No. or ID	BMP Identifier and Description	Corresponding Plan	Latitude/Longitude
B.M.P. 1	Infiltration Basin 1	BMP Site Plan	33°55'00" N, -117°26'11" W
B.M.P. 2	Infiltration Basin2	BMP Site Plan	33°55'02" N, -117°26'09" W
B.M.P. 3	Infiltration Basin 3	BMP Site Plan	33°55'02" N, -117°26'08" W
B.M.P. 4	Infiltration Basin 4	BMP Site Plan	33°54'59" N, -117°26'07" W

Section I: Operation, Maintenance and Funding

As required by the City of Riverside, the following are Operation, Maintenance and Funding details are provided as summarized:

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.
3. An outline of general maintenance requirements for the Stormwater BMPs 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.
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.

See Appendix 9 for a detailed Stormwater BMP Operation and Maintenance Plan that sets forth a maintenance schedule for each of the Stormwater BMPs built on site, and an agreement assigning responsibility for maintenance and providing for inspections and certification.

Maintenance Mechanism: HOA

Will the proposed BMPs be maintained by a Home Owners' Association (HOA) or Property Owners Association (POA)?

☒ Y ☐ N

An Operation and Maintenance Plan and Maintenance Mechanism is included in Appendix 9. Educational materials for those personnel that will be maintaining the proposed BMPs within this Project-Specific WQMP are included in Appendix 10.

Appendix 1: Maps and Site Plans

Location Map, WQMP Site Plan and Receiving Waters Map

Appendix 2: Construction Plans

Grading and Drainage Plans

Appendix 3: Soils Information

Geotechnical Study and Other Infiltration Testing Data

INFILTRATION BASIN 1 AMENDED SOIL SPECIFICATIONS

- AMENDED SOIL TO HAVE A PH BETWEEN 5.5 TO 6.5., ORGANIC CONTENT BETWEEN 1.5% TO 3%, SAND CONTENT BETWEEN 45% TO 60%, AND CLAY CONTENT LOWER THAN 12%.

  CONTRACTOR SHALL SUBMIT SOIL TESTS RESULTS TO ENGINEER, ONE TEST PER BIO-CELL. TEST SHALL INCLUDE THE FOLLOWING:

  1) GRANULOMETRIC ANALYSIS (SAND, SILT AND CLAY) PER WEIGHT (SAND BETWEEN 45-60%; CLAY LESS THAN 12%)
  2) PH (5.5 TO 6.5)
  3) PERCENTAGE OR ORGANIC MATTER IN THE SOIL (1.5% TO 3%)
  4) DETERMINATION OF SOLUBLE SALT CONTENT (LESS THAN 500 PPM)
  5) SATURATED HYDRAULIC CONDUCTIVITY TEST (HIGHER THAN 0.5 IN/HR)
  6) DEPTH OF REMOVAL: 2.5 FEET

- MULCH PER LANDSCAPE PLANS AND SPECIFICATIONS. CONTRACTOR SHALL NOT ADD TOP SOIL TO INFILTRATION AREAS.

Letter from soils engineer forthcoming, he is preparing it as part of his soils investigation that will be included w/ Final

GeoMat Testing Laboratories, Inc.

Soil Engineering, Environmental Engineering, Materials Testing, Geology

October 27, 2015

Project No. 15101-01

TO: Steven Walker Communities
7111 Indiana Avenue, Suite 300
Riverside, California 92504

SUBJECT: Basic Soil Infiltration Testing Report, Hawthorn Heights Project, Single-Family Homes, APN 227-130-025, City of Riverside, California

Introduction

This report provides a summary of the geotechnical engineering services conducted to support evaluation of the feasibility of infiltration at the subject site. The purpose of our services was to complete four insitu infiltration tests utilizing percolation testing procedure in boreholes to evaluate the feasibility of infiltration for disposal of stormwater runoff following the falling head method.

Available Documents

A site plan prepared by SDH and Associates was provided to us for 56 lot subdivision. The plan shows three possible locations for an infiltration basin(s).

Proposed Soil Infiltration Facility

Tentatively infiltration basin(s) are proposed.

Scope of Services

GeoMat Testing Laboratories, Inc. was retained to provide geotechnical engineering services to support the project. Our scope of work consisted of the following specific tasks:

1) Drill deep exploratory borehole.

2) Complete four infiltration tests at the site utilizing the shallow boring percolation testing per Riverside County Environmental Health Department procedures. The tests were completed in general accordance with the falling head method.

3) Complete laboratory gradation analysis and testing of selected soil sample.

4) Complete data analysis.

5) Preparation of this report summarizing our findings, conclusions, and recommendations. The report includes:

9980 Indiana Avenue • Suite 14 • Riverside • California • 92503 • Phone (951) 688-5400 • Fax (951) 688-5200
www.geomatlabs.com, contact: e-mail: geomatlabs@sbcglobal.net

- Site plan showing the location of exploratory borehole and infiltration tests.
- Summary of site conditions observed at the testing locations.
- Results of the laboratory testing.
- Discussion of the results of insitu infiltration testing.
- A discussion of the surficial soil and anticipated groundwater conditions at the site.
- Evaluation of the feasibility of infiltration.
- Recommendations for infiltration facility.

Existing Site Conditions

Currently, the subject site is a vacated elementary school site. School buildings, school building equipment, asphalt and concrete pavement, school yard, storage sheds, etc. remains onsite. The site area is approximately 7(±) acres. The site is bordered from the north by Indiana Avenue, the south by railroad tracks, the east by group of older single family homes, and the west by vacant land. Indiana Avenue is a fully developed road.

Groundwater

Groundwater study is not within the scope of this work. Groundwater was not observed in the test borings at the time of field exploration. These observations represent groundwater conditions at the time of the field exploration and may not be indicative of other times, or at other locations. Depth to groundwater is not expected to impact site development

State Department of Water Resources shows shallowest groundwater on November 2011 at 29.6 feet (elevation 754.5) below ground surface in well 339251N1174342W001.

The well measuring program for regional water Districts maintained by Hydrologist Steven Mains shows shallowest groundwater On January 2001 at 43 feet (elevation 768.3) below ground surface in well 3S5W07J002S and at 46.1 feet (elevation 759.6) below ground surface on June 2006 in well 3S5W18B.

The USGS Groundwater Watch website (http://groundwaterwatch.usgs.gov/countymap) was searched for groundwater records; none found.

The potential for rain or irrigation water locally seeping through from adjacent areas cannot be precluded. Our experience indicates that surface or near-surface groundwater conditions can develop in areas where groundwater conditions did not exist prior to site development, especially in areas where a substantial increase in surface water infiltration results from landscape irrigation and stormwater infiltration systems.

In addition, changes in local or regional water and management patterns, or both, can significantly raise the water table or create zones of perched water. We therefore recommend that landscape irrigation be kept to the minimum necessary to maintain plant vigor and any leaking pipes/sprinklers, etc. should be promptly repaired.

The depth to the groundwater may fluctuate with seasonal changes and from one year to the next. We have no way of predicting future groundwater levels or perched water due to increase in surface water infiltration from rainfall or from landscape irrigation. Subdrains, horizontal drains, toe drains, French drains, heel drains or other devices may be recommended in future for graded areas that exhibit nuisance water seepage, past evidence for shallow water, or areas with a potential for future shallow/surface water

Exploratory Boreholes

One deep exploratory borehole was drilled on October 24, 2015 to a maximum depth of 15 feet below ground surface. The boreholes were drilled utilizing a CME 45 drill rig equipped with 6 inch hollow stem augers. A field engineer from this office observed the drilling and prepared the boring logs. The logs of the boreholes are included with this report.

Soil Sampling and Laboratory Testing

Bulk soil samples were obtained from the bottom of percolation holes for laboratory classification. Laboratory sieve analysis was performed for the collected soil samples. The soil classifications are in conformance with the Unified Soil Classifications System (USCS), as outlined in the Classification and Symbols Chart (Appendix B).

A summary of our laboratory testing is presented in Appendix C.

Percolation Testing Method

The four test holes were drilled with a mobile drill rig. A 3-inch-diameter perforated PVC casing wrapped with filter fabric was placed in the borehole. Pea gravel was placed below and around the pipe for stability of the borehole.

The boreholes were presoaked prior to the percolation testing. Presoaking was conducted using five gallon water bottles. Five gallons of water was absorbed in few minutes in test holes P-2, P-3, and P-4. Additional presoaking water was introduced to facilitate for reasonable test reading interval. Based on field observations and testing, the material was evaluated to be permeable and met the sandy soil criteria. Infiltration testing was conducted on the same day after presoaking. Infiltration testing was conducted for at least one hour with readings taken 10 minutes apart from a fixed reference point. The measurements were taken by filling up the test hole with water and allowing the water to percolate. The drop of water level was recorded every 10 minutes. A wrist watch was used to record the time measurements.

Test hole P-1 did not meet the sandy soil criteria. Infiltration testing for this test hole was conducted the next day after presoaking. Testing was conducted for six hours with readings taken 30 minutes apart from a fixed reference point. The measurements were taken by filling up the test hole with water and allowing the water to percolate. The drop of water level was recorded every 30 minutes. A wrist watch was used to record the time measurements.

Infiltration Test Results

Infiltration tests were conducted betyween 43 and 67 inches below ground surface. The following summarizes the result of the infiltration feasibility study.

Test No.	Depth Below Surface	Percolation Rate (in/hr)	Adjusted Infiltration Rate (in/hr)	% Passing No. 200 Sieve
P-1	43"	7.5	0.8	44
P-2	45"	24	2.5	42
P-3	52"	22.5	2.3	46
P-4	67"	72	10.3	48

The percolation rate is the rate in horizontal and vertical direction. This rate is adjusted using Porchet Method for horizontal water infiltration. Refer to Appendix D for test results.

A safety factor should be applied to this rate by the design engineer. Safety factor discussion is in the following paragraph.

Factors of Safety

Long-term infiltration rates may be reduced significantly by factors such as soil variability and inaccuracy in the infiltration rate measurement. The correction factor for site variability is between 3 and 10. Safety factors for operating the system, maintenance, siltation, biofouling, etc. should also be considered by the design civil engineer at his discretion. Minimum safety factor required by the County of Riverside for tests conducted when deep exploratory borehole has been drilled at the site is 3.

Conclusions/Recommendations

- In our opinion, water infiltration at the site is expected to be fast in the upper five feet of soil.
- The test results may be utilized when the bottom of the infiltration system will be located within the alluvial soil observed/tested. Should this system be located in a different soil type, the infiltration characteristics will be different than those observed during the infiltration testing. The infiltration rate recommended above is based on the assumption that only clean water will be introduced to the subsurface profile. Any fines, debris, or organic materials could significantly impact the infiltration rate.
- The planned infiltration system should extend vertically into native soil.
- Infiltration water should not be allowed to saturate subgrade of pavement, and shallow concrete structures including curb and gutter's subgrade soils. We recommend installing Stego wrap 15 mil barrier sheeting (or equivalent) around shallow concrete structures (ie curb, gutter, etc.) to the depth of proposed sub-base reservoir of porous pavement. The intent is to minimize saturating subgrades of such items.

- Filter fabric should be used whenever aggregates are placed against native soils.
- Please note that soils in infiltration areas should not be subject to compaction during construction.
- The proposed system by the civil engineer should be constructed and maintained in accordance with manufacturer guidelines.

An important consideration for infiltration facilities is that, during construction, great care must be taken not to reduce the infiltrative capacity of the soil in the facility through compaction by heavy equipment or by using the infiltration area as a sediment trap.

Infiltration facilities should be constructed late in the site development after soils (that might erode and clog the units) have been stabilized, or should be protected (by flagging) until site work is completed.

Infiltration facilities should be sited with the following guidelines:

INFILTRATION FACILITY SETBACKS	
Setback From	Distance
Property Lines and Public Right of Way	5 feet
Foundations	15 feet or within a 1:1 plane drawn up from the bottom of foundation
Slopes	H/2, 5 feet minimum (H: is slope height)
Private drinking water wells	100 feet

Ferrous metal pipes should be protected from potential corrosion by bituminous coating, etc. We recommend that all utility pipes be nonmetallic and/or corrosion resistant. Recommendations should be verified by soluble sulfate and corrosion testing of soil samples obtained from specific locations during construction.

If applicable, four to six inch diameter observation well(s), with locking cap, extending vertically into the system's bottom is suggested as an observation point. Observation well(s) should be checked regularly and after large storm event. Once performance stabilizes, frequency of monitoring may be reduced.

GeoMat Testing Laboratories should observe the basin excavation. Additional laboratory testing including but not limited to grain size analysis, sand equivalent, sulfate content, etc should be conducted during construction.

Use of this Report

This report was prepared for the exclusive use of the addressee and his consultants for specific application to the proposed site. The use by others, or for the purposes other than intended, is at the user's sole risk.

The findings, conclusions, and recommendations presented herein are based on our understanding of the project and on subsurface conditions observed during our site work. Within the limitations of scope, schedule, and budget, the conclusions and recommendations presented in this report were prepared in accordance with generally accepted geotechnical engineering principles and practices in the area at the time the report was prepared. We make no other warranty either expressed or implied.

We appreciate this opportunity to provide geotechnical services on this project and look forward to assisting the Project Team as the design progresses. If you have any questions or comments regarding the information contained in this report, or if we may be of further services, please call us at (951) 688-5400.

Submitted for GeoMat Testing Laboratories, Inc.

Haytham Nabilsi, GE 2375
Principal Engineer

Art Martinez
Project Engineer

REGISTERED PROFESSIONAL ENGINEER
HAYTHAM NABILSI
No. 2375
Exp. 12/31/16
GEOTECHNICAL
STATE OF CALIFORNIA

Distribution: [3] Addressee

Attachments:

Figure 1	Site Location Map
Plate 1	Infiltration Test Location Map
Appendix A	References
Appendix B	Exploratory Borehole Logs
Appendix C	Laboratory Test Results
Appendix D	Infiltration Data/Graph

DELORME

Topo USA® 6.0

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TN

MN (12.0°E)

Scale 1 : 12,800

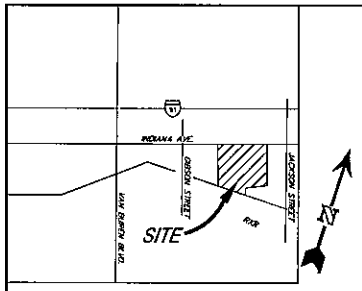
1" = 1,066.7 ft

Data Zoom 14-0

IN THE CITY RIVERSIDE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

TENTATIVE TRACT MAP NO.XXXXX
HAWTHORN HEIGHTS

XX LOT PLANNED RESIDENTIAL DEVELOPMENT
CITY OF RIVERSIDE, CA
SEPTEMBER 2015



VICINITY MAP
"NOT TO SCALE"
THOMAS GUIDE PAGE: 715 GRID: A6

OWNER/APPLICANT
STEVEN WALKER COMMUNITIES, INC.
7161 INDIANA AVE., STE. 300
RIVERSIDE, CA 92504
951-274-3679

ENGINEER
SDH & ASSOCIATES, INC
5225 CANYON CREST DRIVE 71439
RIVERSIDE, CA. 92507
VOICE: (951) 683-3691
FAX: (951) 788-2314

ASSESSOR'S PARCEL NO.
227-130-025

PROJECT INFO
AREA OF SITE = XXXXXX
NUMBER OF UNITS = XX

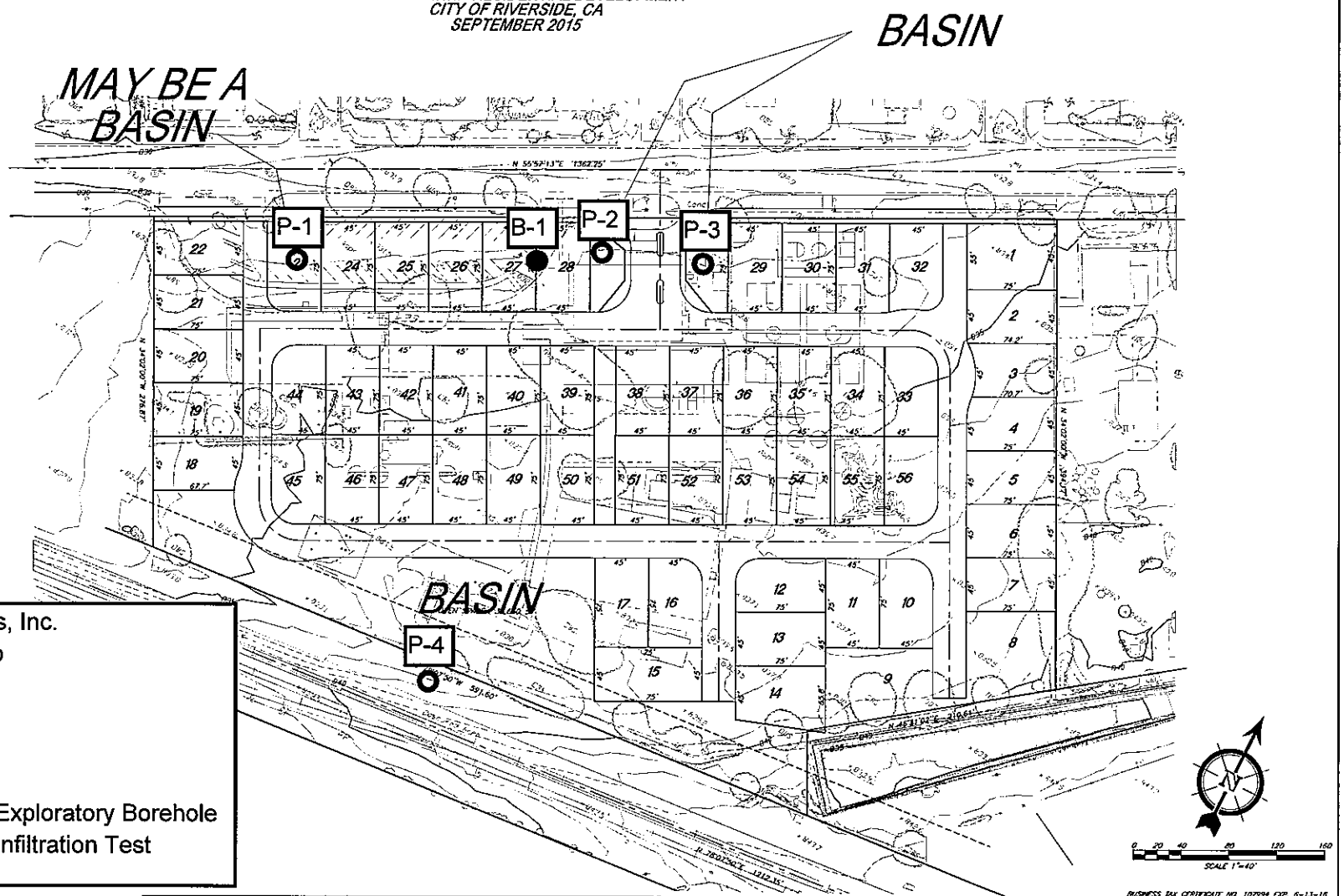
GENERAL PLAN DESIGNATION
EXISTING -
PROPOSED -

ZONING
EXISTING - XXX
PROPOSED - XXXX

SCHOOL DISTRICT
RIVERSIDE UNIFIED SCHOOL DISTRICT

UTILITY PURVEYORS
WATER.....CITY OF RIVERSIDE
GAS.....SO. CALIF. GAS
ELECTRICAL.....CITY OF RIVERSIDE
TELEPHONE.....PACIFIC BELL
SEWER.....CITY OF RIVERSIDE
CABLE.....CHARTER COMM.

LEGAL DESCRIPTION



GeoMat Testing Laboratories, Inc.
Infiltration Test Location Map
Project No. 15101-01
Plate 1
October 27, 2015

● Approximate Location of Exploratory Borehole
○ Approximate Location of Infiltration Test

TRACT BOUNDARY
CENTERLINE
CURB AND GUTTER
1280 EXISTING CONTOUR LINE
LOT LINE
SLOPE

REVISIONS				
MARK	DESCRIPTION	BY	APPR	DATE
DESIGNED BY: S.J.S.	DRAWN BY: S.J.S.			
CHECKED BY: R.V.Z.	PROJECT MANAGER: S.S.			

PREPARED BY: DATE:
ROBERT C. VAN ZANTEN
R.C.E. NO.: 62325 EXP. 9-30-17

SEAL: REGISTERED PROFESSIONAL ENGINEER ROBERT C. VAN ZANTEN No. 62325 Exp. 9-30-17 CIVIL STATE OF CALIFORNIA

PREPARED BY
SDH AND ASSOCIATES INC.
5225 CANYON CREST DRIVE 71439
Riverside, California 92507
TEL: (951) 683-3691 FAX (951) 788-2314
BENCHMARK
SCALE 1"=40'
DATE: SEPTEMBER 2015

BUSINESS TAX CERTIFICATE NO. 107994 EXP. 6-13-16

CITY OF RIVERSIDE
TTM XXXXX
HAWTHORN HEIGHTS
1 OF 1 SHEETS

Appendix A

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REFERENCES

SDH and Associates, Site Plan Showing 56 single family lots.

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Riverside County, Design handbook for Low Impact Development Best management Pactices, September 2011.

Riverside County, Water Quality Management Plan For Urban Runoff, Santa Ana River Region, Santa Margarita River Region, September 17, 2004

California Stormwater Quality Association, Stormwater Best Management Practice, Handbook, Jan. 2003.

California Department of Transportation, Stormwater Quality Handbook, Project Training and Design Guide, Sacramento, 2000.

California Department of Transportation, Stormwater Quality Handbook, Project Planning and Design Guide, Sacramento, 2005.

Federal Highway Administration, Urban Design Drainage Manual, Washington DC, 1996

Water Quality Control Plan, Santa Ana River Basin (8), California Regional Water Quality Control Board, Santa Ana Region, 1995,

Massmann, JW, Butchart, and S Stolar, Infiltration Characteristics, Performance, and Design of Stormwater Facilities, Final Research Report, Research Project TI 803, Task 12, Washington DOT 2003.

Soilvision Systems, A Knowledge-Based Soils Database, Murray Fredlund, Canada, 2004.

US Environmental Protection Agency, Storm water Technology Fact Sheet, Infiltration Trench, EPA 832-F-99-019, 1999.

California Stormwater Quality Association (QASCA), California Stormwater BMP Handbook, Infiltration Trench, TC-10 Design Considerations

BMP Handbook, Part B, Planning Activities, Stormwater Mitigation Measures, Watershed Protection Division, City of Los Angeles.

Appendix B

Geo
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GENERAL NOTES

DRILLING NOTES

WATER LEVEL MEASUREMENTS

Water levels indicated on the boring logs are levels measured in the borings at the times indicated. In permeable materials, the indicated levels may reflect the location of groundwater. In low permeability soils, the accurate determination of groundwater levels is not possible with only short-term observations.

WATER LEVEL OBSERVATION DESIGNATION

W.D.	While Drilling
A.B.	After Boring
B.C.R.	Before Casing Removal
A.C.R.	After Casing Removal
24 hr.	Water level taken approximately 24 hrs. after boring completion

DRILLING AND SAMPLING SYMBOLS

AS	Auger Sample
CS	Continuous Sampler
DB	Diamond Bit -NX unless otherwise noted
HA	Hand Auger
HS	Hollow Stem Auger
PA	Power Auger
RB	Rock Bit
SS*	Split-Barrel
ST	Shelby Tube - 2" (51mm) unless otherwise noted
WB	Wash Bore
CR	Calfornia Ring Sampler 3" O.D., Lined with 2.5"X1" Rings

*The Standard Penetration Test is conducted in conjunction with the split-barrel sampling procedure. The "N" value corresponds to the number of blows required to drive the last 1 foot (0.3m) of an 18 in. (0.46m) long, 2 in. (51mm) O.D. split-barrel sampler with a 140 lb. (63.5 kg) hammer falling a distance of 30 in. (0.76m). The Standard Penetration Test is carried out according to ASTM D-1586. (See "N" Value below.)

SOIL PROPERTIES & DESCRIPTIONS

TEXTURE

PARTICLE	SIZE	
Clay	< 0.002 mm	(< 0.002 mm)
Silt	< #200 Sieve	(0.075 mm)
Sand	#4 to #200 Sieve	(4.75 to 0.075 mm)
Gravel	3 in. to #4 Sieve	(75 mm to 4.75 mm)
Cobbles	12 in. to 3 in.	(300 mm to 75 mm)
Boulders	> 12 in.	(300 mm)

COMPOSITION

SAND & GRAVEL

Description	% by Dry Weight
trace	< 15
with	15 - 29
modifier	> 30

FINES

Description	% by Dry Weight
trace	< 5
with	5 - 12
modifier	> 12

Soil descriptions are based on the Unified Soil Classification System (USCS) as outlined in ASTM Designations D-2487 and D-2488. The USCS group symbol shown on the boring logs correspond to the group names listed below. The description includes soil constituents, consistency, relative density, color and other appropriate descriptive terms. Geologic description of bedrock, when encountered, also is shown in the description column.

GROUP SYMBOL	GROUP NAME	GROUP SYMBOL	GROUP NAME
GW	Well Graded Gravel	CL	Lean Clay
GP	Poorly Graded Gravel	ML	Silt
GM	Silty Gravel	OL	Organic Clay or Silt
GC	Clayey Gravel	CH	Fat Clay
SW	Well Graded Sand	MH	Elastic Silt
SP	Poorly Graded Sand	OH	Organic Clay or Silt
SM	Silty Sand	PT	Peat
SC	Clayey Sand	CL-CH	Lean to Fat Clay

COHESIVE SOILS

CONSISTENCY	UNCONFINED COMPRESSIVE STRENGTH (Qu) (psf)	(kPa)
Very Soft	< 500	(< 24)
Soft	500 - 1000	(24 - 48)
Medium	1001 - 2000	(48 - 96)
Stiff	2001 - 4000	(96 - 192)
Very Stiff	4001 - 8000	(192 - 383)
Hard	> 8001	(> 383)

PLASTICITY Description	Liquid Limit (%)
Lean	< 45%
Lean to Fat	45 to 49%
Fat	≥ 50%

Cohessive Soils Consistenacy	"N" value
Very Soft	<2
Soft	2-4
Medium	4-8
Stiff (Firm)	8-15
Very Stiff (Very Firm)	15-30
Hard	>30

COHESIONLESS SOILS

RELATIVE DENSITY	"N" VALUE*
Very Loose	0 - 3
Loose	4 - 9
Medium Dense	10 - 29
Dense	30 - 49
Very Dense	≥ 50

BEDROCK PROPERTIES & DESCRIPTIONS

ROCK QUALITY DESIGNATION (RQD**)

DESCRIPTION OF ROCK QUALITY	RQD (%)
Very Poor	0 - 25
Poor	25 - 50
Fair	50 - 75
Good	75 - 90
Excellent	90 - 100

**RQD is defined as the total length of sound core pieces, 4 inches (102mm) or greater in length, expressed as a percentage of the total length cored. RQD provides an indication of the integrity of the rock mass and relative extent of seams and bedding planes.

DEGREE OF WEATHERING

Slightly Weathered	Slight decomposition of parent material in joints and seams.
Weathered	Well-developed and decomposed joints and seams.
Highly Weathered	Rock highly decomposed, may be extremely broken.

SOLUTION AND VOID CONDITIONS

Solid	Contains no voids.
Vuggy	Containing small pits or cavities < 1/2" (13mm).
Porous	Containing numerous voids which may be interconnected.
Cavernous	Containing cavities, sometimes quite large.

When classification of rock materials has been estimated from disturbed samples, core samples and petrographic analysis may reveal other rock types.

HARDNESS & DEGREE OF CEMENTATION

LIMESTONE

Hard	Difficult to scratch with knife.
Moderately Hard	Can scratch with knife but not with fingernail.
Soft	Can be scratched with fingernail.

SHALE

Hard	Can scratch with knife but not with fingernail.
Moderately Hard	Can be scratched with fingernail.
Soft	Can be molded easily with fingers.

SANDSTONE

Well Cemented	Capable of scratching a knife blade.
Cemented	Can be scratched with knife.
Poorly Cemented	Can be broken apart easily with fingers.

BEDDING CHARACTERISTICS

TERM	THICKNESS (inches)	THICKNESS (mm)
Very Thick Bedded	> 36	> 915
Thick Bedded	12 - 36	305 - 915
Medium Bedded	4 - 12	102 - 305
Thin Bedded	1 - 4	25 - 102
Very Thin Bedded	0.4 - 1	10 - 25
Laminated	0.1 - 0.4	2.5 - 10
Thinly Laminated	< 0.1	< 2.5

Bedding Planes	Planes dividing the individual layers, beds or strata of rocks.
Joint	Fracture in rock, generally more or less vertical or transverse to the bedding.
Seam	Applies to bedding plane with an unspecified degree of weathering.

BORHOLE LOG — BH-1

		Sheet	1 OF 1
		Date	10/24/2015
Project No.	15101-01	Drilling Co.	GeoMat
Project	Steven Walker Homes - Hawthorne Heights	Sampler	Cal Mod. And SPT
Client	Steven Walker Homes	Method	Hollow Stem
Location	APN 227-130-025, Riverside, California	Hammer Type	140 lb
Coodinate		Surface Elev.	
Notes		Total Depth	15'

Type/Symbol	Casing	Split Spoon	Ring Sampler	Cutting	Date	Time	Water Depth (ft)	Casing Size (in)	Casing Depth (ft)	Hole Depth (ft)	Symbol
I.D.		S	R	C							
O.D.					10/24/2015		None				
Length											
Hammer Wt.											
Hammer Fall											

Depth Below Surface (ft)	Elevation (ft)	Graphic	Soil Sample Type	Number	Symbol	Depth	Blows 0-152.4 mm	152.4-304.8 mm	304.8-457.2 mm	N-Value	N60	(N1)60	VISUAL MATERIAL CLASSIFICATION AND REMARKS	Moisture (%)	Dry Density (pcf)	Test
0													**SILTY SAND (SM)**			
1													medium brown silty sand, moist			
2																
3																
4																
5			R				4	5	7	8			loose	8	124	
6													becoming more coarse grained			
7																
8													**WELL-GRADED SAND (SW)**			
9													gray-brown sand with silt, dry			
10			R				5	8	11	12			medium dense	2	111	
11													% Passing No. 200 Sieve = 3			
12																
13																
14													**SILTY SAND (SM)**			
15			S				8	10	10	20			medium brown silty sand, moist	6		
16													medium dense			
17													% Passing No. 200 Sieve = 21			
18																
19																
20																
21																
22																
23																
24																

The stratification lines represent the approximate boundary lines between soil and rock types. In-situ, the transition may be gradual.

Appendix C

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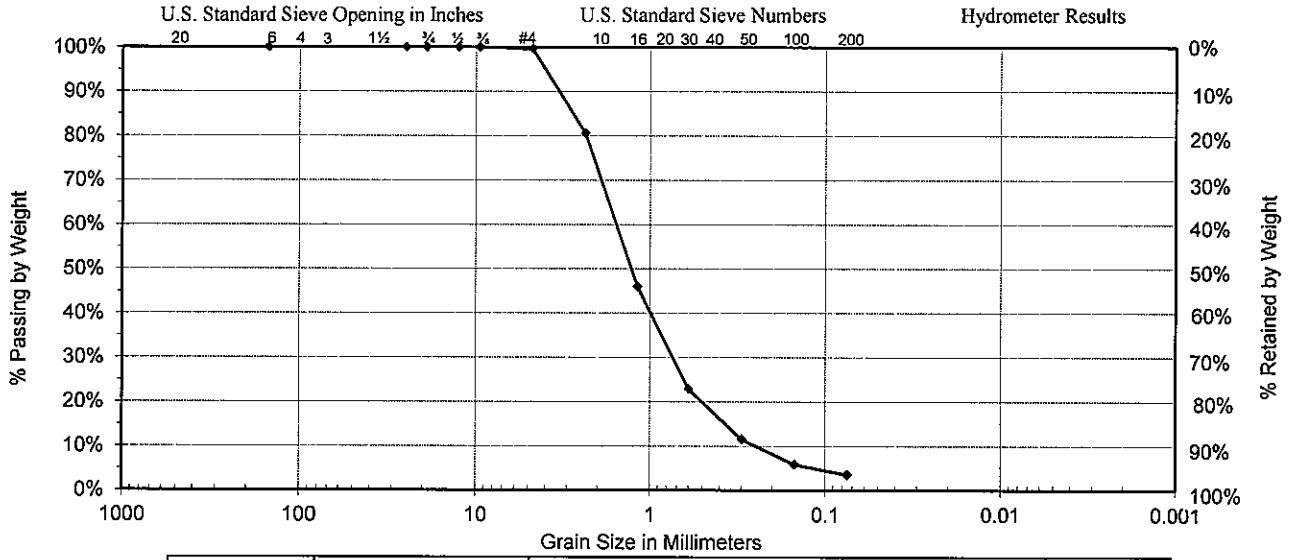
LABORATORY TEST RESULTS



Cobbles	Gravels		Sands			Silts	Clays
	Coarse	Fine	Coarse	Medium	Fine		

Date : 10/24/15	D_{10} = 0.26	**Classification**		% Gravel
Sample #:	D_{30} = 0.78	SW, Well-graded Sand		0.49%
Sample ID: B-1 @ 10'	D_{60} = 1.66			% Sand
Source: Cal Ring	C_C = 1.40	**Specifications**		96.10%
Project: Steven Walker Communities - Hawthorne Heights	C_U = 6.35	custom specs 1		% Silt & Clay
Location: APN: 227-130-025	Liquid Limit= n/a			3.41%
Boring #: B-1	Plastic Limit= n/a	Fineness Modulus		Sample Moisture
Depth: 10'	Plasticity Index= n/a	3.34		**1.9%**

Coarse Section Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min	**Fines Section** Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
6.00"	150.00		100.0%			#4	4.750	99.5%	99.5%		
4.00"	100.00		100.0%			#8	2.360	80.5%	80.5%		
3.00"	75.00		100.0%			#10	2.000		69.9%		
2.50"	63.00		100.0%			#16	1.180	45.9%	45.9%		
2.00"	50.00		100.0%			#20	0.850		32.8%		
1.75"	45.00		100.0%			#30	0.600	22.8%	22.8%		
1.50"	37.50		100.0%			#40	0.425		16.2%		
1.25"	31.50		100.0%			#50	0.300	11.5%	11.5%		
1.00"	25.00	100.0%	100.0%			#60	0.250		9.6%		
7/8"	22.40		100.0%			#80	0.180		6.9%		
3/4"	19.00	100.0%	100.0%			#100	0.150	5.8%	5.8%		
5/8"	16.00		100.0%			#140	0.106		4.4%		
1/2"	12.50	100.0%	100.0%			#170	0.090		3.9%		
3/8"	9.50	100.0%	100.0%			#200	0.075	3.4%	3.4%		
1/4"	6.30		99.7%			#270	0.053				
#4	4.75	99.5%	99.5%								

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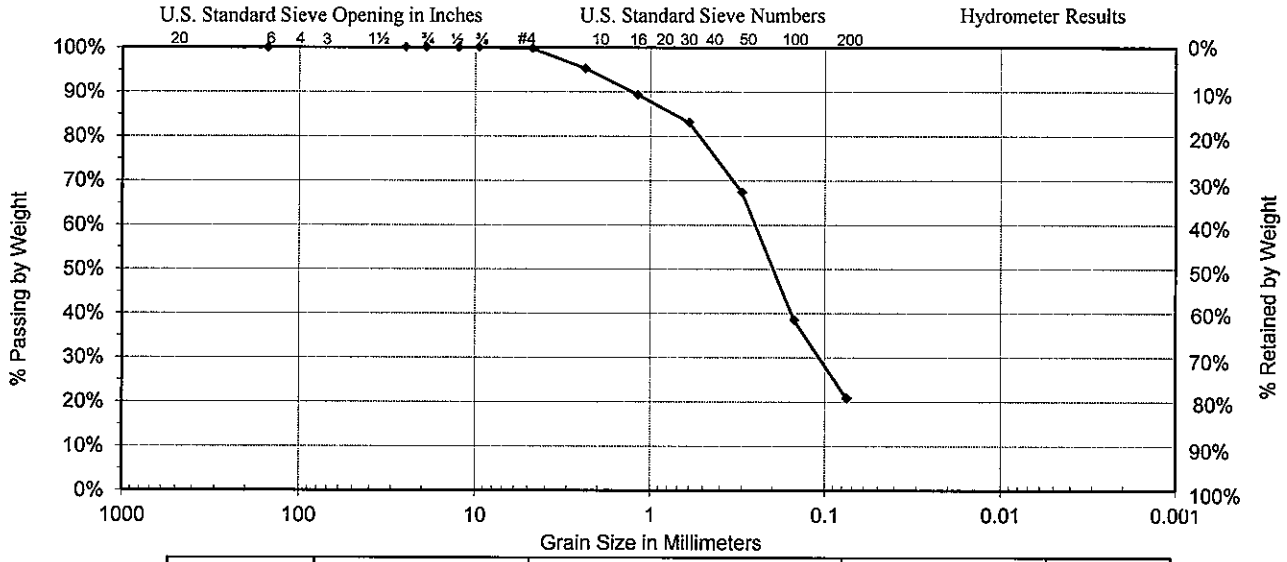
LABORATORY TEST RESULTS



Cobbles	Gravels		Sands			Silts	Clays
	Coarse	Fine	Coarse	Medium	Fine		

Date : 10/24/15	D_{10} = 0.04	**Classification**		% Gravel
Sample #:	D_{30} = 0.11	SM, Silty Sand		0.26%
Sample ID: B-1 @ 15'	D_{60} = 0.26			% Sand
Source: Standard	C_C = 1.38	**Specifications**		79.01%
Project: Steven Walker Communities - Hawthorne Heights	C_U = 7.25	custom specs 1		% Silt & Clay
Location: APN: 227-130-025	Liquid Limit= n/a			20.72%
Boring #: B-1	Plastic Limit= n/a	Fineness Modulus		Sample Moisture
Depth: 15'	Plasticity Index= n/a	1.27		**6.4%**

Coarse Section Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min	**Fines Section** Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
6.00"	150.00		100.0%			#4	4.750	99.7%	99.7%		
4.00"	100.00		100.0%			#8	2.360	95.2%	95.2%		
3.00"	75.00		100.0%			#10	2.000		93.4%		
2.50"	63.00		100.0%			#16	1.180	89.2%	89.2%		
2.00"	50.00		100.0%			#20	0.850		85.7%		
1.75"	45.00		100.0%			#30	0.600	83.1%	83.1%		
1.50"	37.50		100.0%			#40	0.425		73.9%		
1.25"	31.50		100.0%			#50	0.300	67.3%	67.3%		
1.00"	25.00	100.0%	100.0%			#60	0.250		57.6%		
7/8"	22.40		100.0%			#80	0.180		44.1%		
3/4"	19.00	100.0%	100.0%			#100	0.150	38.4%	38.4%		
5/8"	16.00		100.0%			#140	0.106		28.0%		
1/2"	12.50	100.0%	100.0%			#170	0.090		24.3%		
3/8"	9.50	100.0%	100.0%			#200	0.075	20.7%	20.7%		
1/4"	6.30		99.8%			#270	0.053				
#4	4.75	99.7%	99.7%								

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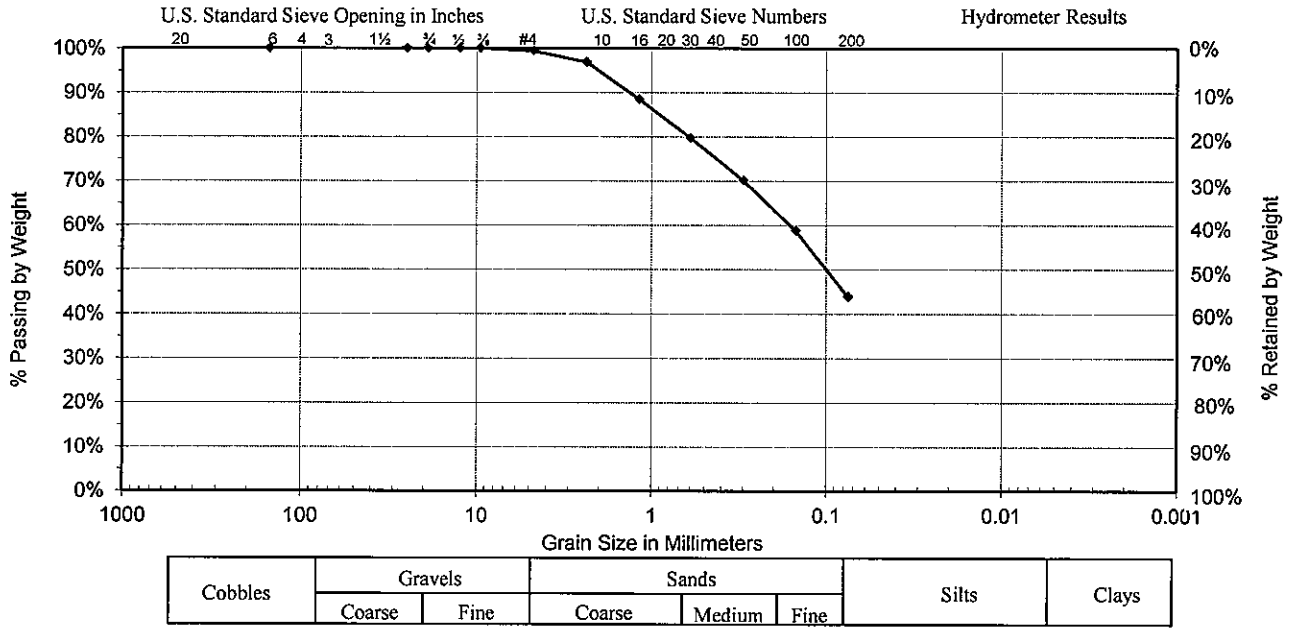
LABORATORY TEST RESULTS



Date : 10/24/15	D_{10} = 0.02	**Classification**		% Gravel
Sample #:	D_{30} = 0.05	SM, Silty Sand		0.60%
Sample ID: P-1 @ 43"	D_{60} = 0.17			% Sand
Source: Bulk	C_C = 0.92	**Specifications**		55.58%
Project: Steven Walker Communities - Hawthorne Heights	C_U = 9.77	custom specs 1		% Silt & Clay
Location: APN: 227-130-025	Liquid Limit= n/a			43.82%
Boring #: P-1	Plastic Limit= n/a	Fineness Modulus		Sample Moisture
Depth: 43"	Plasticity Index= n/a	1.07		**7.9%**

Coarse Section Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
6.00"	150.00		100.0%		
4.00"	100.00		100.0%		
3.00"	75.00		100.0%		
2.50"	63.00		100.0%		
2.00"	50.00		100.0%		
1.75"	45.00		100.0%		
1.50"	37.50		100.0%		
1.25"	31.50		100.0%		
1.00"	25.00	100.0%	100.0%		
7/8"	22.40		100.0%		
3/4"	19.00	100.0%	100.0%		
5/8"	16.00		100.0%		
1/2"	12.50	100.0%	100.0%		
3/8"	9.50	100.0%	100.0%		
1/4"	6.30		99.6%		
#4	4.75	99.4%	99.4%		

Fines Section Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
#4	4.750	99.4%	99.4%		
#8	2.360	96.9%	96.9%		
#10	2.000		94.3%		
#16	1.180	88.4%	88.4%		
#20	0.850		83.5%		
#30	0.600	79.7%	79.7%		
#40	0.425		74.1%		
#50	0.300	70.1%	70.1%		
#60	0.250		66.3%		
#80	0.180		61.0%		
#100	0.150	58.7%	58.7%		
#140	0.106		50.0%		
#170	0.090		46.8%		
#200	0.075	43.8%	43.8%		
#270	0.053				

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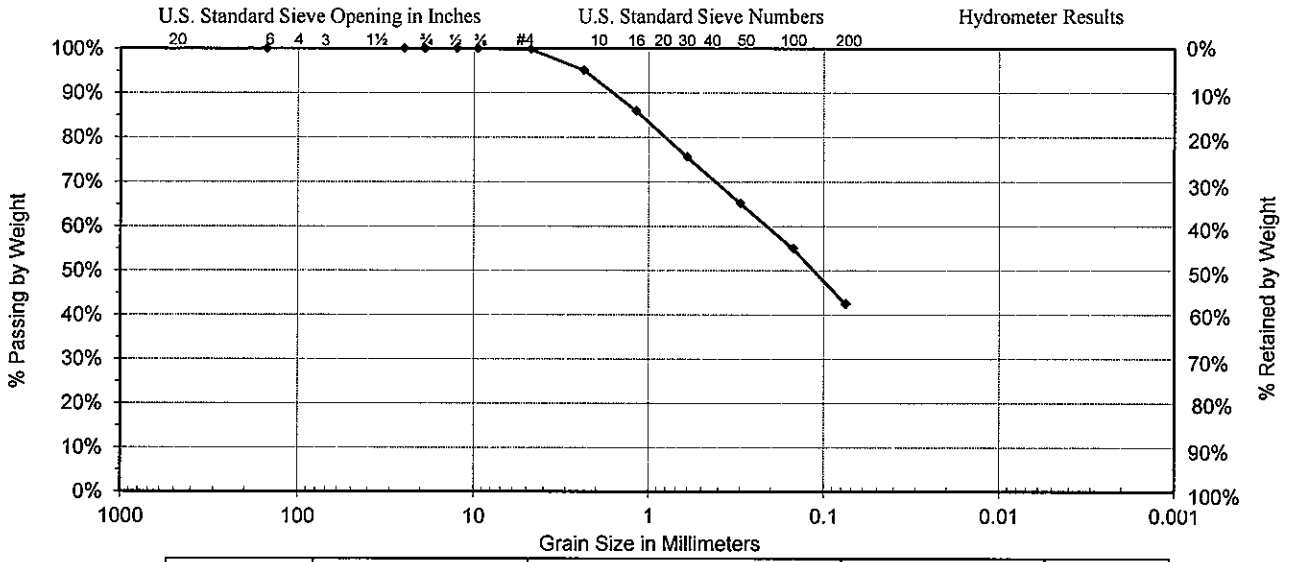
LABORATORY TEST RESULTS



Cobbles	Gravels		Sands			Silts	Clays
	Coarse	Fine	Coarse	Medium	Fine		

Date : 10/24/15	D_{10} = 0.02	**Classification**		% Gravel
Sample #:	D_{30} = 0.05	SM, Silty Sand		0.27%
Sample ID: P-2 @ 45"	D_{60} = 0.22			% Sand
Source: Bulk	C_C = 0.71	**Specifications**		57.39%
Project: Steven Walker Communities - Hawthorne Heights	C_U = 12.69	custom specs 1		% Silt & Clay
Location: APN: 227-130-025	Liquid Limit= n/a			42.34%
Boring #: P-2	Plastic Limit= n/a	Fineness Modulus		Sample Moisture
Depth: 45"	Plasticity Index= n/a	1.24		**6.7%**

Coarse Section Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min	**Fines Section** Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
6.00"	150.00		100.0%			#4	4.750	99.7%	99.7%		
4.00"	100.00		100.0%			#8	2.360	95.0%	95.0%		
3.00"	75.00		100.0%			#10	2.000		92.2%		
2.50"	63.00		100.0%			#16	1.180	85.9%	85.9%		
2.00"	50.00		100.0%			#20	0.850		80.0%		
1.75"	45.00		100.0%			#30	0.600	75.5%	75.5%		
1.50"	37.50		100.0%			#40	0.425		69.5%		
1.25"	31.50		100.0%			#50	0.300	65.1%	65.1%		
1.00"	25.00	100.0%	100.0%			#60	0.250		61.7%		
7/8"	22.40		100.0%			#80	0.180		56.9%		
3/4"	19.00	100.0%	100.0%			#100	0.150	54.9%	54.9%		
5/8"	16.00		100.0%			#140	0.106		47.5%		
1/2"	12.50	100.0%	100.0%			#170	0.090		44.9%		
3/8"	9.50	100.0%	100.0%			#200	0.075	42.3%	42.3%		
1/4"	6.30		99.8%			#270	0.053				
#4	4.75	99.7%	99.7%								

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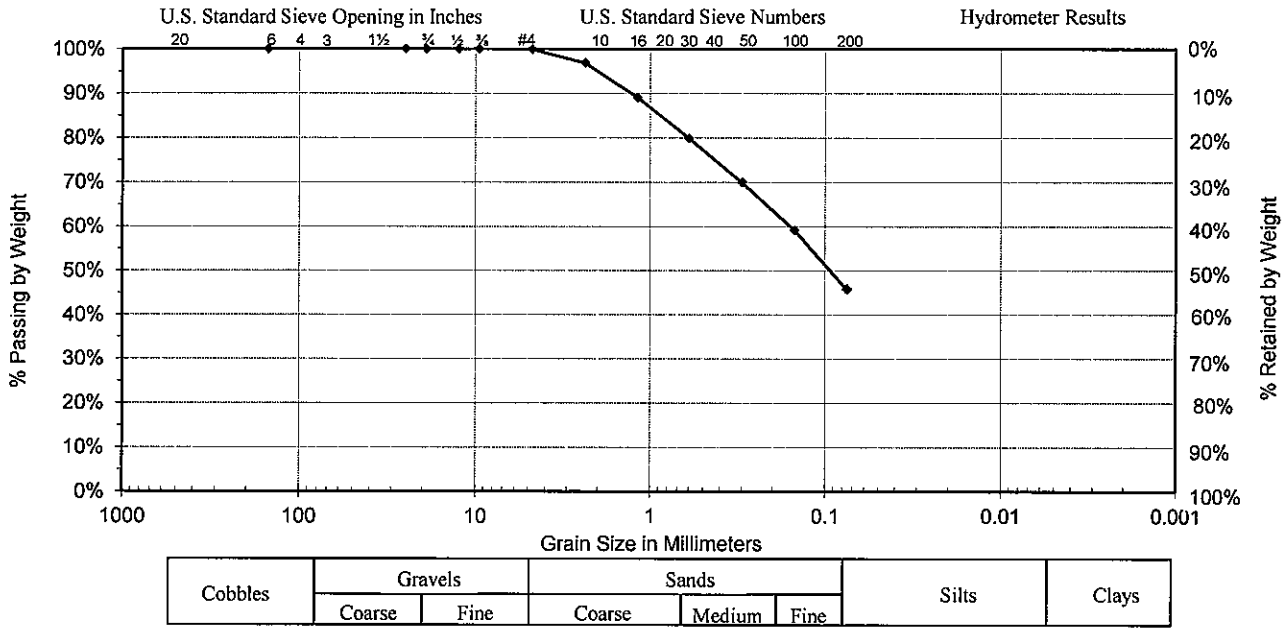
LABORATORY TEST RESULTS



Cobbles	Gravels		Sands			Silts	Clays
	Coarse	Fine	Coarse	Medium	Fine		

Date : 10/24/15	D_{10} = 0.02	**Classification**		% Gravel
Sample #:	D_{30} = 0.05	SM, Silty Sand		0.16%
Sample ID: P-3 @ 52"	D_{60} = 0.16			% Sand
Source: Bulk	C_C = 0.91	**Specifications**		54.22%
Project: Steven Walker Communities - Hawthorne Heights	C_U = 9.91	custom specs 1		% Silt & Clay
Location: APN: 227-130-025	Liquid Limit= n/a			45.61%
Boring #: P-3	Plastic Limit= n/a	Fineness Modulus		Sample Moisture
Depth: 52"	Plasticity Index= n/a	1.06		**6.5%**

Coarse Section Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min	**Fines Section** Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
6.00"	150.00		100.0%			#4	4.750	99.8%	99.8%		
4.00"	100.00		100.0%			#8	2.360	96.8%	96.8%		
3.00"	75.00		100.0%			#10	2.000		94.4%		
2.50"	63.00		100.0%			#16	1.180	89.0%	89.0%		
2.00"	50.00		100.0%			#20	0.850		83.8%		
1.75"	45.00		100.0%			#30	0.600	79.8%	79.8%		
1.50"	37.50		100.0%			#40	0.425		74.0%		
1.25"	31.50		100.0%			#50	0.300	69.9%	69.9%		
1.00"	25.00	100.0%	100.0%			#60	0.250		66.3%		
7/8"	22.40		100.0%			#80	0.180		61.2%		
3/4"	19.00	100.0%	100.0%			#100	0.150	59.1%	59.1%		
5/8"	16.00		100.0%			#140	0.106		51.2%		
1/2"	12.50	100.0%	100.0%			#170	0.090		48.3%		
3/8"	9.50	100.0%	100.0%			#200	0.075	45.6%	45.6%		
1/4"	6.30		99.9%			#270	0.053				
#4	4.75	99.8%	99.8%								

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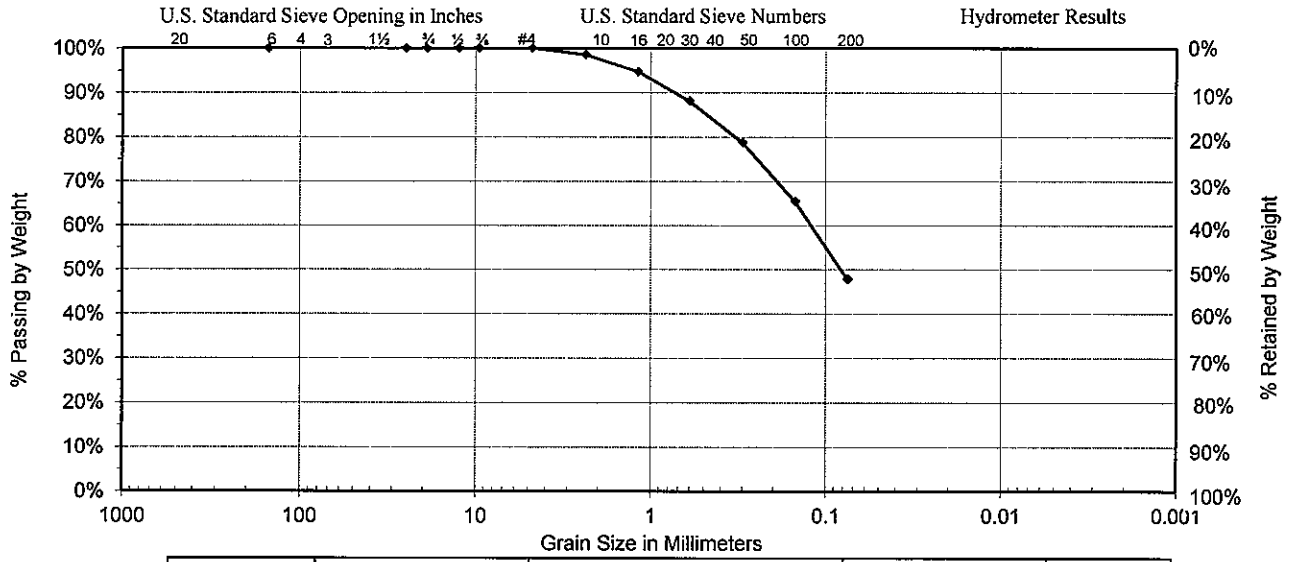
LABORATORY TEST RESULTS



Date : 10/24/15	D_{10} = 0.02	**Classification**		% Gravel
Sample #:	D_{30} = 0.05	SM, Silty Sand		0.00%
Sample ID: P-4 @ 67"	D_{60} = 0.13			% Sand
Source: Bulk	C_C = 1.11	**Specifications**		52.27%
Project: Steven Walker Communities - Hawthorne Heights	C_U = 8.10	custom specs 1		% Silt & Clay
Location: APN: 227-130-025	Liquid Limit= n/a			47.73%
Boring #: P-4	Plastic Limit= n/a	Fineness Modulus		Sample Moisture
Depth: 67"	Plasticity Index= n/a	0.75		**4.2%**

Coarse Section Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min	**Fines Section** Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
6.00"	150.00		100.0%			#4	4.750	100.0%	100.0%		
4.00"	100.00		100.0%			#8	2.360	98.5%	98.5%		
3.00"	75.00		100.0%			#10	2.000		97.4%		
2.50"	63.00		100.0%			#16	1.180	94.7%	94.7%		
2.00"	50.00		100.0%			#20	0.850		90.9%		
1.75"	45.00		100.0%			#30	0.600	88.0%	88.0%		
1.50"	37.50		100.0%			#40	0.425		82.5%		
1.25"	31.50		100.0%			#50	0.300	78.6%	78.6%		
1.00"	25.00	100.0%	100.0%			#60	0.250		74.2%		
7/8"	22.40		100.0%			#80	0.180		68.0%		
3/4"	19.00	100.0%	100.0%			#100	0.150	65.4%	65.4%		
5/8"	16.00		100.0%			#140	0.106		55.0%		
1/2"	12.50	100.0%	100.0%			#170	0.090		51.3%		
3/8"	9.50	100.0%	100.0%			#200	0.075	47.7%	47.7%		
1/4"	6.30		100.0%			#270	0.053				
#4	4.75	100.0%	100.0%								

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Appendix D

GeoMat

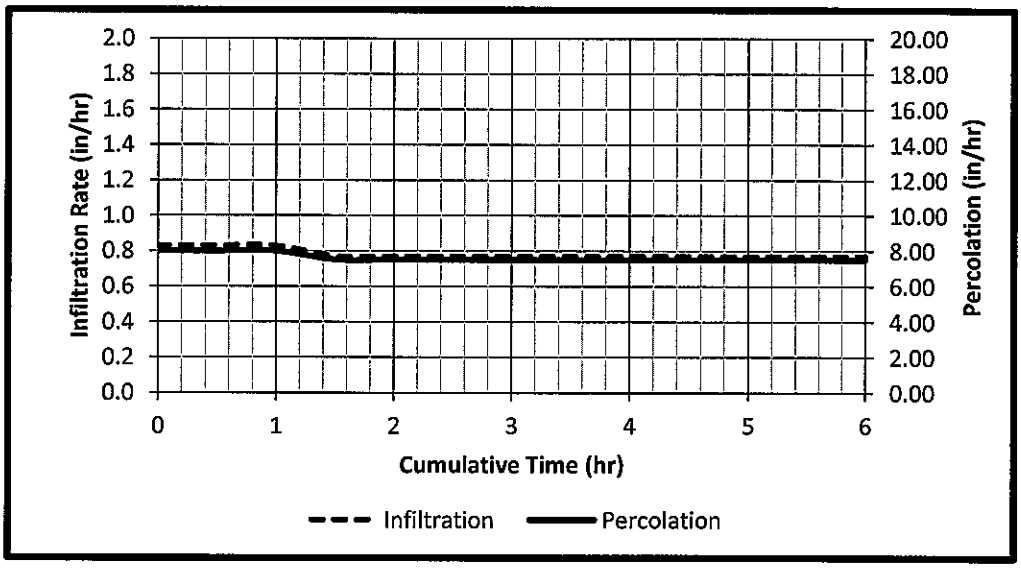
PERCOLATION TEST - P-1

Project No.	15110-01	Project Name	Hawthorne Hills School Site		
Proj. Location	Indaian Avenue, Riverside				
Drilling Date	10/24/2015	Soak Date	10/24/2015	Soak Method	5 gallons
Testing Date	10/25/2015	Borehole Size (in)	6	Test Depth (in)	43

CRITERIA	TIME	TIME INTERVAL (min)	D_o, INITIAL DEPTH TO WATER (in)	D_f, FINAL DEPTH TO WATER (in)	ΔH, WATER DROP (in)	AVERAGE WETTED DEPTH (in)	PERC RATE (min/in)	PERC RATE (in/hr)	CORECTED* INFILTRATION RATE (in/hr)
Sandy Soil Criteria									
Percolation Test Data	0:00:00	0:30:00	28	32	4	13	7.5	8.0	0.8
	0:30:00	30.00							
	0:00:00	0:30:00	28	32	4	13	7.5	8.0	0.8
	0:30:00	30.00							
	0:00:00	0:30:00	28	31.75	3.75	13.125	8.0	7.5	0.8
	0:30:00	30.00							
	0:00:00	0:30:00	28	31.75	3.75	13.125	8.0	7.5	0.8
	0:30:00	30.00							
	0:00:00	0:30:00	28	31.75	3.75	13.125	8.0	7.5	0.8
	0:30:00	30.00							
	0:00:00	0:30:00	28	31.75	3.75	13.125	8.0	7.5	0.8
	0:30:00	30.00							
	0:00:00	0:30:00	28	31.75	3.75	13.125	8.0	7.5	0.8
	0:30:00	30.00							
	0:00:00	0:30:00	28	31.75	3.75	13.125	8.0	7.5	0.8
	0:30:00	30.00							
	0:00:00	0:30:00	28	31.75	3.75	13.125	8.0	7.5	0.8
	0:30:00	30.00							
	0:00:00	0:30:00	28	31.75	3.75	13.125	8.0	7.5	0.8
	0:30:00	30.00							
	0:00:00	0:30:00	28	31.75	3.75	13.125	8.0	7.5	0.8
	0:30:00	30.00							
	0:00:00	0:30:00	28	31.75	3.75	13.125	8.0	7.5	0.8
	0:30:00	30.00							
	0:00:00	0:30:00	28	31.75	3.75	13.125	8.0	7.5	0.8
	0:30:00	30.00							

*Porchet Method

Cumulative Time (hr)	Percolation (in/hr)	Infiltration (in/hr
0	8.00	0.8
0.50	8.00	0.8
1.00	8.00	0.8
1.50	7.50	0.8
2.00	7.50	0.8
2.50	7.50	0.8
3.00	7.50	0.8
3.50	7.50	0.8
4.00	7.50	0.8
4.50	7.50	0.8
5.00	7.50	0.8
5.50	7.50	0.8
6.00	7.50	0.8



PERCOLATION TEST - P-2

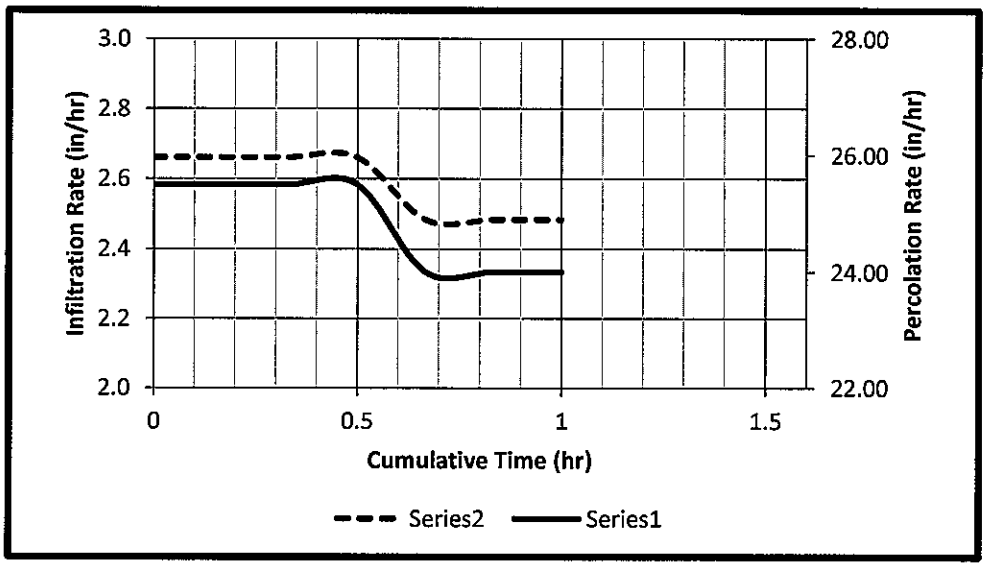
Project No.	15101-01	Project Name	Hawthorne Hills School Site		
Project Location	Indiana Avenue, Riverside				
Drilling Date	10/24/2015	Soak Date	10/24/2015		5 gallons
Testing Date	10/24/2015	Borehole Size (in)	6	Depth (in)	45

All field measurements in inches and time measurement in minutes: seconds

CRITERIA	TIME	TIME INTERVAL	H_o INITIAL WATER HEIGHT	ΔH WATER DROP	H_f FINAL WATER HEIGHT	D_o INITIAL DEPTH TO WATER	D_f FINAL DEPTH TO WATER	H_{ave} AVERAGE HEAD HEIGHT	PERC RATE (in/hr)	CORECTED* INFILTRATION RATE (in/hr)
Sandy Soil Criteria	0:00:00	0:25:00	15	9	6	30	39	10.5	21.6	
	0:25:00	25.00								
	0:00:00	0:25:00	15	8	7	30	38	11	19.2	
	0:25:00	25.00								
Percolation Test Data	0:00:00	12:10:00	15	4.25	10.75	30	34.25	12.875	25.5	2.7
	12:10:00	10.00								
	12:00:00	0:10:00	15	4.25	10.75	30	34.25	12.875	25.5	2.7
	12:10:00	10.00								
	12:00:00	0:10:00	15	4.25	10.75	30	34.25	12.875	25.5	2.7
	12:10:00	10.00								
	12:00:00	0:10:00	15	4	11	30	34	13	24.0	2.5
	12:10:00	10.00								
	12:00:00	0:10:00	15	4	11	30	34	13	24.0	2.5
	12:10:00	10.00								
	12:00:00	0:10:00	15	4	11	30	34	13	24.0	2.5
	12:10:00	10.00								

*Porchet Method

Cmltv. Time (hr)	Perc. (in/hr)	Inf. (in/hr)
0	25.50	2.7
0.17	25.50	2.7
0.33	25.50	2.7
0.50	25.50	2.7
0.67	24.00	2.5
0.83	24.00	2.5
1.00	24.00	2.5



PERCOLATION TEST - P-3

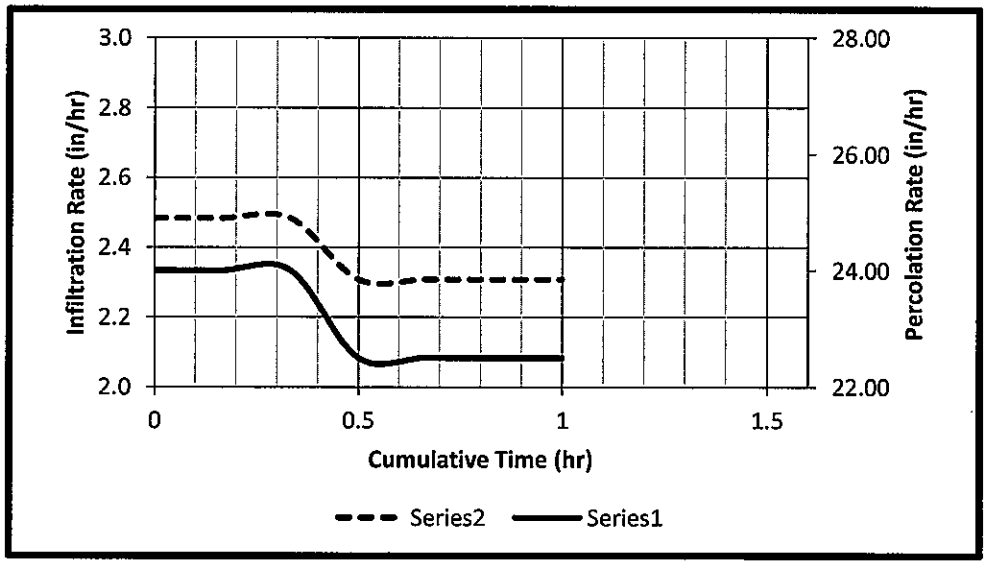
Project No.	15101-01	Project Name	Hawthorne Hills School Site		
Project Location	Indiana Avenue, Riverside				
Drilling Date	10/24/2015	Soak Date	10/24/2015		5 gallons
Testing Date	10/24/2015	Borehole Size (in)	6	Depth (in)	52

All field measurements in inches and time measurement in minutes: seconds

CRITERIA	TIME	TIME INTERVAL	H_o INITIAL WATER HEIGHT	ΔH WATER DROP	H_f FINAL WATER HEIGHT	D_o INITIAL DEPTH TO WATER	D_f FINAL DEPTH TO WATER	H_{ave} AVERAGE HEAD HEIGHT	PERC RATE (in/hr)	CORECTED* INFILTRATION RATE (in/hr)
Sandy Soil Criteria	0:00:00	0:25:00	15	10	5	37	47	10	24.0	
	0:25:00	25.00								
	0:00:00	0:25:00	15	8.5	6.5	37	45.5	10.75	20.4	
	0:25:00	25.00								
Percolation Test Data	0:00:00	12:10:00	15	4	11	37	41	13	24.0	2.5
	12:10:00	10.00								
	12:00:00	0:10:00	15	4	11	37	41	13	24.0	2.5
	12:10:00	10.00								
	12:00:00	0:10:00	15	3.75	11.25	37	40.75	13.125	22.5	2.3
	12:10:00	10.00								
	12:00:00	0:10:00	15	3.75	11.25	37	40.75	13.125	22.5	2.3
	12:10:00	10.00								
	12:00:00	0:10:00	15	3.75	11.25	37	40.75	13.125	22.5	2.3
	12:10:00	10.00								
	12:00:00	0:10:00	15	3.75	11.25	37	40.75	13.125	22.5	2.3
	12:10:00	10.00								

*Porchet Method

Cmltv. Time (hr)	Perc. (in/hr)	Inf. (in/hr)
0	24.00	2.5
0.17	24.00	2.5
0.33	24.00	2.5
0.50	22.50	2.3
0.67	22.50	2.3
0.83	22.50	2.3
1.00	22.50	2.3



PERCOLATION TEST - P-4

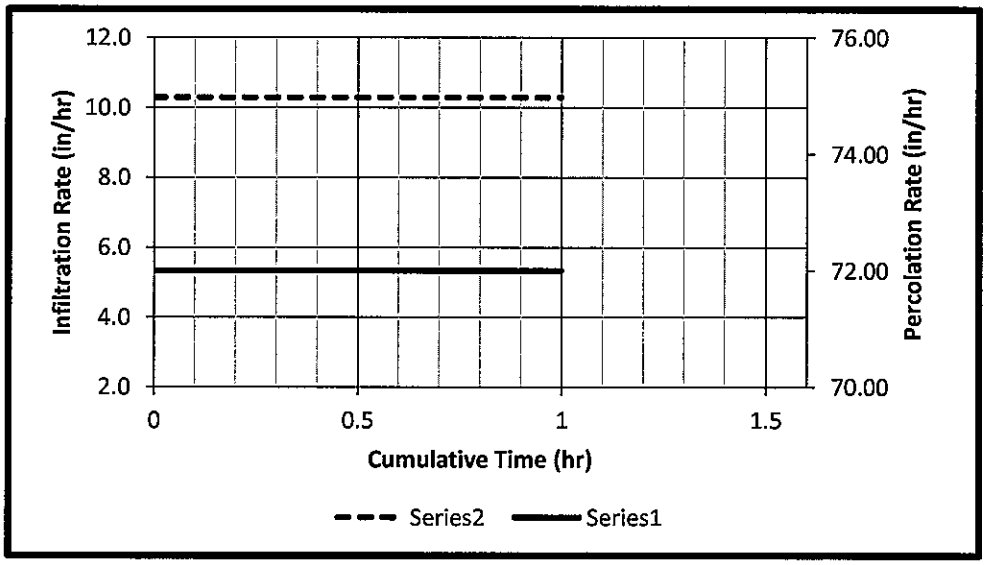
Project No.	15101-01	Project Name	Hawthorne Hills School Site		
Project Location	Indiana Avenue, Riverside				
Drilling Date	10/24/2015	Soak Date	10/24/2015		5 gallons
Testing Date	10/24/2015	Borehole Size (in)	6	Depth (in)	67

All field measurements in inches and time measurement in minutes: seconds

CRITERIA	TIME	TIME INTERVAL	H_o INITIAL WATER HEIGHT	ΔH WATER DROP	H_f FINAL WATER HEIGHT	D_o INITIAL DEPTH TO WATER	D_f FINAL DEPTH TO WATER	H_{ave} AVERAGE HEAD HEIGHT	PERC RATE (in/hr)	CORECTED* INFILTRATION RATE (in/hr)
Sandy Soil Criteria	0:00:00	0:12:00	15	15	0	52	67	7.5	75.0	
	0:12:00	12.00								
	0:00:00	0:13:00	15	15	0	52	67	7.5	69.2	
	0:13:00	13.00								
Percolation Test Data	0:00:00	12:10:00	15	12	3	52	64	9	72.0	10.3
	12:10:00	10.00								
	12:00:00	0:10:00	15	12	3	52	64	9	72.0	10.3
	12:10:00	10.00								
	12:00:00	0:10:00	15	12	3	52	64	9	72.0	10.3
	12:10:00	10.00								
	12:00:00	0:10:00	15	12	3	52	64	9	72.0	10.3
	12:10:00	10.00								
	12:00:00	0:10:00	15	12	3	52	64	9	72.0	10.3
	12:10:00	10.00								
	12:00:00	0:10:00	15	12	3	52	64	9	72.0	10.3
	12:10:00	10.00								

*Porchet Method

Cmltv. Time (hr)	Perc. (in/hr)	Inf. (in/hr)
0	72.00	10.3
0.17	72.00	10.3
0.33	72.00	10.3
0.50	72.00	10.3
0.67	72.00	10.3
0.83	72.00	10.3
1.00	72.00	10.3



Appendix 4: Historical Site Conditions

Phase I Environmental Site Assessment or Other Information on Past Site Use

Appendix 5: LID Infeasibility

LID Technical Infeasibility Analysis

Appendix 6: BMP Design Details

BMP Sizing, Design Details and other Supporting Documentation

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 SDH & Associates, Inc. Date 11/1/2015
Designed by Dane Sommers Case No
Company Project Number/Name TTM 37032

BMP Identification

BMP NAME / ID B.M.P. 1

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}= 0.54 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)
DMA 1A	4500	Mixed Surface Types	1	0.89	4014			
DMA 1B	5855	Ornamental Landscaping	0.1	0.11	646.7			
DMA. 2A	7500	Mixed Surface Types	1	0.89	6690			
DMA 2B	8805	Ornamental Landscaping	0.1	0.11	972.6			
DMA 3	10653	Concrete or Asphalt	1	0.89	9502.5			
DMA 4	1095	Concrete or Asphalt	1	0.89	976.7			
DMA 10A	9000	Mixed Surface Types	1	0.89	8028			
DMA 10B	10332	Ornamental Landscaping	0.1	0.11	1141.3			
BMP 1	3265	Ornamental Landscaping	0.1	0.11	360.6			
	61005	Total			32332.4	0.54	1455	1,527

Notes:

Infiltration Basin - Design Procedure (Rev. 03-2012)	BMP ID [redacted]	Legend: [redacted]
mpany Name: [redacted]		Date: [redacted]
Designed by:		County/City Case No.:

Design Volume

a) Tributary area (BMP subarea)	A_T = [redacted]	acres
b) Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}= [redacted]	ft^3

Maximum Depth

a) Infiltration rate	I = [redacted]	in/hr
b) Factor of Safety (See Table 1, Appendix A: "Infiltration Testing" from this BMP Handbook)	FS = [redacted]	
c) Calculate D_1 $\quad D_1 = \dfrac{I\ (in/hr) \times 72\ hrs}{12\ (in/ft) \times FS}$	D_1 = [redacted]	ft
d) Enter the depth of freeboard (at least 1 ft)	[redacted]	ft
e) Enter depth to historic high ground water (measured from **top** of basin)	[redacted]	ft
f) Enter depth to top of bedrock or impermeable layer (measured from **top** of basin)	[redacted]	ft
g) D_2 is the smaller of:		
Depth to groundwater - (10 ft + freeboard) and Depth to impermeable layer - (5 ft + freeboard)	D_2 = [redacted]	ft
h) D_{MAX} is the smaller value of D_1 and D_2 but shall not exceed 5 feet	D_{MAX} = [redacted]	ft

Basin Geometry

a) Basin side slopes (no steeper than 4:1)	z = [redacted]	:1
b) Proposed basin depth (excluding freeboard)	d_B = [redacted]	ft
c) Minimum bottom surface area of basin ($A_S = V_{BMP}/d_B$)	A_S = [redacted]	ft^2
d) Proposed Design Surface Area	A_D = [redacted]	ft^2

Forebay

a) Forebay volume (minimum 0.5% V_{BMP})	Volume = [redacted]	ft^3
b) Forebay depth (height of berm/splashwall. 1 foot min.)	Depth = [redacted]	ft
c) Forebay surface area (minimum)	Area = [redacted]	ft^2
d) Full height notch-type weir	Width (W) = [redacted]	in

Notes: [redacted]

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 SDH & Associates, Inc. Date 11/1/2015
Designed by Dane Sommers Case No
Company Project Number/Name TTM 37032

BMP Identification

BMP NAME / ID B.M.P. 2

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}= 0.54 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)
DMA 5	7603	Concrete or Asphalt	1	0.89	6781.9			
DMA 11A	9000	Mixed Surface Types	1	0.89	8028			
DMA 11B	11616	Ornamental Landscaping	0.1	0.11	1283.1			
BMP 2	1742	Ornamental Landscaping	0.1	0.11	192.4			
	29961	Total			16285.4	0.54	732.8	1746

Notes:

Infiltration Basin - Design Procedure (Rev. 03-2012)	BMP ID [redacted]	Legend: [redacted]
mpany Name: [redacted]		Date: [redacted]
Designed by:		County/City Case No.:

Design Volume

a) Tributary area (BMP subarea)	A_T = [redacted]	acres
b) Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}= [redacted]	ft^3

Maximum Depth

a) Infiltration rate	I = [redacted]	in/hr
b) Factor of Safety (See Table 1, Appendix A: "Infiltration Testing" from this BMP Handbook)	FS = [redacted]	
c) Calculate D_1 $\quad D_1 = \dfrac{I\ (in/hr) \times 72\ hrs}{12\ (in/ft) \times FS}$	D_1 = [redacted]	ft
d) Enter the depth of freeboard (at least 1 ft)	[redacted]	ft
e) Enter depth to historic high ground water (measured from **top** of basin)	[redacted]	ft
f) Enter depth to top of bedrock or impermeable layer (measured from **top** of basin)	[redacted]	ft
) D_2 is the smaller of:		
Depth to groundwater - (10 ft + freeboard) and Depth to impermeable layer - (5 ft + freeboard)	D_2 = [redacted]	ft
h) D_{MAX} is the smaller value of D_1 and D_2 but shall not exceed 5 feet	D_{MAX} = [redacted]	ft

Basin Geometry

a) Basin side slopes (no steeper than 4:1)	z = [redacted]	:1
b) Proposed basin depth (excluding freeboard)	d_B = [redacted]	ft
c) Minimum bottom surface area of basin (A_S= V_{BMP}/d_B)	A_S = [redacted]	ft^2
d) Proposed Design Surface Area	A_D = [redacted]	ft^2

Forebay

a) Forebay volume (minimum 0.5% V_{BMP})	Volume = [redacted]	ft^3
b) Forebay depth (height of berm/splashwall. 1 foot min.)	Depth = [redacted]	ft
c) Forebay surface area (minimum)	Area = [redacted]	ft^2
) Full height notch-type weir	Width (W) = [redacted]	in

Notes: [redacted]

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 SDH & Associates, Inc. Date 11/1/2015
Designed by Dane Sommers Case No
Company Project Number/Name TTM 37032

BMP Identification

BMP NAME / ID B.M.P. 3

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}= 0.54 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)
DMA 7A	4500	Mixed Surface Types	1	0.89	4014			
DMA 7B	8647	Ornamental Landscaping	0.1	0.11	955.1			
DMA 8	6032	Concrete or Asphalt	1	0.89	5380.5			
DMA 9A	6000	Mixed Surface Types	1	0.89	5352			
DMA 9B	10415	Ornamental Landscaping	0.1	0.11	1150.4			
BMP 3	2066	Ornamental Landscaping	0.1	0.11	228.2			
	37660	Total			17080.2	0.54	768.6	1,565

Notes:

Infiltration Basin - Design Procedure (Rev. 03-2012)	BMP ID	Legend:
mpany Name:		Date:
Designed by:		County/City Case No.:

Design Volume

a) Tributary area (BMP subarea) $A_T =$ acres

b) Enter V_{BMP} determined from Section 2.1 of this Handbook $V_{BMP} =$ ft^3

Maximum Depth

a) Infiltration rate $I =$ in/hr

b) Factor of Safety (See Table 1, Appendix A: "Infiltration Testing" from this BMP Handbook) FS =

c) Calculate D_1 $D_1 = \frac{I\ (in/hr) \times 72\ hrs}{12\ (in/ft) \times FS}$ $D_1 =$ ft

d) Enter the depth of freeboard (at least 1 ft) ft

e) Enter depth to historic high ground water (measured from **top** of basin) ft

f) Enter depth to top of bedrock or impermeable layer (measured from **top** of basin) ft

g) D_2 is the smaller of:

Depth to groundwater - (10 ft + freeboard) and
Depth to impermeable layer - (5 ft + freeboard)

$D_2 =$ ft

h) D_{MAX} is the smaller value of D_1 and D_2 but shall not exceed 5 feet $D_{MAX} =$ ft

Basin Geometry

a) Basin side slopes (no steeper than 4:1) z = :1

b) Proposed basin depth (excluding freeboard) $d_B =$ ft

c) Minimum bottom surface area of basin ($A_S = V_{BMP}/d_B$) $A_S =$ ft^2

d) Proposed Design Surface Area $A_D =$ ft^2

Forebay

a) Forebay volume (minimum 0.5% V_{BMP}) Volume = ft^3

b) Forebay depth (height of berm/splashwall. 1 foot min.) Depth = ft

c) Forebay surface area (minimum) Area = ft^2

d) Full height notch-type weir Width (W) = in

Notes:

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 SDH & Associates, Inc. Date 11/1/2015
Designed by Dane Sommers Case No
Company Project Number/Name TTM 37032

BMP Identification

BMP NAME / ID B.M.P. 4

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}= 0.54 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)
DMA 12A	3000	Mixed Surface Types	1	0.89	2676			
DMA 12B	3296	Ornamental Landscaping	0.1	0.11	364.1			
DMA 13A	18000	Mixed Surface Types	1	0.89	16056			
DMA 13B	22216	Ornamental Landscaping	0.1	0.11	2453.9			
DMA 14A	18000	Mixed Surface Types	1	0.89	16056			
DMA 14B	27750	Ornamental Landscaping	0.1	0.11	3065.2			
DMA 15	24413	Mixed Surface Types	1	0.89	21776.4			
DMA 16	21810	Ornamental Landscaping	0.1	0.11	2409.1			
DMA 17	7522	Ornamental Landscaping	0.1	0.11	830.9			
BMP 4	17031	Ornamental Landscaping	0.1	0.11	1881.2			
	163038	Total			67568.8	0.54	3040.6	7,705

Notes:

Infiltration Basin - Design Procedure (Rev. 03-2012)	BMP ID	Legend:
Company Name:		Date:
Designed by:		County/City Case No.:

Design Volume

a) Tributary area (BMP subarea) — A_T = acres

b) Enter V_{BMP} determined from Section 2.1 of this Handbook — V_{BMP} = ft^3

Maximum Depth

a) Infiltration rate — I = in/hr

b) Factor of Safety (See Table 1, Appendix A: "Infiltration Testing" from this BMP Handbook) — FS =

c) Calculate D_1

$$D_1 = \frac{I\ (in/hr) \times 72\ hrs}{12\ (in/ft) \times FS}$$

D_1 = ft

d) Enter the depth of freeboard (at least 1 ft) — ft

e) Enter depth to historic high ground water (measured from **top** of basin) — ft

f) Enter depth to top of bedrock or impermeable layer (measured from **top** of basin) — ft

g) D_2 is the smaller of:

Depth to groundwater - (10 ft + freeboard) and
Depth to impermeable layer - (5 ft + freeboard)

D_2 = ft

h) D_{MAX} is the smaller value of D_1 and D_2 but shall not exceed 5 feet — D_{MAX} = ft

Basin Geometry

a) Basin side slopes (no steeper than 4:1) — z = :1

b) Proposed basin depth (excluding freeboard) — d_B = ft

c) Minimum bottom surface area of basin ($A_S = V_{BMP}/d_B$) — A_S = ft^2

d) Proposed Design Surface Area — A_D = ft^2

Forebay

a) Forebay volume (minimum 0.5% V_{BMP}) — Volume = ft^3

b) Forebay depth (height of berm/splashwall. 1 foot min.) — Depth = ft

c) Forebay surface area (minimum) — Area = ft^2

d) Full height notch-type weir — Width (W) = in

Notes:

	2 year – 24 hour		
	Pre-condition	**Post-condition**	**% Difference**
Time of Concentration	5.8	9.2	64% increase
Volume (Cubic Feet)	19,473	22,859	17% increase
Note: In the Post Development Condition, all runoff will be retained onsite, therefore the number above does not reflect the quantity of runoff which is being discharged.			

	2 years - 24 hour		
	Pre-condition	**Post-condition**	**% Difference**
Time of Concentration	5.8	9.2	64% Increase
Volume, V (Cubic Feet)	19,473	19,473	0% Increase
Runoff, Q (cfs)	1.68	1.68	0% Increase
Area, A (acres)	6.78	6.78	N/A
Impervious Area (acres)	3.1	3	3.2% Decrease
Coefficient of Runoff, C	0.46	0.46	0% Increase
Rainfall Intensity, I (in/hr)	0.54	0.54	N/A
Precipitation Depth , P(in.)	1.72	1.72	N/A

Runoff, Q=C*I*A

Volume, V=(C*P*A)/12

Appendix 8: Source Control

Pollutant Sources/Source Control Checklist

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Shown on WQMP Drawings	3 Permanent Controls—Listed in WQMP Table and Narrative	4 Operational BMPs—Included 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.

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Shown on WQMP Drawings	3 Permanent Controls—Listed in WQMP Table and Narrative	4 Operational BMPs—Included 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/ ☒ Provide IPM information to new owners, lessees and operators.

1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Shown on WQMP Drawings	3 Permanent Controls—Listed in WQMP Table and Narrative	4 Operational BMPs—Included 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

1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Shown on WQMP Drawings	3 Permanent Controls—Listed in WQMP Table and Narrative	4 Operational BMPs—Included 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/

1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Shown on WQMP Drawings	3 Permanent Controls—Listed in WQMP Table and Narrative	4 Operational BMPs—Included 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

1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Shown on WQMP Drawings	3 Permanent Controls—Listed in WQMP Table and Narrative	4 Operational BMPs—Included 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.

1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Shown on WQMP Drawings	3 Permanent Controls—Listed in WQMP Table and Narrative	4 Operational BMPs—Included 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/

1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Shown on WQMP Drawings	3 Permanent Controls—Listed in WQMP Table and Narrative	4 Operational BMPs—Included 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.

1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Shown on WQMP Drawings	3 Permanent Controls—Listed in WQMP Table and Narrative	4 Operational BMPs—Included 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

1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Shown on WQMP Drawings	3 Permanent Controls—Listed in WQMP Table and Narrative	4 Operational BMPs—Included 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 ❑ Any drainage sumps on-site shall feature a sediment sump to reduce pumped water. ❑ Avoid roofing, gutters, and trim unprotected metals that may leach into runoff. Include controls for other sources as specified by local reviewer.	

1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Shown on WQMP Drawings	3 Permanent Controls—Listed in WQMP Table and Narrative	4 Operational BMPs—Included 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

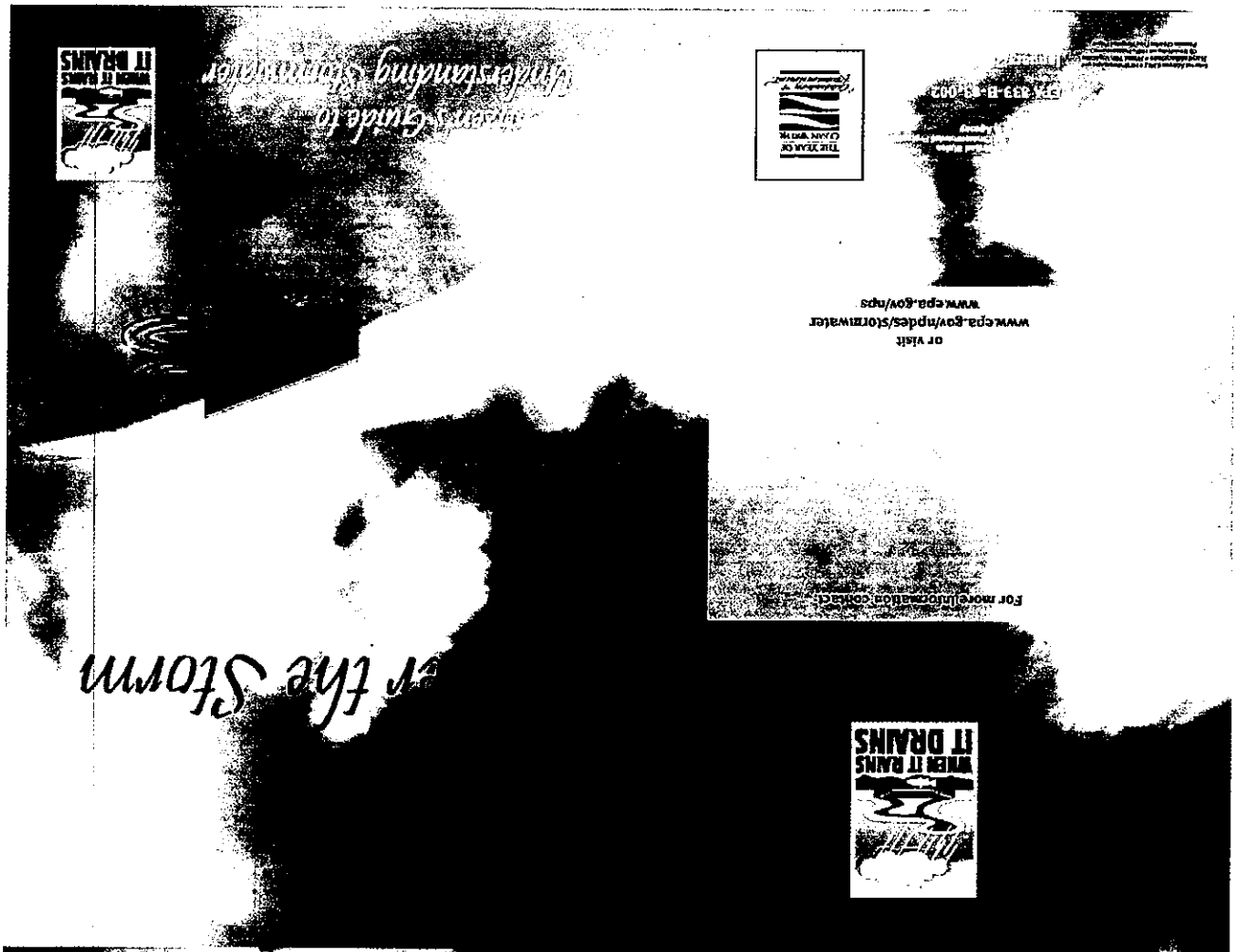
Operation and Maintenance Plan and Documentation of Finance, Maintenance and Recording Mechanisms

To be included in Final WQMP

Appendix 10: Educational Materials

Appendix of Included Materials

- *RCFC Homeowner Education Material*
- *SD-10 – Site Design and Landscape Planning*
- *SD-11 – Roof Runoff Controls*
- *SD-12 – Efficient Irrigation*
- *TC-11 – Infiltration Basin*
- *TC-30 – Vegetated Swale*



What is stormwater runoff?

Stormwater runoff occurs when precipitation from rain or snowmelt flows over the ground. Impervious surfaces like driveways, sidewalks, and streets prevent stormwater from naturally soaking into the ground.

Why is stormwater a problem?

Stormwater can pick up debris, chemicals, dirt, and other pollutants and flow into a storm sewer system or directly to a lake, stream, river, wetland, or coastal water. Anything that enters a storm sewer system is discharged untreated into the waterbodies we use for swimming, fishing, and providing drinking water.

The effects of pollution

Polluted stormwater runoff can have many adverse effects on plants, fish, animals, and people.

- Sediment can cloud the water and make it difficult or impossible for aquatic plants to grow. Sediment also can destroy aquatic habitats.
- Excess nutrients can cause algae blooms. When algae die, they sink to the bottom and decompose in a process that removes oxygen from the water. Fish and other aquatic organisms can't exist in water with low dissolved oxygen levels.
- Bacteria and other pathogens can wash into swimming areas and create health hazards, often making beach closures necessary.
- Debris—plastic bags, six-pack rings, bottles, and cigarette butts—washed into waterbodies can choke, suffocate, or disable aquatic life like ducks, fish, turtles, and birds.
- Household hazardous wastes like insecticides, pesticides, paint, solvents, used motor oil, and other auto fluids can poison aquatic life. Land animals and people can become sick or die from eating diseased fish and shellfish or ingesting polluted water.
- Polluted stormwater often affects drinking water sources. This, in turn, can affect human health and increase drinking water treatment costs.

Recycle or properly dispose of household products that contain chemicals, such as insecticides, pesticides, paint, solvents, and used motor oil and other auto fluids. Don't pour them onto the ground or into storm drains.

Lawn care

Excess fertilizers and pesticides applied to lawns and gardens wash off and pollute streams. In addition, yard clippings and leaves can wash into storm drains and contribute nutrients and organic matter to streams.

- Don't overwater your lawn. Consider using a soaker hose instead of a sprinkler.
- Use pesticides and fertilizers sparingly. When use is necessary, use these chemicals in the recommended amounts. Use organic mulch or safer pest control methods whenever possible.
- Compost or mulch yard waste. Don't leave it in the street or sweep it into storm drains or streams.
- Cover piles of dirt or mulch being used in landscaping projects.

Auto care

Washing your car and degreasing auto parts at home can send detergents and other contaminants through the storm sewer system. Dumping automotive fluids into storm drains has the same result as dumping the materials directly into a waterbody.

- Use a commercial car wash that treats or recycles its wastewater, or wash your car on your yard so the water infiltrates into the ground.
- Repair leaks and dispose of used auto fluids and batteries at designated drop-off or recycling locations.

Septic systems

Leaking and poorly maintained septic systems release nutrients and pathogens (bacteria and viruses) that can be picked up by stormwater and discharged into nearby waterbodies. Pathogens can cause public health problems and environmental concerns.

- Inspect your system every 3 years and pump your tank as necessary (every 3 to 5 years).
- Don't dispose of household hazardous waste in sinks or toilets.

Pet waste

Pet waste can be a major source of bacteria and excess nutrients in local waters.

- When walking your pet, remember to pick up the waste and dispose of it properly. Flushing pet waste is the best disposal method. Leaving pet waste on the ground increases public health risks by allowing harmful bacteria and nutrients to wash into the storm drain and eventually into local waterbodies.

Education is essential to changing people's behavior. Signs and markers near storm drains warn residents that pollutants entering the drains will be carried untreated into a local waterbody.

Residential landscaping

Permeable Pavement—Traditional concrete and asphalt don't allow water to soak into the ground. Instead these surfaces rely on storm drains to divert unwanted water. Permeable pavement systems allow rain and snowmelt to soak through, decreasing stormwater runoff.

Rain Barrels—You can collect rainwater from rooftops in mosquito-proof containers. The water can be used later on lawn or garden areas.

Rain Gardens and Grassy Swales—Specially designed areas planted with native plants can provide natural places for rainwater to collect and soak into the ground. Rain from rooftop areas or paved areas can be diverted into these areas rather than into storm drains.

Vegetated Filter Strips—Filter strips are areas of native grass or plants created along roadways or streams. They trap the pollutants stormwater picks up as it flows across driveways and streets.

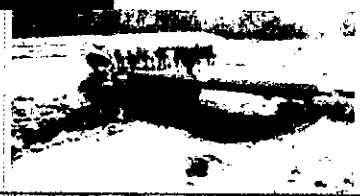
Dirt, oil, and debris that collect in parking lots and paved areas can be washed into the storm sewer system and eventually enter local waterbodies.

- Sweep up litter and debris from sidewalks, driveways and parking lots, especially around storm drains.
- Cover grease storage and dumpsters and keep them clean to avoid leaks.
- Report any chemical spill to the local hazardous waste cleanup team. They'll know the best way to keep spills from harming the environment.

Erosion controls that aren't maintained can cause excessive amounts of sediment and debris to be carried into the stormwater system. Construction vehicles can leak fuel, oil, and other harmful fluids that can be picked up by stormwater and deposited into local waterbodies.

- Divert stormwater away from disturbed or exposed areas of the construction site.
- Install silt fences, vehicle mud removal areas, vegetative cover, and other sediment and erosion controls and properly maintain them, especially after rainstorms.
- Prevent soil erosion by minimizing disturbed areas during construction projects, and seed and mulch bare areas as soon as possible.

Lack of vegetation on streambanks can lead to erosion. Overgrazed pastures can also contribute excessive amounts of sediment to local waterbodies. Excess fertilizers and pesticides can poison aquatic animals and lead to destructive algae blooms. Livestock in streams can contaminate waterways with bacteria, making them unsafe for human contact.



- Keep livestock away from streambanks and provide them a water source away from waterbodies.
- Store and apply manure away from waterbodies and in accordance with a nutrient management plan.
- Vegetate riparian areas along waterways.
- Rotate animal grazing to prevent soil erosion in fields.
- Apply fertilizers and pesticides according to label instructions to save money and minimize pollution.

Uncovered fueling stations allow spills to be washed into storm drains. Cars waiting to be repaired can leak fuel, oil, and other harmful fluids that can be picked up by stormwater.

- Clean up spills immediately and properly dispose of cleanup materials.
- Provide cover over fueling stations and design or retrofit facilities for spill containment.
- Properly maintain fleet vehicles to prevent oil, gas, and other discharges from being washed into local waterbodies.
- Install and maintain oil/water separators.

Improperly managed logging operations can result in erosion and sedimentation.

- Conduct preharvest planning to prevent erosion and lower costs.
- Use logging methods and equipment that minimize soil disturbance.
- Plan and design skid trails, yard areas, and truck access roads to minimize stream crossings and avoid disturbing the forest floor.
- Construct stream crossings so that they minimize erosion and physical changes to streams.
- Expedite revegetation of cleared areas.

Helpful telephone numbers and links:

Riverside County Stormwater Protection Partners

Flood Control District	(951) 955-1200
County of Riverside	(951) 955-1000
City of Banning	(951) 922-3105
City of Beaumont	(951) 769-8520
City of Calimesa	(909) 795-9801
City of Canyon Lake	(951) 244-2955
Cathedral City	(760) 770-0327
City of Coachella	(760) 398-4978
City of Corona	(951) 736-2447
City of Desert Hot Springs	(760) 329-6411
City of Eastvale	(951) 361-0900
City of Hemet	(951) 765-2300
City of Indian Wells	(760) 346-2489
City of Indio	(760) 391-4000
City of Lake Elsinore	(951) 674-3124
City of La Quinta	(760) 777-7000
City of Menifee	(951) 672-6777
City of Moreno Valley	(951) 413-3000
City of Murrieta	(951) 304-2489
City of Norco	(951) 270-5607
City of Palm Desert	(760) 346-0611
City of Palm Springs	(760) 323-8299
City of Perris	(951) 943-6100
City of Rancho Mirage	(760) 324-4511
City of Riverside	(951) 361-0900
City of San Jacinto	(951) 654-7337
City of Temecula	(951) 694-6444
City of Wildomar	(951) 677-7751

REPORT ILLEGAL STORM DRAIN DISPOSAL
1-800-506-2555 or e-mail us at
fcnpdes@rcflood.org

- Riverside County Flood Control and Water Conservation District
  www.rcflood.org

Online resources include:

- California Storm Water Quality Association
  www.casqa.org
- State Water Resources Control Board
  www.waterboards.ca.gov
- Power Washers of North America
  www.thepwna.org

Stormwater Pollution

What you should know for...

Outdoor Cleaning Activities and Professional Mobile Service Providers

Storm drain pollution prevention information for:

- Car Washing / Mobile Detailers
- Window and Carpet Cleaners
- Power Washers
- Waterproofers / Street Sweepers
- Equipment cleaners or degreasers and all mobile service providers

Do you know where street flows actually go?

Storm drains are NOT connected to sanitary sewer systems and treatment plants!

The primary purpose of storm drains is to carry *rain* water away from developed areas to prevent flooding. Pollutants discharged to storm drains are transported directly into rivers, lakes and streams. Soaps, degreasers, automotive fluids, litter and a host of materials are washed off buildings, sidewalks, plazas and parking areas. Vehicles and equipment must be properly managed to prevent the pollution of local waterways.

Unintentional spills by mobile service operators can flow into storm drains and pollute our waterways. **Avoid mishaps.** *Always* have a **Spill Response Kit** on hand to clean up unintentional spills. Only emergency Mechanical repairs should be done in City streets, using drip pans for spills. Plumbing should be done on private property. Always store chemicals in a leak-proof container and keep covered when not in use. Window/Power Washing waste water shouldn't be released into the streets, but should be disposed of in a sanitary sewer, landscaped area or in the soil. Soiled Carpet Cleaning wash water should be filtered before being discharged into the sanitary sewer. Dispose of all filter debris properly. Car Washing/Detailing operators should wash cars on private property and use a regulated hose nozzle for water flow control and runoff prevention. Capture and dispose of waste water and chemicals properly. Remember, storm drains are for receiving rain water runoff only.

REPORT ILLEGAL STORM DRAIN DISPOSAL 1-800-506-2555

Help Protect Our Waterways!

Use these guidelines for Outdoor Cleaning Activities and Wash Water Disposal

Did you know that disposing of pollutants into the street, gutter, storm drain or body of water is *PROHIBITED* by law and can result in stiff penalties?

Best Management Practices

Waste wash water from Mechanics, Plumbers, Window Power Washers, Carpet Cleaners, Car Washing and Mobile Detailing activities may contain significant quantities of motor oil, grease, chemicals, dirt, detergents, brake pad dust, litter and other materials.

Best Management Practices, or BMPs as they are known, are guides to prevent pollutants from entering the storm drains. *Each of us* can do our part to keep stormwater clean by using the suggested BMPs below:

Simple solutions for both light and heavy duty jobs:

Do...consider dry cleaning methods first such as a mop, broom, rag or wire brush. Always keep a spill response kit on site.

Do...prepare the work area before power cleaning by using sand bags, rubber mats, vacuum booms, containment pads or temporary berms to keep wash water away from the gutters and storm drains.

Do...use vacuums or other machines to remove and collect loose debris or litter before applying water.

Do...obtain the property owner's permission to dispose of *small amounts* of power washing waste water on to landscaped, gravel or unpaved surfaces.

Do...check your local sanitary sewer agency's policies on wash water disposal regulations before disposing of wash water into the sewer. (See list on reverse side)

Do...be aware that if discharging to landscape areas, soapy wash water may damage landscaping. Residual wash water may remain on paved surfaces to evaporate. Sweep up solid residuals and dispose of properly. Vacuum booms are another option for capturing and collecting wash water.

Do...check to see if local ordinances prevent certain activities.

Do not let...wash or waste water from sidewalk, plaza or building cleaning go into a street or storm drain.

Report illegal storm drain disposal
Call Toll Free
1-800-506-2555

Using Cleaning Agents

Try using biodegradable/phosphate-free products. They are easier on the environment, but don't confuse them with being toxic free. Soapy water entering the storm drain system can impact the delicate aquatic environment.

When cleaning surfaces with a *high-pressure washer* or *steam cleaner*, additional precautions should be taken to prevent the discharge of pollutants into the storm drain system. These two methods of surface cleaning can loosen additional material that can contaminate local waterways.

Think Water Conservation

Minimize water use by using high pressure, low volume nozzles. Be sure to check all hoses for leaks. Water is a precious resource, don't let it flow freely and be sure to shut it off in between uses.

Screening Wash Water

Conduct thorough dry cleanup before washing exterior surfaces, such as buildings and decks *with loose paint*, sidewalks or plaza areas. Keep debris from entering the storm drain after cleaning by first passing the wash water through a "20 mesh" or finer screen to catch the solid materials, then dispose of the mesh in a refuse container. Do not let the remaining wash water enter a street, gutter or storm drain.

Drain Inlet Protection & Collection of Wash Water

- Prior to any washing, block all storm drains with an impervious barrier such as sandbags or berms, or seal the storm drain with plugs or other appropriate materials.
- Create a containment area with berms and traps or take advantage of a low spot to keep wash water contained.
- Wash vehicles and equipment on grassy or gravel areas so that the wash water can seep into the ground.
- Pump or vacuum up all wash water in the contained area.

Concrete/Coring/Saw Cutting and Drilling Projects

Protect any down-gradient inlets by using dry activity techniques whenever possible. If water is used, minimize the amount of water used during the coring/drilling or saw cutting process. Place a barrier of sandbags and/or absorbent berms to protect the storm drain inlet or watercourse. Use a shovel or wet vacuum to remove the residue from the pavement. Do not wash residue or particulate matter into a storm drain inlet or watercourse.

Site Design & Landscape Planning SD-10

Design Objectives

- ☑ Maximize Infiltration
- ☑ Provide Retention
- ☑ Slow Runoff
- ☑ Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- Contain Pollutants
- Collect and Convey

Description

Each project site possesses unique topographic, hydrologic, and vegetative features, some of which are more suitable for development than others. Integrating and incorporating appropriate landscape planning methodologies into the project design is the most effective action that can be done to minimize surface and groundwater contamination from stormwater.

Approach

Landscape planning should couple consideration of land suitability for urban uses with consideration of community goals and projected growth. Project plan designs should conserve natural areas to the extent possible, maximize natural water storage and infiltration opportunities, and protect slopes and channels.

Suitable Applications

Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment.

Design Considerations

Design requirements for site design and landscapes planning should conform to applicable standards and specifications of agencies with jurisdiction and be consistent with applicable General Plan and Local Area Plan policies.

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Designing New Installations

Begin the development of a plan for the landscape unit with attention to the following general principles:

- Formulate the plan on the basis of clearly articulated community goals. Carefully identify conflicts and choices between retaining and protecting desired resources and community growth.
- Map and assess land suitability for urban uses. Include the following landscape features in the assessment: wooded land, open unwooded land, steep slopes, erosion-prone soils, foundation suitability, soil suitability for waste disposal, aquifers, aquifer recharge areas, wetlands, floodplains, surface waters, agricultural lands, and various categories of urban land use. When appropriate, the assessment can highlight outstanding local or regional resources that the community determines should be protected (e.g., a scenic area, recreational area, threatened species habitat, farmland, fish run). Mapping and assessment should recognize not only these resources but also additional areas needed for their sustenance.

Project plan designs should conserve natural areas to the extent possible, maximize natural water storage and infiltration opportunities, and protect slopes and channels.

Conserve Natural Areas during Landscape Planning

If applicable, the following items are required and must be implemented in the site layout during the subdivision design and approval process, consistent with applicable General Plan and Local Area Plan policies:

- Cluster development on least-sensitive portions of a site while leaving the remaining land in a natural undisturbed condition.
- Limit clearing and grading of native vegetation at a site to the minimum amount needed to build lots, allow access, and provide fire protection.
- Maximize trees and other vegetation at each site by planting additional vegetation, clustering tree areas, and promoting the use of native and/or drought tolerant plants.
- Promote natural vegetation by using parking lot islands and other landscaped areas.
- Preserve riparian areas and wetlands.

Maximize Natural Water Storage and Infiltration Opportunities Within the Landscape Unit

- Promote the conservation of forest cover. Building on land that is already deforested affects basin hydrology to a lesser extent than converting forested land. Loss of forest cover reduces interception storage, detention in the organic forest floor layer, and water losses by evapotranspiration, resulting in large peak runoff increases and either their negative effects or the expense of countering them with structural solutions.
- Maintain natural storage reservoirs and drainage corridors, including depressions, areas of permeable soils, swales, and intermittent streams. Develop and implement policies and

regulations to discourage the clearing, filling, and channelization of these features. Utilize them in drainage networks in preference to pipes, culverts, and engineered ditches.

- Evaluating infiltration opportunities by referring to the stormwater management manual for the jurisdiction and pay particular attention to the selection criteria for avoiding groundwater contamination, poor soils, and hydrogeological conditions that cause these facilities to fail. If necessary, locate developments with large amounts of impervious surfaces or a potential to produce relatively contaminated runoff away from groundwater recharge areas.

Protection of Slopes and Channels during Landscape Design

- Convey runoff safely from the tops of slopes.
- Avoid disturbing steep or unstable slopes.
- Avoid disturbing natural channels.
- Stabilize disturbed slopes as quickly as possible.
- Vegetate slopes with native or drought tolerant vegetation.
- Control and treat flows in landscaping and/or other controls prior to reaching existing natural drainage systems.
- Stabilize temporary and permanent channel crossings as quickly as possible, and ensure that increases in run-off velocity and frequency caused by the project do not erode the channel.
- Install energy dissipaters, such as riprap, at the outlets of new storm drains, culverts, conduits, or channels that enter unlined channels in accordance with applicable specifications to minimize erosion. Energy dissipaters shall be installed in such a way as to minimize impacts to receiving waters.
- Line on-site conveyance channels where appropriate, to reduce erosion caused by increased flow velocity due to increases in tributary impervious area. The first choice for linings should be grass or some other vegetative surface, since these materials not only reduce runoff velocities, but also provide water quality benefits from filtration and infiltration. If velocities in the channel are high enough to erode grass or other vegetative linings, riprap, concrete, soil cement, or geo-grid stabilization are other alternatives.
- Consider other design principles that are 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.

Redevelopment may present significant opportunity to add features which had not previously been implemented. Examples include incorporation of depressions, areas of permeable soils, and swales in newly redeveloped areas. While some site constraints may exist due to the status of already existing infrastructure, opportunities should not be missed to maximize infiltration, slow runoff, reduce impervious areas, disconnect directly connected impervious areas.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Stormwater Management Manual for Western Washington, Washington State Department of Ecology, August 2001.

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.

Roof Runoff Controls SD-11

Rain Garden

Design Objectives

- ☑ Maximize Infiltration
- ☑ Provide Retention
- ☑ Slow Runoff
- Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- ☑ Contain Pollutants
- Collect and Convey

Description

Various roof runoff controls are available to address stormwater that drains off rooftops. The objective is to reduce the total volume and rate of runoff from individual lots, and retain the pollutants on site that may be picked up from roofing materials and atmospheric deposition. Roof runoff controls consist of directing the roof runoff away from paved areas and mitigating flow to the storm drain system through one of several general approaches: cisterns or rain barrels; dry wells or infiltration trenches; pop-up emitters, and foundation planting. The first three approaches require the roof runoff to be contained in a gutter and downspout system. Foundation planting provides a vegetated strip under the drip line of the roof.

Approach

Design of individual lots for single-family homes as well as lots for higher density residential and commercial structures should consider site design provisions for containing and infiltrating roof runoff or directing roof runoff to vegetative swales or buffer areas. Retained water can be reused for watering gardens, lawns, and trees. Benefits to the environment include reduced demand for potable water used for irrigation, improved stormwater quality, increased groundwater recharge, decreased runoff volume and peak flows, and decreased flooding potential.

Suitable Applications

Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment.

Design Considerations

Designing New Installations

Cisterns or Rain Barrels

One method of addressing roof runoff is to direct roof downspouts to cisterns or rain barrels. A cistern is an above ground storage vessel with either a manually operated valve or a permanently open outlet. Roof runoff is temporarily stored and then released for irrigation or infiltration between storms. The number of rain

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barrels needed is a function of the rooftop area. Some low impact developers recommend that every house have at least 2 rain barrels, with a minimum storage capacity of 1000 liters. Roof barrels serve several purposes including mitigating the first flush from the roof which has a high volume, amount of contaminants, and thermal load. Several types of rain barrels are commercially available. Consideration must be given to selecting rain barrels that are vector proof and childproof. In addition, some barrels are designed with a bypass valve that filters out grit and other contaminants and routes overflow to a soak-away pit or rain garden.

If the cistern has an operable valve, the valve can be closed to store stormwater for irrigation or infiltration between storms. This system requires continual monitoring by the resident or grounds crews, but provides greater flexibility in water storage and metering. If a cistern is provided with an operable valve and water is stored inside for long periods, the cistern must be covered to prevent mosquitoes from breeding.

A cistern system with a permanently open outlet can also provide for metering stormwater runoff. If the cistern outlet is significantly smaller than the size of the downspout inlet (say ¼ to ½ inch diameter), runoff will build up inside the cistern during storms, and will empty out slowly after peak intensities subside. This is a feasible way to mitigate the peak flow increases caused by rooftop impervious land coverage, especially for the frequent, small storms.

Dry wells and Infiltration Trenches

Roof downspouts can be directed to dry wells or infiltration trenches. A dry well is constructed by excavating a hole in the ground and filling it with an open graded aggregate, and allowing the water to fill the dry well and infiltrate after the storm event. An underground connection from the downspout conveys water into the dry well, allowing it to be stored in the voids. To minimize sedimentation from lateral soil movement, the sides and top of the stone storage matrix can be wrapped in a permeable filter fabric, though the bottom may remain open. A perforated observation pipe can be inserted vertically into the dry well to allow for inspection and maintenance.

In practice, dry wells receiving runoff from single roof downspouts have been successful over long periods because they contain very little sediment. They must be sized according to the amount of rooftop runoff received, but are typically 4 to 5 feet square, and 2 to 3 feet deep, with a minimum of 1-foot soil cover over the top (maximum depth of 10 feet).

To protect the foundation, dry wells must be set away from the building at least 10 feet. They must be installed in solids that accommodate infiltration. In poorly drained soils, dry wells have very limited feasibility.

Infiltration trenches function in a similar manner and would be particularly effective for larger roof areas. An infiltration trench is a long, narrow, rock-filled trench with no outlet that receives stormwater runoff. These are described under Treatment Controls.

Pop-up Drainage Emitter

Roof downspouts can be directed to an underground pipe that daylights some distance from the building foundation, releasing the roof runoff through a pop-up emitter. Similar to a pop-up irrigation head, the emitter only opens when there is flow from the roof. The emitter remains flush to the ground during dry periods, for ease of lawn or landscape maintenance.

Foundation Planting

Landscape planting can be provided around the base to allow increased opportunities for stormwater infiltration and protect the soil from erosion caused by concentrated sheet flow coming off the roof. Foundation plantings can reduce the physical impact of water on the soil and provide a subsurface matrix of roots that encourage infiltration. These plantings must be sturdy enough to tolerate the heavy runoff sheet flows, and periodic soil saturation.

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.

Supplemental Information

Examples

- City of Ottawa's Water Links Surface –Water Quality Protection Program
- City of Toronto Downspout Disconnection Program
- City of Boston, MA, Rain Barrel Demonstration Program

Other Resources

Hager, Marty Catherine, Stormwater, "Low-Impact Development", January/February 2003. www.stormh2o.com

Low Impact Urban Design Tools, Low Impact Development Design Center, Beltsville, MD. www.lid-stormwater.net

Start at the Source, Bay Area Stormwater Management Agencies Association, 1999 Edition

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.

Infiltration Basin TC-11

Design Considerations

- Soil for Infiltration
- Slope
- Aesthetics

Targeted Constituents

☑	Sediment	■
☑	Nutrients	■
☑	Trash	■
☑	Metals	■
☑	Bacteria	■
☑	Oil and Grease	■
☑	Organics	■

Legend ***(Removal Effectiveness)***

● Low ■ High

▲ Medium

Description

An infiltration basin is a shallow impoundment that is designed to infiltrate stormwater. Infiltration basins use the natural filtering ability of the soil to remove pollutants in stormwater runoff. Infiltration facilities store runoff until it gradually exfiltrates through the soil and eventually into the water table. This practice has high pollutant removal efficiency and can also help recharge groundwater, thus helping to maintain low flows in stream systems. Infiltration basins can be challenging to apply on many sites, however, because of soils requirements. In addition, some studies have shown relatively high failure rates compared with other management practices.

California Experience

Infiltration basins have a long history of use in California, especially in the Central Valley. Basins located in Fresno were among those initially evaluated in the National Urban Runoff Program and were found to be effective at reducing the volume of runoff, while posing little long-term threat to groundwater quality (EPA, 1983; Schroeder, 1995). Proper siting of these devices is crucial as underscored by the experience of Caltrans in siting two basins in Southern California. The basin with marginal separation from groundwater and soil permeability failed immediately and could never be rehabilitated.

Advantages

- Provides 100% reduction in the load discharged to surface waters.
- The principal benefit of infiltration basins is the approximation of pre-development hydrology during which a

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significant portion of the average annual rainfall runoff is infiltrated and evaporated rather than flushed directly to creeks.

- If the water quality volume is adequately sized, infiltration basins can be useful for providing control of channel forming (erosion) and high frequency (generally less than the 2-year) flood events.

Limitations

- May not be appropriate for industrial sites or locations where spills may occur.
- Infiltration basins require a minimum soil infiltration rate of 0.5 inches/hour, not appropriate at sites with Hydrologic Soil Types C and D.
- If infiltration rates exceed 2.4 inches/hour, then the runoff should be fully treated prior to infiltration to protect groundwater quality.
- Not suitable on fill sites or steep slopes.
- Risk of groundwater contamination in very coarse soils.
- Upstream drainage area must be completely stabilized before construction.
- Difficult to restore functioning of infiltration basins once clogged.

Design and Sizing Guidelines

- Water quality volume determined by local requirements or sized so that 85% of the annual runoff volume is captured.
- Basin sized so that the entire water quality volume is infiltrated within 48 hours.
- Vegetation establishment on the basin floor may help reduce the clogging rate.

Construction/Inspection Considerations

- Before construction begins, stabilize the entire area draining to the facility. If impossible, place a diversion berm around the perimeter of the infiltration site to prevent sediment entrance during construction or remove the top 2 inches of soil after the site is stabililized. Stabilize the entire contributing drainage area, including the side slopes, before allowing any runoff to enter once construction is complete.
- Place excavated material such that it can not be washed back into the basin if a storm occurs during construction of the facility.
- Build the basin without driving heavy equipment over the infiltration surface. Any equipment driven on the surface should have extra-wide ("low pressure") tires. Prior to any construction, rope off the infiltration area to stop entrance by unwanted equipment.
- After final grading, till the infiltration surface deeply.
- Use appropriate erosion control seed mix for the specific project and location.

Performance

As water migrates through porous soil and rock, pollutant attenuation mechanisms include precipitation, sorption, physical filtration, and bacterial degradation. If functioning properly, this approach is presumed to have high removal efficiencies for particulate pollutants and moderate removal of soluble pollutants. Actual pollutant removal in the subsurface would be expected to vary depending upon site-specific soil types. This technology eliminates discharge to surface waters except for the very largest storms; consequently, complete removal of all stormwater constituents can be assumed.

There remain some concerns about the potential for groundwater contamination despite the findings of the NURP and Nightingale (1975; 1987a,b,c; 1989). For instance, a report by Pitt et al. (1994) highlighted the potential for groundwater contamination from intentional and unintentional stormwater infiltration. That report recommends that infiltration facilities not be sited in areas where high concentrations are present or where there is a potential for spills of toxic material. Conversely, Schroeder (1995) reported that there was no evidence of groundwater impacts from an infiltration basin serving a large industrial catchment in Fresno, CA.

Siting Criteria

The key element in siting infiltration basins is identifying sites with appropriate soil and hydrogeologic properties, which is critical for long term performance. In one study conducted in Prince George's County, Maryland (Galli, 1992), all of the infiltration basins investigated clogged within 2 years. It is believed that these failures were for the most part due to allowing infiltration at sites with rates of less than 0.5 in/hr, basing siting on soil type rather than field infiltration tests, and poor construction practices that resulted in soil compaction of the basin invert.

A study of 23 infiltration basins in the Pacific Northwest showed better long-term performance in an area with highly permeable soils (Hilding, 1996). In this study, few of the infiltration basins had failed after 10 years. Consequently, the following guidelines for identifying appropriate soil and subsurface conditions should be rigorously adhered to.

- Determine soil type (consider RCS soil type 'A, B or C' only) from mapping and consult USDA soil survey tables to review other parameters such as the amount of silt and clay, presence of a restrictive layer or seasonal high water table, and estimated permeability. The soil should not have more than 30% clay or more than 40% of clay and silt combined. Eliminate sites that are clearly unsuitable for infiltration.

- Groundwater separation should be at least 3 m from the basin invert to the measured ground water elevation. There is concern at the state and regional levels of the impact on groundwater quality from infiltrated runoff, especially when the separation between groundwater and the surface is small.

- Location away from buildings, slopes and highway pavement (greater than 6 m) and wells and bridge structures (greater than 30 m). Sites constructed of fill, having a base flow or with a slope greater than 15% should not be considered.

- Ensure that adequate head is available to operate flow splitter structures (to allow the basin to be offline) without ponding in the splitter structure or creating backwater upstream of the splitter.

- Base flow should not be present in the tributary watershed.

Secondary Screening Based on Site Geotechnical Investigation

- At least three in-hole conductivity tests shall be performed using USBR 7300-89 or Bouwer-Rice procedures (the latter if groundwater is encountered within the boring), two tests at different locations within the proposed basin and the third down gradient by no more than approximately 10 m. The tests shall measure permeability in the side slopes and the bed within a depth of 3 m of the invert.

- The minimum acceptable hydraulic conductivity as measured in any of the three required test holes is 13 mm/hr. If any test hole shows less than the minimum value, the site should be disqualified from further consideration.

- Exclude from consideration sites constructed in fill or partially in fill unless no silts or clays are present in the soil boring. Fill tends to be compacted, with clays in a dispersed rather than flocculated state, greatly reducing permeability.

- The geotechnical investigation should be such that a good understanding is gained as to how the stormwater runoff will move in the soil (horizontally or vertically) and if there are any geological conditions that could inhibit the movement of water.

Additional Design Guidelines

(1) Basin Sizing - The required water quality volume is determined by local regulations or sufficient to capture 85% of the annual runoff.

(2) Provide pretreatment if sediment loading is a maintenance concern for the basin.

(3) Include energy dissipation in the inlet design for the basins. Avoid designs that include a permanent pool to reduce opportunity for standing water and associated vector problems.

(4) Basin invert area should be determined by the equation:

$$A = \frac{WQV}{kt}$$

where A = Basin invert area (m^2)

WQV = water quality volume (m^3)

k = 0.5 times the lowest field-measured hydraulic conductivity (m/hr)

t = drawdown time (48 hr)

(5) The use of vertical piping, either for distribution or infiltration enhancement shall not be allowed to avoid device classification as a Class V injection well per 40 CFR146.5(e)(4).

Maintenance

Regular maintenance is critical to the successful operation of infiltration basins. Recommended operation and maintenance guidelines include:

- Inspections and maintenance to ensure that water infiltrates into the subsurface completely (recommended infiltration rate of 72 hours or less) and that vegetation is carefully managed to prevent creating mosquito and other vector habitats.
- Observe drain time for the design storm after completion or modification of the facility to confirm that the desired drain time has been obtained.
- Schedule semiannual inspections for beginning and end of the wet season to identify potential problems such as erosion of the basin side slopes and invert, standing water, trash and debris, and sediment accumulation.
- Remove accumulated trash and debris in the basin at the start and end of the wet season.
- Inspect for standing water at the end of the wet season.
- Trim vegetation at the beginning and end of the wet season to prevent establishment of woody vegetation and for aesthetic and vector reasons.
- Remove accumulated sediment and regrade when the accumulated sediment volume exceeds 10% of the basin.
- If erosion is occurring within the basin, revegetate immediately and stabilize with an erosion control mulch or mat until vegetation cover is established.
- To avoid reversing soil development, scarification or other disturbance should only be performed when there are actual signs of clogging, rather than on a routine basis. Always remove deposited sediments before scarification, and use a hand-guided rotary tiller, if possible, or a disc harrow pulled by a very light tractor.

Cost

Infiltration basins are relatively cost-effective practices because little infrastructure is needed when constructing them. One study estimated the total construction cost at about $2 per ft (adjusted for inflation) of storage for a 0.25-acre basin (SWRPC, 1991). As with other BMPs, these published cost estimates may deviate greatly from what might be incurred at a specific site. For instance, Caltrans spent about $18/ft^3 for the two infiltration basins constructed in southern California, each of which had a water quality volume of about 0.34 ac.-ft. Much of the higher cost can be attributed to changes in the storm drain system necessary to route the runoff to the basin locations.

Infiltration basins typically consume about 2 to 3% of the site draining to them, which is relatively small. Additional space may be required for buffer, landscaping, access road, and fencing. Maintenance costs are estimated at 5 to 10% of construction costs.

One cost concern associated with infiltration practices is the maintenance burden and longevity. If improperly maintained, infiltration basins have a high failure rate. Thus, it may be necessary to replace the basin with a different technology after a relatively short period of time.

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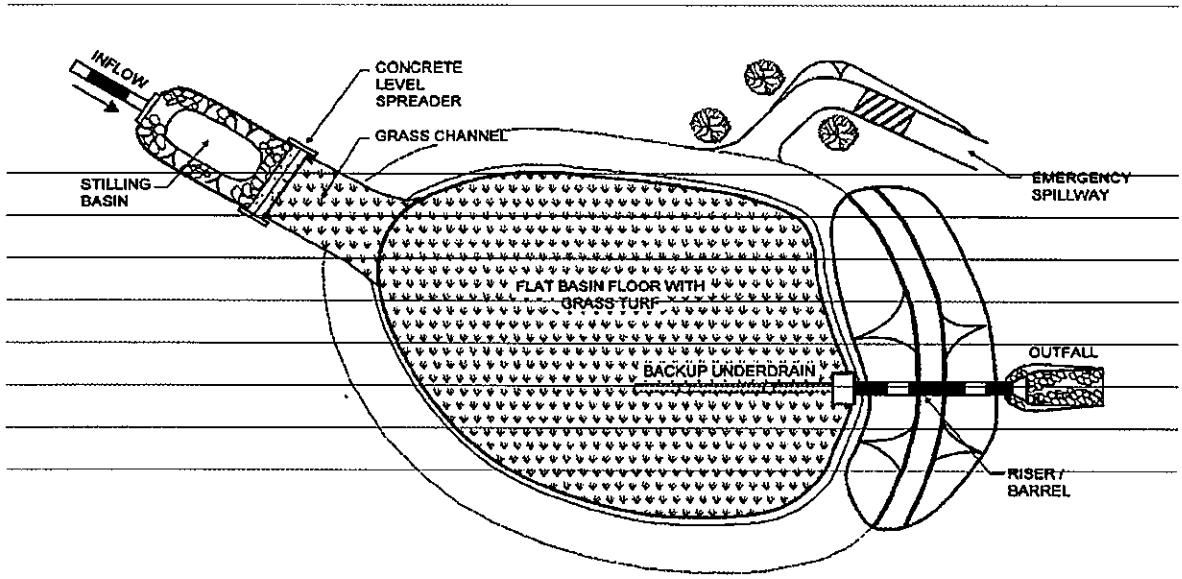
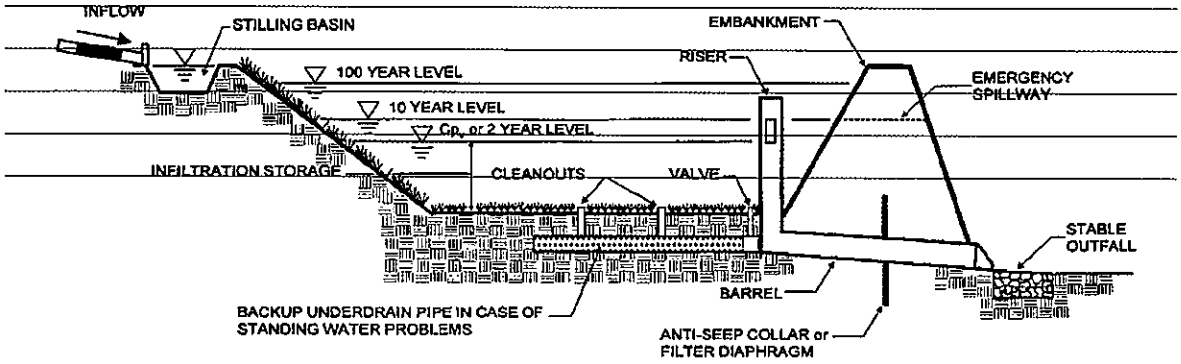


PLAN VIEW



PROFILE

Vegetated Swale TC-30

Design Considerations

- Tributary Area
- Area Required
- Slope
- Water Availability

Description

Vegetated swales are open, shallow channels with vegetation covering the side slopes and bottom that collect and slowly convey runoff flow to downstream discharge points. They are designed to treat runoff through filtering by the vegetation in the channel, filtering through a subsoil matrix, and/or infiltration into the underlying soils. Swales can be natural or manmade. They trap particulate pollutants (suspended solids and trace metals), promote infiltration, and reduce the flow velocity of stormwater runoff. Vegetated swales can serve as part of a stormwater drainage system and can replace curbs, gutters and storm sewer systems.

Targeted Constituents

☑	Sediment	▲
☑	Nutrients	●
☑	Trash	●
☑	Metals	▲
☑	Bacteria	●
☑	Oil and Grease	▲
☑	Organics	▲

Legend ***(Removal Effectiveness)***

● Low ■ High

▲ Medium

California Experience

Caltrans constructed and monitored six vegetated swales in southern California. These swales were generally effective in reducing the volume and mass of pollutants in runoff. Even in the areas where the annual rainfall was only about 10 inches/yr, the vegetation did not require additional irrigation. One factor that strongly affected performance was the presence of large numbers of gophers at most of the sites. The gophers created earthen mounds, destroyed vegetation, and generally reduced the effectiveness of the controls for TSS reduction.

Advantages

- If properly designed, vegetated, and operated, swales can serve as an aesthetic, potentially inexpensive urban development or roadway drainage conveyance measure with significant collateral water quality benefits.

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- Roadside ditches should be regarded as significant potential swale/buffer strip sites and should be utilized for this purpose whenever possible.

Limitations

- Can be difficult to avoid channelization.
- May not be appropriate for industrial sites or locations where spills may occur
- Grassed swales cannot treat a very large drainage area. Large areas may be divided and treated using multiple swales.
- A thick vegetative cover is needed for these practices to function properly.
- They are impractical in areas with steep topography.
- They are not effective and may even erode when flow velocities are high, if the grass cover is not properly maintained.
- In some places, their use is restricted by law: many local municipalities require curb and gutter systems in residential areas.
- Swales are mores susceptible to failure if not properly maintained than other treatment BMPs.

Design and Sizing Guidelines

- Flow rate based design determined by local requirements or sized so that 85% of the annual runoff volume is discharged at less than the design rainfall intensity.
- Swale should be designed so that the water level does not exceed 2/3rds the height of the grass or 4 inches, which ever is less, at the design treatment rate.
- Longitudinal slopes should not exceed 2.5%
- Trapezoidal channels are normally recommended but other configurations, such as parabolic, can also provide substantial water quality improvement and may be easier to mow than designs with sharp breaks in slope.
- Swales constructed in cut are preferred, or in fill areas that are far enough from an adjacent slope to minimize the potential for gopher damage. Do not use side slopes constructed of fill, which are prone to structural damage by gophers and other burrowing animals.
- A diverse selection of low growing, plants that thrive under the specific site, climatic, and watering conditions should be specified. Vegetation whose growing season corresponds to the wet season are preferred. Drought tolerant vegetation should be considered especially for swales that are not part of a regularly irrigated landscaped area.
- The width of the swale should be determined using Manning's Equation using a value of 0.25 for Manning's n.

Construction/Inspection Considerations

- Include directions in the specifications for use of appropriate fertilizer and soil amendments based on soil properties determined through testing and compared to the needs of the vegetation requirements.
- Install swales at the time of the year when there is a reasonable chance of successful establishment without irrigation; however, it is recognized that rainfall in a given year may not be sufficient and temporary irrigation may be used.
- If sod tiles must be used, they should be placed so that there are no gaps between the tiles; stagger the ends of the tiles to prevent the formation of channels along the swale or strip.
- Use a roller on the sod to ensure that no air pockets form between the sod and the soil.
- Where seeds are used, erosion controls will be necessary to protect seeds for at least 75 days after the first rainfall of the season.

Performance

The literature suggests that vegetated swales represent a practical and potentially effective technique for controlling urban runoff quality. While limited quantitative performance data exists for vegetated swales, it is known that check dams, slight slopes, permeable soils, dense grass cover, increased contact time, and small storm events all contribute to successful pollutant removal by the swale system. Factors decreasing the effectiveness of swales include compacted soils, short runoff contact time, large storm events, frozen ground, short grass heights, steep slopes, and high runoff velocities and discharge rates.

Conventional vegetated swale designs have achieved mixed results in removing particulate pollutants. A study performed by the Nationwide Urban Runoff Program (NURP) monitored three grass swales in the Washington, D.C., area and found no significant improvement in urban runoff quality for the pollutants analyzed. However, the weak performance of these swales was attributed to the high flow velocities in the swales, soil compaction, steep slopes, and short grass height.

Another project in Durham, NC, monitored the performance of a carefully designed artificial swale that received runoff from a commercial parking lot. The project tracked 11 storms and concluded that particulate concentrations of heavy metals (Cu, Pb, Zn, and Cd) were reduced by approximately 50 percent. However, the swale proved largely ineffective for removing soluble nutrients.

The effectiveness of vegetated swales can be enhanced by adding check dams at approximately 17 meter (50 foot) increments along their length (See Figure 1). These dams maximize the retention time within the swale, decrease flow velocities, and promote particulate settling. Finally, the incorporation of vegetated filter strips parallel to the top of the channel banks can help to treat sheet flows entering the swale.

Only 9 studies have been conducted on all grassed channels designed for water quality (Table 1). The data suggest relatively high removal rates for some pollutants, but negative removals for some bacteria, and fair performance for phosphorus.

Table 1 Grassed swale pollutant removal efficiency data

Removal Efficiencies (% Removal)							
Study	TSS	TP	TN	NO_3	Metals	Bacteria	Type
Caltrans 2002	77	8	67	66	83-90	-33	dry swales
Goldberg 1993	67.8	4.5	-	31.4	42–62	-100	grassed channel
Seattle Metro and Washington Department of Ecology 1992	60	45	-	-25	2–16	-25	grassed channel
Seattle Metro and Washington Department of Ecology, 1992	83	29	-	-25	46–73	-25	grassed channel
Wang et al., 1981	80	-	-	-	70–80	-	dry swale
Dorman et al., 1989	98	18	-	45	37–81	-	dry swale
Harper, 1988	87	83	84	80	88–90	-	dry swale
Kercher et al., 1983	99	99	99	99	99	-	dry swale
Harper, 1988.	81	17	40	52	37–69	-	wet swale
Koon, 1995	67	39	-	9	-35 to 6	-	wet swale

While it is difficult to distinguish between different designs based on the small amount of available data, grassed channels generally have poorer removal rates than wet and dry swales, although some swales appear to export soluble phosphorus (Harper, 1988; Koon, 1995). It is not clear why swales export bacteria. One explanation is that bacteria thrive in the warm swale soils.

Siting Criteria

The suitability of a swale at a site will depend on land use, size of the area serviced, soil type, slope, imperviousness of the contributing watershed, and dimensions and slope of the swale system (Schueler et al., 1992). In general, swales can be used to serve areas of less than 10 acres, with slopes no greater than 5 %. Use of natural topographic lows is encouraged and natural drainage courses should be regarded as significant local resources to be kept in use (Young et al., 1996).

Selection Criteria (NCTCOG, 1993)

- Comparable performance to wet basins
- Limited to treating a few acres
- Availability of water during dry periods to maintain vegetation
- Sufficient available land area

Research in the Austin area indicates that vegetated controls are effective at removing pollutants even when dormant. Therefore, irrigation is not required to maintain growth during dry periods, but may be necessary only to prevent the vegetation from dying.

The topography of the site should permit the design of a channel with appropriate slope and cross-sectional area. Site topography may also dictate a need for additional structural controls. Recommendations for longitudinal slopes range between 2 and 6 percent. Flatter slopes can be used, if sufficient to provide adequate conveyance. Steep slopes increase flow velocity, decrease detention time, and may require energy dissipating and grade check. Steep slopes also can be managed using a series of check dams to terrace the swale and reduce the slope to within acceptable limits. The use of check dams with swales also promotes infiltration.

Additional Design Guidelines

Most of the design guidelines adopted for swale design specify a minimum hydraulic residence time of 9 minutes. This criterion is based on the results of a single study conducted in Seattle, Washington (Seattle Metro and Washington Department of Ecology, 1992), and is not well supported. Analysis of the data collected in that study indicates that pollutant removal at a residence time of 5 minutes was not significantly different, although there is more variability in that data. Therefore, additional research in the design criteria for swales is needed. Substantial pollutant removal has also been observed for vegetated controls designed solely for conveyance (Barrett et al, 1998); consequently, some flexibility in the design is warranted.

Many design guidelines recommend that grass be frequently mowed to maintain dense coverage near the ground surface. Recent research (Colwell et al., 2000) has shown mowing frequency or grass height has little or no effect on pollutant removal.

Summary of Design Recommendations

1) The swale should have a length that provides a minimum hydraulic residence time of at least 10 minutes. The maximum bottom width should not exceed 10 feet unless a dividing berm is provided. The depth of flow should not exceed 2/3rds the height of the grass at the peak of the water quality design storm intensity. The channel slope should not exceed 2.5%.

2) A design grass height of 6 inches is recommended.

3) Regardless of the recommended detention time, the swale should be not less than 100 feet in length.

4) The width of the swale should be determined using Manning's Equation, at the peak of the design storm, using a Manning's n of 0.25.

5) The swale can be sized as both a treatment facility for the design storm and as a conveyance system to pass the peak hydraulic flows of the 100-year storm if it is located "on-line." The side slopes should be no steeper than 3:1 (H:V).

6) Roadside ditches should be regarded as significant potential swale/buffer strip sites and should be utilized for this purpose whenever possible. If flow is to be introduced through curb cuts, place pavement slightly above the elevation of the vegetated areas. Curb cuts should be at least 12 inches wide to prevent clogging.

7) Swales must be vegetated in order to provide adequate treatment of runoff. It is important to maximize water contact with vegetation and the soil surface. For general purposes, select fine, close-growing, water-resistant grasses. If possible, divert runoff (other than necessary irrigation) during the period of vegetation

establishment. Where runoff diversion is not possible, cover graded and seeded areas with suitable erosion control materials.

Maintenance

The useful life of a vegetated swale system is directly proportional to its maintenance frequency. If properly designed and regularly maintained, vegetated swales can last indefinitely. The maintenance objectives for vegetated swale systems include keeping up the hydraulic and removal efficiency of the channel and maintaining a dense, healthy grass cover.

Maintenance activities should include periodic mowing (with grass never cut shorter than the design flow depth), weed control, watering during drought conditions, reseeding of bare areas, and clearing of debris and blockages. Cuttings should be removed from the channel and disposed in a local composting facility. Accumulated sediment should also be removed manually to avoid concentrated flows in the swale. The application of fertilizers and pesticides should be minimal.

Another aspect of a good maintenance plan is repairing damaged areas within a channel. For example, if the channel develops ruts or holes, it should be repaired utilizing a suitable soil that is properly tamped and seeded. The grass cover should be thick; if it is not, reseed as necessary. Any standing water removed during the maintenance operation must be disposed to a sanitary sewer at an approved discharge location. Residuals (e.g., silt, grass cuttings) must be disposed in accordance with local or State requirements. Maintenance of grassed swales mostly involves maintenance of the grass or wetland plant cover. Typical maintenance activities are summarized below:

- Inspect swales at least twice annually for erosion, damage to vegetation, and sediment and debris accumulation preferably at the end of the wet season to schedule summer maintenance and before major fall runoff to be sure the swale is ready for winter. However, additional inspection after periods of heavy runoff is desirable. The swale should be checked for debris and litter, and areas of sediment accumulation.

- Grass height and mowing frequency may not have a large impact on pollutant removal. Consequently, mowing may only be necessary once or twice a year for safety or aesthetics or to suppress weeds and woody vegetation.

- Trash tends to accumulate in swale areas, particularly along highways. The need for litter removal is determined through periodic inspection, but litter should always be removed prior to mowing.

- Sediment accumulating near culverts and in channels should be removed when it builds up to 75 mm (3 in.) at any spot, or covers vegetation.

- Regularly inspect swales for pools of standing water. Swales can become a nuisance due to mosquito breeding in standing water if obstructions develop (e.g. debris accumulation, invasive vegetation) and/or if proper drainage slopes are not implemented and maintained.

Cost

Construction Cost

Little data is available to estimate the difference in cost between various swale designs. One study (SWRPC, 1991) estimated the construction cost of grassed channels at approximately \$0.25 per ft^2. This price does not include design costs or contingencies. Brown and Schueler (1997) estimate these costs at approximately 32 percent of construction costs for most stormwater management practices. For swales, however, these costs would probably be significantly higher since the construction costs are so low compared with other practices. A more realistic estimate would be a total cost of approximately \$0.50 per ft^2, which compares favorably with other stormwater management practices.

Table 2 Swale Cost Estimate (SEWRPC, 1991)

Component	Unit	Extent	Unit Cost			Total Cost		
			Low	Moderate	High	Low	Moderate	High
Mobilization / Demobilization-Light	Swale	1	$107	$274	$441	$107	$274	$441
Site Preparation								
Clearing[b].....	Acre	0.5	$2,200	$3,800	$5,400	$1,100	$1,900	$2,700
Grubbing[c].....	Acre	0.25	$3,800	$5,200	$6,600	$950	$1,300	$1,650
General Excavation[d].....	Yd^3	372	$2.10	$3.70	$5.30	$781	$1,376	$1,972
Level and Till[e].....	Yd^2	1,210	$0.20	$0.35	$0.50	$242	$424	$605
Sites Development								
Salvaged Topsoil Seed, and Mulch[f]..	Yd^2	1,210	$0.40	$1.00	$1.60	$484	$1,210	$1,936
Sod[g].....	Yd^2	1,210	$1.20	$2.40	$3.60	$1,452	$2,904	$4,356
Subtotal	--	–	--	–	--	$5,116	$9,388	$13,660
Contingencies	Swale	1	25%	25%	25%	$1,279	$2,347	$3,415
Total	--	–	--	–	--	$6,395	$11,735	$17,075

Source: (SEWRPC, 1991)

Note: Mobilization/demobilization refers to the organization and planning involved in establishing a vegetative swale.

[a] Swale has a bottom width of 1.0 foot, a top width of 10 feet with 1:3 side slopes, and a 1,000-foot length.

[b] Area cleared = (top width + 10 feet) x swale length.

[c] Area grubbed = (top width x swale length).

[d] Volume excavated = (0.67 x top width x swale depth) x swale length (parabolic cross-section).

[e] Area tilled = $\left(\text{top width} + \frac{8(\text{swale depth}^2)}{3(\text{top width})}\right) \times \text{swale length}$ (parabolic cross-section).

[f] Area seeded = area cleared x 0.5.

[g] Area sodded = area cleared x 0.5.

Table 3 Estimated Maintenance Costs (SEWRPC, 1991)

Component	Unit Cost	Swale Size (Depth and Top Width)		Comment
		1.5 Foot Depth, One-Foot Bottom Width, 10-Foot Top Width	3-Foot Depth, 3-Foot Bottom Width, 21-Foot Top Width	
Lawn Mowing	$0.85 / 1,000 ft^2/ mowing	$0.14 / linear foot	$0.21 / linear foot	Lawn maintenance area=(top width + 10 feet) x length. Mow eight times per year
General Lawn Care	$9.00 / 1,000 ft^2/ year	$0.18 / linear foot	$0.28 / linear foot	Lawn maintenance area = (top width + 10 feet) x length
Swale Debris and Litter Removal	$0.10 / linear foot / year	$0.10 / linear foot	$0.10 / linear foot	–
Grass Reseeding with Mulch and Fertilizer	$0.30 / yd^2	$0.01 / linear foot	$0.01 / linear foot	Area revegetated equals 1% of lawn maintenance area per year
Program Administration and Swale Inspection	$0.15 / linear foot / year, plus $25 / inspection	$0.15 / linear foot	$0.15 / linear foot	Inspect four times per year
Total	--	**$0.58 / linear foot**	**$ 0.75 / linear foot**	–

Maintenance Cost

Caltrans (2002) estimated the expected annual maintenance cost for a swale with a tributary area of approximately 2 ha at approximately $2,700. Since almost all maintenance consists of mowing, the cost is fundamentally a function of the mowing frequency. Unit costs developed by SEWRPC are shown in Table 3. In many cases vegetated channels would be used to convey runoff and would require periodic mowing as well, so there may be little additional cost for the water quality component. Since essentially all the activities are related to vegetation management, no special training is required for maintenance personnel.

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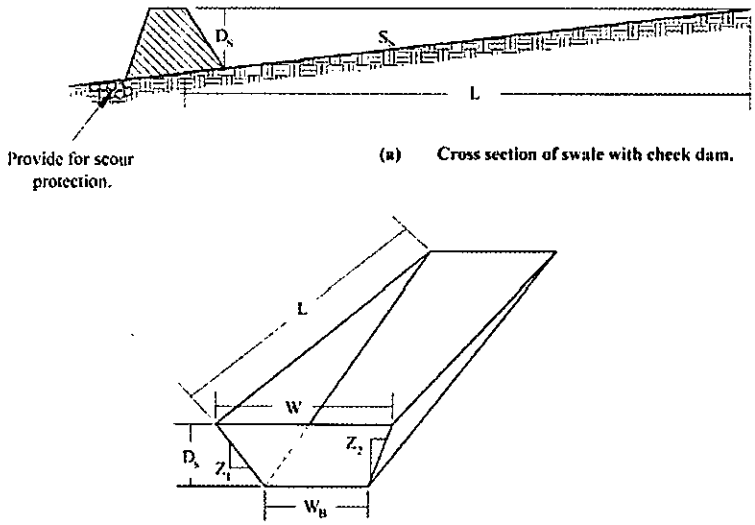

(a) Cross section of swale with check dam.

(b) Dimensional view of swale impoundment area.

Notation:

L = Length of swale impoundment area per check dam (ft)
D_s = Depth of check dam (ft)
S_s = Bottom slpe of swale (ft/ft)
W = Top width of check dam (ft)
W_B = Bottom width of check dam (ft)
$Z_{1\&2}$ = Ratio of horizontal to vertical change in swale side slope (ft/ft)

Appendix H:
Noise and Vibration Impact Analysis

NOISE AND VIBRATION IMPACT ANALYSIS

HAWTHORNE RESIDENTIAL DEVELOPMENT PROJECT

9170 INDIANA AVENUE, RIVERSIDE, CALIFORNIA

LSA

August 2017

NOISE AND VIBRATION IMPACT ANALYSIS

HAWTHORNE RESIDENTIAL DEVELOPMENT PROJECT

9170 INDIANA AVENUE, RIVERSIDE, CALIFORNIA

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Project No. SWK1502

August 2017

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HAWTHORNE RESIDENTIAL DEVELOPMENT PROJECT

INTRODUCTION

This noise impact analysis has been prepared to evaluate the potential noise impacts and mitigation measures associated with the proposed residential development project (project) located at 9170 Indiana Avenue in the City of Riverside (City), Riverside County (County), California. This report is intended to satisfy the City's requirement for a project-specific noise and vibration impact analysis by examining the impacts of the proposed uses on adjacent noise-sensitive uses as well as the noise impacts on the proposed uses on the project site, and evaluating the mitigation measures required as part of the project design.

Project Location

The project site is a former elementary school located south of Indiana Avenue and north of existing railroad tracks, between Gibson Street and Jackson Street in the City of Riverside, Riverside County. Figure 1 shows the project location map.

Land Uses in the Project Vicinity

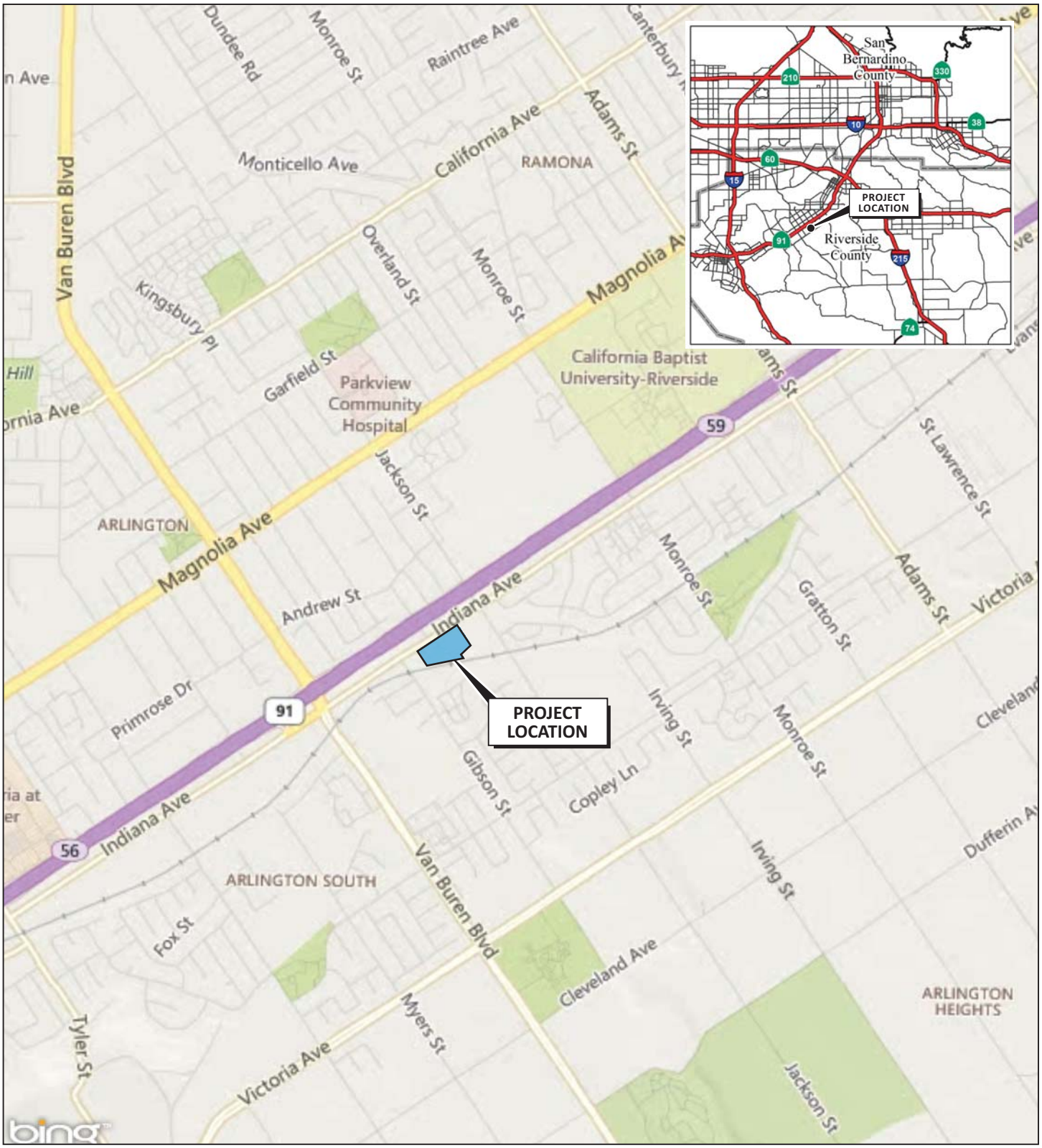
The project site is surrounded primarily by residential development, with the nearest residential use east of the project site having a garage located approximately 7.5 feet (ft) from the property line and the residence located approximately 25 ft from the property line. The areas adjacent to the project site include the following uses:

- **North:** Residential uses on the north side of Indiana Avenue
- **East:** Vacant land and single-family residential development
- **South:** Burlington Northern Santa Fe (BNSF) Railway right-of-way with substation, vacant land, and single-family residential development farther south
- **West:** Vacant land and single-family residential development farther west

Project Description

The project consists of the construction of 54 single-family dwelling units on approximately 6.85 acres (ac). The proposed single-family lot sizes range from 2,853 square feet (sf) to 5,434 sf. Three floor plans are proposed that range in size from 1,835 to 2,107 sf. Figure 2 illustrates the site plan.

The proposed uses are not consistent with the current Zoning and General Plan designation. Thus, a Rezone (P16-0113) and General Plan Amendment (P16-0112) are being processed along with the Planned Residential Development (P16-0111), Tentative Tract Map (P16-0114), and Variance (P16-0883) applications.



LSA

FIGURE 1

N

0 1000 2000

FEET

SOURCE: Bing Maps

Hawthorne Residential Development Project

Project Location Map

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LSA

FIGURE 2

N

0 70 140
FEET

Hawthorne Residential Development Project

Site Plan

SOURCE: SDH and Associates, Inc. February, 2016.

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METHODOLOGY

The evaluation of noise and vibration impacts associated with the proposed project included the following:

- Conducted short-term ambient noise measurements at representative noise-sensitive locations.
- Determined the short-term construction noise and vibration impacts on off-site noise-sensitive uses.
- Determined the long-term traffic and train noise impacts on on-site noise-sensitive uses.
- Determined the long-term traffic and train vibration impacts on on-site noise-sensitive uses.
- Determined the long-term stationary source noise impacts on off-site noise-sensitive uses.
- Determined the required mitigation measures to reduce long-term on-site and off-site noise and vibration impacts.

CHARACTERISTICS OF SOUND

Sound is increasing to such disagreeable levels in the environment that it can threaten quality of life. Noise is usually defined as unwanted sound. Noise consists of any sound that may produce physiological or psychological damage and/or interfere with communication, work, rest, recreation, and sleep.

To the human ear, sound has two significant characteristics: pitch and loudness. Pitch is generally an annoyance, while loudness can affect the ability to hear. Pitch is the number of complete vibrations, or cycles per second, of a wave resulting in the tone's range from high to low. Loudness is the strength of a sound that describes a noisy or quiet environment and is measured by the amplitude of the sound wave. Loudness is determined by the intensity of the sound waves combined with the reception characteristics of the human ear. Sound intensity refers to how hard the sound wave strikes an object, which in turn produces the sound's effect. This characteristic of sound can be precisely measured with instruments. The analysis of a project defines the noise environment of the project area in terms of sound intensity and its effect on adjacent sensitive land uses.

Measurement of Sound

Sound intensity is measured through the A-weighted scale to correct for the relative frequency response of the human ear. That is, an A-weighted noise level de-emphasizes low and very high frequencies of sound similar to the human ear's de-emphasis of these frequencies. Unlike linear units (e.g., inches or pounds) decibels are measured on a logarithmic scale representing points on a sharply rising curve.

For example, 10 decibels (dB) is 10 times more intense than 1 dB, 20 dB is 100 times more intense than 1 dB, and 30 dB is 1,000 times more intense than 1 dB. Thirty decibels (30 dB) represents 1,000 times as much acoustic energy as 1 dB. The decibel scale increases as the square of the change, representing the sound pressure energy. A sound as soft as human breathing is about 10 times greater than 0 dB. The decibel system of measuring sound gives a rough connection between the physical intensity of sound and its perceived loudness to the human ear. A 10 dB increase in sound level is perceived by the human ear as only a doubling of the loudness of the sound. Ambient sounds generally range from 30 dB (very quiet) to 100 dB (very loud).

Sound levels are generated from a source, and their decibel level decreases as the distance from that source increases. Sound dissipates exponentially with distance from the noise source. For a single-point source, sound levels decrease approximately 6 dB for each doubling of distance from the source. This drop-off rate is appropriate for noise generated by stationary equipment. If noise is produced by a line source (e.g., highway traffic or railroad operations), the sound decreases 3 dB for each doubling of distance in a hard site environment. Line source (noise in a relatively flat environment with absorptive vegetation) decreases 4.5 dB for each doubling of distance.

There are many ways to rate noise for various time periods, but an appropriate rating of ambient noise affecting humans also accounts for the annoying effects of sound. The equivalent continuous sound level (L_{eq}) is the total sound energy of time-varying noise over a sample period. However, the predominant rating scales for human communities in the State of California are the L_{eq} and Community Noise Equivalent Level (CNEL) or the day-night average noise level (L_{dn}) based on A-weighted decibels (dBA). CNEL is the time-varying noise over a 24-hour period, with a 5 dBA weighting factor applied to the hourly L_{eq} for noises occurring from 7:00 p.m. to 10:00 p.m. (defined as relaxation hours), and a 10 dBA weighting factor applied to noises occurring from 10:00 p.m. to 7:00 a.m. (defined as sleeping hours). L_{dn} is similar to the CNEL scale but without the adjustment for events occurring during the evening hours. CNEL and L_{dn} are within 1 dBA of each other and are normally interchangeable. The City uses the CNEL noise scale for long-term noise impact assessment.

Other noise rating scales of importance when assessing the annoyance factor include the maximum instantaneous noise level (L_{max}), which is the highest exponential time-averaged sound level that occurs during a stated time period. The noise environments discussed in this analysis for short-term noise impacts are specified in terms of maximum levels denoted by L_{max}, which reflects peak operating conditions and addresses the annoying aspects of intermittent noise. It is often used together with another noise scale, or noise standards in terms of percentile noise levels, in noise ordinances for enforcement purposes. For example, the L_{10} noise level represents the noise level exceeded 10 percent of the time during a stated period. The L_{50} noise level represents the median noise level. Half the time the noise level exceeds this level, and half the time it is less than this level. The L_{90} noise level represents the noise level exceeded 90 percent of the time and is considered the background noise level during a monitoring period. For a relatively constant noise source, the L_{eq} and L_{50} are approximately the same.

Noise impacts can be described in three categories. The first category includes audible impacts that refer to increases in noise levels noticeable to humans. Audible increases in noise levels generally refer to a change of 3 dB or greater because this level has been found to be barely perceptible in exterior environments. The second category, potentially audible, refers to a change in the noise level between 1 dB and 3 dB. This range of noise levels has been found to be noticeable only in laboratory environments. The last category includes changes in noise levels of less than 1 dB, which are inaudible to the human ear. Only audible changes in existing ambient or background noise levels are considered potentially significant.

Physiological Effects of Noise

Physical damage to human hearing begins at prolonged exposure to noise levels higher than 85 dBA. Exposure to high noise levels affects the entire system, with prolonged noise exposure in excess of

75 dBA increasing body tensions, thereby affecting blood pressure and functions of the heart and the nervous system. In comparison, extended periods of noise exposure above 90 dBA would result in permanent cell damage. When the noise level reaches 120 dBA, a tickling sensation occurs in the human ear, even with short-term exposure. This level of noise is called the threshold of feeling. As the sound reaches 140 dBA, the tickling sensation is replaced by the feeling of pain in the ear (the threshold of pain). A sound level of 160–165 dBA will result in dizziness or loss of equilibrium. The ambient or background noise problem is widespread and generally more concentrated in urban areas than in outlying, less developed areas. Table A lists definitions of acoustical terms, and Table B shows common sound levels and their sources.

FUNDAMENTALS OF VIBRATION

Vibration refers to ground-borne noise and perceptible motion. Ground-borne vibration is almost exclusively a concern inside buildings and is rarely perceived as a problem outdoors, where the motion may be discernible but without the effects associated with the shaking of a building, there is less adverse reaction. Vibration energy propagates from a source through intervening soil and rock layers to the foundations of nearby buildings. The vibration then propagates from the foundation throughout the remainder of the structure. Building vibration may be perceived by occupants as the motion of building surfaces, the rattling of items on shelves or hanging on walls, or a low-frequency rumbling noise. The rumbling noise is caused by the vibration of walls, floors, and ceilings that radiate sound waves. Annoyance from vibration often occurs when the vibration exceeds the threshold of perception by 10 vibration velocity decibels (VdB). This is an order of magnitude below the damage threshold for normal buildings.

Typical sources of ground-borne vibration are construction activities (e.g., blasting, pile driving, and operating heavy-duty earthmoving equipment), steel-wheeled trains, and occasional traffic on rough roads. Problems with both ground-borne vibration and noise from these sources are usually localized to areas within approximately 100 ft of the vibration source, although there are examples of ground-borne vibration causing interference out to distances greater than 200 ft (FTA 2006). When roadways are smooth, vibration from traffic, even heavy trucks, is rarely perceptible. It is assumed for most projects that the roadway surface will be smooth enough that ground-borne vibration from street traffic will not exceed the impact criteria; however, both construction of a project and freight train operations on railroad tracks could result in ground-borne vibration that may be perceptible and annoying.

Ground-borne noise is not likely to be a problem because noise arriving via the normal airborne path will usually be greater than ground-borne noise. Ground-borne vibration has the potential to disturb people and damage buildings. Although it is very rare for train-induced ground-borne vibration to cause even cosmetic building damage, it is not uncommon for heavy-duty construction processes (e.g., blasting and pile driving) to cause vibration of sufficient amplitudes to damage nearby buildings (FTA 2006). Ground-borne vibration is usually measured in terms of vibration velocity, either the root-mean-square (RMS) velocity or peak particle velocity (PPV). The RMS is best for characterizing human response to building vibration, and PPV is used to characterize potential for damage. Decibel notation acts to compress the range of numbers required to describe vibration. Vibration velocity level in decibels is defined as:

$$L_v = 20 \log_{10} [V/V_{ref}]$$

Table A: Definitions of Acoustical Terms

Term	Definitions
Decibel, dB	A unit of level that denotes the ratio between two quantities proportional to power; the number of decibels is 10 times the logarithm (to the base 10) of this ratio.
Frequency, Hz	Of a function periodic in time, the number of times that the quantity repeats itself in one second (i.e., number of cycles per second).
A-Weighted Sound Level, dBA	The sound level obtained by use of A-weighting. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound levels in this report are A-weighted, unless reported otherwise.
L_{01}, L_{10}, L_{50}, L_{90}	The fast A-weighted noise levels equaled or exceeded by a fluctuating sound level for 1 percent, 10 percent, 50 percent, and 90 percent of a stated time period.
Equivalent Continuous Noise Level, L_{eq}	The level of a steady sound that, in a stated time period and at a stated location, has the same A-weighted sound energy as the time varying sound.
Community Noise Equivalent Level, CNEL	The 24-hour A-weighted average sound level from midnight to midnight, obtained after the addition of 5 dB to sound levels occurring in the evening from 7:00 p.m. to 10:00 p.m. and after the addition of 10 dB to sound levels occurring in the night between 10:00 p.m. and 7:00 a.m.
Day/Night Noise Level, L_{dn}	The 24-hour A-weighted average sound level from midnight to midnight, obtained after the addition of 10 dB to sound levels occurring in the night between 10:00 p.m. and 7:00 a.m.
L_{max}, L_{min}	The maximum and minimum A-weighted sound levels measured on a sound level meter, during a designated time interval, using fast time averaging.
Ambient Noise Level	The all-encompassing noise associated with a given environment at a specified time, usually a composite of sound from many sources at many directions, near and far; no particular sound is dominant.
Intrusive	The noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

Source: *Handbook of Acoustical Measurements and Noise Control* (Harris 1991).

Table B: Common Sound Levels and Their Noise Sources

Noise Source	A-Weighted Sound Level (dB)	Noise Environment	Subjective Evaluation
Near Jet Engine	140	Deafening	128 times as loud
Civil Defense Siren	130	Threshold of Pain	64 times as loud
Hard Rock Band	120	Threshold of Feeling	32 times as loud
Accelerating Motorcycle a few ft away	110	Very Loud	16 times as loud
Pile Driver; Noisy Urban Street/Heavy City Traffic	100	Very Loud	8 times as loud
Ambulance Siren; Food Blender	95	Very Loud	
Garbage Disposal	90	Very Loud	4 times as loud
Freight Cars; Living Room Music	85	Loud	
Pneumatic Drill; Vacuum Cleaner	80	Loud	2 times as loud
Busy Restaurant	75	Moderately Loud	
Near Freeway Auto Traffic	70	Moderately Loud	Reference Level
Average Office	60	Quiet	1/2 as loud
Suburban Street	55	Quiet	
Light Traffic; Soft Radio Music in Apartment	50	Quiet	1/4 as loud
Large Transformer	45	Quiet	
Average Residence Without Stereo Playing	40	Faint	1/8 as loud
Soft Whisper	30	Faint	
Rustling Leaves	20	Very Faint	
Human Breathing	10	Very Faint	Threshold of Hearing

Source: Compiled by LSA (2004).
dB = decibels

where L_v is the VdB, "V" is the RMS velocity amplitude, and "V_{ref}" is the reference velocity amplitude, or 1 x 10^{-6} inches/second (in/sec) used in the United States. Table C illustrates human response to various vibration levels, as described in the *Transit Noise and Vibration Impact Assessment* (FTA 2006).

Table C: Human Response to Different Levels of Ground-Borne Noise and Vibration

Vibration Velocity Level	Noise Level		Human Response
	Low-Frequency[1]	Mid-Frequency[2]	
65 VdB	25 dBA	40 dBA	Approximate threshold of perception for many humans. Low-frequency sound usually inaudible; mid-frequency sound excessive for quiet sleeping areas.
75 VdB	35 dBA	50 dBA	Approximate dividing line between barely perceptible and distinctly perceptible. Many people find transit vibration at this level annoying. Low-frequency noise acceptable for sleeping areas, mid-frequency noise annoying in most quiet occupied areas.
85 VdB	45 dBA	60 dBA	Vibration acceptable only if there are an infrequent number of events per day. Low-frequency noise annoying for sleeping areas, mid-frequency noise annoying even for infrequent events with institutional land uses such as schools and churches.

Source: *FTA Transit Noise and Vibration Impact Assessment* (FTA 2006).
[1] Approximate noise level when vibration spectrum peak is near 30 Hz.
[2] Approximate noise level when vibration spectrum peak is near 60 Hz.
dBA = A-weighted decibels Hz = Hertz
FTA = Federal Transit Administration VdB = vibration velocity decibels

Factors that influence ground-borne vibration and noise include the following:

- **Vibration Source:** Vehicle suspension, wheel types and condition, railroad track/roadway surface, railroad track support system, speed, transit structure, and depth of vibration source
- **Vibration Path:** Soil type, rock layers, soil layering, depth to water table, and frost depth
- **Vibration Receiver:** Foundation type, building construction, and acoustical absorption

Among the factors listed above, there are significant differences in the vibration characteristics when the source is underground compared to at the ground surface. In addition, soil conditions are known to have a strong influence on the levels of ground-borne vibration. Among the most important factors are the stiffness and internal damping of the soil and the depth to bedrock.

Experience with ground-borne vibration indicates: (1) vibration propagation is more efficient in stiff, clay soils than in loose, sandy soils; and (2) shallow rock seems to concentrate the vibration energy close to the surface and can result in ground-borne vibration problems at large distances from a railroad track. Factors including layering of the soil and the depth to the water table can have significant effects on the propagation of ground-borne vibration. Soft, loose, sandy soils tend to attenuate more vibration energy than hard, rocky materials. Vibration propagation through groundwater is more efficient than through sandy soils.

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 regulations of stationary sources is left to local agencies.

Federal Regulations

Federal Transit Administration. Vibration standards included in the Federal Transit Administration's (FTA) *Transit Noise and Vibration Impact Assessment* (FTA 2006) are used in this analysis for ground-borne vibration impacts on human annoyance, as shown in Table D. The criteria presented in Table D account for variation in project types as well as the frequency of events, which differ widely among projects. It is intuitive that when there will be fewer events per day, it should take higher vibration levels to evoke the same community response. This is accounted for in the criteria by distinguishing between projects with frequent and infrequent events, in which the term "occasional events" is defined as between 30 and 70 events per day.

Table D: Ground-Borne Vibration and Ground-Borne Noise Impact Criteria for General Assessment

Land Use Category	Ground-Borne Vibration Impact Levels (VdB re 1 µin/sec)			Ground-Borne Noise Impact Levels (dB re 20 µPa)		
	Frequent[1] Events	**Occasional[2] Events**	**Infrequent[3] Events**	**Frequent[1] Events**	**Occasional[2] Events**	**Infrequent[3] Events**
Category 1: Buildings where vibration would interfere with interior operations.	65 VdB[4]	65 VdB[4]	65 VdB[4]	N/A[5]	N/A[5]	N/A[5]
Category 2: Residences and buildings where people normally sleep.	72 VdB	75 VdB	80 VdB	35 dBA	38 dBA	43 dBA
Category 3: Institutional land uses with primarily daytime use.	75 VdB	78 VdB	83 VdB	40 dBA	43 dBA	48 dBA

Source: Table 8-1. FTA *Transit Noise and Vibration Impact Assessment* (FTA 2006).

[1] "Frequent Events" is defined as more than 70 vibration events of the same source per day. Most rapid transit projects fall into this category.

[2] "Occasional Events" is defined as between 30 and 70 vibration events of the same source per day. Most commuter trunk lines have this many operations.

[3] "Infrequent Events" is defined as fewer than 30 vibration events of the same kind per day. This category includes most commuter rail branch lines.

[4] This criterion limit is based on levels that are acceptable for most moderately sensitive equipment, such as optical microscopes. Vibration-sensitive manufacturing or research will require detailed evaluation to define the acceptable vibration levels. Ensuring lower vibration levels in a building often requires special design of the HVAC systems and stiffened floors.

[5] Vibration-sensitive equipment is generally not sensitive to ground-borne noise.

µin/sec = microinches per second
µPa = micropascals
dB = decibels
dBA = A-weighted decibels
HVAC = heating, ventilation, and air conditioning
VdB = vibration velocity decibels

The criteria for environmental impact from ground-borne vibration and noise are based on the maximum levels for a single event. Table E lists the potential vibration building damage criteria associated with construction activities, as suggested in the FTA *Transit Noise and Vibration Impact Assessment* (2006).

Table E: Construction Vibration Damage Criteria

Building Category	PPV (in/sec)	Approximate L_v (RMS VdB re 1 µin/sec)
Reinforced concrete, steel, or timber (no plaster)	0.5	102
Engineered concrete and masonry (no plaster)	0.3	98
Nonengineered timber and masonry buildings	0.2	94
Buildings extremely susceptible to vibration damage	0.12	90

Source: Table 12-3, *FTA Transit Noise and Vibration Impact Assessment* (FTA 2006).
µin/sec = microinches per second
in/sec = inches per second
$L_v = 20 \log_{10} (V/V_{ref})$, i.e., vibration velocity in decibels
PPV = peak particle velocity
RMS = root-mean-square
VdB = vibration velocity decibels

FTA guidelines show that a vibration level of up to 102 VdB (equivalent to 0.5 in/sec in PPV) (FTA 2006) is considered safe for buildings consisting of reinforced concrete, steel, or timber (no plaster), and would not result in any construction vibration damage. For a non-engineered timber and masonry building, the construction building vibration damage criterion is 94 VdB (0.2 in/sec in PPV).

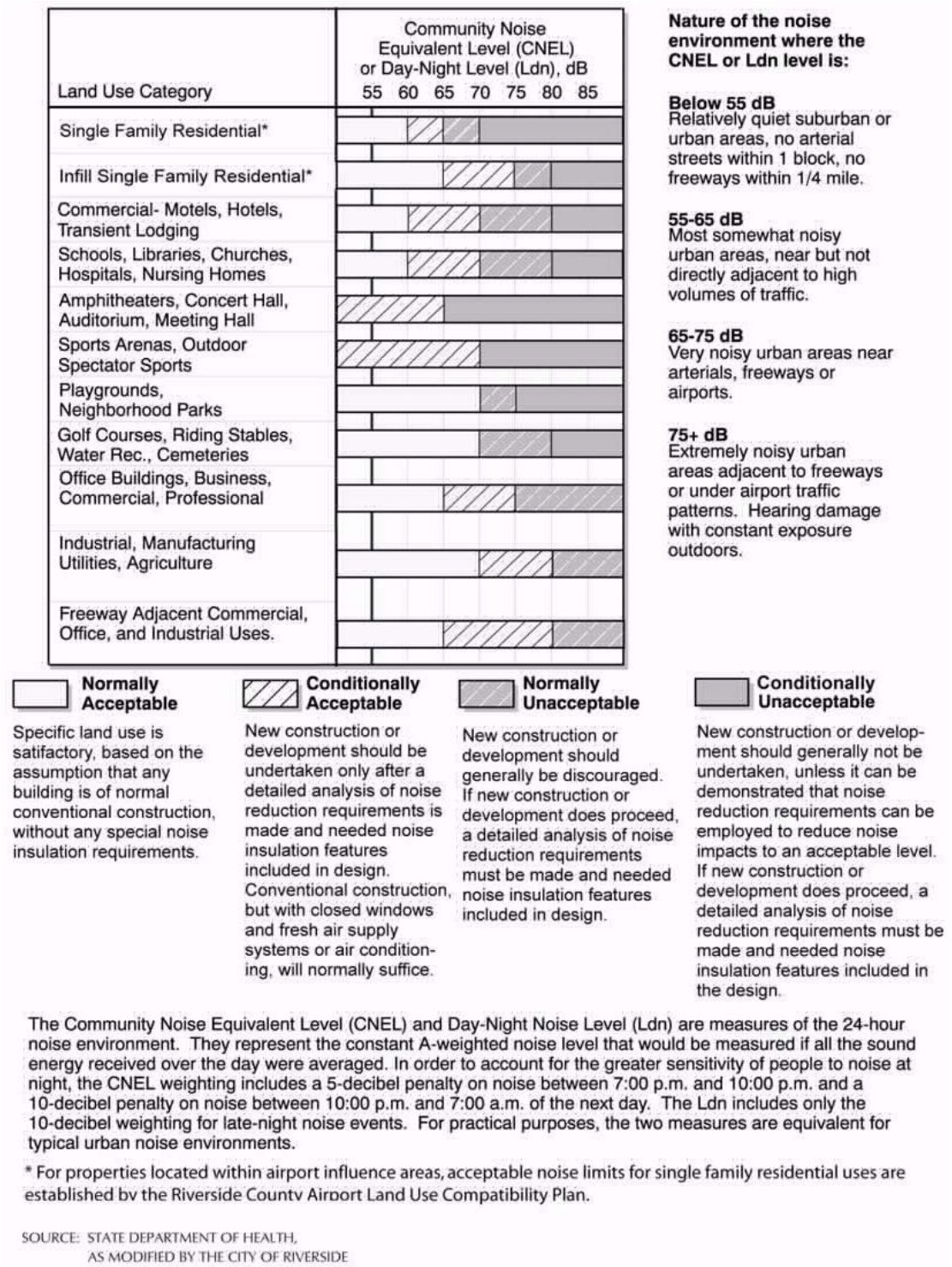
Local Regulations

City of Riverside.

Noise Element of the General Plan. The City has adopted a Noise Element of the General Plan to control and abate environmental noise, and to protect the citizens of the City from excessive exposure to noise. The Noise Element specifies the maximum allowable unmitigated exterior noise levels for new developments impacted by transportation noise sources such as arterial roads, freeways, airports, and railroads. In addition, the Noise Element identifies several policies to minimize the impacts of excessive noise levels throughout the community, and establishes noise level requirements for all land uses.

In its land use decisions, the City may consider its noise/land use compatibility guidelines. The *Noise/Land Use Compatibility Criteria* describes categories of compatibility and not specific noise standards. The Noise/Land Use Noise Compatibility Criteria in the City's General Plan Noise Element provides guidelines to evaluate the land use compatibility of transportation-related noise and is shown in Table F. These guidelines generally identify conditions where development of a particular use may be "Normally Acceptable", "Conditionally Acceptable", "Normally Unacceptable" or "Conditionally Unacceptable." The development of infill residential uses is "Normally Acceptable" in areas with noise levels of 65 dBA CNEL or less, and "Conditionally Acceptable" in areas with a noise levels between 65 and 75 dBA CNEL. For "Conditionally Acceptable" single-family residential uses, new development should only be undertaken after an analysis of noise reduction requirements and identification of noise reduction/insulation feature.

Table F: Noise/Land Use Noise Compatibility Criteria



Source: Figure N-10, *General Plan Noise Element* (City of Riverside 2007).

As stated in the City's General Plan 2025 Noise Element, ". . . Depending on the ambient environment of a particular community, these basic guidelines may be tailored to reflect existing noise and land use characteristics."

The City's General Plan 2025 identifies policies to address noise/land use compatibility issues, including:

- Policy N–1.1: Continue to enforce noise abatement and control measures particularly within residential neighborhoods.
- Policy N–1.2: Require the inclusion of noise-reducing design features in development consistent with standards in the Municipal Code.
- Policy N–1.3: Enforce the City of Riverside Noise Control Code to ensure that stationary noise and noise emanating from construction activities, private developments/residences and special events are minimized.
- Policy N–1-5: Avoid locating noise-sensitive land uses in existing and anticipated noise-impacted areas.
- Policy N–1.7: Evaluate noise impacts from roadway improvement projects by using the City's Acoustical Assessment Procedure.
- Policy N–1.8: Continue to consider noise concerns in evaluating all proposed development decisions and roadway projects.
- Policy N–4.1: Ensure that noise impacts generated by vehicular sources are minimized through the use of noise reduction features (e.g., earthen berms, landscaped walls, lowered streets, improved technology).
- Policy N–4.2: Investigate and pursue innovative approaches to reducing noise from railroad sources.

For the purposes of this noise impact analysis, single-family residential uses with outdoor active use areas (e.g., backyards or balconies) exposed to noise levels exceeding 65 dBA CNEL would require mitigation. In addition, interior noise levels for new residential development is required to comply with standards set forth in Title 24 of the State Health and Safety Code. New construction is required to incorporate special insulation, windows and sealants in order to ensure that interior noise levels meet Title 24 standards. The interior noise standard for residences is 45 dBA CNEL.

In addition, interior noise levels for new residential development, regardless of location within the Planning Area, will be required to comply with standards set forth in Title 24 of the State Health and Safety Code. New construction may need to incorporate special insulation, windows, and sealants in order to ensure that interior noise levels meet Title 24 standards. The interior noise standard for residences is 45 dBA CNEL.

Municipal Code. The purpose of the City's Municipal Code Noise Ordinance is to control unnecessary, excessive, and/or annoying noises in the City by prohibiting such noise generated by the sources specified in Title 7 of the City's Municipal Code. It is the goal of the City to minimize noise levels and mitigate the effects of noise to provide a safe and healthy living environment.

The City has incorporated the following standards in its Municipal Code to control loud, unnecessary, and unusual nuisance noises:

Exterior Sound Level Limits. Unless a variance has been granted, it shall be unlawful for any person to cause or allow the creation of any noise that exceeds the following:

- The exterior noise standard of the applicable land use category (Table G), up to 5 dB, for a cumulative period of more than 30 minutes in an hour; or
- The exterior noise standard of the applicable land use category, plus 5 dB, for a cumulative period of more than 15 minutes in any hour; or
- The exterior noise standard of the applicable land use category, plus 10 dB, for a cumulative period of more than 5 minutes in any hour; or
- The exterior noise standard of the applicable land use category, plus 15 dB, for a cumulative period of more than 1 minute in any hour; or
- The exterior noise standard of the applicable land use category, plus 20 dB or the maximum measured ambient noise level, for any period of time.

Table G: City of Riverside Sound Level Limits

Land Use Category	Time Period	Exterior Noise Standard (dBA)	Interior Noise Standard (dBA)
Residential	Night (10:00 p.m. to 7:00 a.m.) Day (7:00 a.m. to 10:00 p.m.)	45 55	35 45
School	7:00 a.m. to 10:00 p.m. (while school is in session)	N/A[1]	45
Hospital	Anytime	N/A	45
Office/Commercial	Anytime	65	N/A
Industrial	Anytime	70	N/A
Community Support	Anytime	60	N/A
Public Recreation Facility	Anytime	65	N/A
Non-Urban	Anytime	70	N/A

Source: Municipal Code Noise Ordinances (City of Riverside 2005).
[1] The City of Riverside has not established a sound level limit for this land use.
dBA = A-weighted decibels
N/A = not applicable

Interior Sound Level Limits. No person shall operate or cause to be operated, any source of sound indoors which causes the noise level, when measured inside another dwelling unit, school or hospital, to exceed:

- The interior noise standard for the applicable noise category (Table G), up to 5 dB, for a cumulative period of more than 5 minutes in any hour; or
- The interior noise standard for the applicable land use category, plus 5 dB, for a cumulative period of more than 1 minute in any hour; or
- The interior noise standard for the applicable land use category, plus 10 dB, or the maximum measured ambient noise level, for any period of time.

Based on Table G and Sections 7.25.010 and 7.30.015 of the City's Municipal Code, maximum exterior noise level for residential uses is 75 dBA L_{max} (i.e., 55 dB plus 20 dB) during daytime hours and 65 dBA L_{max} (i.e., 45 dB plus 20 dB) during nighttime hours, or the maximum measured ambient noise level for any period of time. Similarly, maximum interior nuisance noise level for residential uses is 55 dBA L_{max} (i.e., 45 dB plus 10 dB) during daytime hours and 45 dBA L_{max} (i.e., 35 dB plus 10 dB) during nighttime hours, or the maximum measured ambient noise level for any period of time.

Construction Noise. Section 7.35.020.G, Exemptions, of the City's Municipal Code Noise Ordinance states that "Noise sources associated with construction, repair, remodeling, or grading of any real property; provided a permit has been obtained from the City as required; and provided said activities do not take place between the hours of 7:00 p.m. and 7:00 a.m. on weekdays, between the hours of 5:00 p.m. and 8:00 a.m. on Saturdays, or at any time on Sunday or a federal holiday" are exempt from the noise level limits of the Municipal Code. The proposed construction activities will comply with the allowable days and hours for construction and therefore is exempt from the City's Municipal Code Noise Ordinance.

EXISTING SETTING

Overview of the Existing Noise Environment

The primary existing noise sources in the project area are transportation facilities. Traffic on Indiana Avenue and State Route 91 (SR-91) is the dominant source of ambient noise. Train operations to the south along the BNSF tracks also contribute to the ambient noise in the project vicinity.

Ambient Noise Level Measurement

The project site is adjacent to SR-91, Indiana Avenue, and the BNSF railroad tracks. Noise associated with these mobile sources would potentially affect the project site. To assess the existing noise environment, LSA conducted four short-term (15 minutes each) noise measurements using the Larson Davis 824 sound level meter to establish the existing noise environment within the project area. The sound level meter was calibrated with Cal200 field calibrator before and after noise level measurements. The noise level measurements were conducted at four representative locations in the project area, as identified by City staff. The short-term monitoring locations are shown on Figure 3.

The noise level measurement survey sheets are provided in Appendix A. Noise level measurements at these times show the typical baseline ambient noise level.

The summary below and Table H list the measured noise levels. These noise levels represent the noise environment in a snapshot of time at the identified locations during that time period. These measurements should not be used for the determination of future noise impacts or used as the basis for mitigation measures.

- **ST-1:** The measurements taken at this location were conducted at the southwest corner of the project site, near the railroad tracks. The noise levels measured at ST-1 were 67.2 dBA L_{eq} and 83.9 dBA L_{max}, with the primary noise sources coming from traffic on SR-91 and the railroad tracks. Another ambient noise measurement at this location was taken without a train passing by

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FIGURE 3

LEGEND

Project Site

ST-1 Noise Monitoring Location

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SOURCE: SDH and Associates, Inc. February, 2016.

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Hawthorne Residential Development Project

Noise Monitoring Locations

Table H: Summary of Short-Term Noise Level Measurements

Monitor No.	Location	Date	Start Time	Duration	Measured Ambient Noise Level (dBA)			
					L_{eq}		L_{max}	
					With Train Noise	No Train Noise	With Train Noise	No Train Noise
ST-1	9170/9174 Indiana Avenue; southwest corner	12/13/16	11:30 AM	15 minutes	67.2	53.6	83.9	66.9
ST-2	9170/9174 Indiana Avenue; northwest corner	12/13/16	11:56 AM	15 minutes	N/A	61.4	N/A	79.4
ST-3	9126 Indiana Avenue; north of project site	12/13/16	12:39 PM	15 minutes	58.8	56.4	79.3	70.1
ST-4	3418 Donald Avenue; outside of back yard	12/13/16	12:59 PM	15 minutes	67.5	67.9	82.6	81.4

Source: Compiled by LSA (August 2017).
dBA = A-weighted decibels
N/A = not applicable (no train pass-by)
L_{eq} = equivalent continuous sound level
L_{max} = maximum instantaneous noise level
ST = short-term

the site. The noise levels measured at this location without the train noise were 53.6 dBA L_{eq} and 66.9 dBA L_{max}, with the noise sources coming from traffic on SR-91.

- **ST-2:** The measurements taken at this location were conducted at the northwestern corner of the project site, south of Indiana Avenue near SR-91. The noise levels measured at ST-2 were 61.4 dBA L_{eq} and 79.4 dBA L_{max}, with primary noise sources coming from SR-91 and Indiana Avenue. No train pass-by noise was recorded.
- **ST-3:** The measurements taken at this location were conducted north of the project site along the north side of Indiana Avenue. The noise levels at ST-3 were 58.8 dBA L_{eq} and 79.3 dBA L_{max} with train noise and 56.4 dBA L_{eq} and 70.1 dBA L_{max} without train noise. Noise sources contributing to this measurement site included distant train noise and traffic on SR-91 and Indiana Avenue.
- **ST-4:** The measurements taken at this location were conducted at the northeastern corner of the project site next to the back yard of the residence located at 3418 Donald Avenue. The noise levels measured at this location were 67.5 dBA L_{eq} and 82.6 dBA L_{max} from vehicular and train noise adjacent to the project site, and 67.9 dBA L_{eq} and 81.4 dBA L_{max} without train noise.

Existing Traffic Noise

The Federal Highway Administration (FHWA) highway traffic noise prediction model (FHWA RD-77-108) was used to evaluate highway traffic-related noise conditions along the roadway segments in the project vicinity. Traffic volumes on Indiana Avenue in the Traffic Impact Analysis (LSA 2017) prepared for the proposed project and traffic volumes for SR-91 from the California Department of Transportation (Caltrans) *2015 Traffic Volumes on California State Highways* were used to assess the existing traffic noise impacts. Traffic volumes on SR-91 were used for the existing and extrapolated for the future (2017 and 2040) scenarios. Table I provides the existing traffic noise levels along the roadways adjacent to the project site. These noise levels represent the worst-case scenario, which assumes that no shielding is provided between the traffic and the location where the

Table I: Existing Traffic Noise Levels

Roadway Segment	ADT	Centerline to 70 dBA CNEL (ft)	Centerline to 65 dBA CNEL (ft)	Centerline to 60 dBA CNEL (ft)	CNEL (dBA) 50 ft from Centerline[1] of Outermost Lane
Indiana Avenue east of Donald Avenue	8,800	36[1,2]	78	167	67.2
Indiana Avenue west of Donald Avenue	8,700	36[1,2]	77	166	67.1
SR-91	176,500	1,022[2]	2,199	4,736	85.7

Source: Compiled by LSA (August 2017).
[1] Traffic noise within 50 ft of the roadway centerline was calculated manually.
[2] Indiana Avenue and SR-91 was modeled using Riverside County's traffic mix based on their roadway classification.
ADT = average daily traffic
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibels
ft = foot/feet
SR-91 = State Route 91

noise contours are drawn. The specific assumptions used in developing these noise levels and model printouts are provided in Appendix B.

Table I shows that traffic noise levels in the project vicinity vary from moderate (Indiana Avenue) to high (SR-91), with the 70 dBA CNEL extending to 36 ft from the centerline of Indiana Avenue and to 1,022 ft from the SR-91 centerline. Figure 4 shows that the project site is approximately 44 ft from the centerline of Indiana Avenue and would be impacted by traffic noise from Indiana Avenue that reaches 69 dBA CNEL. Figure 4 also shows that the project site is approximately 350 ft from the centerline of SR-91 and would be potentially exposed to traffic noise from SR-91 that reaches 77 dBA CNEL. However, SR-91 in this area is approximately 20 ft below the project site, and existing residences are located between the project site and SR-91. There is an existing noise barrier along the edge of the freeway that is measured approximately 20 ft high on the freeway side and 8 to 10 ft high on the existing residence side. The elevation difference between the freeway and the project site and the existing residences between SR-91 and the project site would function as noise barriers and would provide a noise reduction minimum of 15 dBA, thereby reducing the freeway traffic noise to 62 dBA CNEL or lower. When combined together, traffic on SR-91 and Indiana Avenue would result in a noise level of 70 dBA CNEL.

Existing Train Noise

The FTA's 2006 *Transit Noise and Vibration Impact Assessment* manual was used to evaluate train-related noise and vibration impacts. Based on the January 2017 comment letter received by Metrolink, approximately 25 Metrolink passenger trains, 2 Amtrak passenger trains, and 74 BNSF freight trains operate on the rail line immediately adjacent to the proposed project. These trains operate 7 days per week, 24 hours per day.[1] Similar to vehicular traffic on roadways, train noise is also a line source that would be assumed to have the train along the centerline of the train tracks so that it covers both directions and balances the train noise emissions. Train noise projected from the edge of the train tracks would be the same as train noise projected from the centerline of the train

[1] Metrolink, 2017. *Planning Cases P16-0112 (GPA), P16-0113 (ZC), P16-0114 (TTM), P16-0111 (PRD).* January 10.

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FIGURE 4

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SOURCE: SDH and Associates, Inc. February, 2016.

Hawthorne Residential Development Project

Existing Traffic and Train Noise Levels

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tracks, with a slight modification to the calculation process for the noise source and distance attenuation. Using the FTA's guidelines, it is calculated that train operations in the study area would result in a noise level of 74.8 dBA CNEL at 50 ft from the train tracks. The project site is approximately 100 to 200 ft from the centerline of the train tracks. Train noise is a line source with 4.5 dBA reduction per doubling of distance (noise reduction from a line source is based on 15Log (D_2/D_1), where D_1 in this case is 50 ft and D_2 is the distance from the line source to the location of concern. At this distance, train noise would be reduced to 70.3 dBA CNEL and 65.8 dBA CNEL, respectively, south of the project site. Figure 4 shows the distances from the centerline of the train tracks to the proposed on-site residential properties. Currently, there is no noise barrier or other intervening structure between the railroad tracks and the project site. Figure 4 also shows the projected train noise levels.

IMPACTS

Short-Term Construction Noise Impacts

Two types of short-term noise impacts could occur during the construction of the proposed project. First, construction crew commutes and the transport of construction equipment and materials to the site for the proposed project would incrementally increase noise levels on access roads leading to the site. Although there would be a relatively high single-event noise exposure potential causing intermittent noise nuisance (passing trucks at 50 ft would generate up to a maximum of 84 dBA L_{max}), the effect on longer term (hourly or daily) ambient noise levels would be small. Therefore, short-term construction-related impacts associated with worker commute and equipment transport to the project site would be less than significant.

The second type of short-term noise impact is related to noise generated during demolition, grading, and construction of the buildings on the project site. Construction is completed in discrete steps, each of which has its own mix of equipment, and consequently, its own noise characteristics. These various sequential phases would change the character of the noise generated on the site, and therefore the noise levels surrounding the site, as construction progresses. Despite the variety in the type and size of construction equipment, similarities in the dominant noise sources and patterns of operation allow construction-related noise ranges to be categorized by work phase. Table J lists typical construction equipment noise levels recommended for noise impact assessments, based on a distance of 50 ft between the equipment and a noise receptor.

Typical noise levels range up to 86 dBA L_{max} at 50 ft during the noisiest construction phases. The site preparation phase, which includes the excavation and grading of the site, tends to generate the highest noise levels because the noisiest construction equipment is earthmoving equipment. Earthmoving equipment includes excavating machinery (e.g., backfillers, bulldozers, draglines, and front loaders). Earthmoving and compacting equipment includes compactors, scrapers, and graders. Typical operating cycles for these types of construction equipment may involve 1 or 2 minutes of full power operation followed by 3 or 4 minutes at lower power settings.

Project construction is expected to require the use of bulldozers, a front-end loader, and water trucks/ pickup trucks. Noise associated with the use of construction equipment is estimated to be between 55 and 85 dBA L_{max} at a distance of 50 ft from the active construction area for the grading phase.

Table J: RCNM Default Noise Emission Reference Levels and Usage Factors

Equipment Description	Impact Device?	Acoustical Usage Factor[1] (%)	Spec. 721.560 L_{max} at 50 ft (dBA, slow)[2]	Actual Measured L_{max} at 50 ft (dBA, slow)[3]	Number of Actual Data Samples (Count)
All other Equipment > 5 HP	No	50	85	N/A	0
Auger Drill Rig	No	20	85	84	36
Backhoe	No	40	80	78	372
Bar Bender	No	20	80	N/A	0
Blasting	Yes	N/A	94	N/A	0
Boring Jack Power Unit	No	50	80	83	1
Chain Saw	No	20	85	84	46
Clam Shovel (dropping)	Yes	20	93	87	4
Compactor (ground)	No	20	80	83	57
Compressor (air)	No	40	80	78	18
Concrete Batch Plant	No	15	83	N/A	0
Concrete Mixer Truck	No	40	85	79	40
Concrete Pump Truck	No	20	82	81	30
Concrete Saw	No	20	90	90	55
Crane	No	16	85	81	405
Dozer	No	40	85	82	55
Drill Rig Truck	No	20	84	79	22
Drum Mixer	No	50	80	80	1
Dump Truck	No	40	84	76	31
Excavator	No	40	85	81	170
Flat Bed Truck	No	40	84	74	4
Front End Loader	No	40	80	79	96
Generator	No	50	82	81	19
Generator (< 25 kVA, VMS Signs)	No	50	70	73	74
Gradall	No	40	85	83	70
Grader	No	40	85	N/A	0
Grapple (on backhoe)	No	40	85	87	1
Horizontal Boring Hydraulic Jack	No	25	80	82	6
Hydra Break Ram	Yes	10	90	N/A	0
Impact Derive	Yes	20	95	101	11
Jackhammer	Yes	20	85	89	133
Man Lift	No	20	85	75	23
Mounted Impact Hammer (hoe ram)	Yes	20	90	90	212
Pavement Scarifier	No	20	85	90	2
Paver	No	50	85	77	9
Pickup Truck	No	40	55	75	1
Pneumatic Tools	No	50	85	85	90
Pumps	No	50	77	81	17
Refrigerator Unit	No	100	82	73	3
Rivit Buster/Chipping Gun	Yes	20	85	79	19
Rock Drill	No	20	85	81	3
Roller	No	20	85	80	16
Sand Blasting (single nozzle)	No	20	85	96	9
Scraper	No	40	85	84	12
Sheers (on backhoe)	No	40	85	96	5
Slurry Plant	No	100	78	78	1
Slurry Trench Machine	No	50	82	80	75
Soil Mix Drill Rig	No	50	80	N/A	0
Tractor	No	40	84	N/A	0
Vacuum Excavator (Vac-Truck)	No	40	85	85	149

Table J: RCNM Default Noise Emission Reference Levels and Usage Factors

Equipment Description	Impact Device?	Acoustical Usage Factor[1] (%)	Spec. 721.560 L_{max} at 50 ft (dBA, slow)[2]	Actual Measured L_{max} at 50 ft (dBA, slow)[3]	Number of Actual Data Samples (Count)
Vacuum Street Sweeper	No	10	80	82	19
Ventilation Fan	No	100	85	79	13
Vibrating Hopper	No	50	85	87	1
Vibratory Concrete Mixer	No	20	80	80	1
Vibratory Pile Driver	No	20	95	101	44
Warning Horn	No	5	85	83	12
Welder/Torch	No	40	73	74	5

Source: Table 9.1, FHWA *Highway Construction Noise Handbook* (FHWA 2006).

[1] Usage factor is the percentage of time during a construction noise operation that a piece of construction equipment is operating at full power.

[2] Maximum noise levels were developed based on Specification (Spec.) 721.560 from the Central Artery/Tunnel (CA/T) program to be consistent with the City of Boston's Noise Code for the "Big Dig" project.

[3] The maximum noise level was developed based on the average noise level measured for each piece of equipment during the CA/T program in Boston, Massachusetts.

[4] Since the maximum noise level based on the average noise level measured for this piece of equipment was not available, the maximum noise level developed based on Spec 721.560 would be used.

dBA = A-weighted decibels
ft = foot/feet
HP = horsepower
kVA = kilovolt-amperes
L_{max} = maximum instantaneous noise level
N/A = Not Applicable
RCNM = Roadway Construction Noise Model
VMS = variable-message sign

These construction equipment noise levels were selected from the Specification (Spec.) 721.560 noise levels as a worst-case scenario because construction equipment noise levels associated with grading are typically higher than the actual measured noise levels shown in Table J.

As seen in Table J, the maximum noise level generated by each dozer is assumed to be approximately 85 dBA L_{max} at 50 ft from the dozer in operation. Each front-end loader would generate approximately 80 dBA L_{max} at 50 ft. The maximum noise level generated by water trucks/pickup trucks is approximately 55 dBA L_{max} at 50 ft from these vehicles. Each doubling of the sound source with equal strength increases the noise level by 3 dBA. Each piece of construction equipment operates as an individual point source. The worst-case composite noise level at the nearest residence during this phase of construction would be 86 dBA L_{max} (85 dBA + 80 dBA + 55 dBA = 86 dBA) at a distance of 50 ft from an active construction area. Based on a usage factor of 40 percent, the worst-case combined noise level during this phase of construction would be 82 dBA L_{eq} at a distance of 50 ft from the active construction area.

Construction-related, short-term noise levels would be higher than existing ambient noise levels in the project area today, but would no longer occur once construction of the project is completed. Section 7.35.020.G, Exemptions, of the City's Noise Ordinance states that "Noise sources associated with construction, repair, remodeling, or grading of any real property; provided a permit has been obtained from the City as required; and provided said activities do not take place between the hours of 7:00 p.m. and 7:00 a.m. on weekdays, between the hours of 5:00 p.m. and 8:00 a.m. on Saturdays, or at any time on Sunday or a federal holiday" are exempt from the noise level limits of the Municipal Code. Construction activities would occur in accordance with the dates and times allowed as

described in Section 7.35.020.G, Exemptions, of the City's Noise Ordinance; therefore, no significant construction noise impact would occur.

Short-Term Construction Vibration Impacts

This construction vibration impact analysis discusses the level of human annoyance using vibration levels in VdB and will assess the potential for building damages using vibration levels in PPV (in/sec) because vibration levels calculated in RMS are best for characterizing human response to building vibration while vibration level in PPV is best used to characterize potential for damage. As shown in Table E, the FTA guidelines indicate that a vibration level up to 102 VdB (an equivalent to 0.5 in/sec in PPV) (FTA 2006) is considered safe for buildings consisting of reinforced concrete, steel, or timber (no plaster), and would not result in any construction vibration damage. For a non-engineered timber and masonry building, the construction vibration damage criterion is 94 VdB (0.2 in/sec in PPV).

Table K shows the PPV and VdB values at 25 ft from the construction vibration source. As shown in Table K, bulldozers and other heavy-tracked construction equipment (except for pile drivers and vibratory rollers) generate approximately 87 VdB of ground-borne vibration when measured at 25 ft, based on the Transit Noise and Vibration Impact Assessment (FTA 2006). This level of ground-borne vibration levels would result in potential annoyance to residences and workers located adjacent to the project site, but would not cause any damage to the buildings. Construction vibration, similar to vibration from other sources, would not have any significant effects on outdoor activities (e.g., those outside of residences in the project vicinity). Outdoor site preparation for the project is expected to use a bulldozer and loaded truck. The greatest levels of vibration are anticipated to occur during the site preparation phase. All other phases are expected to result in lower vibration levels. The distance to the nearest buildings for vibration impact analysis is measured between the nearest off-site buildings and the project boundary (assuming the construction equipment would be used at or near the project boundary) because vibration impacts occur normally within the buildings. The formula for vibration transmission is provided below.

$$L_v dB\ (D) = L_v dB\ (25\ ft) - 30\ Log\ (D/25)$$

$$PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$$

Table L lists the respective projected vibration level from various construction equipment expected to be used on the project site to the nearest buildings in the project vicinity. For typical construction activity, the equipment with the highest vibration generation potential is the large bulldozer, which would generate 87 VdB (0.089 PPV [in/sec]) at 25 ft. The closest residential property is located east of the project site and includes a garage located approximately 7.5 ft from the project construction boundary (property line). The residential building is located approximately 25 ft from the property line. As shown in Table L, the garage building and residential building at the closest residential property would experience vibration levels of up to 103 VdB (0.54 PPV [in/sec]). Other adjacent buildings in the project area are farther away and would experience lower vibration levels.

Table K: Vibration Source Amplitudes for Construction Equipment

Equipment	Reference PPV/L_V at 25 ft	
	PPV (in/sec)	L_V (VdB)[1]
Pile Driver (Impact), Typical	0.644	104
Pile Driver (Sonic), Typical	0.170	93
Vibratory Roller	0.210	94
Hoe Ram	0.089	87
Large Bulldozer[2]	**0.089**	**87**
Caisson Drilling	0.089	87
Loaded Trucks	**0.076**	**86**
Jackhammer	0.035	79
Small Bulldozer	0.003	58

Source: FTA *Transit Noise and Vibration Impact Assessment* (FTA 2006).
[1] RMS vibration velocity in decibels (VdB) is 1 µin/sec.
[2] Equipment shown in **bold** is expected to be used on site.
µin/sec = microinches per second
ft = feet
FTA = Federal Transit Administration
in/sec = inches per second
L_V = velocity in decibels
PPV = peak particle velocity
RMS = root-mean-square
VdB = vibration velocity decibels

Table L: Summary of Construction Equipment and Activity Vibration

Receptor	Construction Equipment	Reference Vibration Level (VdB) at 25 ft	Reference Vibration Level (PPV) at 25 ft	Distance (ft)	Vibration Level (VdB)	Vibration Level (PPV)
Garage Building	Large Bulldozer	87	0.089	7.5	103	0.542
	Loaded Truck	86	0.076	7.5	102	0.463
Residential Building	Large Bulldozer	87	0.089	25	87	0.089
	Loaded Truck	86	0.076	25	86	0.076

Source: Compiled by LSA (August 2017).
Note: The FTA-recommended building damage threshold is 0.2 PPV (in/sec) or approximately 94 VdB at the receiving property structure or building.
ft = feet
in/sec = inches per second
FTA = Federal Transit Administration
PPV = peak particle velocity
VdB = vibration velocity decibels

Construction vibration levels at the garage building of the closest residential property would exceed the FTA threshold of 94 VdB (0.2 in/sec PPV) for building damage when bulldozers and loaded trucks operate within 7.5 ft of the property line. The implementation of mitigation measures to use light construction equipment (e.g. small bulldozers and trucks) within 15 ft from the eastern property line would ensure that construction vibration levels would be below the FTA threshold of 94 VdB (0.2 in/sec PPV) for building damage. Although construction vibration levels at residential uses would have the potential to result in annoyance, these vibration levels would no longer occur once construction of the project is completed. Therefore, construction vibration levels would be less than significant with the implementation of mitigation measures that use light construction equipment (e.g. small bulldozers and trucks) within 15 ft from the eastern property line.

Long-Term Train Noise Impacts

It must be noted that the project site is located in an area currently subjected to high levels of noise from adjacent roadways and rail operations. CEQA Guidelines section 15126.2(a) generally requires an evaluation of environmental conditions and hazards existing on a proposed project site if such conditions and hazards may cause substantial adverse impacts to future residents or users of the project. CEQA calls upon an agency to evaluate existing conditions in order to assess whether a project could exacerbate hazards that are already present.

In *California Building Industry Association v. Bay Area Air Quality Management District* (2015), the California Supreme Court held that ". . .agencies subject to CEQA generally are not required to analyze the impact of existing environmental conditions on a project's future users or residents. But when a proposed project risks exacerbating those environmental hazards or conditions that already exist, an agency must analyze the potential impact of such hazards on future residents or users. In those specific instances, it is the project's impact on the environment -– and not the environment's impact on the project – that compels an evaluation of how future residents or users could be affected by exacerbated conditions."

While existing on-site ambient noise levels from traffic and rail operations exceed the City's exterior noise standard of 65 dBA CNEL for residential uses, the incorporation of the recommended sound attenuation features (walls and building facade improvements), would implement City policies for reducing noise impacts at a "Conditionally Acceptable" use by, 1) enforcing noise abatement and control measures particularly within residential neighborhoods, 2) requiring the inclusion of noise-reducing design features in development consistent with standards in the Municipal Code, and 3) ensuring that noise impacts generated by transportation (vehicular and rail) noise sources are minimized through the use of noise reduction features. Thus, installation of these walls would improve the livability and quality of life for these residences.

The FTA's 2006 *Transit Noise and Vibration Impact Assessment* manual was used to evaluate train-related noise and vibration impacts. Based on the January 2017 comment letter received by Metrolink, approximately 25 Metrolink, 2 Amtrak passenger trains, and 74 BNSF freight trains operate on the rail line immediately adjacent to the proposed project. These trains operate 7 days per week, 24 hours per day.[1] The current Metrolink schedule at the La Sierra train station shows that 15 trains run during daytime hours (between 7:00 a.m. and 7:00 p.m.), 2 trains run during evening hours (between 7:00 p.m. and 10:00 p.m.), and 8 trains run during nighttime hours (between 10:00 p.m. and 7:00 a.m.) each day on weekdays. Similar to vehicular traffic on roadways, train noise is a line source that would be assumed to have the train along the centerline of the train tracks so that it covers both directions and balances the train noise emissions. Train noise projected from the edge of the train tracks would be the same as train noise projected from the centerline of the train tracks, with a slight modification to the calculation process for the noise source and distance attenuation. Using the FTA's guidelines, it is calculated that train operations in the study area would result in a noise level of 74.8 dBA CNEL at 50 ft from the train tracks.

[1] Metrolink, 2017. *Planning Cases P16-0112 (GPA), P16-0113 (ZC), P16-0114 (TTM), P16-0111 (PRD).* January 10.

The project site is approximately 100 to 200 ft from the centerline of the train tracks. Train noise is a line source with 4.5 dBA reduction per doubling of distance (noise reduction from a line source is based on 15Log (D_2/D_1), where D_1 in this case is 50 ft and D_2 is the distance from the line source to the location of concern. At this distance, train noise would be reduced to 70.3 and 65.8 dBA CNEL, respectively, south of the project site. Figure 4 shows the distances from the centerline of the train tracks to the proposed on-site residential properties. Noise from a train horn occurs in much shorter time periods, usually seconds. Based on the FTA *Transit Noise and Vibration Impact Assessment* (2006), transit car horns could generate 78 to 90 dBA L_{max} at 50 ft, and a train horn can generate up to 110 dBA L_{max} at 50 ft. Even though it is higher in peak or maximum noise level, train horn noise usually is not used to determine the required noise mitigation due to the feasibility and lack of noise regulations associated with it. In addition, the project is located in an existing Federal Railroad Administration (FRA) approved quiet zone where locomotive engineers are not required to sound the train horns unless in case of emergencies (e.g., when tracks are obstructed).

The noise level reduction from the shielding of train noise with noise barriers was calculated using the guidelines in the FTA *Transit Noise and Vibration Impact Assessment* (2006). Playgrounds on the south side of the project property line facing the railroad tracks would require a minimum noise barrier height of 10 ft while backyards and/or balconies associated with residential structures on the south, east, and west side of the project facing the railroad tracks that would not be shielded from proposed on-site residential structures would require a minimum noise barrier height of 8 ft to reduce train noise levels to the City's exterior noise standard of 65 dBA CNEL or below. Backyard and/or balconies associated with residential structures on the south side of the project that face the railroad tracks would be shielded by a minimum 10 ft high noise barrier at the project property line but would also require an additional minimum 6 ft high noise barrier at the residential property line in order to reduce train noise levels at those residences to the City's exterior noise standard of 65 dBA CNEL or below. Figure 5 shows the required noise barrier location for each residential lot and playground area. It should be noted that the proposed noise barrier would not result in noise increases to off-site residences located south of the project from reflection because the reflected noise would be attenuated through distance and would not add to the direct noise.

Based on the data provided in the United States Environmental Protection Agency (EPA) Protective Noise Levels (1979), standard homes in Southern California provide at least 12 dBA of exterior-to-interior noise attenuation with windows and doors open and 24 dBA with windows and doors closed. Based on the above discussion, the closest residences located on the southern edge of the project site would be exposed to an interior noise level of 58 dBA CNEL (70.3 dBA – 12 dBA = 58.3 dBA) with windows and doors open. With windows and doors closed, the closest residence on the southern edge of the project site would be exposed to an interior noise level of 46.3 dBA CNEL (70.3 dBA - 24 dBA = 46.3 dBA). The interior noise level with windows and doors open and closed would exceed the City's interior noise standard of 45 dBA CNEL. Therefore, building facade upgrades (e.g., windows with sound transmission class [STC] ratings higher than the STC-28 provided by standard building construction) and air conditioning would be required to ensure that windows and doors can remain closed for a prolonged period of time to maintain the interior noise standard.

Residential buildings in the middle of the project site would be shielded by the proposed on-site residential buildings, which would function as noise barriers and provide at least 10 dBA in noise attenuation. Exterior noise levels for residential buildings or units in the middle of the project site would be reduced to 60.3 dBA CNEL (70.3 dBA – 10 dBA = 60.3 dBA) and would not exceed the

LSA

LEGEND

- Minimum 10 ft High Noise Barrier
- Minimum 8 ft High Noise Barrier
- Minimum 6 ft High Noise Barrier
- STC-28 or Higher Windows

N

0 70 140
FEET

SOURCE: SDH and Associates, Inc. February, 2016.

FIGURE 5

Hawthorne Residential Development Project

Noise Barrier Locations and Building Facade Upgrades

I:\SWK1502\G\Barriers-Upgrades.cdr (8/17/2017)

City's exterior noise standard of 65 dBA CNEL. In addition, interior noise levels would be 48.3 dBA and 36.3 dBA CNEL, respectively, with windows and doors open and closed. Therefore, air conditioning would be required to ensure that windows and doors can remain closed for a prolonged period of time to maintain the interior noise standard.

Each air conditioning unit will be designed to comply with the City's Municipal Code noise standards regulating the heating, ventilation, and air conditioning (HVAC) equipment noise. The mitigation measure applies to both first floor and second floor noise-sensitive rooms. It should be noted that, noise mitigation for the building facades should be based on the windows and doors closed scenario for practical and feasibility reasons, and not windows and doors open scenario regardless of whether future residents prefer windows and doors open or not. Figure 5 shows the required building facade upgrade for each residential lot. If any residents choose to leave the windows and doors open, their interior noise would be higher than when the windows and doors are closed.

Long-Term Traffic Noise Impacts

The FHWA highway traffic noise prediction model (FHWA RD-77-108) was used to evaluate highway traffic-related noise conditions along the roadway segments in the project vicinity. Traffic volumes on Indiana Avenue projected in the Traffic Impact Analysis (LSA 2017) for the proposed project were used to assess the potential traffic noise impacts along the street segments in the project vicinity. The project-related changes would be small enough to not have any significant impacts on off-site land uses along these roadway segments. Existing traffic volumes on SR-91 were projected to the future scenarios (2017 and 2040).

Tables M, N, and O provide the traffic noise levels for the existing, 2017, and 2040, respectively, with project scenarios. These noise levels represent the worst-case scenario, which assumes that no shielding is provided between the traffic and the location where the noise contours are drawn. The specific assumptions used in developing these noise levels and model printouts are provided in Appendix A.

Based on the Traffic Impact Analysis, the proposed project is expected to generate 514 average daily vehicle trips (ADT). Generally, a doubling of traffic is required to generate a perceptible increase (3 dBA) in noise. As detailed in Tables M, N and O, the project-related traffic is not sufficiently extreme to generate a perceptible increase in noise in the project area. Project-related traffic noise level increases would be 0.2 dBA or less and would not be discernible to the human ear in an outdoor environment. In addition, Table O shows that in the 2040 scenario, traffic volumes on Indiana Avenue and SR-91 would be the highest among the three scenarios, and that traffic noise levels under this scenario are used to determine the potential traffic noise impacts on the proposed on-site land uses.

Table O shows that in the 2040 with project scenario, the 70 dBA CNEL noise contour along Indiana Avenue would extend to 45 ft from the centerline of Indiana Avenue. The 70 dBA CNEL noise contour from SR-91 would continue to extend to 1,198 ft from the centerline of the freeway. The project site is approximately 44 ft from the centerline of Indiana Avenue and would be impacted by traffic noise from Indiana Avenue reaching 70 dBA CNEL. The project site is approximately 350 ft from the centerline of SR-91 and would be potentially exposed to traffic noise from SR-91 reaching

Table M: Existing (2016) Traffic Noise Levels Without and With Project

	Existing Without Project (Baseline)					Existing With Project						
Roadway Segment	**ADT**	**Centerline to 70 dBA CNEL (ft)**	**Centerline to 65 dBA CNEL (ft)**	**Centerline to 60 dBA CNEL (ft)**	**CNEL (dBA) 50 ft from Centerline of Outermost Lane**	**ADT**	**Change in ADT**	**Centerline to 70 dBA CNEL (ft)**	**Centerline to 65 dBA CNEL (ft)**	**Centerline to 60 dBA CNEL (ft)**	**CNEL (dBA) 50 ft from Centerline of Outermost Lane**	**Increase over Baseline CNEL (dBA) 50 ft from Centerline of Outermost Lane**
Indiana Avenue east of Donald Avenue	8,800	36[1,2]	78	167	67.2	8,900	0	36	78	168	67.2	0.0
Indiana Avenue west of Donald Avenue	8,700	36[1,2]	77	166	67.1	9,100	400	37	80	171	67.3	0.2
State Route 91	176,500	1,022	2,199	4,736	85.7	176,500	0	1,022	2,199	4,736	85.7	0.0

Source: *Compiled by LSA (August 2017).*
[1] Traffic noise within 50 ft of the roadway centerline was calculated manually.
[2] Indiana Avenue and SR-91 was modeled using Riverside County's traffic mix based on their roadway classification.
ADT = average daily traffic
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibels
ft = feet
SR-91 = State Route 91

Table N: 2017 Traffic Noise Levels Without and With Project

	2017 Cumulative Without Project (Baseline)					2017 Cumulative With Project						
Roadway Segment	**ADT**	**Centerline to 70 dBA CNEL (ft)**	**Centerline to 65 dBA CNEL (ft)**	**Centerline to 60 dBA CNEL (ft)**	**CNEL (dBA) 50 ft from Centerline of Outermost Lane**	**ADT**	**Change in ADT**	**Centerline to 70 dBA CNEL (ft)**	**Centerline to 65 dBA CNEL (ft)**	**Centerline to 60 dBA CNEL (ft)**	**CNEL (dBA) 50 ft from Centerline of Outermost Lane**	**Increase over Baseline CNEL (dBA) 50 ft from Centerline of Outermost Lane**
Indiana Avenue east of Donald Avenue	9,800	39[1,2]	84	179	67.6	10,000	200	39	85	182	67.7	0.1
Indiana Avenue west of Donald Avenue	9,800	39[1,2]	84	179	67.6	10,200	400	40	86	184	67.8	0.2
State Route 91	178,300	1,029	2,214	4,768	85.7	178,300	0	1,029	2,214	4,768	85.7	0.0

Source: *Compiled by LSA (August 2017).*
[1] Traffic noise within 50 ft of the roadway centerline was calculated manually.
[2] Indiana Avenue and SR-91 was modeled using Riverside County's traffic mix based on their roadway classification.
ADT = average daily traffic
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibels
ft = feet
SR-91 = State Route 91

Table O: 2040 Traffic Noise Levels Without and With Project

	2040 Cumulative Without Project (Baseline)					2040 Cumulative With Project						
Roadway Segment	**ADT**	**Centerline to 70 dBA CNEL (ft)**	**Centerline to 65 dBA CNEL (ft)**	**Centerline to 60 dBA CNEL (ft)**	**CNEL (dBA) 50 ft from Centerline of Outermost Lane**	**ADT**	**Change in ADT**	**Centerline to 70 dBA CNEL (ft)**	**Centerline to 65 dBA CNEL (ft)**	**Centerline to 60 dBA CNEL (ft)**	**CNEL (dBA) 50 ft from Centerline of Outermost Lane**	**Increase over Baseline CNEL (dBA) 50 ft from Centerline of Outermost Lane**
Indiana Avenue east of Donald Avenue	11,900	44[1,2]	95	204	68.5	12,000	100	45	96	205	68.5	0.0
Indiana Avenue west of Donald Avenue	11,900	44[1,2]	95	204	68.5	12,200	300	45	97	208	68.6	0.1
State Route 91	224,100	1,198	2,579	5,553	86.7	224,100	0	1,198	2,579	5,553	86.7	0.0

Source: *Compiled by LSA (August 2017).*
[1] Traffic noise within 50 ft of the roadway centerline was calculated manually.
[2] Indiana Avenue and SR-91 was modeled using Riverside County's traffic mix based on their roadway classification.
ADT = average daily traffic
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibels
ft = feet
SR-91 = State Route 91

78 dBA CNEL. SR-91 in this area is approximately 20 ft below the project site, and existing residences are located between the project site and SR-91. There is an existing noise barrier that is approximately 20 ft high and 8 to 10 ft high on the residence side. The elevation difference between the freeway and the project site and the existing residences between SR-91 and the project site would function as noise barriers and would provide a noise reduction minimum of 15 dBA, thereby reducing the freeway traffic noise to 63 dBA CNEL or lower. When combined together, traffic on SR-91 and Indiana Avenue would result in a noise level of 71 dBA CNEL, and mitigation measures would be required.

Indiana Avenue. The proposed residential buildings closest to Indiana Avenue are approximately 44 ft from the centerline of Indiana Avenue and would be potentially exposed to traffic noise reaching 70 dBA CNEL from traffic on Indiana Avenue. Any outdoor active use areas (e.g., backyards or balconies) on the north side of the residential buildings facing Indiana Avenue would need to be protected by a noise barrier with a minimum height of 6 ft. Outdoor active use areas located on the south side of the residential buildings would not be exposed to traffic noise exceeding the 65 dBA CNEL noise standards, and no mitigation measures would be required.

Based on the data provided in the EPA *Protective Noise Levels* (1979), standard homes in Southern California provide at least 12 dBA of exterior-to-interior noise attenuation with windows open and 24 dBA with windows closed. The residential units with bedrooms and/or living rooms facing north would be exposed to a noise level of 58 dBA CNEL (70 dBA – 12 dBA = 58 dBA) with windows and doors open, which is higher than the interior noise standard of 45 dBA CNEL. Therefore, air conditioning would be required to ensure that windows and doors can remain closed for a prolonged period of time to maintain the interior noise standard. Each air conditioning unit will be designed to comply with the City's Municipal Code noise standards regulating HVAC equipment noise. This mitigation measure applies to both first floor and second floor noise-sensitive rooms.

The residential units with north-facing bedrooms and/or living rooms would be exposed to a noise level of 46 dBA CNEL (70 dBA – 24 dBA = 46 dBA) with windows and doors closed, which would exceed the City's interior noise standard of 45 dBA CNEL. Therefore, building facade upgrades (e.g., windows with STC ratings higher than the STC-28 provided by standard building construction) would be required for dwelling units on the north side of the buildings along Indiana Avenue that are not protected by the proposed on-site residential structures from noise generated along SR-91 and Indiana Avenue. This mitigation measure applies to both first floor and second floor noise-sensitive rooms.

It should be noted that noise mitigation for the building facades should be based on the closed windows and doors scenario for practical and feasibility reasons rather than on the open windows and doors scenario regardless of whether future residents prefer windows and doors open or not. If any residents choose to leave the windows and doors open, their interior noise would be higher than when the windows and doors are closed and would not meet the City's interior noise standard of 45 dBA CNEL.

State Route 91. The proposed residential buildings are approximately 350 ft from the SR-91 centerline to the north and would be exposed to up to 78 dBA CNEL when no shielding is considered,

which is a worst-case scenario. SR-91 in this area is approximately 20 ft below the project site and the existing residences between the project site and SR-91. There is an existing noise barrier that is approximately 20 ft high and 8 to 10 ft high on the residence side. The elevation differences between the freeway and the project site and the existing residences between SR-91 and the project site would function as noise barriers and would provide a noise reduction minimum of 15 dBA, thereby reducing the freeway traffic noise to 63 dBA CNEL or lower. When combined together, traffic on SR-91 and Indiana Avenue would result in a noise level of 71 dBA CNEL. Any outdoor active use areas (e.g., backyards and/or balconies) on the north side of the residential buildings facing Indiana Avenue and SR-91 that are not shielded by the proposed on-site residential structures would require a noise barrier with a minimum height of 6 ft. Therefore, a noise barrier with a minimum height of 6 feet is required along the perimeter of each backyard or balcony for residences that have these outdoor active use areas facing north and that are directly exposed to the traffic noise. With the noise barrier along the perimeter, each backyard and/or balcony would have exterior noise levels reduced to 65 dBA CNEL or lower and would meet the City's exterior noise standard of 65 dBA CNEL for residential uses. Since residential units at the eastern and western ends of the project site would be potentially exposed to traffic and train noise, an 8 ft high noise barrier along the private property line would be required. Figure 5 depicts the residential lots that would be affected by the required noise barriers.

Based on the data provided in the EPA *Protective Noise Levels* (1979), standard homes in Southern California provide at least 12 dBA of exterior-to-interior noise attenuation with windows and doors open and 24 dBA with windows and doors closed. The residential units with bedrooms and/or living rooms facing north would be exposed to a noise level of 59 dBA CNEL (71 dBA – 12 dBA = 59 dBA) with windows and doors open, which is higher than the interior noise standard of 45 dBA CNEL. Therefore, air conditioning would be required to ensure that windows and doors can remain closed for a prolonged period of time to maintain the interior noise standard. Each air conditioning unit will be designed to comply with the City's Municipal Code noise standards regulating HVAC equipment noise. This mitigation measure applies to both first floor and second floor noise-sensitive rooms.

The residential units with bedrooms and/or living rooms facing north would be exposed to a noise level of 47 dBA CNEL (71 dBA – 24 dBA = 47 dBA) with windows and doors closed, which would exceed the City's interior noise standard of 45 dBA CNEL. Therefore, building facade upgrades (e.g., windows with STC ratings higher than the STC-28 provided by standard building construction) would be required for dwelling units on the north side of the buildings along Indiana Avenue that are not protected by the proposed on-site residential structures from noise generated along SR-91 and Indiana Avenue. This mitigation measure applies to both first floor and second floor noise-sensitive rooms. Figure 5 depicts the residential lots that would be affected by the required building facade upgrades.

It should be noted that noise mitigation for the building facades should be based on the closed windows and doors scenario for practical and feasibility reasons rather than on the open windows and doors scenario regardless of whether future residents prefer windows and doors open or not. If any residents choose to leave the windows and doors open, their interior noise would be higher than when the windows and doors are closed and would not meet the City's interior noise standard of 45 dBA CNEL.

Long-Term Stationary Noise Impacts

Potential long-term noise impacts would be associated with stationary sources. These activities are potential point sources of noise that could affect on-site residences. On-site noise-producing activities include heating, ventilation, and air-conditioning equipment (HVAC).

HVAC equipment associated with the project would be the project's primary noise source. HVAC equipment is often mounted on rooftops, located on the ground, or located within mechanical rooms. The noise sources could take the form of fans, pumps, air compressors, chillers, or cooling towers. HVAC operations would be required to meet all noise standards. For the purpose of this analysis, HVAC equipment was assumed to be located on the ground floor in the backyard area of the single-family residential units.

Precise details of HVAC equipment, including future location and sizing, are unknown at this time; therefore, for purposes of this analysis, 75 dBA at 3 ft was assumed to represent HVAC-related noise.[1] As identified above, off-site noise-sensitive receptors would be located approximately 25 ft from the proposed project. Adjusted for distance to the nearest off-site sensitive receptors, the off-site residences would be exposed to a noise level of 57 dBA L_{eq} generated by HVAC equipment. This noise level would exceed the City's exterior daytime L_{50} standard of 55 dBA and nighttime L_{50}, L_{25}, and L_8 standard of 45, 50, and 55 dBA, respectively. This noise level would not exceed the City's interior daytime and nighttime noise standard. Mitigation measures to construct an 8 ft high wall on the east side of the project would be required to reduce noise levels by 12 dBA so noise levels generated from HVAC equipment would be reduced to a noise level of 45 dBA L_{eq} (57 dBA – 12 dBA = 45 dBA). This noise level would not exceed the City's exterior daytime and nighttime noise standard. Therefore, long-term noise impacts from HVAC equipment would be less than significant with the implementation of an 8 ft high wall on the east side of the project.

Long-Term Vehicular Traffic Vibration Impacts

Operations of the proposed project (i.e., a residential project) would not involve any vibration sources that would cause exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels. Vehicles with rubber tires on roadways segments surrounding the project site would not generate any significant ground-borne vibration that would exceed the 65 VdB perception threshold for such uses. No significant ground-borne vibration impacts would occur. No mitigation is required.

Long-Term Train Vibration Impacts

The FTA 2006 *Transit Noise and Vibration Impact Assessment* manual was used to evaluate train-related vibration impacts. Based on the January 2017 comment letter received by Metrolink, approximately 25 Metrolink passenger trains, 2 Amtrak passenger trains, and 74 BNSF freight trains operate on the rail line immediately adjacent to the proposed project. These trains operate 7 days per week, 24 hours per day.[2] Based on the FTA's 2006 *Transit Noise and Vibration Impact Assessment*

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1 Trane. 2002. Sound Data and Application Guide for the New and Quieter Air-Cooled Series R Chiller.

2 Metrolink, 2017. *Planning Cases P16-0112 (GPA), P16-0113 (ZC), P16-0114 (TTM), P16-0111 (PRD).* January 10.

(Figure 10-1, Generalized Ground Surface Vibration Curves), at a distance of 60 ft from the train tracks, rapid transit or light rail vehicles (50 miles per hour [mph]) would result in a vibration level of 72 VdB. At the same distance, locomotive-powered passenger or freight trains (50 mph) would result in 83 VdB of ground vibration.

Table E shows that vibration levels reaching 90 VdB or higher would result in potential building damages. None of the predicted vibration levels (all below 90 VdB) for buildings or structures in the vicinity of the project site would reach this threshold level. Thus, no significant vibration impacts are anticipated, and no mitigation is required.

MINIMIZATION MEASURES

Construction Noise Impacts

The following measures would reduce short-term construction-related noise impacts resulting from the proposed project:

- Construction activities are restricted within the City of Riverside to the hours between 7:00 a.m. and 7:00 p.m. Monday through Friday and between 8:00 a.m. and 5:00 p.m. on Saturdays, and are prohibited on Sundays and federal holidays.
- During all project site demolition, excavation, and grading on site, the project contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers consistent with manufacturers' standards.
- The project contractor shall place all stationary construction equipment so that emitted noise is directed away from sensitive receptors nearest the project site.
- The construction contractor shall locate equipment staging in areas that shall create the greatest distance between construction-related noise sources and noise-sensitive receptors nearest the project site during all project construction.

MITIGATION MEASURES

The following mitigation measures are required:

Short-Term Construction Vibration Impacts

1. The construction contractor shall use light construction equipment (e.g., small bulldozers and trucks) within 15 ft of the eastern property line.

Long-Term Traffic/Train Noise Impacts

2. An interior noise analysis shall be required upon completion of detailed floor plans and prior to issuance of building permits to ensure compliance with the noise standard and with installation of an air conditioning unit. If noise standards are not met, the Applicant shall be required to enhance the building facades (e.g., double-paned windows) to comply with the interior noise standards.

3. Air conditioning, a form of mechanical ventilation, shall be required for all dwelling units to ensure that windows and doors can remain closed for a prolonged period of time to maintain the interior noise standard.
4. A minimum noise barrier height of 10 ft shall be required along the southern project property line and a portion of the east and west property lines around the recreational area to shield the playground and residences closest to the southern property line (Lots 10 through 16) from train related noises.
5. A minimum noise barrier height of 8 ft shall be required along the rear private property lines of Lots 1 through 9 and Lots 17 through 21; and south private property lines of Lots 8, 9 and 17 to shield outdoor active use areas (e.g., backyards or balconies) from train related noises.
6. A minimum 6 ft high noise barrier shall be required along the south private property lines of Lots 10 through 16 and west private property line of Lot 16 to shield the outdoor active use areas (e.g., backyards or balconies) from train related noises.
7. A minimum noise barrier height of 6 ft shall be required along the private property line immediately south of Indiana Avenue (Lots 1, and 21 through 30) to shield outdoor active use areas such as backyards or balconies from traffic noise along Indiana Avenue and State Route 91 freeway.
8. Building facade upgrades (e.g., double-paned windows with a sound transmission class rating of STC-28 or higher) shall be required for all residences located south of Indiana Avenue (Lots 1, 21 through 30).
9. Building facade upgrades (e.g., double-paned windows with a STC-28 or higher) shall be required for all residences facing the BNSF railroad tracks (Lots 1 through 21 and 43 through 48).

On-Site Operational Noise Impacts

10. A minimum noise barrier height of 8 ft along the east side of the project (Lots 1 through 8) shall be required to shield on-site ground-floor HVAC equipment.

On-Site Operational Vibration Impacts

No mitigation measures are required.

LEVEL OF SIGNIFICANCE AFTER MITIGATION

With mitigation measures implemented, the project would result in a less than significant impact for noise and vibration.

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APPENDIX A

NOISE MEASUREMENT SURVEY SHEETS

Noise Measurement Survey

Project Number: SWK 1502
Project Name: Tentative Tract Map No. 37032

Test Personnel: Daniel Kaufman
Equipment: Larson Davis 824

Site Number: ST-1 Date: 12/13/2016

Time: From 11:12 AM To 11:27 AM

Site Location: 9174 Indiana Avenue. At the southwest portion of the site, behind the former school.

Primary Noise Sources: Freight train, SR-91, and Indiana Avenue.

Comments: Freight train pass-by at 11:12 AM.

Adjacent Roadways: Indiana Avenue.

Measurement Results	
L_{eq}	67.2
L_{max}	83.9
L_{min}	49.7
L_2	77.1
L_8	74.4
L_{25}	53.5
L_{50}	52.4
L_{90}	51.2
L_{99}	50.5

Atmospheric Conditions	
Average Wind Velocity (mph)	1.4
Maximum Wind Velocity (mph)	3.6
Temperature (F)	63.4
Relative Humidity (%)	63.8

Location Photo:

Noise Measurement Survey

Project Number: SWK 1502
Project Name: Tentative Tract Map No. 37032

Test Personnel: Daniel Kaufman
Equipment: Larson Davis 824

Site Number: ST-1 B Date: 12/13/2016

Time: From 11:30 AM To 11:47 AM

Site Location: 9174 Indiana Avenue. At the southwest portion of the site, behind the former school.

Primary Noise Sources: SR-91 and Indiana Avenue.

Comments: Filtered train.

Adjacent Roadways: Indiana Avenue.

Measurement Results	
L_{eq}	53.6
L_{max}	66.9
L_{min}	49.8
L_2	59.2
L_8	55.0
L_{25}	53.1
L_{50}	52.3
L_{90}	51.2
L_{99}	50.4

Atmospheric Conditions	
Average Wind Velocity (mph)	1.6
Maximum Wind Velocity (mph)	5.1
Temperature (F)	64.6
Relative Humidity (%)	61.9

Location Photo:

Noise Measurement Survey

Project Number: SWK 1502 Test Personnel: Daniel Kaufman
Project Name: Tentative Tract Map No. 37032 Equipment: Larson Davis 824

Site Number: ST-2 Date: 12/13/2016 Time: From 11:56 AM To 12:11 PM

Site Location: 9174 Indiana Avenue. At the north portion of the site, in the parking lot area of the former school.

Primary Noise Sources: Indiana Avenue and SR-91.

Comments: No trains.

Adjacent Roadways: Indiana Avenue.

Measurement Results	
L_{eq}	61.4
L_{max}	79.4
L_{min}	54.4
L_2	66.7
L_8	64.5
L_{25}	62.1
L_{50}	59.4
L_{90}	56.1
L_{99}	55.1

Atmospheric Conditions	
Average Wind Velocity (mph)	1.1
Maximum Wind Velocity (mph)	2.8
Temperature (F)	66.1
Relative Humidity (%)	74.1

Location Photo:

Noise Measurement Survey

Project Number: SWK 1502 Test Personnel: Daniel Kaufman
Project Name: Tentative Tract Map No. 37032 Equipment: Larson Davis 824

Site Number: ST-3 Date: 12/13/2016 Time: From 12:39 AM To 12:54 PM

Site Location: East side of the site, next to the backyard of the house at 9126 Indiana Avenue.

Primary Noise Sources: SR-91, Indiana Avenue, and trains.

Comments: Short train pass-by at 12:39 PM. Second short pass-by at 12:48.

Adjacent Roadways: Indiana Avenue.

Measurement Results	
L_{eq}	58.8
L_{max}	79.3
L_{min}	53.3
L_2	65.0
L_8	60.3
L_{25}	58.2
L_{50}	57.1
L_{90}	55.3
L_{99}	53.9

Atmospheric Conditions	
Average Wind Velocity (mph)	1.7
Maximum Wind Velocity (mph)	5.1
Temperature (F)	68.4
Relative Humidity (%)	53.5

Location Photo:

Noise Measurement Survey

Project Number: SWK 1502
Project Name: Tentative Tract Map No. 37032

Test Personnel: Daniel Kaufman
Equipment: Larson Davis 824

Site Number: ST-3 B Date: 12/13/2016

Time: From 12:59 PM To 1:14 PM

Site Location: East side of the site, next to the backyard of the house at 9126 Indiana Avenue.

Primary Noise Sources: SR-91 and Indiana Avenue.

Comments: Filtered train.

Adjacent Roadways: Indiana Avenue.

Measurement Results	
L_{eq}	56.4
L_{max}	70.1
L_{min}	51.9
L_2	60.3
L_8	58.0
L_{25}	56.8
L_{50}	55.9
L_{90}	53.8
L_{99}	52.7

Atmospheric Conditions	
Average Wind Velocity (mph)	1.1
Maximum Wind Velocity (mph)	3.3
Temperature (F)	70.4
Relative Humidity (%)	54.0

Location Photo:

Noise Measurement Survey

Project Number: SWK 1502
Project Name: Tentative Tract Map No. 37032

Test Personnel: Daniel Kaufman
Equipment: Larson Davis 824

Site Number: ST-4 Date: 12/13/2016

Time: From 10:26 AM To 10:41 AM

Site Location: 3418 Donald Avenue. At the front yard of the house on the northwest corner of Indiana Avenue and Donald Avenue.

Primary Noise Sources: Indiana Avenue and SR-91.

Comments: Metrolink pass-by, near the beginning of the measurement.

Adjacent Roadways: Indiana Avenue.

Measurement Results	
L_{eq}	67.5
L_{max}	82.6
L_{min}	54.5
L_2	75.2
L_8	72.0
L_{25}	67.4
L_{50}	63.8
L_{90}	58.9
L_{99}	56.6

Atmospheric Conditions	
Average Wind Velocity (mph)	1.1
Maximum Wind Velocity (mph)	3.0
Temperature (F)	67.1
Relative Humidity (%)	57.2

=

Location Photo:

Noise Measurement Survey

Project Number: SWK 1502
Project Name: Tentative Tract Map No. 37032

Test Personnel: Daniel Kaufman
Equipment: Larson Davis 824

Site Number: ST-4 B Date: 12/13/2016

Time: From 11:46 AM To 11:03 AM

Site Location: 3418 Donald Avenue. At the front yard of the house on the northwest corner of Indiana Avenue and Donald Avenue.

Primary Noise Sources: Indiana Avenue and SR-91.

Comments: Filtered train.

Adjacent Roadways: Indiana Avenue.

Measurement Results	
L_{eq}	67.9
L_{max}	81.4
L_{min}	53.0
L_2	75.8
L_8	73.0
L_{25}	67.7
L_{50}	63.3
L_{90}	58.8
L_{99}	56.7

Atmospheric Conditions	
Average Wind Velocity (mph)	1.1
Maximum Wind Velocity (mph)	4.3
Temperature (F)	68.2
Relative Humidity (%)	65.4

Location Photo:

APPENDIX B

FHWA TRAFFIC NOISE MODEL PRINTOUTS

TABLE Existing-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/19/2016
ROADWAY SEGMENT: Indiana Avenue east of Donald Avenue
NOTES: TENTATIVE TRACT MAP NO. 37032 - Existing

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 8800 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.16

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	77.7	167.0	359.6

TABLE Existing-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/19/2016
ROADWAY SEGMENT: Indiana Avenue west of Donald Avenue
NOTES: TENTATIVE TRACT MAP NO. 37032 - Existing

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 8700 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.11

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	77.1	165.8	356.9

TABLE Existing-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/19/2016
ROADWAY SEGMENT: Freeway
NOTES: TENTATIVE TRACT MAP NO. 37032 - Existing

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 176500 SPEED (MPH): 65 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	69.50	12.90	9.60
M-TRUCKS	1.44	0.06	1.50
H-TRUCKS	2.40	0.10	2.50

ACTIVE HALF-WIDTH (FT): 60 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 85.66

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
1022.4	2199.4	4736.0	10200.8

TABLE Existing with Project-01

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/19/2016
ROADWAY SEGMENT: Indiana Avenue east of Donald Avenue
NOTES: TENTATIVE TRACT MAP NO. 37032 - Existing with Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 8900 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.20

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	78.3	168.3	362.3

TABLE Existing with Project-02

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/19/2016
ROADWAY SEGMENT: Indiana Avenue west of Donald Avenue
NOTES: TENTATIVE TRACT MAP NO. 37032 - Existing with Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 9100 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.30

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	79.5	170.8	367.7

TABLE Existing with Project-03

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/19/2016
ROADWAY SEGMENT: Freeway
NOTES: TENTATIVE TRACT MAP NO. 37032 - Existing with Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 176500 SPEED (MPH): 65 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	69.50	12.90	9.60
M-TRUCKS	1.44	0.06	1.50
H-TRUCKS	2.40	0.10	2.50

ACTIVE HALF-WIDTH (FT): 60 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 85.66

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
1022.4	2199.4	4736.0	10200.8

TABLE 2017 Cumulative w/o Project-01

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/19/2016
ROADWAY SEGMENT: Indiana Avenue east of Donald Avenue
NOTES: TENTATIVE TRACT MAP NO. 37032 - 2017 Cumulative w/o Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 9800 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.62

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	83.5	179.4	386.3

TABLE 2017 Cumulative w/o Project-02

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/19/2016
ROADWAY SEGMENT: Indiana Avenue west of Donald Avenue
NOTES: TENTATIVE TRACT MAP NO. 37032 - 2017 Cumulative w/o Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 9800 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.62

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	83.5	179.4	386.3

TABLE 2017 Cumulative w/o Project-03

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/19/2016
ROADWAY SEGMENT: Freeway
NOTES: TENTATIVE TRACT MAP NO. 37032 - 2017 Cumulative w/o Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 178300 SPEED (MPH): 65 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	69.50	12.90	9.60
M-TRUCKS	1.44	0.06	1.50
H-TRUCKS	2.40	0.10	2.50

ACTIVE HALF-WIDTH (FT): 60 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 85.71

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
1029.4	2214.3	4768.2	10270.0

TABLE 2017 Cumulative with Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/19/2016
ROADWAY SEGMENT: Indiana Avenue east of Donald Avenue
NOTES: TENTATIVE TRACT MAP NO. 37032 - 2017 Cumulative with Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 10000 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.71

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	84.6	181.9	391.6

TABLE 2017 Cumulative with Project-02

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/19/2016
ROADWAY SEGMENT: Indiana Avenue west of Donald Avenue
NOTES: TENTATIVE TRACT MAP NO. 37032 - 2017 Cumulative with Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 10200 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.80

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	85.7	184.3	396.8

TABLE 2017 Cumulative with Project-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/19/2016
ROADWAY SEGMENT: Freeway
NOTES: TENTATIVE TRACT MAP NO. 37032 - 2017 Cumulative with Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 178300 SPEED (MPH): 65 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	69.50	12.90	9.60
M-TRUCKS	1.44	0.06	1.50
H-TRUCKS	2.40	0.10	2.50

ACTIVE HALF-WIDTH (FT): 60 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 85.71

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
1029.4	2214.3	4768.2	10270.0

TABLE 2040 Cumulative without Project-01

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/19/2016
ROADWAY SEGMENT: Indiana Avenue east of Donald Avenue
NOTES: TENTATIVE TRACT MAP NO. 37032 - 2040 Cumulative without Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 11900 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 68.47

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	95.0	204.2	439.7

TABLE 2040 Cumulative without Project-02

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/19/2016
ROADWAY SEGMENT: Indiana Avenue west of Donald Avenue
NOTES: TENTATIVE TRACT MAP NO. 37032 - 2040 Cumulative without Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 11900 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 68.47

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	95.0	204.2	439.7

TABLE 2040 Cumulative without Project-03

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/19/2016
ROADWAY SEGMENT: Freeway
NOTES: TENTATIVE TRACT MAP NO. 37032 - 2040 Cumulative without Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 224100 SPEED (MPH): 65 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	69.50	12.90	9.60
M-TRUCKS	1.44	0.06	1.50
H-TRUCKS	2.40	0.10	2.50

ACTIVE HALF-WIDTH (FT): 60 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 86.70

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
1198.3	2578.6	5553.1	11960.8

TABLE 2040 Cumulative with Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/19/2016
ROADWAY SEGMENT: Indiana Avenue east of Donald Avenue
NOTES: TENTATIVE TRACT MAP NO. 37032 - 2040 Cumulative with Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 12000 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 68.50

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	95.5	205.3	442.2

TABLE 2040 Cumulative with Project-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/19/2016
ROADWAY SEGMENT: Indiana Avenue west of Donald Avenue
NOTES: TENTATIVE TRACT MAP NO. 37032 - 2040 Cumulative with Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 12200 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 68.57

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	96.5	207.6	447.1

TABLE 2040 Cumulative with Project-03

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/19/2016
ROADWAY SEGMENT: Freeway
NOTES: TENTATIVE TRACT MAP NO. 37032 - 2040 Cumulative with Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 224100 SPEED (MPH): 65 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	69.50	12.90	9.60
M-TRUCKS	1.44	0.06	1.50
H-TRUCKS	2.40	0.10	2.50

ACTIVE HALF-WIDTH (FT): 60 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 86.70

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
1198.3	2578.6	5553.1	11960.8

Appendix I:
Traffic Impact Analysis

TRAFFIC IMPACT ANALYSIS

HAWTHORNE RESIDENTIAL DEVELOPMENT PROJECT

CITY OF RIVERSIDE

RIVERSIDE COUNTY, CALIFORNIA

This traffic study has been prepared under the supervision of
Donson H. Liu, T.E.

Signed _____

LICENSED PROFESSIONAL ENGINEER
DONSON H. LIU
TR 2743
EXP. 3/31/19
TRAFFIC
STATE OF CALIFORNIA

LSA

April 26, 2017

TRAFFIC IMPACT ANALYSIS

HAWTHORNE RESIDENTIAL DEVELOPMENT PROJECT

CITY OF RIVERSIDE

RIVERSIDE COUNTY, CALIFORNIA

Prepared for:

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LSA Project No. SWK1603

April 26, 2017

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INTRODUCTION

This traffic impact analysis (TIA) has been prepared for the proposed Hawthorne Residential Development Project to be located at 9170 Indiana Avenue, in the City of Riverside (City). The proposed project will include 54 single-family residential units. Figure 1 illustrates the regional and project location. Figure 2 illustrates the conceptual site plan.

This report is intended to satisfy the requirements established by the City of Riverside "Traffic Impact Preparation Guide," dated January 2016, as well as the requirements for the disclosure of potential impacts and mitigation measures pursuant to the California Environmental Quality Act (CEQA). The scope of work for this TIA, including trip generation, trip distribution, study area, and analysis methodologies have been approved by City staff. A copy of the City Scoping Agreement is included as Appendix A.

This TIA examines traffic operations in the vicinity of the proposed project, which were analyzed under the following scenarios:

- Existing traffic conditions;
- Existing with project traffic conditions;
- Project completion (2017) conditions;
- Project completion (2017) with project traffic conditions;
- Cumulative (2017) traffic conditions; and
- Cumulative (2017) with project traffic conditions.

Because the project requires a General Plan Amendment and Zone Change, a build-out analysis is required as stated in the City's "Traffic Impact Preparation Guide," dated January 2016. Therefore, the following analysis scenarios were also analyzed:

- Build-out 2040 Without Project Conditions; and
- Build-out 2040 With Project Conditions.

For each scenario, traffic operations at study intersections are evaluated for the a.m. and p.m. peak hours. The a.m. peak hour is defined as the one hour of highest traffic volumes occurring between 7:00 and 9:00 a.m. The p.m. peak hour is defined as the one hour of highest traffic volumes occurring between 4:00 and 6:00 p.m.

STUDY AREA DETERMINATION

The study area was approved by City staff via the City's scoping agreement process (Appendix A). Study intersections were selected based on discussion with City staff. The study includes locations where project traffic has potential to cause a significant impact. As such, one intersection was identified for analysis: Donald Avenue-Project Driveway/Indiana Avenue. Figure 3 illustrates the location of the study area intersection.

LSA

FIGURE 1

N

0 1000 2000
FEET

SOURCE: Bing Aerial, 2016: Streetmap, 2013/Riverside County, 2015.

Hawthorne Residential Development
Traffic Impact Analysis

Regional and Project Location

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LSA

FIGURE 2

N

0 70 140
FEET

SOURCE: SDH and Associates, Inc. February, 2016.

Hawthorne Residential Development
Traffic Impact Analysis

Conceptual Site Plan

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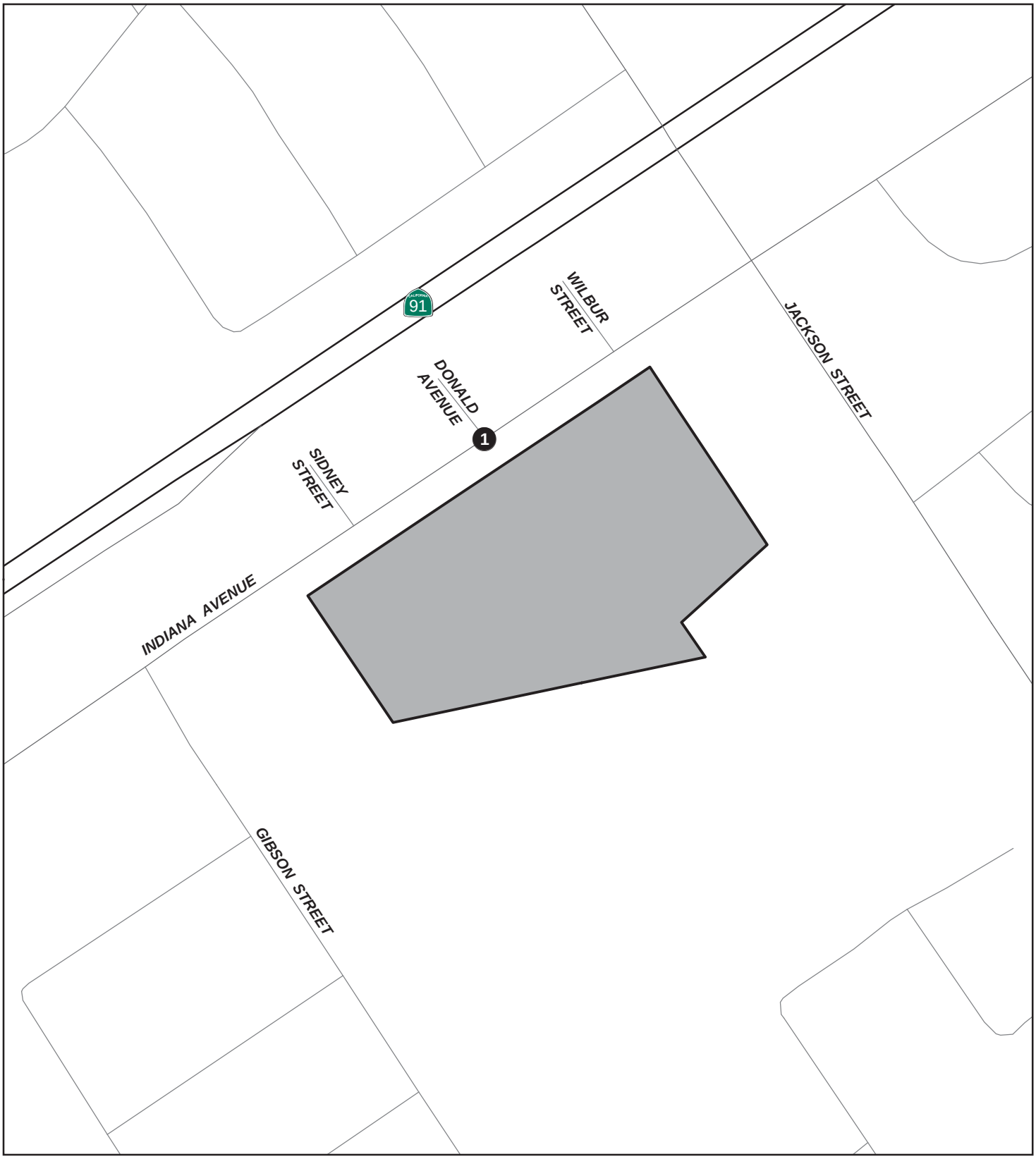

LSA

Legend

Project Boundary

Study Area Intersection

N

0 125 250
FEET

SOURCE: Streetmap, 2013/Riverside County, 2015.

FIGURE 3

Hawthorne Residential Development
Traffic Impact Analysis

Study Area Intersection

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PROJECT DESCRIPTION

As previously discussed, the proposed project will include 54 single-family residential units. Access to the project site will be provided via the south leg of the intersection of Donald Avenue/Indiana Avenue. Current General Plan and Zoning designations for the site are Business/Office Park (B/OP) and PF (Public Facilities), respectively. The project includes processing of a General Plan Amendment (GPA) (P16-0112) to Medium Density Residential (MDR) and Zone Change (P16-0113) to Single-Family Residential (R-1-7000). The project site was previously occupied by the Hawthorne Elementary School. The school was originally founded in 1923 and rebuilt in 1959. However, the school has been vacant for more than two years, and therefore, no trip credits were taken. Development of the site will necessitate the removal of existing on-site structures and features. Previously referenced Figure 2 illustrates the site plan for the proposed project.

ANALYSIS METHODOLOGY

Level of Service Definitions and Procedures

Roadway operations and the relationship between capacity and traffic volumes are generally expressed in terms of levels of service (which are defined using the letter grades A through F). These levels recognize that, while an absolute limit exists as to the amount of traffic traveling through a given intersection (the absolute capacity), the conditions that motorists experience rapidly deteriorate as traffic approaches the absolute capacity. Under such conditions, congestion is experienced. There is general instability in the traffic flow, which means that relatively small incidents (e.g., momentary engine stall) can cause considerable fluctuations in speeds and delays. This near-capacity situation is labeled Level of Service (LOS) E. Beyond LOS E, capacity has been exceeded, and arriving traffic will exceed the ability of the intersection to accommodate it. An upstream queue will then form and continue to expand in length until the demand volume again declines.

A complete description of the meaning of level of service can be found in the Transportation Research Board Special Report 209, *Highway Capacity Manual* (HCM). The HCM establishes levels of service A through F as shown in Table A.

Table A: Level of Service Definitions

LOS	Description
A	No approach phase is fully utilized by traffic and no vehicle waits longer than one red indication. Typically, the approach appears quite open, turns are made easily and nearly all drivers find freedom of operation.
B	This service level represents stable operation, where an occasional approach phase is fully utilized and a substantial number are approaching full use. Many drivers begin to feel restricted within platoons of vehicles.
C	This level still represents stable operating conditions. Occasionally drivers may have to wait through more than one red signal indication, and backups may develop behind turning vehicles. Most drivers feel somewhat restricted, but not objectionably so.

Table A: Level of Service Definitions

LOS	Description
D	This level encompasses a zone of increasing restriction approaching instability at the intersection. Delays to approaching vehicles may be substantial during short peaks within the peak period; however, enough cycles with lower demand occur to permit periodic clearance of developing queues, thus preventing excessive backups.
E	Capacity occurs at the upper end of this service level. It represents the most vehicles that any particular intersection approach can accommodate. Full utilization of every signal cycle is seldom attained no matter how great the demand.
F	This level describes forced flow operations at low speeds, where volumes exceed capacity. These conditions usually result from queues of vehicles backing up from a restriction downstream. Speeds are reduced substantially and stoppages may occur for short or long periods of time due to the congestion. In the extreme case, both speed and volume can drop to zero.

Table B shows the level of service criteria for unsignalized and signalized intersections.

Table B: Level of Service Criteria for Unsignalized and Signalized Intersections

Level of Service	Unsignalized Intersection Average Delay per Vehicle (sec.)	Signalized Intersection Average Delay per Vehicle (sec.)
A	$\leq$ 10	$\leq$ 10
B	> 10 and $\leq$ 15	> 10 and $\leq$ 20
C	> 15 and $\leq$ 25	> 20 and $\leq$ 35
D	> 25 and $\leq$ 35	> 35 and $\leq$ 55
E	> 35 and $\leq$ 50	> 55 and $\leq$ 80
F	> 50	> 80

Consistent with the City's TIA guidelines, the 2010 HCM analysis methodologies were used to determine intersection levels of service for all study area intersections. All levels of service were calculated using Synchro 9.1 software, which uses the HCM 2010 methodologies.

Level of Service Threshold

The City uses LOS D as its minimum level of service criteria for intersections and roadways of Collector or higher classification; while LOS C is to be maintained on local street intersections. The study intersection (Donald Avenue-Project Driveway/Indiana Avenue) analyzed in this TIA is located on Indiana Avenue, which is designated as a 4-lane arterial by the City's General Plan. Therefore, LOS D is used as the minimum level of service standard.

Project Significance Threshold

The City's significance criteria are used to determine circulation impacts. Because the project requires a General Plan Amendment and Zone Change, a significant impact occurs when the addition of project-related trips causes either peak hour LOS to degrade from acceptable (LOS A through D) to unacceptable LOS (E or F) or the peak hour delay to increase as follows:

- LOS A/B: by 10.0 seconds.
- LOS C: by 8.0 seconds.
- LOS D: by 5.0 seconds.
- LOS E: by 2.0 seconds.
- LOS F: by 1.0 second.

TRAFFIC VOLUMES WITHOUT PROJECT SCENARIOS

Existing Traffic Volumes

Existing traffic volumes are based on peak hour intersection turn movement counts collected by National Data and Surveying Services in September 2016. Count sheets are included in Appendix B. Figure 4 illustrates existing peak hour traffic volumes at study intersections.

Project Completion (2017) Traffic Volumes

Project completion traffic volumes were developed by applying an annual growth rate of 1.5 percent per year (2016 to 2017) to existing without project traffic volumes. All assumptions, including the growth rate, used for opening year analyses are outlined in the City-approved scoping letter (Appendix A). Figure 4 illustrates project completion without project peak hour traffic volumes. Detailed volume development worksheets are included in Appendix C.

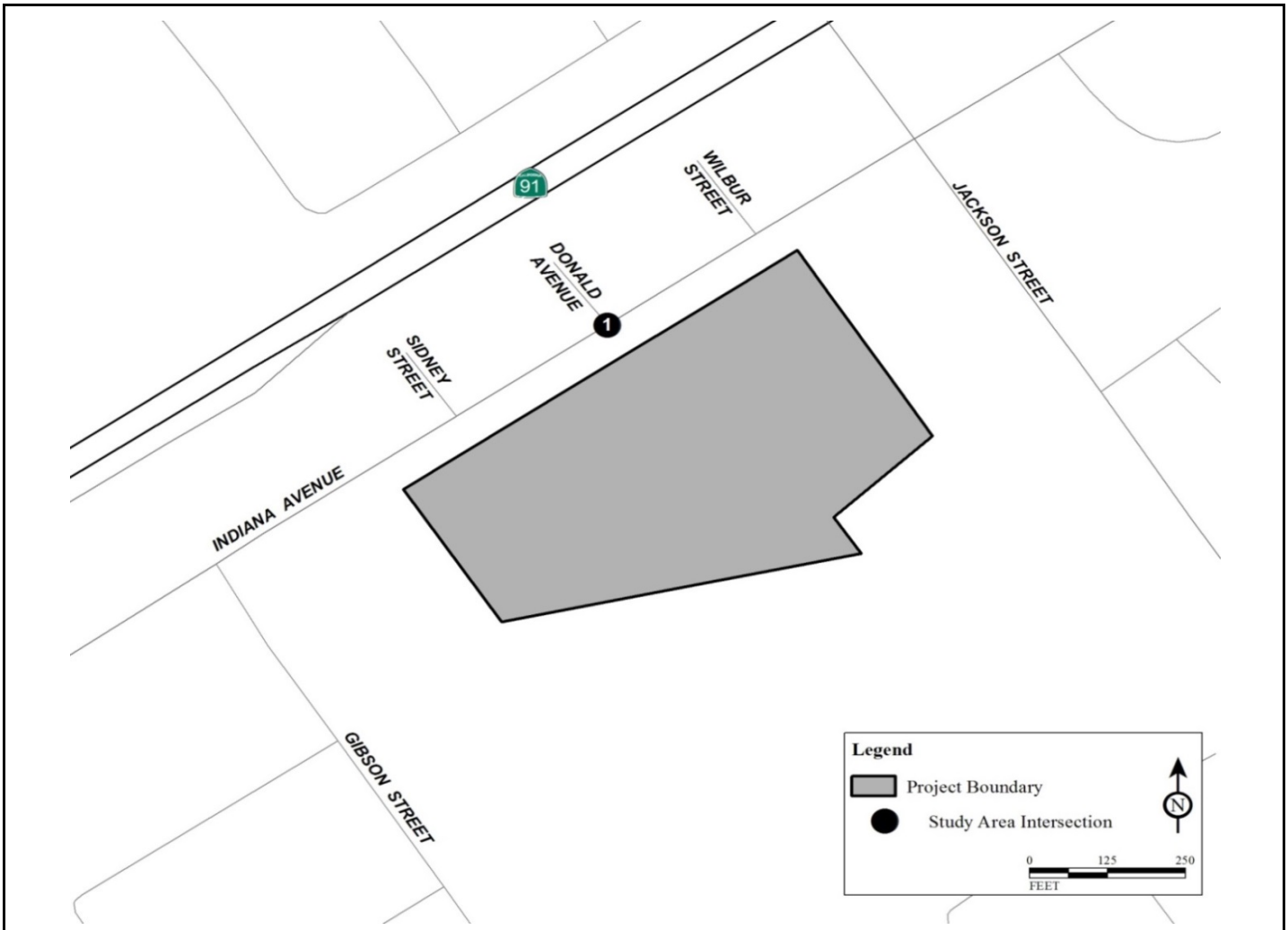
Cumulative (2017) Traffic Volumes

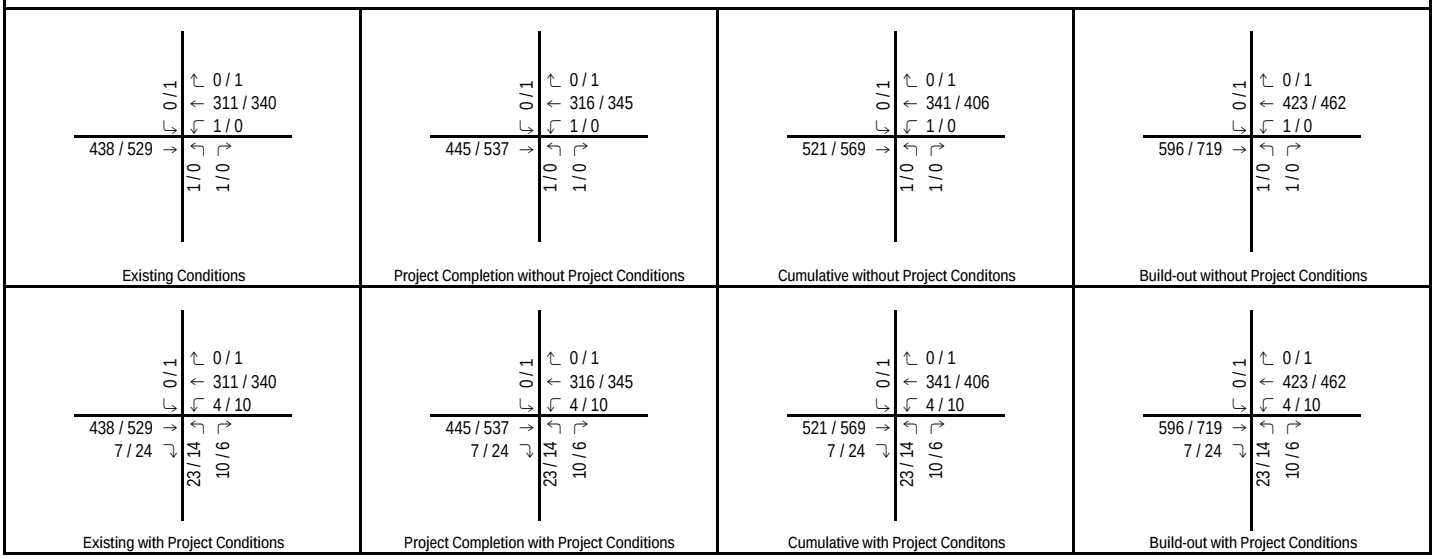
Information concerning cumulative projects in the vicinity of the proposed project was obtained from City staff. Table C lists the cumulative projects included in this analysis. Figure 5 illustrates the cumulative project locations.

The trip generation for cumulative projects was developed using rates from the Institute of Transportation Engineers (ITE) *Trip Generation*, 9th Edition. As shown in Table C, cumulative projects are expected to generate 8,589 net daily trips, 761 net a.m. peak hour trips, and 735 net p.m. peak hour trips. Figure 6 illustrates the total cumulative project trips at study intersections. Cumulative traffic volumes were added to the project completion volumes to develop cumulative without project traffic volumes. Figure 4 illustrates cumulative without project peak hour traffic volumes at study intersections. Detailed volume development worksheets are included in Appendix C.

Build-out (2040) Traffic Volumes

Build-out traffic volumes were developed by applying an annual growth rate of 1.5 percent per year (2016 to 2040) to the existing volumes at the intersection of Donald Avenue-Project Driveway/ Indiana Avenue. All assumptions, including the growth rate, used for build-out analyses, are outlined in the City-approved scoping letter (Appendix A). Figure 4 illustrates build-out without project peak hour traffic volumes. Detailed volume development worksheets are included in Appendix C.





LSA

FIGURE 4

XXX / YYY

AM / PM Peak Hour Volumes

Hawthorne Residential Development

Traffic Impact Analysis

Peak Hour Traffic Volumes - All Analysis Scenarios

(Intersection of Donald Avenue-Project Driveway/Indiana Avenue)

Table C - Cumulative Projects Trip Generation

Project Number	Location	Land Use	Units	Rate	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
1 .	8432 Magnolia Ave.	CBU Specific Plan Amendment	146.0 TSF	Trips/Unit[1]	3.30	0.93	4.24	1.15	2.45	3.60	38.22
	Riverside, CA	(University/College Campus)		Trip Generation	**482**	**136**	**618**	**168**	**357**	**525**	**5,580**
2 .	10050 Magnolia Ave.	Retail	5.2 TSF	Trips/Unit[2]	0.60	0.36	0.96	1.78	1.93	3.71	42.70
	Riverside, CA	(Shopping Center)		Trip Generation	3	2	5	9	10	19	222
				Pass-by Trips[3]	0	0	0	(4)	(4)	(7)	(7)
				Total Net Trips	**3**	**2**	**5**	**6**	**6**	**12**	**215**
3 .	Northeast Corner of	Single Family Residential	18 DU	Trips/Unit[4]	0.19	0.56	0.75	0.63	0.37	1.00	9.52
	Gibson and Lincoln			Trip Generation	**3**	**10**	**13**	**11**	**7**	**18**	**171**
4 .	9644 Magnolia Ave.	Commercial	10.3 TSF	Trips/Unit[2]	0.60	0.36	0.96	1.78	1.93	3.71	42.70
	Riverside, CA	(Shopping Center)		Trip Generation	6	4	10	18	20	38	438
				Pass-by Trips[3]	0	0	0	(6)	(7)	(13)	(13)
				Total Net Trips	**6**	**4**	**10**	**12**	**13**	**25**	**425**
		Restaurant	2.0 TSF	Trips/Unit[5]	5.95	4.86	10.81	5.91	3.94	9.85	127.15
		High-Turnover (Sit-Down)		Trip Generation	12	10	22	12	8	20	260
				Pass-by Trips[6]	0	0	0	(4)	(5)	(9)	(9)
				Total Net Trips	**12**	**10**	**22**	**8**	**3**	**11**	**251**
5 .	8505-8543 Indiana Ave.	Car Dealership	41.0 TSF	Trips/Unit[7]	1.44	0.48	1.92	1.05	1.57	2.62	32.30
	Riverside, CA	(Automobile Sales)		Trip Generation	**59**	**20**	**79**	**43**	**64**	**107**	**1,324**
6 .	9471 Magnolia Ave.	Commercial	15.0 TSF	Trips/Unit[2]	0.60	0.36	0.96	1.78	1.93	3.71	42.70
	Riverside, CA	(Shopping Center)		Trip Generation	9	5	14	27	29	56	641
				Pass-by Trips[3]	0	0	0	(10)	(9)	(19)	(19)
				Total Net Trips	**9**	**5**	**14**	**17**	**20**	**37**	**621**
				Gross Trip Generation	**574**	**187**	**761**	**288**	**495**	**783**	**8,636**
				Total Pass-by Trips	**0**	**0**	**0**	**(24)**	**(24)**	**(48)**	**(48)**
				Total Net Trip Generation	**574**	**187**	**761**	**264**	**471**	**735**	**8,589**

Notes:

TSF = Thousand Square Feet, DU=Dwelling Units

[1]There are no rates for a University/College Campus based on square footage in the Institute of Transportation Engineers (ITE) *Trip Generation* Manual, therefore student rates for Land Use 540 "Junior/Community College" from ITE Trip Generation Manual were factored to develop square footage rate.

[2]Rates based on Land Use 820 "Shopping Center" from the ITE *Trip Generation* Manual, 9th Edition.

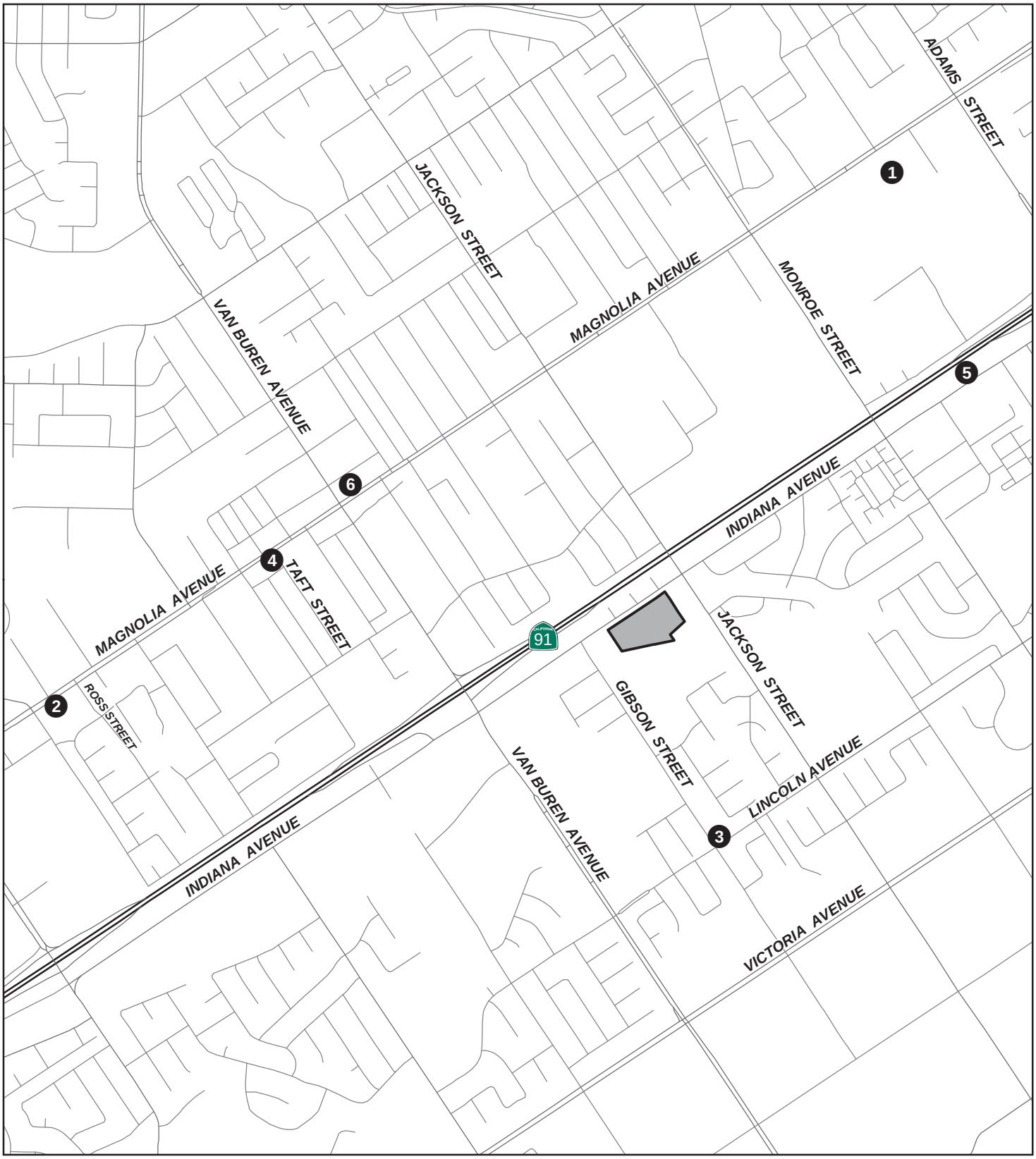
[3]Pass-by trips are based on rates for Land Use 820 "Shopping Center" from the ITE *Trip Generation Handbook*, 2nd Edition. Since there is no data available for daily pass-by trips, p.m. pass-by trips have been applied to the daily trip generation.

[4]Rates based on Land Use 210 "Single-Family Detached Housing" from the ITE *Trip Generation* Manual, 9th Edition.

[5]Rates based on Land Use 932 "High-Turnover (Sit-Down) Restaurant" from the ITE *Trip Generation* Manual, 9th Edition.

[6]Pass-by trips are based on rates for Land Use 932 "High-Turnover (Sit-Down) Restaurant" from the ITE *Trip Generation Handbook*, 2nd Edition. Since there is no data available for daily pass-by trips, p.m. pass-by trips have been applied to the daily trip generation.

[7]Rates based on Land Use 841 "Automobile Sales" from the Institute of Transportation Engineers (ITE) *Trip Generation* Manual, 9th Edition.



LSA

Legend

Project Boundary

Cumulative Project Location

N

0 750 1500
FEET

SOURCE: Streetmap, 2013/Riverside County, 2015.

FIGURE 5

Hawthorne Residential Development
Traffic Impact Analysis

Cumulative Project Locations

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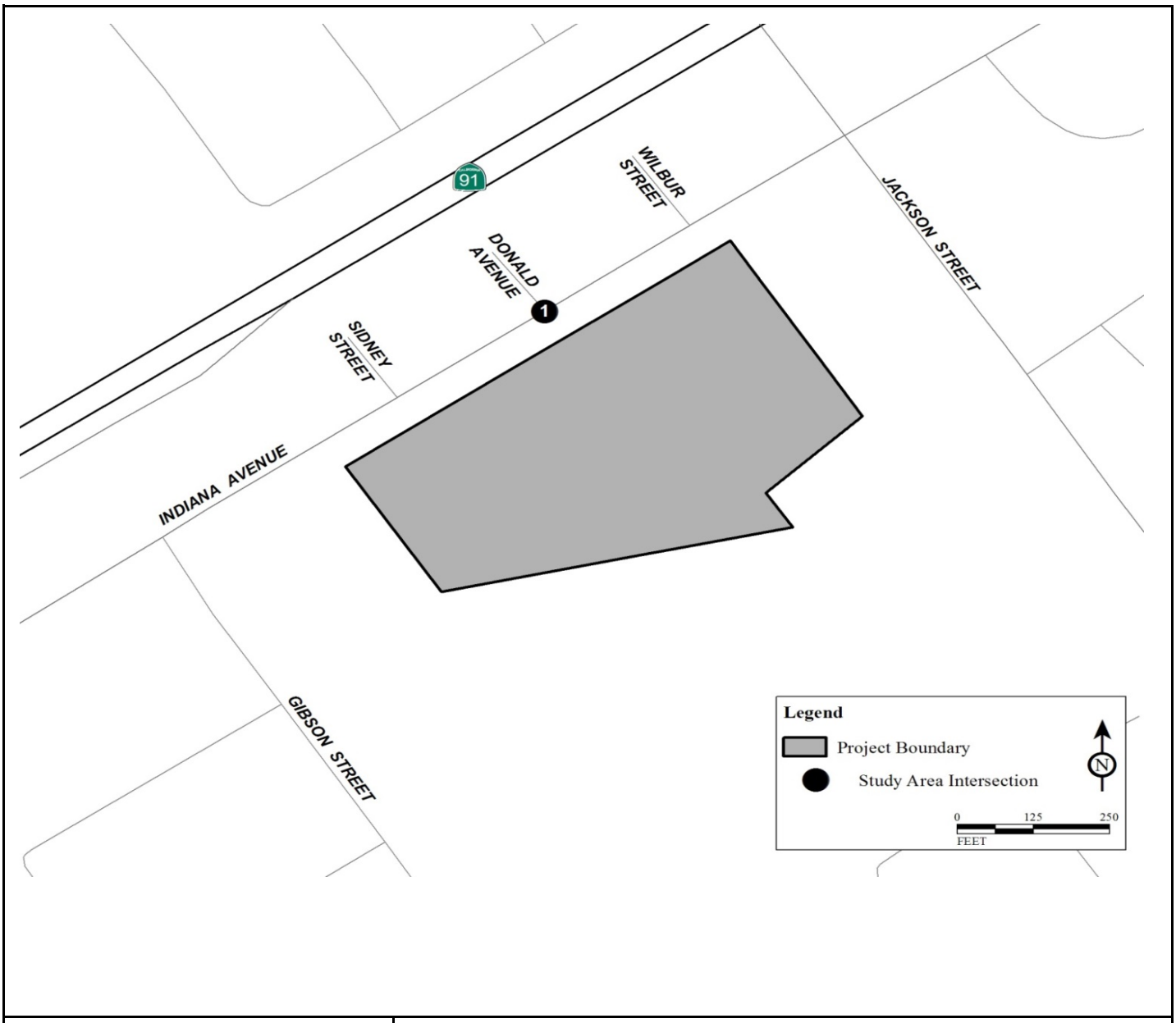

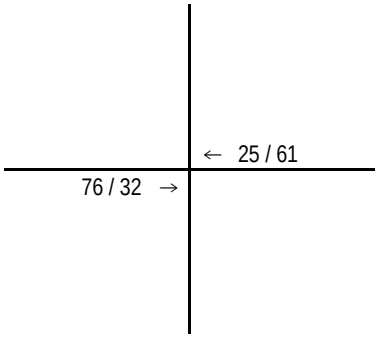

Donald Avenue-Project Driveway/Indiana Avenue

LSA

FIGURE 6

XX / YY

AM / PM Peak Hour Trips

Hawthorne Residential Development

Traffic Impact Analysis

Cumualtive Project Trips

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PROJECT TRAFFIC

Project Trip Generation

Total vehicle trip generation for the proposed project was developed using rates from the ITE *Trip Generation* (9th Edition) for Land Use 210 "Single-Family Detached Housing." As shown in Table D, the proposed project is anticipated to generate 514 daily trips with 41 trips occurring during the a.m. peak hour, 54 trips occurring during the p.m. peak hour.

Project Trip Distribution and Assignment

Generalized trip distribution patterns were developed based on the location of the proposed project in relation to surrounding land uses and the regional roadway network. The project trip distributions were approved by City staff via the City's scoping agreement process. Figure 7 illustrates the trip distribution and assignment for proposed project.

TRAFFIC VOLUMES WITH PROJECT SCENARIOS

Existing, project completion, cumulative, and build-out (2040) with project traffic volumes were developed by adding project traffic to the corresponding without project scenarios. Previously referenced Figure 4 illustrates existing, project completion, cumulative, and build-out with project traffic volumes.

INTERSECTION LEVELS OF SERVICE

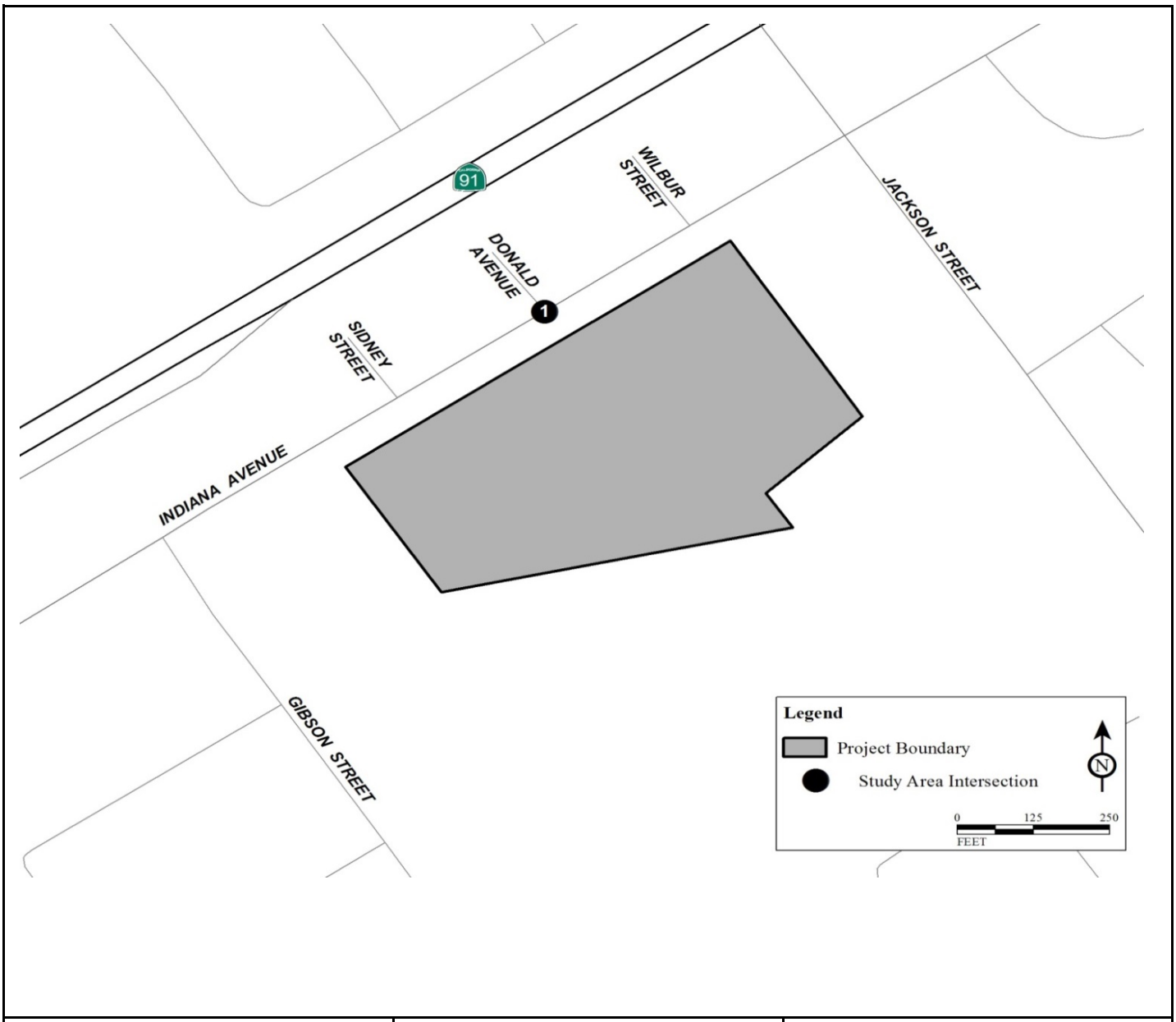
Existing, Project Completion (2017), Cumulative (2017), and Build-out (2040) Levels of Service

Figure 8 illustrates existing and future year without and with project study intersection geometrics. Existing, project completion, cumulative, and build-out traffic volumes were developed using the approach discussed in the traffic forecast section of this report. An intersection level of service analysis was conducted for each scenario to determine intersection performance. LOS calculation worksheets are included in Appendix D. Table E summarizes the results of these analyses and shows that the intersections of Donald Avenue-Project Driveway/Indiana Avenue would operate at satisfactory levels of service without and with the project under all scenarios analyzed in this report.

Based on the City's significant impact criteria as defined in the "Project Significance Threshold" section of this report, significant circulation impact occurs at the intersection Donald Avenue-Project Driveway/Indiana under build-out with project conditions (a.m. peak hour).

CIRCULATION IMPROVEMENTS AND RECOMMENDATIONS

At intersections where the level of service is forecast to be unsatisfactory or where the project would have a significant impact as defined in the "Project Significant Threshold" section of this report, improvements have been identified to maintain conformance with City level of service standards.



Project Trip Distribution

30%

70%

(70%) (30%)

*XX% (YY%)

Inbound% (Outbound%)

Donald Avenue-Project Driveway/Indiana Avenue

Project Trip Assignment

3 / 10

7 / 24

22 / 14 9 / 6

*XX / YY

AM / PM Peak Hour Trips

Donald Avenue-Project Driveway/Indiana Avenue

LSA

FIGURE 7

Hawthorne Residential Development

Traffic Impact Analysis

Project Trip Distribution and Assignment

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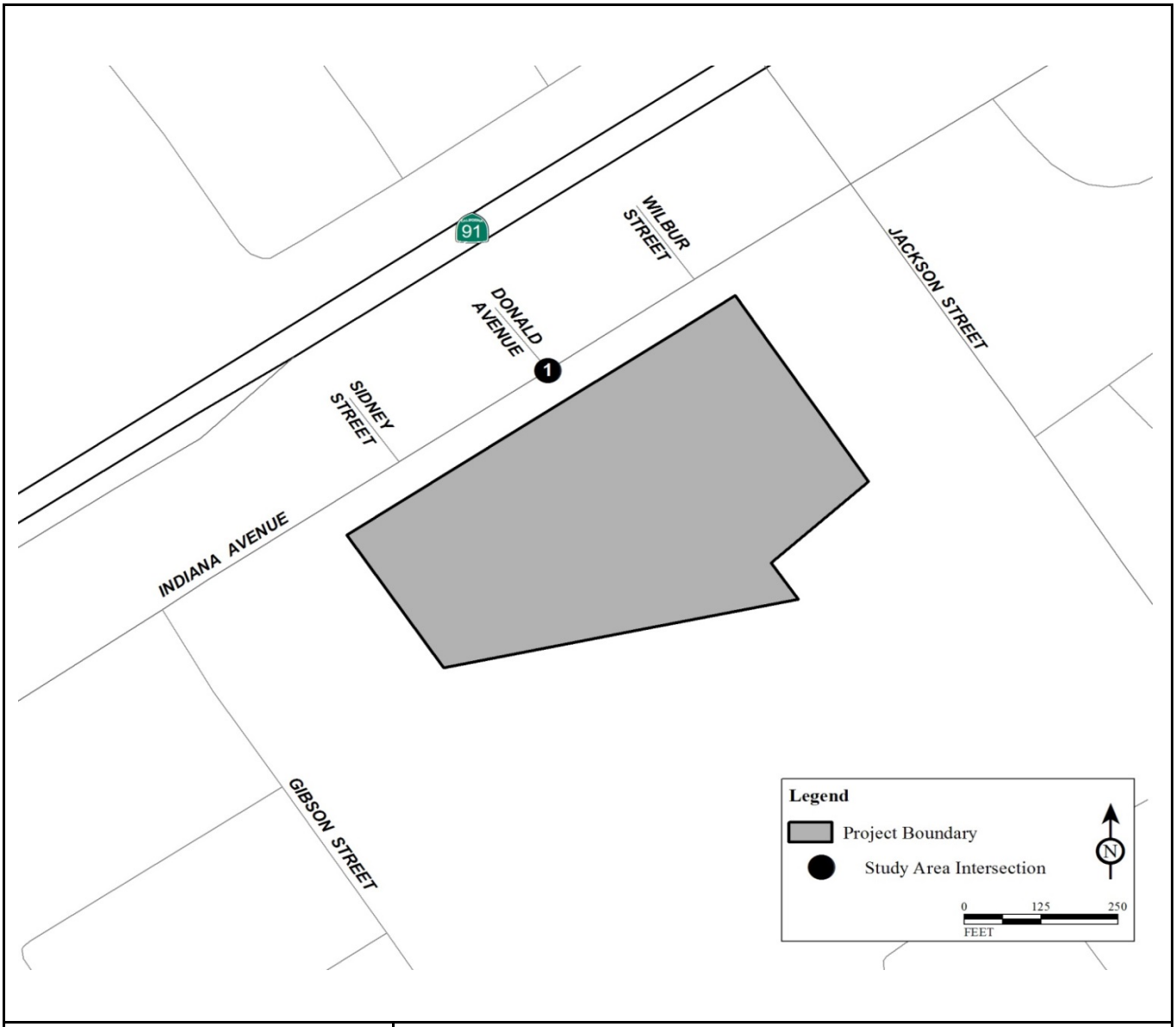

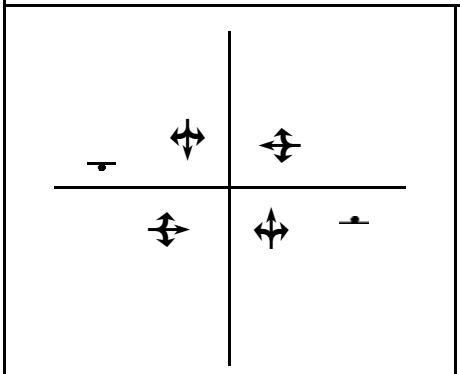

Donald Avenue-Project Driveway/Indiana Avenue

LSA

FIGURE 8

Legend

Stop Sign

Hawthorne Residential Development

Traffic Impact Analysis

Existing and Future Intersection Geometrics and Stop Control

R:\SWK1603_Hawthorne Site\Traffic\2016_09\z12 - lane geo (4/26/2017)

Table D - Project Trip Generation

Land Use	Units	A.M. Peak Hour In	A.M. Peak Hour Out	A.M. Peak Hour Total	P.M. Peak Hour In	P.M. Peak Hour Out	P.M. Peak Hour Total	Daily
Single-Family Residentia	54 DU							
Trips/Unit[1]		0.19	0.56	0.75	0.63	0.37	1.00	9.52
Trip Generation		10	31	41	34	20	54	514
Total Trip Generation		**10**	**31**	**41**	**34**	**20**	**54**	**514**

Notes:

DU = Dwelling Units

[1] Rates based on Land Use 210 - "Single Family Detached Housing" from the Institute of Transportation Engineers (ITE) *Trip Generation* Manual, 9th Edition.

Table E - Study Intersection Level of Service
(Intersection of Donald Avenue-Project Driveway/Indiana Avenue)

		Without Project				With Project				With Project With Recommended Improvements			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		A. Peak Hour		PM Peak Hour	
Scenario	**Control**	**Delay (sec.)**	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**	**LOS**
Existing Conditions	TWSC	15.4	C	19.6	C	18.9	C	20.9	C	*No Improvements Required*			
Project Completion (2017) Conditions	TWSC	15.6	C	19.9	C	19.2	C	21.2	C	*No Improvements Required*			
Cumulative (2017) Conditions	TWSC	17.6	C	22.5	C	22.6	C	24.1	C	*No Improvements Required*			
Build-Out (2040) Conditions	TWSC	21.2	C	30.4	D	**30.0**	**D** *	32.7	D	16.2	C	16.7	D

Notes:

TWSC = Two-Way Stop Control, AWSC = All-Way Stop Control

For TWSC intersections, reported delay is for worst-case movement.

LOS = Level of Service

* A significant circulation impact occurs as the addition of project related trips causes the a.m. peak hour delay to increase by more than 8.0 seconds when operating at LOS C.

Build-out (2040) Improvements

- **Donald Avenue-Project Driveway/Indiana Avenue:** Restripe Indiana Avenue to provide a two-way left-turn lane along the project frontage. This improvement will be provided by the project. As such, the cumulative LOS deficiency at this location does not constitute a significant impact. A copy the proposed striping plan is included in Appendix E.

Previously referenced Table D summarizes levels of service at the intersection of Donald Avenue-Project Driveway/Indiana Avenue with the recommended improvements under build-out (2040) with project conditions. As shown in Table D, the intersection of Donald Avenue-Project Driveway/Indiana Avenue would operate at a satisfactory LOS with the implementation of the recommended improvements. As previously mentioned, this improvement will be provided by the project.

SUMMARY AND CONCLUSIONS

The proposed project will include 54 single-family residential units. Access to the project site will be provided via the south leg of the intersection of Donald Avenue/Indiana Avenue. Under all scenarios analyzed in this TIA, the intersection of Donald Avenue-Project Driveway/Indiana Avenue is forecast to operate at an acceptable LOS during the a.m. and p.m. peak hours.

Based on the City's significant impact criteria as defined in the "Project Significance Threshold" section of this report, significant circulation impact occurs at the intersection Donald Avenue-Project Driveway/Indiana under build-out with project conditions (a.m. peak hour). As discussed in the "Circulation Improvements and Recommendations" section of this report, a two-way left-turn lane along the project frontage would be required to improve intersection performance to satisfactory conditions. Because this improvement will be provided in order to facilitate access to the project, a cumulative LOS deficiency at this location does not constitute a significant impact.

APPENDIX A:

SCOPING AGREEMENT

LSA

LSA ASSOCIATES, INC.
1500 IOWA AVENUE, SUITE 200
RIVERSIDE, CALIFORNIA 92507

951.781.9310 TEL
951.781.4277 FAX

BERKELEY
CARLSBAD
FRESNO
IRVINE
PALM SPRINGS
PT. RICHMOND
ROCKLIN
SAN LUIS OBISPO

September 23, 2016

Mr. Nathan Mustafa, P.E.
City of Riverside
3900 Main Street
Riverside, California 92522

Subject: Scope of Work for Hawthorne Residential Development Project Traffic Impact Analysis (LSA Project No. SWK1603)

Dear Mr. Mustafa:

LSA will be preparing a traffic impact analysis (TIA) for the proposed Hawthorne Residential Development Project to be located at 9170 Indiana Avenue, in the City of Riverside (City). Attached is Exhibit B, the "Scoping Agreement for Traffic Impact Study" form of the City's Traffic Impact Analysis Preparation Guide, dated January 2016, for your review.

The proposed project will include 54 single-family residential units. Access to the project site will be provided via of the south leg of the intersection of Donald Avenue/Indiana Avenue. Figure 1 (all figures and tables attached) illustrates the regional and project location. Figure 2 illustrates a conceptual site plan of the proposed project. Figure 3 illustrates the proposed study area intersection.

LSA anticipates that the following scope of work will be required to conduct the traffic study for proposed project.

SCOPE OF WORK

Trip Generation

Total vehicle trip generation for the proposed project will be developed using rates from the Institute of Transportation Engineers (ITE) *Trip Generation* (9th Edition) for Land Use 210 "Single-Family Detached Housing." As shown in Table A, the proposed project is anticipated to generate 41 gross trips in the a.m. peak hour, 54 gross trips in the p.m. peak hour, and 514 gross daily trips.

Project trip distribution patterns are based on the locations of residential, employment, and commercial centers in relation to the proposed project. Figure 4 illustrates the project trip distribution. The project trip generation was applied to the trip distribution patterns to develop the project trip assignments. Figure 5 illustrates the project trip assignment.

The TIA will be prepared to satisfy the requirements established by the City of Riverside "Traffic Impact Preparation Guide," dated January 2016, as well as the requirements for the disclosure of potential impacts and mitigation measures pursuant to the California Environmental Quality Act (CEQA). Based on the City's TIA guidelines, the study area shall generally include any intersection

of "Collector" or higher classification street on which the proposed project will add 50 or more peak hour trips. As such, LSA proposes include the following intersection:

1. Donald Avenue-Project Driveway/Indiana Avenue.

Analysis Scenarios

The TIA for the proposed project will be prepared to meet the requirements of the City. LSA proposes to analyze a.m. and p.m. peak hour traffic operations at the study intersection for the following scenarios:

- Existing Conditions;
- Existing Year plus Project Conditions;
- Project Completion without Project Conditions;
- Project Completion with Project Conditions;
- Cumulative Without Project Conditions; and
- Cumulative Plus Project Conditions.

Because the project requires a General Plan Amendment, the following scenarios will be analyzed as well:

- Build-out 2040 Without Project Conditions; and
- Build-out 2040 With Project Conditions.

Volume Development and Analysis Methodology

Traffic volumes for existing year traffic conditions will be based on existing a.m. and p.m. peak hour traffic counts collected the intersections identified for analysis. The a.m. peak hour is defined as the one hour of highest traffic volumes occurring between 7:00 and 9:00 a.m., while the p.m. peak hour is defined as the one hour of highest traffic volume occurring between 4:00 and 6:00 p.m.

Project completion without project traffic volumes will be developed by applying an annual growth rate of 1.5 percent per year (2016 to 2017) to existing peak hour traffic volumes. Cumulative project traffic volumes will be added to the project completion volumes to develop cumulative without project traffic volumes. Traffic volumes for future build-out year (2040) base traffic conditions will be developed 1.5 percent per annum to existing traffic volumes.

Existing, project completion, cumulative, and build-out year (2040) with project traffic volumes will be developed by adding project traffic to the corresponding without project scenarios.

The TIA will analyze study intersections during the a.m. and p.m. peak hours. Intersection levels of service (LOS) will be calculated using the *Highway Capacity Manual 2010* (HCM 2010) analysis methodologies and using *Synchro 9.0* software.

Project Impact Assessment and Mitigation Measures

Intersection LOS without the project will be compared to the intersection LOS plus the project for each of the analysis scenarios to determine potential project impacts. Determination of the significance of project impacts will be made based on City's LOS and threshold of significance criteria. At significantly affected intersections, mitigation measures will be recommended to improve intersection performance to satisfactory conditions. Mitigation measures may include intersection turn lanes, signalization, and segment lane additions. The LOS with mitigation will be calculated and summarized, along with a comparison of the LOS without mitigation.

Fair Share

For improvements not included in any fee program, LSA will calculate project's fair-share percentage to total new traffic. A table with recommended mitigation will be prepared and will include mitigation measures required under future build-out year (2040) conditions. The fair share will be based on project traffic as a percentage of total growth from existing to year 2040.

Sincerely,

LSA ASSOCIATES, INC.

Joe Urzua
Senior Transportation Planner

Attachments: Exhibit B: Scope of Study Form
Table A: Project Trip Generation
Figure 1: Regional and Project Location
Figure 2: Site Plan
Figure 3: Study Area Intersection
Figure 4: Project Trip Distribution
Figure 5: Project Trip Assignment

Exhibit B

SCOPING AGREEMENT FOR TRAFFIC IMPACT STUDY

This letter acknowledges the City of Riverside Public Works Traffic Engineering Division requirements for traffic impact analysis of the following project. The analysis must follow the City Traffic Impact Analysis Preparation Guide dated January 2016.

Case No. P16-0112, P16-0113 ,p16-0114 & p16-0111
Related Cases -
SP No.
EIR No.
GPA No.
CZ No.
Project Name: Hawthorne Residentail Development
Project Location: 9170 Indiana Avenue, Riverside
Project Description: The project is proposed to develop 54 single-family residential dwelling units in occupied land.

	Consultant	Developer
Name:	LSA Associates, Inc.	Steve Berzansky, Steven Walker Communities, Inc.
Address:	1500 Iowa Avenue, Suite 200	7111 Indiana Avenue, Suite 300
	Riverside, CA 92507	Riverside, CA 92504
Telephone:	951-781-9310	(951) 784-0840

A. Trip Generation Source: ITE *Trip Generation Manual*, most recent edition

Existing Land Use School
Existing Zoning Public Facilities/Institutional
Total Daily Trips 514

Proposed Land Use Single-Family Residential
Proposed Zoning Single-Family Residential

	In	Out	Total
AM Trips	10	31	41
PM Trips	34	20	54

Internal Trip Allowance ☐ Yes ☒ No (% Trip Discount)
Pass-By Trip Allowance ☐ Yes ☒ No (% Trip Discount)
(Attach additional sheet if this is a multi-use site with a breakdown of trips generated)

B. Trip Geographic Distribution: N 0 % S 0 % E 25 % W 75 %
(See attached exhibit for detailed assignment)

C. Background Traffic

Project Completion Year: 2016 **Annual Ambient Growth Rate:** 1.5 %
Other area projects to be included: See attached Table B

Please contact Planning Division or use the most recently provided data

Model/Forecast methodology if required Not Applicable

D. Build-out Studies: Does this project require a Build-out Study per TIA Guidelines Section 7.2? ■ Yes ☐ No

E. Study Intersections: (NOTE: Subject to revision after other projects, trip generation and distribution are determined, or comments from other agencies.)

1. Donald Avenue-Project Driveway/Indiana Avenue
2.
3.
4.
5.
6.
7.
8.

F. Study Roadway Segments (For Build-out Studies):

1.
2.
3.
4.
5.
6.
7.
8.

G. Other Jurisdictional Impacts

Is this project within any other Agency's Sphere of Influence or one-mile radius of boundaries? ☐ Yes ■ No

If so, name of Jurisdiction:

H. Site Plan (please attach a legible 11'X17' copy)

I. Specific Issues to be addressed in the Study (in addition to the standard analysis described in the Guideline) (To be filled out by Public Works Traffic Department)

PLEASE INCLUDE RECOMMENDED TRAFFIC CONTROL AT INTERSECTION OF INDIANA & DONALD

Recommended by:

Joe Urzua
Consultant's Representative

09/23/2016
Date

Scoping Agreement Submitted on

09/23/2016
Date

Scoping Agreement Resubmitted on

Date

Approved Scoping Agreement:

City of Riverside
Traffic Engineering Division

10/11/16
Date

cc: Planning Division

Table A - Project Trip Generation

Land Use		Units	A.M. Peak Hour In	A.M. Peak Hour Out	A.M. Peak Hour Total	P.M. Peak Hour In	P.M. Peak Hour Out	P.M. Peak Hour Total	Daily
Single-Family Residentia	54	Dwelling							
Trips/Unit[1]			0.19	0.56	0.75	0.63	0.37	1.00	9.52
Trip Generation			10	31	41	34	20	54	514
Total Trip Generation			**10**	**31**	**41**	**34**	**20**	**54**	**514**

[1] Rates based on Land Use 210 - "Single Family Detached Housing" from the *Institute of Transportation Engineers (ITE) Trip Generation* Manual, 9th Edition.

Table B - Proposed Cumulative Projects

No.	Project (Case #)	Land Use	Location	Units
1	P15-0988, P15-098, P15-087 P15-0990	CBU Specific Plan Amendment University/College Campus)	8432 Magnolia Avenue	146,000 SF
2	P15-0894, P16-0004, P16-0297	Retail	10050 Magnolia Avenue	5,200 SF
3	P15-0957	Single Family Residential	Northeast Corner of Gibson and Li	18 DU
4	P16-301	Commercial Restaurant	9644 Magnolia Avenue	10,265 SF 2,043 SF
5	P16-0404, 0545-0546	Car Dealership	8505-8543 Indiana Avenue	41,000 SF
6	P16-0238, P16-0104	Commercial	9471 Magnolia Avenue.	15,000 SF

Notes: SF = Square Feet; DU = Dwelling Units

LSA

FIGURE 1

0 1000 2000
FEET

SOURCE: Bing Aerial, 2016: Streetmap, 2013/Riverside County, 2015.

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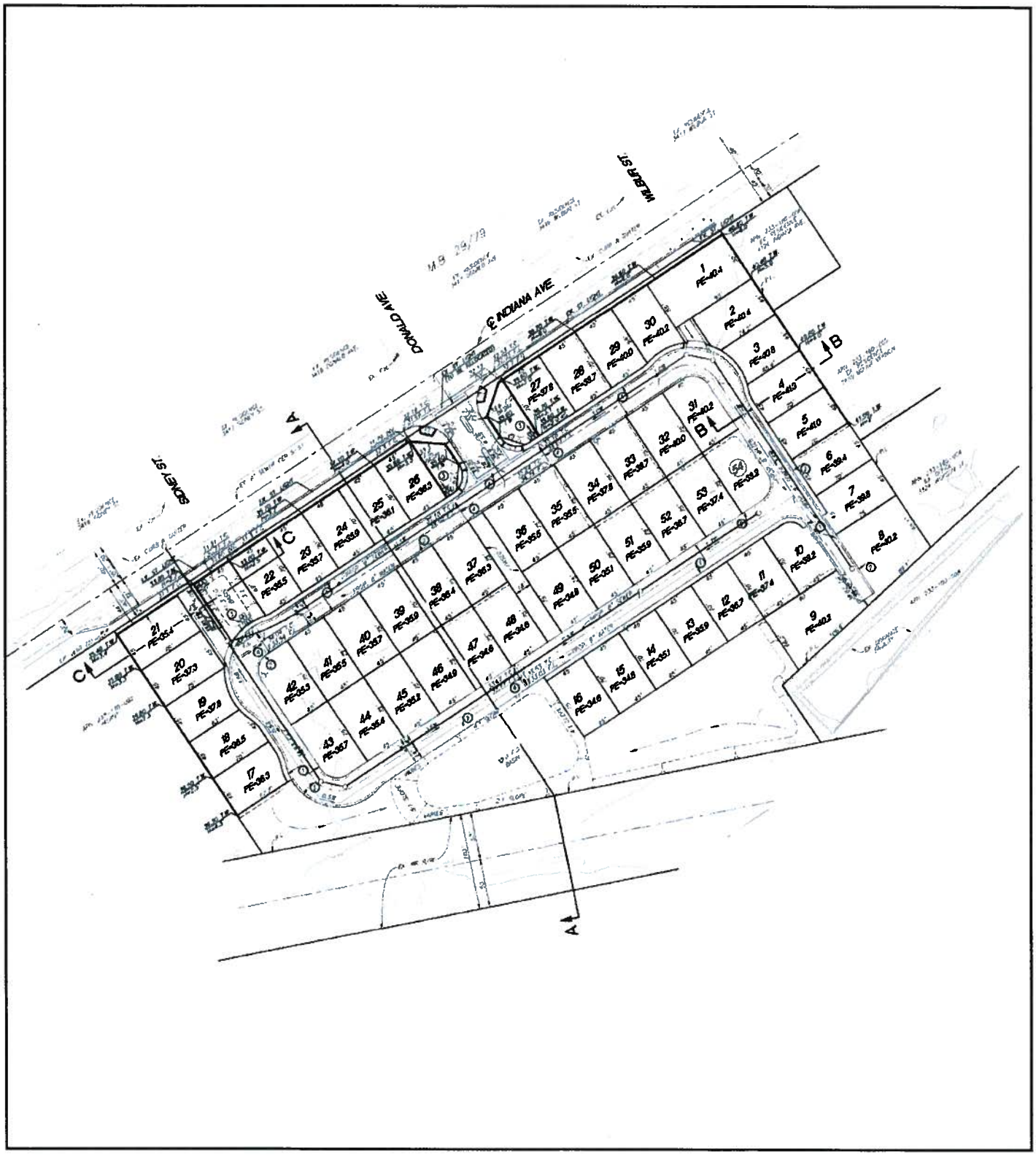
Hawthorne Residential Development
Traffic Impact Analysis

Regional and Project Location



LSA

FIGURE 2

N

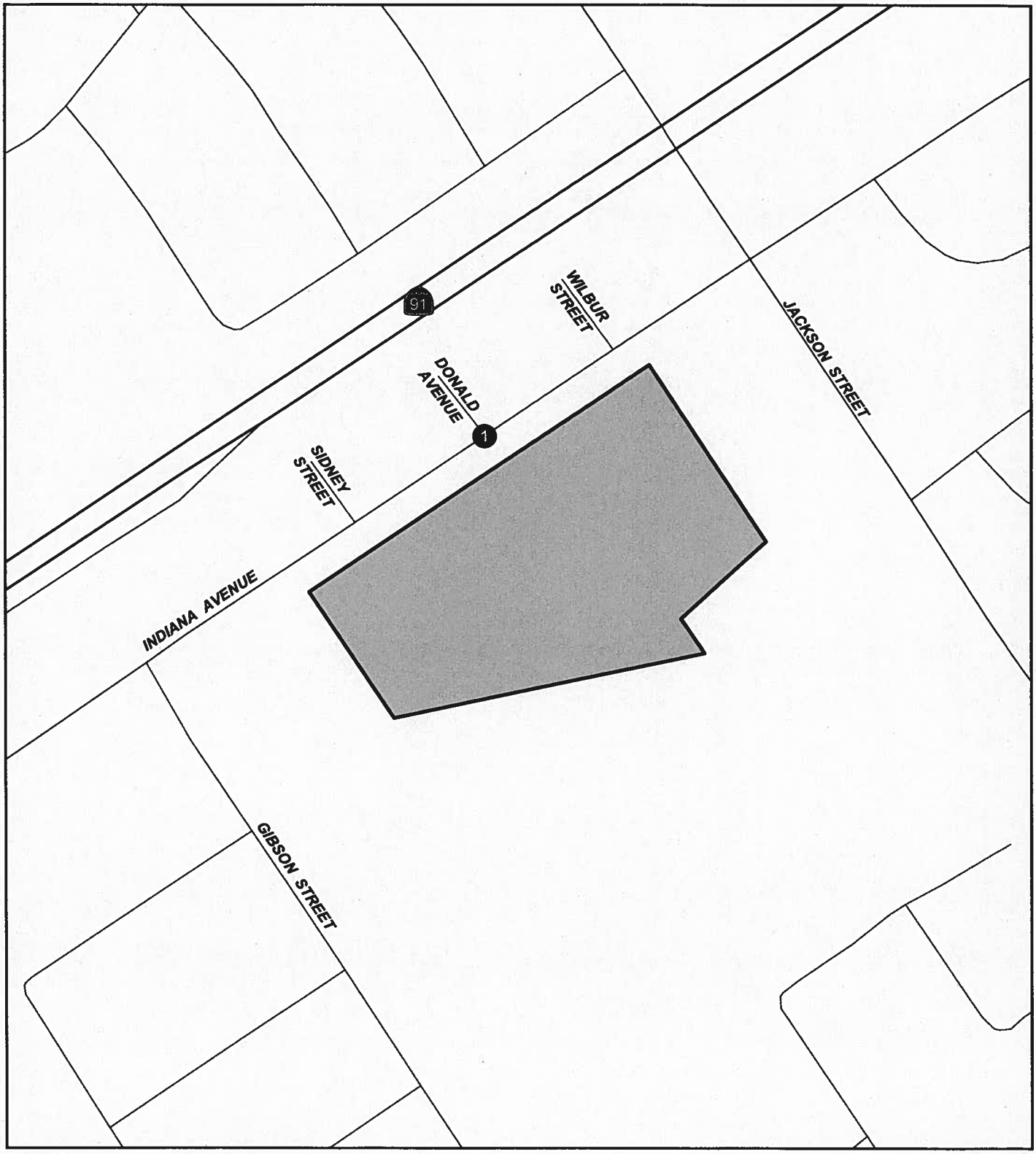
0 70 140
FEET

SOURCE: SDH and Associates, Inc. February, 2016.

Hawthorne Residential Development
Traffic Impact Analysis

Conceptual Site Plan

I:\SWK1603\Reports\Traffic\fig2_ConceptSP.mxd (9/23/2016)



LSA

Legend

Project Boundary

Study Area Intersection

FIGURE 3

N

0 125 250
FEET

SOURCE: Streetmap, 2013/Riverside County, 2015.

Hawthorne Residential Development
Traffic Impact Analysis

Study Area Intersection

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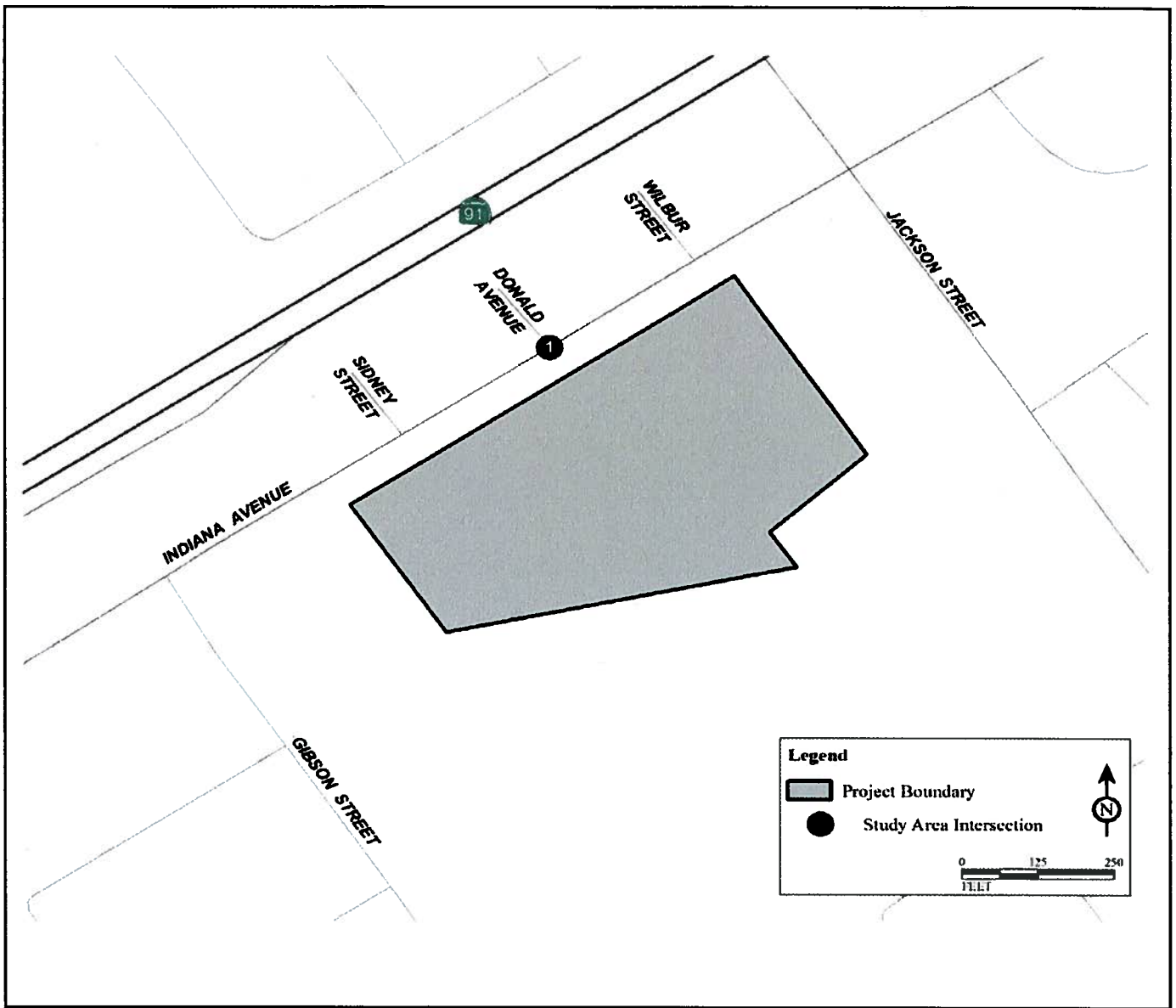


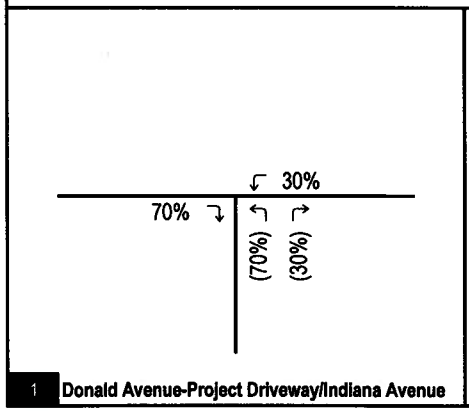


FIGURE 4

LSA

XX% (YY%)

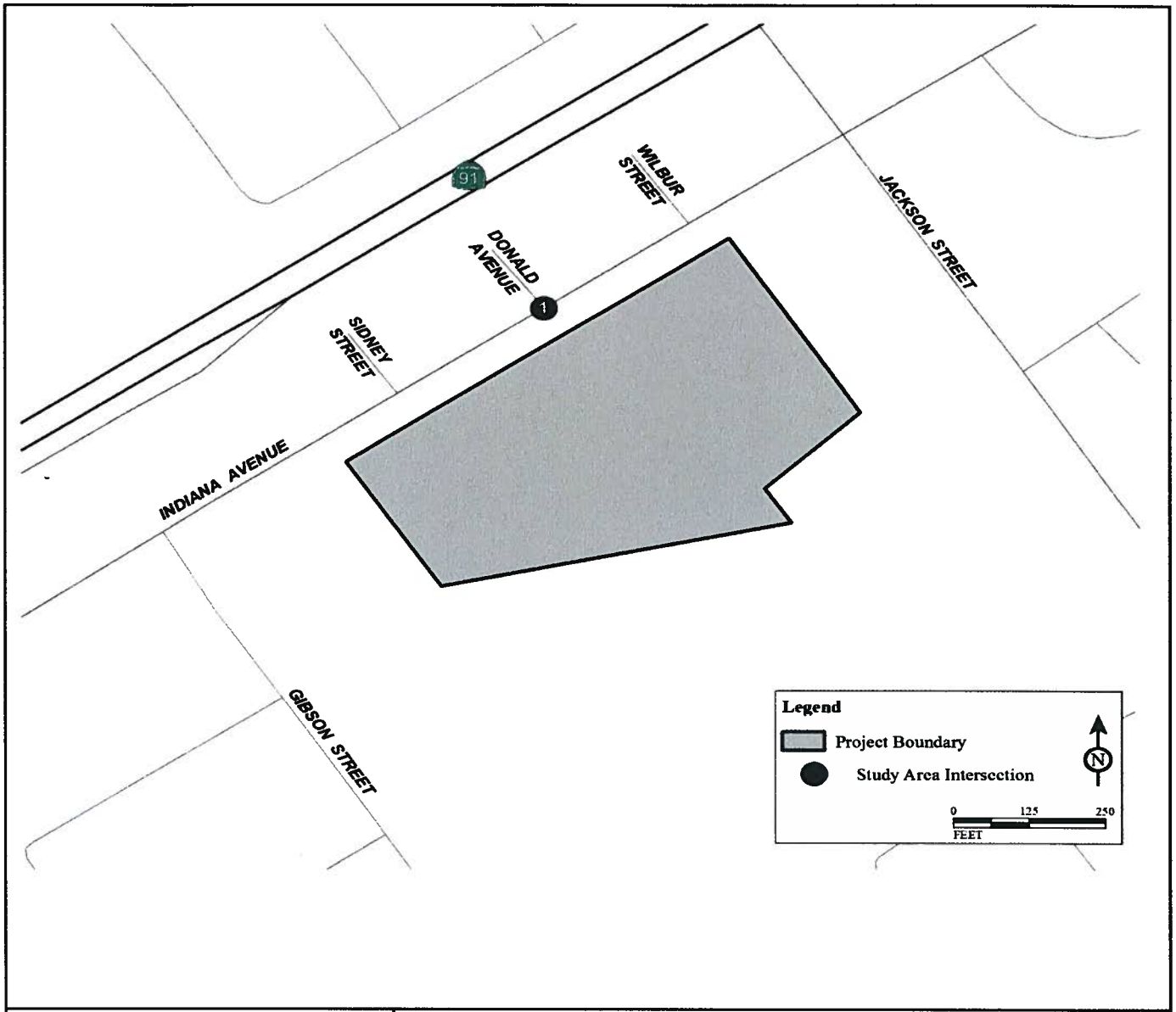
Inbound% (Outbound%) Trip Distribution

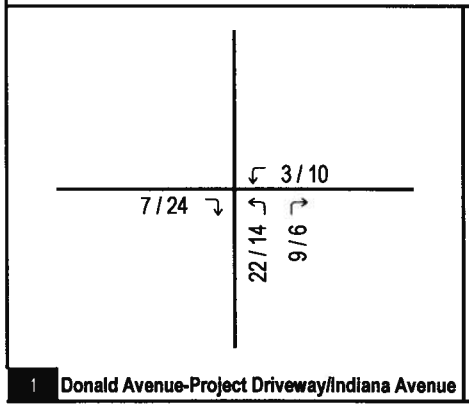
Hawthorne Residential Development

Traffic Impact Study

Project Trip Distribution

R:\SWK1603\Scope\z12 - Dist 9/23/2016





LSA

FIGURE 5

XX / YY

AM / PM Peak Hour Trips

Hawthorne Residential Development

Traffic Impact Analysis

Project Trip Assignment

R:\SWK1603\Scope\z12 - Assn 9/23/2016

APPENDIX B:

TRAFFIC COUNT SHEETS

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

Donald Ave and Indiana Ave , Riverside

Date: 9/8/2016

Day: Thursday

Project #: 16-6124-002

City: Riverside

AM Peak Hour	730 AM
NOON Peak Hour	
PM Peak Hour	445 PM

Peak Hour Summary

Southbound Approach

Donald Ave

	Lanes 0	1	0		
AM	0	0	0	0	AM
NOON	0	0	0	0	NOON
PM	0	0	1	1	PM

Eastbound Approach

Indiana Ave

	AM	NOON	PM
	312	0	340
0	0	0	0
1	438	0	529
0	0	0	0
Lanes	AM	NOON	PM

Westbound Approach

AM	NOON	PM	Lanes
0	0	1	0
311	0	340	1
1	0	0	0
439	0	530	
AM	NOON	PM	

CONTROL

1-Way Stop(SB)

Northbound Approach

AM	1	1	0	1	AM
	0	0	0	0	
	0	0	0	0	
		0	1	0	Lanes

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON	NONE	NONE
PM	4:00 PM	6:00 PM

APPENDIX C:

VOLUME DEVELOPMENT WORKSHEETS

Table C-1 - Existing Peak Hour Volume Summary

	AM Peak Hour			PM Peak Hour		
	Existing Volume	Project Trips	With Project Volume	Existing Volume	Project Trips	With Project Volume
1 Donald Avenue-Project Driveway/Indiana Avenue						
NBL	1	22	23	0	14	14
NBT	0	0	0	0	0	0
NBR	1	9	10	0	6	6
SBL	0	0	0	1	0	1
SBT	0	0	0	0	0	0
SBR	0	0	0	0	0	0
EBL	0	0	0	0	0	0
EBT	438	0	438	529	0	529
EBR	0	7	7	0	24	24
WBL	1	3	4	0	10	10
WBT	311	0	311	340	0	340
WBR	0	0	0	1	0	1
North Leg						
Approach	0	0	0	1	0	1
Departure	0	0	0	1	0	1
Total	0	0	0	2	0	2
South Leg						
Approach	2	31	33	0	20	20
Departure	1	10	11	0	34	34
Total	3	41	44	0	54	54
East Leg						
Approach	312	3	315	341	10	351
Departure	439	9	448	530	6	536
Total	751	12	763	871	16	887
West Leg						
Approach	438	7	445	529	24	553
Departure	312	22	334	340	14	354
Total	750	29	779	869	38	907
Total Approaches						
Approach	752	41	793	871	54	925
Departure	752	41	793	871	54	925
Total	1,504	82	1,586	1,742	108	1,850

Table C-2-Year 2017 Peak Hour Volume Summary

	Existing Volume	Ambient Growth	Existing (+) Ambient W/O Project	Project Trips	Existing (+) Ambient W/ Project	Existing Volume	Ambient Growth	Existing (+) Ambient W/O Project	Project Trips	Existing (+) Ambient W/ Project
1 Donald Avenue-Project Driveway/Indiana Avenue										
NBL	1	0	1	22	23	0	0	0	14	14
NBT	0	0	0	0	0	0	0	0	0	0
NBR	1	0	1	9	10	0	0	0	6	6
SBL	0	0	0	0	0	1	0	1	0	1
SBT	0	0	0	0	0	0	0	0	0	0
SBR	0	0	0	0	0	0	0	0	0	0
EBL	0	0	0	0	0	0	0	0	0	0
EBT	438	7	445	0	445	529	8	537	0	537
EBR	0	0	0	7	7	0	0	0	24	24
WBL	1	0	1	3	4	0	0	0	10	10
WBT	311	5	316	0	316	340	5	345	0	345
WBR	0	0	0	0	0	1	0	1	0	1
North Leg										
Approach	0	0	0	0	0	1	0	1	0	1
Departure	0	0	0	0	0	1	0	1	0	1
Total	0	0	0	0	0	2	0	2	0	2
South Leg										
Approach	2	0	2	31	33	0	0	0	20	20
Departure	1	0	1	10	11	0	0	0	34	34
Total	3	0	3	41	44	0	0	0	54	54
East Leg										
Approach	312	5	317	3	320	341	5	346	10	356
Departure	439	7	446	9	455	530	8	538	6	544
Total	751	12	763	12	775	871	13	884	16	900
West Leg										
Approach	438	7	445	7	452	529	8	537	24	561
Departure	312	5	317	22	339	340	5	345	14	359
Total	750	12	762	29	791	869	13	882	38	920
Total Approaches										
Approach	752	12	764	41	805	871	13	884	54	938
Departure	752	12	764	41	805	871	13	884	54	938
Total	1,504	24	1,528	82	1,610	1,742	26	1,768	108	1,876

Table C-3-Year 2017 Cumulative Conditions Peak Hour Volume Summary

	Existing (+) Ambient W/O Project	Cumulative Projects	Cumulative NP	Project Trips	Cumulative WP	Existing (+) Ambient W/O Project	Cumulative Projects	Cumulative NP	Project Trips	Cumulative WP
1 Donald Avenue-Project Driveway/Indiana Avenue										
NBL	1	0	1	22	23	0	0	0	14	14
NBT	0	0	0	0	0	0	0	0	0	0
NBR	1	0	1	9	10	0	0	0	6	6
SBL	0	0	0	0	0	1	0	1	0	1
SBT	0	0	0	0	0	0	0	0	0	0
SBR	0	0	0	0	0	0	0	0	0	0
EBL	0	0	0	0	0	0	0	0	0	0
EBT	445	76	521	0	521	537	32	569	0	569
EBR	0	0	0	7	7	0	0	0	24	24
WBL	1	0	1	3	4	0	0	0	10	10
WBT	316	25	341	0	341	345	61	406	0	406
WBR	0	0	0	0	0	1	0	1	0	1
North Leg										
Approach	0	0	0	0	0	1	0	1	0	1
Departure	0	0	0	0	0	1	0	1	0	1
Total	0	0	0	0	0	2	0	2	0	2
South Leg										
Approach	2	0	2	31	33	0	0	0	20	20
Departure	1	0	1	10	11	0	0	0	34	34
Total	3	0	3	41	44	0	0	0	54	54
East Leg										
Approach	317	25	342	3	345	346	61	407	10	417
Departure	446	76	522	9	531	538	32	570	6	576
Total	763	101	864	12	876	884	93	977	16	993
West Leg										
Approach	445	76	521	7	528	537	32	569	24	593
Departure	317	25	342	22	364	345	61	406	14	420
Total	762	101	863	29	892	882	93	975	38	1,013
Total Approaches										
Approach	764	101	865	41	906	884	93	977	54	1,031
Departure	764	101	865	41	906	884	93	977	54	1,031
Total	1,528	202	1,730	82	1,812	1,768	186	1,954	108	2,062

Table C-4-Year 2040 Peak Hour Volume Summary

	2040 NP	Project Trips	2040 WP	2040 NP	Project Trips	2040 WP
1 Donald Avenue-Project Driveway/Indiana Avenue						
NBL	1	22	23	0	14	14
NBT	0	0	0	0	0	0
NBR	1	9	10	0	6	6
SBL	0	0	0	1	0	1
SBT	0	0	0	0	0	0
SBR	0	0	0	0	0	0
EBL	0	0	0	0	0	0
EBT	596	0	596	719	0	719
EBR	0	7	7	0	24	24
WBL	1	3	4	0	10	10
WBT	423	0	423	462	0	462
WBR	0	0	0	1	0	1
North Leg						
Approach	0	0	0	1	0	1
Departure	0	0	0	1	0	1
Total	0	0	0	2	0	2
South Leg						
Approach	2	31	33	0	20	20
Departure	1	10	11	0	34	34
Total	3	41	44	0	54	54
East Leg						
Approach	424	3	427	463	10	473
Departure	597	9	606	720	6	726
Total	1,021	12	1,033	1,183	16	1,199
West Leg						
Approach	596	7	603	719	24	743
Departure	424	22	446	462	14	476
Total	1,020	29	1,049	1,181	38	1,219
Total Approaches						
Approach	1,022	41	1,063	1,183	54	1,237
Departure	1,022	41	1,063	1,183	54	1,237
Total	2,044	82	2,126	2,366	108	2,474

APPENDIX D:

LOS CALCULATION WORKSHEETS

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	438	0	1	311	0	1	0	1	0	0	0
Future Vol, veh/h	0	438	0	1	311	0	1	0	1	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	0	534	0	1	379	0	1	0	1	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	379	0	0	534	0	0	916	916	534	917	916	379
Stage 1	-	-	-	-	-	-	534	534	-	382	382	-
Stage 2	-	-	-	-	-	-	382	382	-	535	534	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1191	-	-	1044	-	-	255	274	550	255	274	672
Stage 1	-	-	-	-	-	-	534	528	-	645	616	-
Stage 2	-	-	-	-	-	-	645	616	-	533	528	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1191	-	-	1044	-	-	255	274	550	254	274	672
Mov Cap-2 Maneuver	-	-	-	-	-	-	255	274	-	254	274	-
Stage 1	-	-	-	-	-	-	534	528	-	645	615	-
Stage 2	-	-	-	-	-	-	644	615	-	532	528	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	15.4	0
HCM LOS			C	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	348	1191	-	-	1044	-	-	-
HCM Lane V/C Ratio	0.007	-	-	-	0.001	-	-	-
HCM Control Delay (s)	15.4	0	-	-	8.5	0	-	0
HCM Lane LOS	C	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	-

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	529	0	0	340	1	0	0	0	1	0	0
Future Vol, veh/h	0	529	0	0	340	1	0	0	0	1	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	0	569	0	0	366	1	0	0	0	1	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	367	0	0	569	0	0	935	936	569	935	935	366
Stage 1	-	-	-	-	-	-	569	569	-	366	366	-
Stage 2	-	-	-	-	-	-	366	367	-	569	569	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1203	-	-	1013	-	-	248	267	525	248	267	684
Stage 1	-	-	-	-	-	-	511	509	-	657	626	-
Stage 2	-	-	-	-	-	-	657	626	-	511	509	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1203	-	-	1013	-	-	248	267	525	248	267	684
Mov Cap-2 Maneuver	-	-	-	-	-	-	248	267	-	248	267	-
Stage 1	-	-	-	-	-	-	511	509	-	657	626	-
Stage 2	-	-	-	-	-	-	657	626	-	511	509	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	0	19.6
HCM LOS			A	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1203	-	-	1013	-	-	248
HCM Lane V/C Ratio	-	-	-	-	-	-	-	0.004
HCM Control Delay (s)	0	0	-	-	0	-	-	19.6
HCM Lane LOS	A	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	438	7	4	311	0	23	0	10	0	0	0
Future Vol, veh/h	0	438	7	4	311	0	23	0	10	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	0	534	9	5	379	0	28	0	12	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	379	0	0	543	0	0	927	927	538	934	932	379
Stage 1	-	-	-	-	-	-	538	538	-	389	389	-
Stage 2	-	-	-	-	-	-	389	389	-	545	543	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1191	-	-	1036	-	-	251	270	547	248	269	672
Stage 1	-	-	-	-	-	-	531	526	-	639	612	-
Stage 2	-	-	-	-	-	-	639	612	-	526	523	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1191	-	-	1036	-	-	250	268	547	241	267	672
Mov Cap-2 Maneuver	-	-	-	-	-	-	250	268	-	241	267	-
Stage 1	-	-	-	-	-	-	531	526	-	639	608	-
Stage 2	-	-	-	-	-	-	635	608	-	514	523	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	18.9	0
HCM LOS			C	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	299	1191	-	-	1036	-	-	-
HCM Lane V/C Ratio	0.135	-	-	-	0.005	-	-	-
HCM Control Delay (s)	18.9	0	-	-	8.5	0	-	0
HCM Lane LOS	C	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	0.5	0	-	-	0	-	-	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	529	24	10	340	1	14	0	6	1	0	0
Future Vol, veh/h	0	529	24	10	340	1	14	0	6	1	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	0	569	26	11	366	1	15	0	6	1	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	367	0	0	595	0	0	970	970	582	973	983	366
Stage 1	-	-	-	-	-	-	582	582	-	388	388	-
Stage 2	-	-	-	-	-	-	388	388	-	585	595	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1203	-	-	991	-	-	235	255	517	233	251	684
Stage 1	-	-	-	-	-	-	502	502	-	640	612	-
Stage 2	-	-	-	-	-	-	640	612	-	501	496	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1203	-	-	991	-	-	232	251	517	228	247	684
Mov Cap-2 Maneuver	-	-	-	-	-	-	232	251	-	228	247	-
Stage 1	-	-	-	-	-	-	502	502	-	640	603	-
Stage 2	-	-	-	-	-	-	631	603	-	495	496	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.2	19	20.9
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	278	1203	-	-	991	-	-	228
HCM Lane V/C Ratio	0.077	-	-	-	0.011	-	-	0.005
HCM Control Delay (s)	19	0	-	-	8.7	0	-	20.9
HCM Lane LOS	C	A	-	-	A	A	-	C
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	445	0	1	316	0	1	0	1	0	0	0
Future Vol, veh/h	0	445	0	1	316	0	1	0	1	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	0	543	0	1	385	0	1	0	1	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	385	0	0	543	0	0	931	931	543	931	931	385
Stage 1	-	-	-	-	-	-	543	543	-	388	388	-
Stage 2	-	-	-	-	-	-	388	388	-	543	543	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1185	-	-	1036	-	-	249	269	544	249	269	667
Stage 1	-	-	-	-	-	-	528	523	-	640	612	-
Stage 2	-	-	-	-	-	-	640	612	-	528	523	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1185	-	-	1036	-	-	249	269	544	248	269	667
Mov Cap-2 Maneuver	-	-	-	-	-	-	249	269	-	248	269	-
Stage 1	-	-	-	-	-	-	528	523	-	640	611	-
Stage 2	-	-	-	-	-	-	639	611	-	527	523	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	15.6	0
HCM LOS			C	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	342	1185	-	-	1036	-	-	-
HCM Lane V/C Ratio	0.007	-	-	-	0.001	-	-	-
HCM Control Delay (s)	15.6	0	-	-	8.5	0	-	0
HCM Lane LOS	C	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	-

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	537	0	0	345	1	0	0	0	1	0	0
Future Vol, veh/h	0	537	0	0	345	1	0	0	0	1	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	0	577	0	0	371	1	0	0	0	1	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	372	0	0	577	0	0	949	949	577	949	949	372
Stage 1	-	-	-	-	-	-	577	577	-	372	372	-
Stage 2	-	-	-	-	-	-	372	372	-	577	577	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1198	-	-	1006	-	-	242	262	520	242	262	678
Stage 1	-	-	-	-	-	-	506	505	-	653	622	-
Stage 2	-	-	-	-	-	-	653	622	-	506	505	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1198	-	-	1006	-	-	242	262	520	242	262	678
Mov Cap-2 Maneuver	-	-	-	-	-	-	242	262	-	242	262	-
Stage 1	-	-	-	-	-	-	506	505	-	653	622	-
Stage 2	-	-	-	-	-	-	653	622	-	506	505	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	0	19.9
HCM LOS			A	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1198	-	-	1006	-	-	242
HCM Lane V/C Ratio	-	-	-	-	-	-	-	0.004
HCM Control Delay (s)	0	0	-	-	0	-	-	19.9
HCM Lane LOS	A	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	445	7	4	316	0	23	0	10	0	0	0
Future Vol, veh/h	0	445	7	4	316	0	23	0	10	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	0	543	9	5	385	0	28	0	12	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	385	0	0	551	0	0	942	942	547	948	946	385
Stage 1	-	-	-	-	-	-	547	547	-	395	395	-
Stage 2	-	-	-	-	-	-	395	395	-	553	551	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1185	-	-	1029	-	-	245	265	541	243	264	667
Stage 1	-	-	-	-	-	-	525	521	-	634	608	-
Stage 2	-	-	-	-	-	-	634	608	-	521	519	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1185	-	-	1029	-	-	244	263	541	236	262	667
Mov Cap-2 Maneuver	-	-	-	-	-	-	244	263	-	236	262	-
Stage 1	-	-	-	-	-	-	525	521	-	634	604	-
Stage 2	-	-	-	-	-	-	630	604	-	509	519	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	19.2	0
HCM LOS			C	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	293	1185	-	-	1029	-	-	-
HCM Lane V/C Ratio	0.137	-	-	-	0.005	-	-	-
HCM Control Delay (s)	19.2	0	-	-	8.5	0	-	0
HCM Lane LOS	C	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	0.5	0	-	-	0	-	-	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	537	24	10	345	1	14	0	6	1	0	0
Future Vol, veh/h	0	537	24	10	345	1	14	0	6	1	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	0	577	26	11	371	1	15	0	6	1	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	372	0	0	603	0	0	983	984	590	987	996	372
Stage 1	-	-	-	-	-	-	590	590	-	393	393	-
Stage 2	-	-	-	-	-	-	393	394	-	594	603	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1198	-	-	984	-	-	230	250	511	228	246	678
Stage 1	-	-	-	-	-	-	497	498	-	636	609	-
Stage 2	-	-	-	-	-	-	636	609	-	495	492	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1198	-	-	984	-	-	228	247	511	223	243	678
Mov Cap-2 Maneuver	-	-	-	-	-	-	228	247	-	223	243	-
Stage 1	-	-	-	-	-	-	497	498	-	636	600	-
Stage 2	-	-	-	-	-	-	627	600	-	489	492	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.2	19.3	21.2
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	273	1198	-	-	984	-	-	223
HCM Lane V/C Ratio	0.079	-	-	-	0.011	-	-	0.005
HCM Control Delay (s)	19.3	0	-	-	8.7	0	-	21.2
HCM Lane LOS	C	A	-	-	A	A	-	C
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	521	0	1	341	0	1	0	1	0	0	0
Future Vol, veh/h	0	521	0	1	341	0	1	0	1	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	0	635	0	1	416	0	1	0	1	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	416	0	0	635	0	0	1053	1053	635	1054	1053	416
Stage 1	-	-	-	-	-	-	635	635	-	418	418	-
Stage 2	-	-	-	-	-	-	418	418	-	636	635	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1154	-	-	958	-	-	206	228	482	206	228	641
Stage 1	-	-	-	-	-	-	470	476	-	616	594	-
Stage 2	-	-	-	-	-	-	616	594	-	469	476	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1154	-	-	958	-	-	206	228	482	205	228	641
Mov Cap-2 Maneuver	-	-	-	-	-	-	206	228	-	205	228	-
Stage 1	-	-	-	-	-	-	470	476	-	616	593	-
Stage 2	-	-	-	-	-	-	615	593	-	468	476	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	17.6	0
HCM LOS			C	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	289	1154	-	-	958	-	-	-
HCM Lane V/C Ratio	0.008	-	-	-	0.001	-	-	-
HCM Control Delay (s)	17.6	0	-	-	8.8	0	-	0
HCM Lane LOS	C	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	-

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	569	0	0	406	1	0	0	0	1	0	0
Future Vol, veh/h	0	569	0	0	406	1	0	0	0	1	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	0	612	0	0	437	1	0	0	0	1	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	438	0	0	612	0	0	1049	1050	612	1049	1049	437
Stage 1	-	-	-	-	-	-	612	612	-	437	437	-
Stage 2	-	-	-	-	-	-	437	438	-	612	612	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1133	-	-	977	-	-	207	229	497	207	229	624
Stage 1	-	-	-	-	-	-	484	487	-	602	583	-
Stage 2	-	-	-	-	-	-	602	582	-	484	487	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1133	-	-	977	-	-	207	229	497	207	229	624
Mov Cap-2 Maneuver	-	-	-	-	-	-	207	229	-	207	229	-
Stage 1	-	-	-	-	-	-	484	487	-	602	583	-
Stage 2	-	-	-	-	-	-	602	582	-	484	487	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	0	22.5
HCM LOS			A	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1133	-	-	977	-	-	207
HCM Lane V/C Ratio	-	-	-	-	-	-	-	0.005
HCM Control Delay (s)	0	0	-	-	0	-	-	22.5
HCM Lane LOS	A	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	521	7	4	341	0	23	0	10	0	0	0
Future Vol, veh/h	0	521	7	4	341	0	23	0	10	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	0	635	9	5	416	0	28	0	12	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	416	0	0	644	0	0	1066	1066	640	1072	1070	416
Stage 1	-	-	-	-	-	-	640	640	-	426	426	-
Stage 2	-	-	-	-	-	-	426	426	-	646	644	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1154	-	-	951	-	-	202	224	479	200	223	641
Stage 1	-	-	-	-	-	-	467	473	-	610	589	-
Stage 2	-	-	-	-	-	-	610	589	-	464	471	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1154	-	-	951	-	-	201	222	479	194	221	641
Mov Cap-2 Maneuver	-	-	-	-	-	-	201	222	-	194	221	-
Stage 1	-	-	-	-	-	-	467	473	-	610	585	-
Stage 2	-	-	-	-	-	-	606	585	-	452	471	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	22.6	0
HCM LOS			C	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	244	1154	-	-	951	-	-	-
HCM Lane V/C Ratio	0.165	-	-	-	0.005	-	-	-
HCM Control Delay (s)	22.6	0	-	-	8.8	0	-	0
HCM Lane LOS	C	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	0.6	0	-	-	0	-	-	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	569	24	10	406	1	14	0	6	1	0	0
Future Vol, veh/h	0	569	24	10	406	1	14	0	6	1	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	0	612	26	11	437	1	15	0	6	1	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	438	0	0	638	0	0	1084	1084	625	1087	1097	437
Stage 1	-	-	-	-	-	-	625	625	-	459	459	-
Stage 2	-	-	-	-	-	-	459	459	-	628	638	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1133	-	-	956	-	-	196	219	488	195	215	624
Stage 1	-	-	-	-	-	-	476	480	-	586	570	-
Stage 2	-	-	-	-	-	-	586	570	-	474	474	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1133	-	-	956	-	-	194	216	488	190	212	624
Mov Cap-2 Maneuver	-	-	-	-	-	-	194	216	-	190	212	-
Stage 1	-	-	-	-	-	-	476	480	-	586	561	-
Stage 2	-	-	-	-	-	-	577	561	-	468	474	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.2	21.7	24.1
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	237	1133	-	-	956	-	-	190
HCM Lane V/C Ratio	0.091	-	-	-	0.011	-	-	0.006
HCM Control Delay (s)	21.7	0	-	-	8.8	0	-	24.1
HCM Lane LOS	C	A	-	-	A	A	-	C
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	596	0	1	423	0	1	0	1	0	0	0
Future Vol, veh/h	0	596	0	1	423	0	1	0	1	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	0	727	0	1	516	0	1	0	1	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	516	0	0	727	0	0	1245	1245	727	1245	1245	516
Stage 1	-	-	-	-	-	-	727	727	-	518	518	-
Stage 2	-	-	-	-	-	-	518	518	-	727	727	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1060	-	-	886	-	-	152	176	427	152	176	563
Stage 1	-	-	-	-	-	-	419	432	-	544	536	-
Stage 2	-	-	-	-	-	-	544	536	-	419	432	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1060	-	-	886	-	-	152	176	427	151	176	563
Mov Cap-2 Maneuver	-	-	-	-	-	-	152	176	-	151	176	-
Stage 1	-	-	-	-	-	-	419	432	-	544	535	-
Stage 2	-	-	-	-	-	-	543	535	-	418	432	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	21.2	0
HCM LOS			C	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	224	1060	-	-	886	-	-	-
HCM Lane V/C Ratio	0.011	-	-	-	0.001	-	-	-
HCM Control Delay (s)	21.2	0	-	-	9.1	0	-	0
HCM Lane LOS	C	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	-

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	719	0	0	462	1	0	0	0	1	0	0
Future Vol, veh/h	0	719	0	0	462	1	0	0	0	1	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	0	782	0	0	502	1	0	0	0	1	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	503	0	0	782	0	0	1285	1285	782	1285	1285	503
Stage 1	-	-	-	-	-	-	782	782	-	503	503	-
Stage 2	-	-	-	-	-	-	503	503	-	782	782	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1072	-	-	845	-	-	143	166	397	143	166	573
Stage 1	-	-	-	-	-	-	390	408	-	555	545	-
Stage 2	-	-	-	-	-	-	555	545	-	390	408	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1072	-	-	845	-	-	143	166	397	143	166	573
Mov Cap-2 Maneuver	-	-	-	-	-	-	143	166	-	143	166	-
Stage 1	-	-	-	-	-	-	390	408	-	555	545	-
Stage 2	-	-	-	-	-	-	555	545	-	390	408	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	0	30.4
HCM LOS			A	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1072	-	-	845	-	-	143
HCM Lane V/C Ratio	-	-	-	-	-	-	-	0.008
HCM Control Delay (s)	0	0	-	-	0	-	-	30.4
HCM Lane LOS	A	A	-	-	A	-	-	D
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	596	7	4	423	0	23	0	10	0	0	0
Future Vol, veh/h	0	596	7	4	423	0	23	0	10	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	0	727	9	5	516	0	28	0	12	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	516	0	0	735	0	0	1257	1257	731	1263	1261	516
Stage 1	-	-	-	-	-	-	731	731	-	526	526	-
Stage 2	-	-	-	-	-	-	526	526	-	737	735	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1060	-	-	879	-	-	149	173	425	148	172	563
Stage 1	-	-	-	-	-	-	416	430	-	539	532	-
Stage 2	-	-	-	-	-	-	539	532	-	413	428	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1060	-	-	879	-	-	148	172	425	143	171	563
Mov Cap-2 Maneuver	-	-	-	-	-	-	148	172	-	143	171	-
Stage 1	-	-	-	-	-	-	416	430	-	539	528	-
Stage 2	-	-	-	-	-	-	535	528	-	401	428	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	30	0
HCM LOS			D	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	184	1060	-	-	879	-	-	-
HCM Lane V/C Ratio	0.219	-	-	-	0.006	-	-	-
HCM Control Delay (s)	30	0	-	-	9.1	0	-	0
HCM Lane LOS	D	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	0.8	0	-	-	0	-	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	719	24	10	462	1	14	0	6	1	0	0
Future Vol, veh/h	0	719	24	10	462	1	14	0	6	1	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	0	782	26	11	502	1	15	0	7	1	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	503	0	0	808	0	0	1319	1320	795	1322	1332	503
Stage 1	-	-	-	-	-	-	795	795	-	524	524	-
Stage 2	-	-	-	-	-	-	524	525	-	798	808	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1072	-	-	826	-	-	135	158	391	135	156	573
Stage 1	-	-	-	-	-	-	384	402	-	540	533	-
Stage 2	-	-	-	-	-	-	540	533	-	382	397	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1072	-	-	826	-	-	133	155	391	131	153	573
Mov Cap-2 Maneuver	-	-	-	-	-	-	133	155	-	131	153	-
Stage 1	-	-	-	-	-	-	384	402	-	540	523	-
Stage 2	-	-	-	-	-	-	530	523	-	376	397	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.2	29.9	32.7
HCM LOS			D	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	166	1072	-	-	826	-	-	131
HCM Lane V/C Ratio	0.131	-	-	-	0.013	-	-	0.008
HCM Control Delay (s)	29.9	0	-	-	9.4	0	-	32.7
HCM Lane LOS	D	A	-	-	A	A	-	D
HCM 95th %tile Q(veh)	0.4	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	596	7	4	423	0	23	0	10	0	0	0
Future Vol, veh/h	0	596	7	4	423	0	23	0	10	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	2	-	-	2	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	0	727	9	5	516	0	28	0	12	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	516	0	0	735	0	0	1257	1257	731	1263	1261	516
Stage 1	-	-	-	-	-	-	731	731	-	526	526	-
Stage 2	-	-	-	-	-	-	526	526	-	737	735	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1060	-	-	879	-	-	149	173	425	148	172	563
Stage 1	-	-	-	-	-	-	416	430	-	539	532	-
Stage 2	-	-	-	-	-	-	539	532	-	413	428	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1060	-	-	879	-	-	148	172	425	143	171	563
Mov Cap-2 Maneuver	-	-	-	-	-	-	339	351	-	328	347	-
Stage 1	-	-	-	-	-	-	416	430	-	539	528	-
Stage 2	-	-	-	-	-	-	535	528	-	401	428	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	16.2	0
HCM LOS			C	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	361	1060	-	-	879	-	-	-
HCM Lane V/C Ratio	0.111	-	-	-	0.006	-	-	-
HCM Control Delay (s)	16.2	0	-	-	9.1	0	-	0
HCM Lane LOS	C	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	0.4	0	-	-	0	-	-	-

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	719	24	10	462	1	14	0	6	1	0	0
Future Vol, veh/h	0	719	24	10	462	1	14	0	6	1	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	2	-	-	2	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	0	782	26	11	502	1	15	0	7	1	0	0

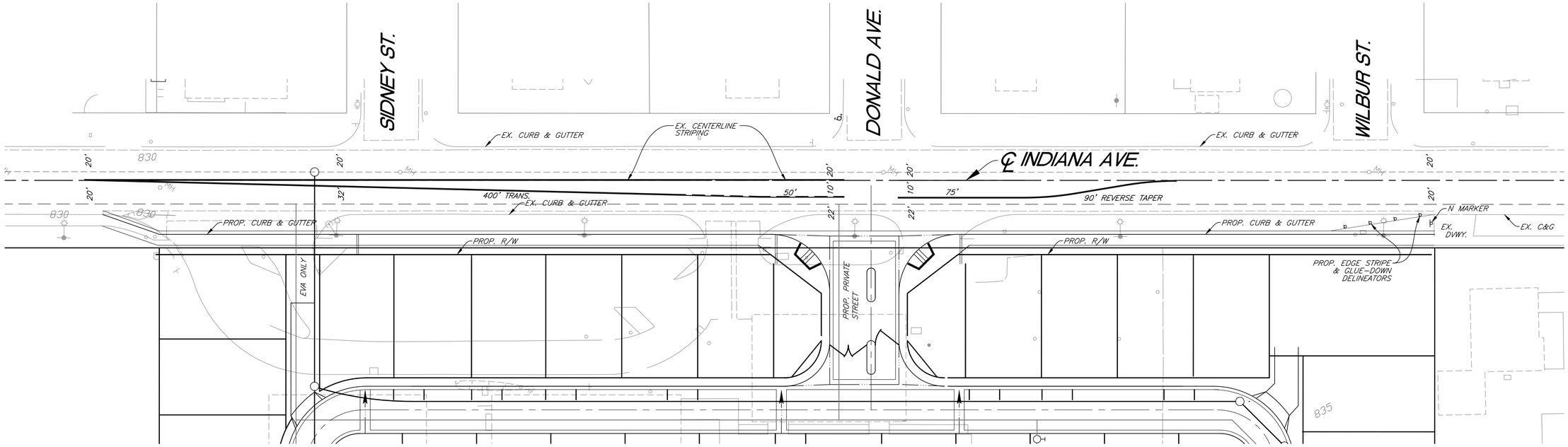
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	503	0	0	808	0	0	1319	1320	795	1322	1332	503
Stage 1	-	-	-	-	-	-	795	795	-	524	524	-
Stage 2	-	-	-	-	-	-	524	525	-	798	808	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1072	-	-	826	-	-	135	158	391	135	156	573
Stage 1	-	-	-	-	-	-	384	402	-	540	533	-
Stage 2	-	-	-	-	-	-	540	533	-	382	397	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1072	-	-	826	-	-	133	155	391	131	153	573
Mov Cap-2 Maneuver	-	-	-	-	-	-	318	332	-	308	323	-
Stage 1	-	-	-	-	-	-	384	402	-	540	523	-
Stage 2	-	-	-	-	-	-	530	523	-	376	397	-

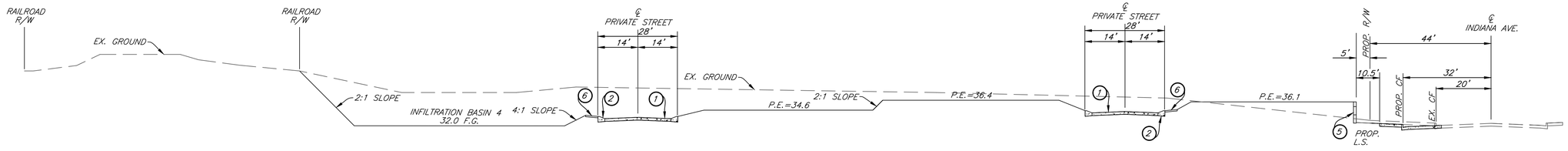
Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.2	16.4	16.7
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	337	1072	-	-	826	-	-	308
HCM Lane V/C Ratio	0.065	-	-	-	0.013	-	-	0.004
HCM Control Delay (s)	16.4	0	-	-	9.4	0	-	16.7
HCM Lane LOS	C	A	-	-	A	A	-	C
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0

APPENDIX E:

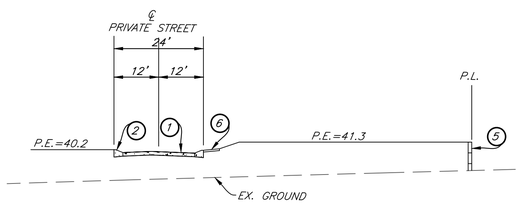
STRIPING PLAN (TTM 37032)





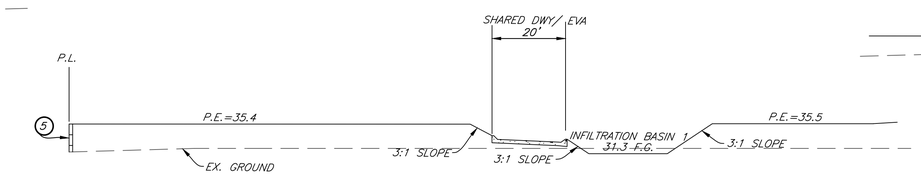
SECTION A-A

HORIZ.: 1"=20'
VERT. 1"=10'



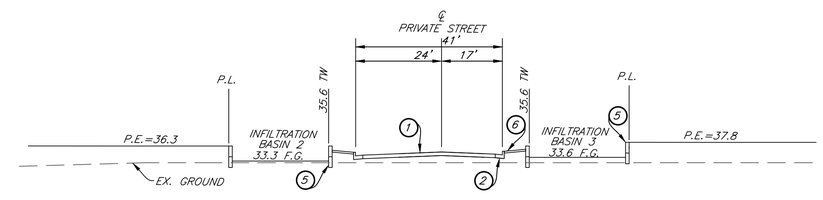
SECTION B-B

HORIZ.: 1"=20'
VERT. 1"=10'



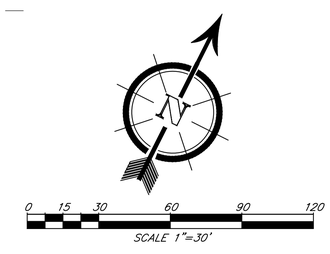
SECTION C-C

HORIZ.: 1"=20'
VERT. 1"=10'



SECTION D-D

HORIZ.: 1"=20'
VERT. 1"=10'



BUSINESS TAX CERTIFICATE NO. 107994 EXP. 6-13-16

CONSTRUCTION NOTES

1. CONSTRUCT 3" OVER 5" BASE PAVING
2. CONSTRUCT 6" CURB & GUTTER
3. CONSTRUCT 6"-12" DIA RIP RAP
4. CONSTRUCT CROSS GUTTER
5. CONSTRUCT RETAINING WALL (5' MAX)
6. CONSTRUCT CONCRETE SIDEWALK

SEAL: REGISTERED PROFESSIONAL ENGINEER ROBERT C. VAN DEN HEUVEL No. 61635 Exp. 9-30-17 CIVIL STATE OF CALIFORNIA

PREPARED BY:

SDH & ASSOCIATES INCORPORATED
SDH AND ASSOCIATES INC.
5225 CANYON CREST DRIVE 71439
Riverside, California 92507
TEL: (951) 683-3691 FAX (951) 788-2314

SCALE: 1"=30'

DATE: JANUARY 2016

BENCHMARK

CITY OF RIVERSIDE

TTM 37032
STRIPING STUDY
9170 INDIANA AVENUE

2 OF 2 SHEETS