ALABBASI COMPOUND

INITIAL STUDY

Prepared for:

Marwan Alabbasi
764 West Ramona Expressway
Perris, CA 92571

City of Riverside Planning Division
3900 Main Street, 3rd Floor
Riverside, CA 92522

Prepared by:

BIRDSEYE
PLANNING GROUP

May 2018

TABLE OF CONTENTS

Page

Initial Study

1. Project title 1
2. Lead agency name and address 1
3. Contact person and phone number 1
4. Project location 1
5. Project sponsor's name and address 1
6. General plan designation 1
7. Zoning 1
8. Description of project 3
9. Surrounding land uses and setting 3
10. Public agencies whose approval is required 3
11. Other documents incorporated by reference 5
12. Acronyms 5

Environmental Factors Affected 6

Determination 7

Environmental Checklist 8

Discussion

I. Aesthetics 8
II. Agricultural and Forest Resources 10
III. Air Quality 11
IV. Biological Resources 19
V. Cultural Resources 26
VI. Geology and Soils 32
VII. Greenhouse Gas Emissions 35
VIII. Hazards and Hazardous Materials 38
IX. Hydrology and Water Quality 41
X. Land Use and Planning 45
XI. Mineral Resources 50
XII. Noise 51

XIII. Population and Housing 59
XIV. Public Services 60
XV. Recreation 62
XVI. Transportation/Traffic 63
XVII. Tribal Cultural Resources 65
XVIII. Utilities and Service Systems 67
XIX. Mandatory Findings of Significance 71

References 73

List of Figures

Figure 1: Vicinity Map 2
Figure 2: Proposed Project 4

List of Tables

Table 1: SCAQMD Air Quality Significance Thresholds 12
Table 2: Estimated Maximum Mitigated Daily Construction Emissions 15
Table 3: SCAQMD LSTs for Construction 16
Table 4: Estimated Maximum Daily Construction Emissions and LSTs 16
Table 5: Estimated Operational Emissions 17
Table 6: Combined Annual GHG Emissions 36
Table 7: Typical Construction Equipment Noise Levels 54
Table 8: Typical Vibration Source Levels for Construction Equipment 57

Appendices

Appendix A – CalEEMod Output Files
Appendix B – Combined Biological Resources Report
Appendix C - Phase I Cultural Resources Assessment
Appendix D – Water Quality Management Plan
Appendix E – Mitigation Monitoring and Reporting Program

INITIAL STUDY

1. Project title:

Alabbasi Compound (Tentative Map No. 37392) – Planning Cases P17-0929 (Tentative Tract Map), P17-0930 (Variance), P17-0931 (Variance) and P17-0932 (Variance and Subdivision Code Modification)

2. Lead agency name and address:

City of Riverside
Planning Division
3900 Main Street, 3rd Floor
Riverside, CA 92522

3. Contact person and phone number:

Matthew Taylor, Associate Planner
Planning Division
3900 Main Street, 3rd Floor
Riverside, CA 92522
951-826-5371

4. Project location:

The proposed project is located on a 16.79-gross acre site generally at the east end of Talcey Terrace, east of Golden Star Avenue in the City of Riverside (portions of Assessor's Parcel Nos. 243-210-037 and 041). The site generally slopes to the south and undeveloped. The project location is shown in Figure 1 – Vicinity Map and Project Site.

5. Project sponsor's name and address:

Marwan Alabbasi
764 West Ramona Expressway
Perris, CA 92571

6. General Plan designation:

HR - Hillside Residential

7. Zoning:

RC - Residential Conservation Zone

Figure 1—Vicinity Map

8. Description of project:

The proposed project is a Tentative Tract Map that would subdivide 16.79-gross acre site into 8 single-family residential lots in the Alessandro Heights area of the City of Riverside, in the RC - Residential Conservation Zone. Lots would range from 1.01 to 3.79 acres in size and be located on either side of the primary access street, Alabbasi Way, a 40-foot-wide private cul-de-sac extending southerly from the existing terminus of Talcey Terrace. The subject property is characterized by rolling, hilly terrain and includes tributaries to the Prenda Arroyo. Utility easements run along the northern and western site boundaries.

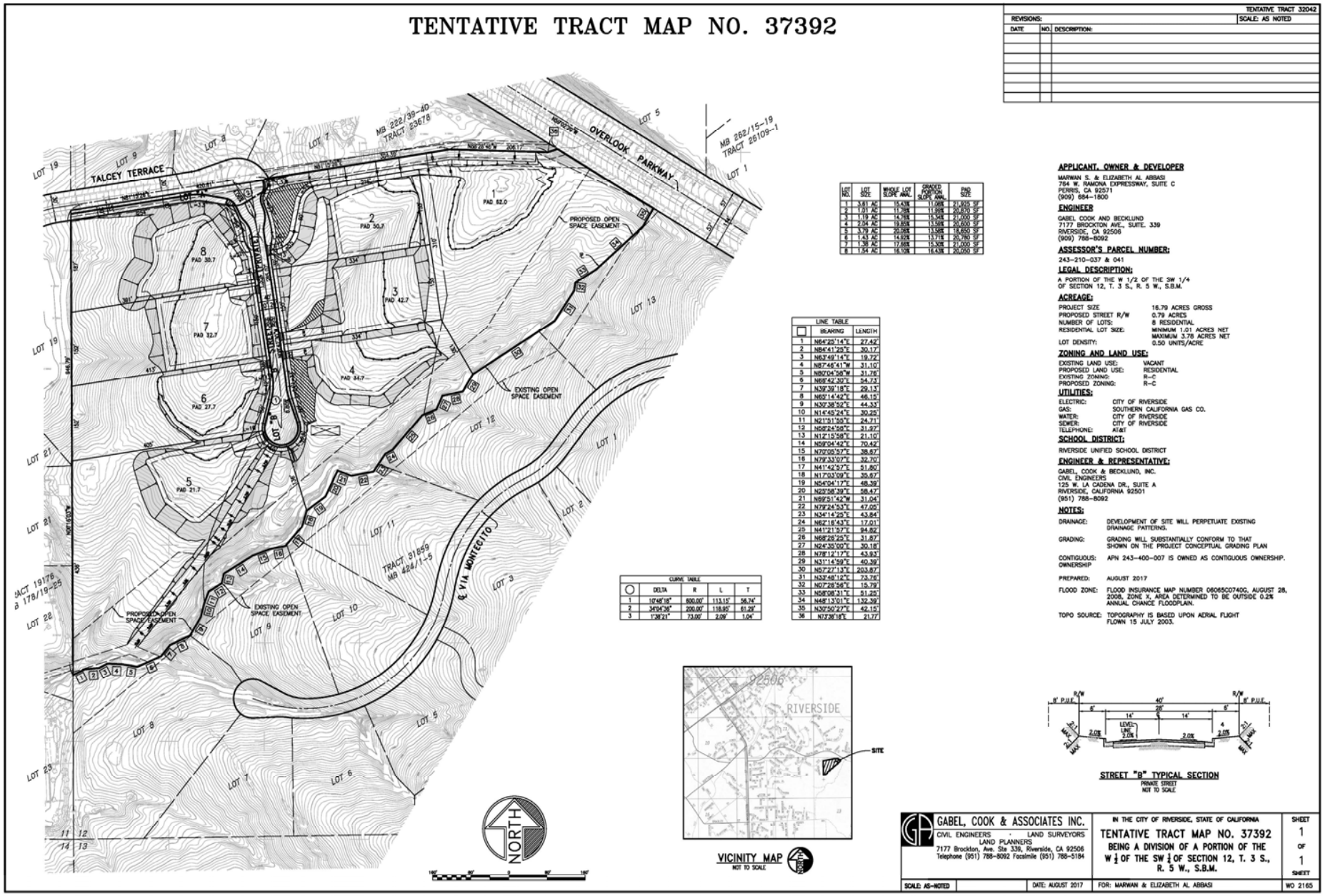
Grading is proposed to accommodate the street system and residential pads generally ranging between 18,650 and 21,925 square feet in size, involving manufactured slopes up to approximately 25 feet in vertical height, though with most at or below 20 feet in height. The site was the subject of TM 32042 approved by the City of Riverside in 2004 for the same project and scope as proposed herein. The graded lots would be sold to individual buyers for development of individual single-family residences subject to Design Review approval and issuance of building permits by the City of Riverside.

The proposed project would require approval of Tentative Tract 37392 in addition to variance applications to allow deviation from the existing zoning provisions for the RC zoning district. Specifically, a variance is required to allow Lots 7 & 8 to vary from the two- acre minimum lot size requirement when the average natural ground slope is in excess of 15%. An additional variance is required to allow Lot 1 to be configured as a corridor access lot. Finally, a third variance and modification to the development standards of Title 18 (Subdivisions) of the Riverside Municipal Code would allow Lot 2 to provide less than 130 feet of lot frontage at the front setback line.

Grading and construction of the infrastructure would begin in late 2018 and be completed within approximately 12 months. It is unknown when construction of the residences would occur; however, for the purpose of this analysis, it is assumed all residences would be constructed by mid-2020. The proposed site plan is shown on Figure 2.

9. Surrounding Land Uses and Setting

The vacant site is characterized by diverse topography, ranging from gently rolling to steep and rocky. All adjacent properties are zoned RC-Residential Conservation and developed with existing single-family residences.



LOT NO.	LOT SIZE	WHOLE LOT SLOPE ANAL.	GRADED PORTION SLOPE ANAL.	PAD SIZE
1	3.61 AC	15.43%	11.06%	21,925 SF
2	1.01 AC	11.79%	11.95%	20,470 SF
3	1.19 AC	14.76%	15.34%	21,000 SF
4	2.04 AC	19.85%	13.00%	20,600 SF
5	3.79 AC	20.06%	13.50%	18,650 SF
6	1.43 AC	14.92%	13.71%	20,780 SF
7	1.38 AC	17.56%	15.30%	21,000 SF
8	1.54 AC	16.10%	16.43%	20,050 SF

LINE TABLE		
	BEARING	LENGTH
1	N64°25'14"E	27.42'
2	N84°41'25"E	30.17'
3	N63°49'14"E	19.72'
4	N87°46'41"W	31.10'
5	N80°04'58"W	31.76'
6	N66°42'30"E	54.73'
7	N39°39'18"E	29.13'
8	N65°14'42"E	46.15'
9	N30°38'52"E	44.33'
10	N14°45'24"E	30.25'
11	N21°51'35"E	24.71'
12	N56°24'56"E	31.97'
13	N12°15'58"E	21.10'
14	N59°04'42"E	70.42'
15	N70°00'57"E	38.67'
16	N79°33'07"E	32.70'
17	N41°42'57"E	51.80'
18	N17°03'09"E	35.67'
19	N54°04'17"E	48.39'
20	N20°58'39"E	58.47'
21	N69°51'42"W	31.04'
22	N79°24'53"E	47.00'
23	N34°14'25"E	43.84'
24	N62°16'43"E	17.01'
25	N41°21'37"E	84.52'
26	N68°26'25"E	31.87'
27	N24°35'00"E	30.18'
28	N78°12'17"E	43.93'
29	N31°14'59"E	40.39'
30	N07°27'13"E	203.87'
31	N33°48'12"E	73.76'
32	N07°26'56"E	15.79'
33	N56°08'31"E	51.25'
34	N48°13'01"E	132.39'
35	N30°50'27"E	42.15'
36	N73°36'18"E	21.77'

CURVE TABLE				
	DELTA	R	L	T
1	10°48'18"	600.00'	113.15'	56.74'
2	34°94'36"	200.00'	118.95'	61.29'
3	1°38'21"	73.00'	2.09'	1.04'

Figure 2—Proposed Project

10. Public agencies whose approval is required:

- City of Riverside – Tentative Tract Map approval
- City of Riverside - Variances and Subdivision Code Modificaiton

  A. Allow Lots 7 & 8 to vary from the two-acre minimum lot size requirement when the average natural ground slope is in excess of 15%.
  B. Allow Lot 1 to be configured as a corridor access lot.
  C. Allow Lot 2 to provide less than 130 feet of lot frontage at the front setback line, and modify the Subdivision Code requirement that new lots be a minimum of 60 feet in width.

- California Department of Fish and Wildlife - Streambed Alteration Agreement

11. Other documents incorporated by reference

a. City of Riverside General Plan 2025
b. GP 2025 Final Program Environmental Impact Report (FPEIR)
c. Appendix A - CalEEMod Output Files
d. Appendix B – Combined Biological Technical Report for Tract 37392 Residential Development Project
e. Appendix C – Phase I Cultural Resource Inventory
f. Appendix D - Project Specific Water Quality Management Plan

12. **Acronyms**

AICUZ -	Air Installation Compatible Use Zone Study
AQMP -	Air Quality Management Plan
AUSD -	Alvord Unified School District
CDG -	Citywide Design Guidelines
CEQA -	California Environmental Quality Act
CMP -	Congestion Management Plan
EMWD -	Eastern Municipal Water District
EOP -	Emergency Operations Plan
FEMA -	Federal Emergency Management Agency
FPEIR -	GP 2025 Final Programmatic Environmental Impact Report
GIS -	Geographic Information System
GP 2025 -	General Plan 2025
LHMP -	Local Hazard Mitigation Plan
MARB/MIP -	March Air Reserve Base/March Inland Port
MJPA-JLUS -	March Joint Powers Authority - Joint Land Use Study
MSHCP -	Multiple-Species Habitat Conservation Plan
MVUSD -	Moreno Valley Unified School District
NCCP -	Natural Communities Conservation Plan

OEM -	Office of Emergency Services
RCALUC -	Riverside County Airport Land Use Commission
RCALUCP -	Riverside County Airport Land Use Compatibility Plan
RCP -	Regional Comprehensive Plan
RCTC -	Riverside County Transportation Commission
RMC -	Riverside Municipal Code
RPD -	Riverside Police Department
RPU -	Riverside Public Utilities
RPW -	Riverside Public Works
RTP -	Regional Transportation Plan
RUSD -	Riverside Unified School District
SCAG -	Southern California Association of Governments
SCAQMD -	South Coast Air Quality Management District
SKR-HCP -	Stephens' Kangaroo Rat - Habitat Conservation Plan
SWPPP -	Storm Water Pollution Prevention Plan
USGS -	United States Geologic Survey
WMWD -	Western Municipal Water District
WQMP -	Water Quality Management Plan

ENVIRONMENTAL FACTORS AFFECTED

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is "Potentially Significant" or "Potentially Significant Unless Mitigation Incorporated" as indicated by the checklist on the following pages.

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

DETERMINATION:

On the basis of this initial evaluation:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☒ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "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.

☐ I find that although the proposed project could have a significant effect on the environment, because all potential 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 Date

_____

Printed Name

ENVIRONMENTAL CHECKLIST

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
I. <u>AESTHETICS</u> – Would the project:				
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☒	☐
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☒
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☒	☐
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☒	☐

a) The City of Riverside General Plan 2025 (GP 2025, 2007 provides planning and policy guidance for development within the City. No specific visual features are noted in the General Plan that pertain to the general project area. Objective OS-2 addresses the minimization of development within hillside areas and importance of mitigating significant and adverse consequences of urbanization. The following policies apply to the preservation of scenic resources within the hillside areas in the City of Riverside:

OS-2.2: Limit the extent and intensity of uses and development in areas of unstable terrain, steep terrain, scenic vistas, arroyos and other critical environmental areas;

Policy OS-2.3: Control the grading of land, pursuant to the City's Grading Code, to minimize the potential for erosion, landsliding and other forms of land failure, as well as to limit the potential negative aesthetic impact of excessive modification of natural landforms.

Policy OS-2.4: Recognize the value of ridgelines, hillsides and arroyos as significant natural and visual resources and strengthen their role as features which define the character of the City and its individual neighborhoods.

Implementation of the project would occur on an undeveloped site. The site is surrounded by single-family residences of large lots. The property immediately to the south of the site has already been graded for a residential subdivision. Overlook Parkway is a four-lane parkway with a center median located to the north of the site. Portions of the site are visible from Overlook Parkway; however, existing landscaping and a masonry wall within the Overlook Parkway right-of-way obscure views from the right-of-way into most of the site. Views into the site are of undeveloped bare ground with ruderal vegetation. Portions of the site have been graded. Views within the area are not designated scenic nor does the site contain any unique visual features.

Per Chapter 19.100.010 (B) of the Riverside Municipal Code, the RC zoning designation and related development regulations are intended to protect prominent ridges, hilltops and hillsides, slopes, arroyos, ravines and canyons, and other areas with high visibility or topographic conditions that warrant sensitive development from adverse development practices. The proposed project consists of developing the 16.79 acre site with 8 lots for the future construction of single family residences. Per Table 19.100.040 A, buildings in the RC zone are limited to one story and cannot exceed 20 feet in height and are subject to further development standards in Chapter 19.100.050. These standards address lot size, slope calculation, grading requirements and design review procedures (Chapter 19.710 of the Riverside Municipal Code).

The project would be designed consistent with City of Riverside Municipal Code requirements referenced above to ensure the proposed grading, lot layout and building design are visually consistent with the surrounding area. Implementation of these requirements would also address the intent of General Plan policies referenced above. Thus, while views of the site would change, no designated scenic views or resources would be affected. Thus, impacts to scenic vistas would be **less than significant.**

b) There are three designated state scenic highways in Riverside County as defined by the California Department of Transportation. The nearest state-designated scenic highway to the study area is the segment of State Route 74 (SR-74) that extends from the western boundary of the San Bernardino National Forest (60 miles southeast of the site) to Highway 111 in the City of Palm Desert. As noted, the site is undeveloped. The site contains a tributary to the Prenda Arroyo, located near the southern site boundary, which may be considered a visually prominent feature; however, the project design avoids this feature. There are no trees or historic structures on the site. **No impact** to these resources would occur as a result of project implementation.

c) Implementation of the project would occur on an undeveloped site. Views within the area are not designated scenic nor does the site contain any unique visual features. As referenced, the site is located adjacent to single-family residential areas and vacant land. Overlook Parkway borders the site to the east. As referenced, views into the site would change; however, development would occur consistent with City of Riverside Design Guidelines for projects

within the RC zone. Compliance with these design guidelines would reduce potential impacts to **less than significant**.

d) The project would add new residential buildings and street lighting which would be visible from adjacent streets and vehicles operating on the streets. Temporary outdoor lighting may be visible during operation of construction equipment; however, construction is expected to occur primarily during daylight hours. All outdoor street lighting would be designed to City of Riverside standards contained in Chapter 19.556 of the Municipal Code regarding outdoor lighting requirements. Impacts related to light and glare would be **less than significant.**

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
II. <u>AGRICULTURE AND FOREST RESOURCES</u> -- Would the project:				
a) Convert Prime Farmland, Unique Farmland, 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?	☐	☐	☐	☒
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220(g)), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g))?	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-	☐	☐	☐	☒

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
II. <u>AGRICULTURE AND FOREST RESOURCES</u> -- Would the project:				

agricultural use?

a) The project site is zoned RC which is intended to support residential uses while maintaining aesthetic benefits of lands located within this zoning designation. The project site is vacant and designated Farmland of Local Importance in Figure OS-2 (Agricultural Suitability) of the General Plan 2025. While it is recognized that the project would impact farmland of local importance, No Prime Farmland, Unique Farmland, or Farmland of Statewide Importance occurs on the project site; and thus, these resources would not be affected by project implementation. **No impact** would occur under this threshold.

b) The project site is not enrolled in a Williamson Act contract. The proposed project would not conflict with any zoning designations designed to promote agriculture. **No impact** would occur under this threshold**.**

c-e) Neither the site nor surrounding areas are used for timber production or commercial agriculture. The project would not conflict with any zoning designations designed to preserve timber or agricultural resources. **No impact** would occur under this threshold.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
III. <u>AIR QUALITY</u> -- Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☐	☒
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☐	☒	☐
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable	☐	☐	☒	☐

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
III. <u>AIR QUALITY</u> -- Would the project:				
federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?				
d) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☒	☐
e) Create objectionable odors affecting a substantial number of people?	☐	☐	☒	☐

The project site is located within the South Coast Air Basin, which is under the jurisdiction of the South Coast Air Quality Management District (SCAQMD). A significant adverse air quality impact may occur when a project individually or cumulatively interferes with progress toward the attainment of the ozone standard by generating emissions that equal or exceed the established long term quantitative thresholds for pollutants, or exceed a state or federal ambient air quality standard for any criteria pollutant. Table 1 shows the significance thresholds that have been recommended by the SCAQMD for projects within the South Coast Air Basin.

A significant adverse air quality impact may occur when a project individually or cumulatively interferes with progress toward the attainment of the ozone standard by generating emissions that equal or exceed the established long term quantitative thresholds for pollutants, or exceed a state or federal ambient air quality standard for any criteria pollutant. Table 1 shows the significance thresholds that have been recommended by the SCAQMD.

<u>Localized Significance Thresholds</u>. In addition to the thresholds described above, the SCAQMD has developed Localized Significance Thresholds (LSTs). LSTs were devised in response to concern regarding exposure of individuals to criteria pollutants in local communities. LSTs represent the maximum emissions from a project that will not cause or contribute to an air quality exceedance of the most stringent applicable federal or state ambient air quality standard at the nearest sensitive receptor, taking into consideration ambient concentrations in each source receptor area (SRA), project size and distance to the sensitive receptor. However, LSTs only apply to emissions within a fixed stationary location, including idling emissions during both project construction and operation. LSTs have been developed for NO_X, CO, PM_{10} and $PM_{2.5}$. LSTs are not applicable to mobile sources such as cars on a roadway (Final Localized Significance Threshold Methodology, SCAQMD, June 2003). As such, LSTs for operational emissions do not apply to the proposed development as the majority of emissions would be generated by cars on roadways.

Table 1
SCAQMD Air Quality Significance Thresholds

Mass Daily Thresholds		
Pollutant	**Construction**	**Operation**
Nitrogen Oxides (NO_x)	100 lbs/day	55 lbs/day
Reactive Organic Gases (ROG)	75 lbs/day	55 lbs/day
Particulate Matter 10 (PM_{10})	150 lbs/day	150 lbs/day
Particulate Matter 2.5 ($PM_{2.5}$)	55 lbs/day	55 lbs/day
SO_x	No standard	150 lbs/day
CO	550 lbs/day	550 lbs/day

[a] *Ambient air quality thresholds for criteria pollutants based on SCAQMD Rule 1303, unless otherwise stated.*
[b] *Ambient air quality threshold based on SCAQMD Rule 403.*

lbs/day = pounds per day

LSTs have been developed for emissions within areas up to five acres in size, with air pollutant modeling recommended for activity within larger areas.

Regional construction emissions associated with implementing the proposed project were calculated using the California Emissions Estimator Model (CalEEMod) version 2016.3.1 (2016) software. Construction emission modeling for site preparation, grading, building construction, paving, and architectural coating application is based on the overall scope of the proposed development and construction phasing. Construction is expected to begin mid-2018 and be completed by late 2019. In addition to SCAQMD Rule 403 requirements for fugitive dust control, emissions modeling also accounts for the use of low-VOC paint (50 g/L for non-flat coatings) as required by SCAQMD Rule 1113. Operation of the project would generate vehicle trips which would be the primary source of emissions post-construction. All CalEEMod output files are provided in Appendix A.

a) A project may be inconsistent with the AQMP if it would generate population, housing, or employment growth exceeding forecasts used in the development of the AQMP. The 2016 AQMP, the most recent AQMP adopted by the SCAQMD, incorporates local city General Plans and the Southern California Association of Government's (SCAG) Regional Transportation Plan (April 2016) socioeconomic forecast projections of regional population, housing and employment growth.

The proposed project involves the construction of eight single-family residences on a 16.79-acre site. The project would provide new housing which is expected to accommodate people already living in the Riverside area. While the project would create housing, it would not increase housing demand to the extent that new housing would be needed for a workforce. The

proposed site is zoned RC and the lot yield is consistent with the zoning designation and density approved in TM 32042 in 2004. The proposed project would be consistent with current planning documents; thus, it would be consistent with the AQMP. **No impact** would occur under this threshold.

b-c) Project construction would generate temporary air pollutant emissions. Both construction emissions and vehicle emissions associated with operation of the facility are quantified herein.

Construction Emissions

Construction vehicles and equipment operating on the graded site as well as grading/site preparation activities have the potential to generate fugitive dust (PM_{10} and $PM_{2.5}$) through the exposure of soil to wind erosion and dust entrainment. Project related construction activities would also emit ozone precursors (oxides of nitrogen (NO_X), reactive organic gases (ROG)) as well as carbon monoxide (CO). The majority of construction-related emissions would result from site preparation and the use of heavy duty construction equipment. However, emissions would also be associated with constructing the residences and paving surface streets.

The project would be required to comply with SCAQMD Rule 403, which identifies measures to reduce fugitive dust and is required to be implemented at all construction sites located within the South Coast Air Basin. Rule 403 (2) was included in CalEEMod for site preparation and grading phases of construction. Specifically, modeling assumed the site would be watered three times daily.

1. **Minimization of Disturbance.** Construction contractors should minimize the area disturbed by clearing, grading, earth moving, or excavation operations to prevent excessive amounts of dust.

2. **Soil Treatment.** Construction contractors should treat all graded and excavated material, exposed soil areas, and active portions of the construction site, including unpaved on-site roadways to minimize fugitive dust. Treatment shall include, but not necessarily be limited to, periodic watering, application of environmentally safe soil stabilization materials, and/or roll compaction as appropriate. Watering shall be done as often as necessary, and at least three times daily, preferably in the late morning and after work is done for the day.

3. **Soil Stabilization.** Construction contractors should monitor all graded and/or excavated inactive areas of the construction site at least weekly for dust stabilization. Soil stabilization methods, such as water and roll compaction, and environmentally safe dust control materials, shall be applied to portions of the construction site that are inactive for over four days.

4. **No Grading During High Winds.** Construction contractors should stop all

clearing, grading, earth moving, and excavation operations during periods of high winds (20 miles per hour or greater, as measured continuously over a one-hour period).

5. **Street Sweeping.** Construction contractors should sweep all on-site driveways and adjacent streets and roads at least once per day, preferably at the end of the day, if visible soil material is carried over to adjacent streets and roads.

Construction emission modeling for site preparation, grading, building construction, paving, and architectural coating application is based on the overall scope of the proposed development and construction phasing which is expected to begin mid-2018 and extend through late 2019. As discussed in Section V, Biological Resources, grading on 2.54 acres of the site would be avoided to minimize impacts to biological resources. It was assumed for modeling purpose that the entire 16.79-acre development area would be disturbed during construction. Thus, the emissions data provide a conservative estimate of daily emissions. Further, it was assumed that no more than five acres would be disturbed daily. For dust control, it was assumed the maximum area would be watered three times daily. In addition to SCAQMD Rule 403 requirements referenced above, emissions modeling also accounts for the use of low-VOC paint (50 g/L for nonflat coatings) as required by SCAQMD Rule 1113. Table 2 summarizes the estimated maximum mitigated daily emissions of pollutants occurring during 2018 and 2019.

Table 2
Estimated Maximum Mitigated Daily Construction Emissions

Construction Phase	Maximum Emissions (lbs/day)					
	ROG	NO_x	CO	SOx	PM_{10}	$PM_{2.5}$
2018 Maximum lbs/day	5.2	59.5	36.0	0.06	9.8	6.2
2019 Maximum lbs/day	7.7	54.5	34.2	0.06	5.0	3.5
SCAQMD Regional Thresholds	*75*	*100*	*550*	*150*	*150*	*55*
Threshold Exceeded 2018	**No**	**No**	**No**	**No**	**No**	**No**
Threshold Exceeded 2019	**No**	**No**	**No**	**No**	**No**	**No**

As shown in Table 2, construction of the proposed project would not exceed the SCAQMD regional thresholds during either 2018 or 2019. No mitigation in addition to compliance with SCAQMD Rule 403 and Rule 1113 would be required to reduce construction emissions to less than significant.

Localized Significance Thresholds. The SCAQMD has published a "Fact Sheet for Applying CalEEMod to Localized Significance Thresholds" (South Coast Air Quality Management

District, 2011). CalEEMod calculates construction emissions based on the number of equipment hours and the maximum daily disturbance activity possible for each piece of equipment. Construction-related emissions reported by CalEEMod are compared to the localized significance threshold lookup tables.

LSTs were devised in response to concern regarding exposure of individuals to criteria pollutants in local communities. LSTs represent the maximum emissions from a project that will not cause or contribute to an air quality exceedance of the most stringent applicable federal or state ambient air quality standard at the nearest sensitive receptor, taking into consideration ambient concentrations in each source receptor area (SRA), project size and distance to the sensitive receptor. However, LSTs only apply to emissions within a fixed stationary location, including idling emissions during both project construction and operation. LSTs have been developed for NO_X, CO, PM_{10} and $PM_{2.5}$. LSTs are not applicable to mobile sources such as cars on a roadway (Final Localized Significance Threshold Methodology, SCAQMD, June 2003). As such, LSTs for operational emissions do not apply to the proposed development as the majority of emissions would be generated by vehicles operating on roadways.

LSTs have been developed for emissions within areas up to five acres in size, with air pollutant modeling recommended for activity within larger areas. The SCAQMD provides lookup tables for project sites that measure one, two, or five acres. As referenced, 5 of the 16.79 acres would be disturbed daily during construction; however, the associated look up table values for two acres were used to provide a conservative evaluation of potential impacts. The project site is located in Source Receptor Area 23 (SRA-23, Metropolitan Riverside County). LSTs for construction related emissions in the SRA 23 at varying distances between the source and receiving property are shown in Table 3.

Table 3
SCAQMD LSTs for Construction

Pollutant	**Allowable emissions as a function of receptor distance in meters from a two-acre site (lbs/day)**				
	25	**50**	**100**	**200**	**500**
Gradual conversion of NO_x to NO_2	170	200	264	379	684
CO	883	1,262	2,232	5,136	18,974
PM_{10}	7	20	38	75	186
$PM_{2.5}$	2	5	10	18	45

Source: http://www.aqmd.gov/CEQA/handbook/LST/appC.pdf, October 2009.

As referenced, the nearest sensitive receptors to the project site are approximately 75 to 100 feet (60 meters) north across Talcey Terrace. Thus, the 50-meter values shown in Table 3 are used to determine project consistency with the LSTs. As discussed, LSTs apply only to on-site activities and do not include off-site vehicle trips and associated emissions. As shown in Table 4, the LST values would not be exceeded at the nearest receiver located north of the site. No mitigation is required.

Table 4
Estimated Maximum Daily On-Site Construction Emissions and LSTs

On-Site Construction Emissions	**NOx**	**CO**	**PM_{10}**	**$PM_{2.5}$**
- Site Preparation	0.06	0.8	0.2	0.05
- Grading	0.06	0.8	0.2	0.06
- Building Construction (2019)	0.12	0.15	0.04	0.01
- Paving	0.05	0.6	0.1	0.04
- Architectural Coating	0.01	0.04	0.1	0.1
Local Significance Threshold – 50 meters (on-site only)[3]	**170**	**883**	**7**	**2**
Threshold Exceeded	No	No	No	No

Notes: All calculations were made using CalEEMod 2016.3.1. See Appendix A. Grading, Paving, Building Construction, and Architectural Coating totals include worker trips, construction vehicle emissions and fugitive dust.
Site Preparation and Grading phases incorporate anticipated emissions reductions required by SCAQMD Rule 403 to reduce fugitive dust. Architectural coating phase assumes low VOC paint would be used per SCAQMD Rule 1113.
[2] LSTs are for a 2-acre disturbance area in SRA-23 within 50 meters of sensitive property boundary.

Compliance with SCAQMD regulations as referenced above would not require additional mitigation measures. Construction impacts would not cause an adverse air quality impact per thresholds (b) and (d) referenced above.

Operation Emissions

Table 5 summarizes emissions associated with operation of the proposed project. Operational emissions include emissions from electricity consumption (energy sources), vehicle trips (mobile sources), and area sources including landscape equipment and architectural coating emissions as the structures are repainted over the life of the project. The majority of operational emissions are associated with vehicle trips to and from the project site. Trip volumes were based on trip generation factors for storage facilities incorporated into CalEEMod. As shown in Table 5, the net change in emissions would not exceed the SCAQMD thresholds.

Table 5
Estimated Operational Emissions

	Estimated Emissions (lbs/day)					
	ROG	**NO_X**	**CO**	**SO_X**	**PM_{10}**	**$PM_{2.5}$**
Proposed Project						
Area	0.5	0.1	0.6	0.01	0.01	0.01

Energy	0.1	0.07	0.03	0.01	0.01	0.01
Mobile	0.1	1.2	2.2	0.01	0.6	0.7
Maximum lbs/day	**0.5**	**1.2**	**2.2**	**0.01**	**0.6**	**0.7**
SCAQMD Thresholds	**55**	**55**	**550**	**150**	**150**	**55**
Threshold Exceeded?	**No**	**Yes**	**No**	**No**	**No**	**No**

See Appendix A for CalEEMod version. 2016.3.1 computer model output for operational emissions. Summer emissions shown.
Note – totals may vary slightly due to rounding.

Therefore, the project's regional air quality impacts (including impacts related to criteria pollutants, sensitive receptors and violations of air quality standards) would be **less than significant.**

d) The nearest sensitive receptor to the project site are the residences located north of the site on the north side of Talcey Terrace. As shown above, neither the total construction or operation emissions would exceed the SCAQMD thresholds. In addition to quantifying emissions, SCAQMD recommends performing a local CO hotspot analysis if an intersection meets one of the following criteria: 1) the intersection is at Level of Service (LOS) D or worse and where the project increases the volume to capacity ratio by 2 percent, or 2) the project decreases LOS at an intersection to D or worse. A CO hotspot is a localized concentration of CO that is above the state or national 1-hour or 8-hour CO ambient air standards. Localized CO "hotspots" can occur at intersections with heavy peak hour traffic. Specifically, hotspots can be created at intersections where traffic levels are sufficiently high such that the local CO concentration exceeds the federal AAQS of 35.0 parts per million (ppm) or the state AAQS of 20.0 ppm. As discussed in Section XVI, *Transportation/Traffic*, the proposed project would not generate enough vehicle trips to warrant preparation of a traffic impact study; thus, it is assumed the project would not adversely affect the LOS at neighboring intersections. The project would not contribute to traffic conditions that would create a CO hotspot adverse health risks. Therefore, impacts would be **less than significant.**

e) The proposed project would generate odors from construction (i.e., diesel exhaust, asphalt). Construction odors would be temporary. Construction emissions would not exceed SCAQMD impact thresholds; thus, short-term odors are not expected to be significant. During operation, the facility would not generate odors. Odors impacts would be **less than significant.**

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
IV. <u>BIOLOGICAL RESOURCES</u> -- 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 Game or U.S. Fish and Wildlife Service?	☐	☒	☐	☐
b) Have a substantial adverse effect 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 Game or U.S. Fish and Wildlife Service?	☐	☐	☐	☒
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?	☐	☐	☐	☒
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?	☐	☐	☐	☒
e) Conflict with any local policies or ordinances protecting biological	☐	☐	☐	☒

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
IV. <u>BIOLOGICAL RESOURCES</u> -- Would the project:				
resources, such as a tree preservation policy or ordinance?				
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?	☐	☐	☐	☒

The material presented herein is based on the *Biological Technical Report for Tract 37392 Residential Development Project*, prepared by Glenn Lukos Associates, February 2018. The report is provided herein as Appendix B.

a) This section identifies and evaluates impacts to biological resources associated with the proposed project in the context of the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP) and State and Federal regulations such as the Endangered Species Act (ESA), Clean Water Act (CWA), and the California Fish and Game Code.

Vegetation Communities
As referenced, the entire project site is comprised of approximately 16.79 acres. Of the total, approximately 2.94 acres is vegetated with disturbed Riversidean sage scrub primarily consisting of areas adjacent to on-site drainage features; approximately 0.05 acre located within the two main drainages on site is vegetated with mule fat scrub; approximately 7.21 acres is vegetated with non-native grassland and approximately 6.58 acres is developed disturbed land.

The proposed project would result in a permanent removal of 0.90 acre of disturbed Riversidean sage scrub vegetation. This would not be a significant impact under CEQA because of the very low quantity of this vegetation community being removed is not expected to support a biologically important population of native species. Similarly, the removal of 6.42 acres of disturbed/ruderal vegetation would not be significant because this land cover type generally holds very low biological value. However, the removal of disturbed Riversidean sage scrub by the proposed project would be fully mitigated through compliance with the biological requirements of the MSHCP.

The proposed permanent removal of 6.90 acres of non-native grassland may potentially be a significant impact under CEQA prior to mitigation, as this habitat type provides live-in and foraging resources for native species. However, the removal of non-native grassland by the proposed Project would be fully mitigated through compliance with the biological requirements of the MSHCP.

Approximately 2.57 acres, consisting of the area nearest to the southeastern boundary of the Project will be avoided and placed under conservation under a deed restriction, conservation easement, or similar protective mechanism. This area includes 0.05 acre of mule fat scrub, 2.04 acres of disturbed Riversidean sage scrub, 0.31 acre of non-native grassland, and 0.17 acre of disturbed/developed areas.

Special Status Plants

No special-status plant species have been detected at the project area to date. Seven CNPS Rank species have a reasonable potential to occur within the project area, ranging from very low to low. These are Plummer's mariposa-lily, Payson's jewelflower, Parry's spineflower, Robinson's pepper-grass, Brand's phacelia, white rabbit-tobacco, and chaparral ragwort.

Potential impacts to Plummer's mariposa lily, Payson's jewelflower, Parry's spineflower, and Brand's phacelia are not considered significant under CEQA as only 0.90 acre of disturbed Riversidean sage scrub with a very low to low potential to support these species would be impacted. Populations of these species, if present, are not expected to represent a number potentially significant under CEQA within the area being impacted. These species are covered under the MSHCP and no compensatory or avoidance action would be required because the project area is not located within a Narrow Endemic Plant Species Survey Area.

Potential Project impacts to Robinson's pepper-grass, white rabbit-tobacco, and chaparral ragwort are not significant under CEQA, as only 0.90 acre of disturbed Riversidean sage scrub with a very low to low potential to support these would be impacted; therefore, populations of these species, if present, are not expected to represent a number potentially significant under CEQA within this small area being impacted. No compensatory or avoidance action would be required for these species under CEQA.

Stephen's Kangaroo Rat

Approximately 7.88 acres of habitat consisting of disturbed Riversidean sage scrub and nonnative grassland with a low potential to support Stephens' kangaroo rat would be permanently impacted by the proposed Project. If unmitigated, impacts to Stephens' kangaroo rat, if present, could be potentially significant under CEQA; however, take would be authorized and these impacts would be mitigated through payment of the SKR fee as required under the Habitat 51 Conservation Plan for the Stephens' Kangaroo Rat in Western Riverside County, California.

Coastal California Gnatcatcher
Approximately 0.90 acres of disturbed Riversidean sage scrub habitat with a very low potential to support coastal California gnatcatcher would be permanently impacted by the proposed Project. If unmitigated, impacts to coastal California gnatcatcher, if present, could be potentially significant under CEQA; however, take would be authorized and these impacts would be mitigated through payment of the MSHCP development fee, as this species is considered adequately conserved by the Plan.

Burrowing Owl
No burrowing owls were detected within or adjacent to the project site during general biological surveys or incidentally during the jurisdictional delineation field work performed to date or during focused burrowing owl surveys. While there is a "very low" potential for burrowing owls to be detected, the site is within the MSHCP Burrowing Owl Survey Area and focused surveys were performed in March/April 2018 during the burrowing owl breeding season (March 1 through August 31). No burrowing owls were detected during the focused survey period. However, burrowing owls could nest on the site between the survey period and project construction; thus, construction related impacts could be potentially significant without mitigation. Mitigation Measure BIO-1 would reduce potential burrowing owl impacts to less than significant. If burrowing owls are not detected during the pre-construction survey, the project would not impact burrowing owls.

> **Mitigation Measure BIO-1:** A qualified biologist will conduct a pre-construction presence/absence survey for burrowing owls within 30 days prior to site disturbance. If burrowing owls are detected onsite and may be affected by the project, avoidance measures shall be developed in compliance with the MSHCP and subject to the approval of the Western Riverside Regional Conservation Authority and wildlife agencies.

Other Special Status Animals
The project area has a "very low" to "moderate" potential to provide breeding or live-in habitat for several non-listed special-status animals including the following: reptiles - California glossy snake, coastal whiptail, San Diego banded gecko, Northern red-diamond rattlesnake, and coast horned lizard; birds - burrowing owl, and coastal California gnatcatcher; and mammals - northwestern San Diego pocket mouse, Stephens' kangaroo rat, and southern grasshopper mouse.

Further, the project area contains foraging habitat for the state-listed threatened Swainson's hawk, as well as non-listed special-status species. Non-listed special-status animals that are not expected to reside or breed within the project area but could forage in the area include birds - white-tailed kite, loggerhead shrike, and yellow warbler; and mammals - pallid bat, western mastiff bat, western yellow bat, San Diego desert woodrat, and American badger.

With the exception of the burrowing owl, for those species covered under the MSHCP, no additional survey, compensatory, or avoidance action would be required, as the project site is not located within a Small Mammal, Amphibian, or Criteria Area Species Survey Area.

Potential impacts to these species by development of the project would be mitigated through payment of MSHCP fees and SKR fees described above and implementation of Mitigation Measure BIO-1. This includes state or federally listed species such as the Stephens' kangaroo rat, which is covered by the SKR HCP and coastal California gnatcatcher which is considered adequately conserved by the MSHCP.

Potential impacts to special-status animals not covered by the MSHCP include reptiles: California glossy snake; and mammals: southern grasshopper mouse. Although the project could potentially impact these species, the number of individuals affected is not expected to be significant based on the level of existing on-site disturbance and the fact that the area surrounding the site is relatively fragmented.

The project will remove habitat with the potential to support foraging by the state listed threatened Swainson's hawk, as well as non-listed, special-status species not covered by the MSHCP. Special-status animals not covered by the MSHCP that are not expected to reside or breed within the project area, but could forage on the site include mammals: pallid bat, western mastiff bat, western yellow bat, and American badger. Due to the disturbed and relatively fragmented nature of the project area, the removal of foraging habitat resulting from the project will not be significant.

Critical Habitat
The proposed project will not impact lands designated as critical habitat by the US Fish and Wildlife Service.

Raptor Use
The project area lacks mature trees and tall shrubs commonly used for raptor nesting; however, the site does provide foraging and breeding habitat for raptor species, including special-status raptors. Raptors detected over the course of the field studies performed for the project were red-tailed hawk, American kestrel, and turkey vulture (*Cathartes aura*). Great horned owl (*Bubo virginianus*) and barn owl (*Tyto alba*) may also be present in the project area. Many of the raptors that would be expected to forage and nest within western Riverside County are fully covered under the MSHCP. Some common raptor species (e.g., American kestrel and Red-tailed Hawk) are not covered by the MSHCP but are expected to be conserved with implementation of the Plan as their habitat is similar to those required by the raptors covered under the Plan. Payment of MSHCP fees as described above would address potential raptor impacts.

Nesting Birds
The project has the potential to impact active bird nests if vegetation is removed during the nesting season (February 1 to August 31). Impacts to nesting birds are prohibited by the Migratory Bird Treaty Act and California Fish and Game Code. Mitigation Measure BIO-2 would reduce potential nesting bird impacts to less than significant.

> **Mitigation Measure BIO-2**: As feasible, vegetation clearing should be conducted outside of the nesting season, which is generally identified as February 1 through

September 15. If avoidance of the nesting season is not feasible, then a qualified biologist shall conduct a nesting bird survey within three days prior to any disturbance of the site, including disking and grading. If active nests are identified, the biologist shall establish suitable buffers around the nests based on his/her judgement, and the buffer areas shall be avoided until the nests are no longer occupied and the juvenile birds can survive independently from the nests.

With the payment of MSHCP fees and implementation of Mitigation Measures BIO-1 and BIO-2, impacts to species covered under the MSHCP would be **less than significant**.

b and c) A jurisdictional delineation was performed for the project site (see Appendix C of Appendix B). A total of four drainages occur on the property. Potential US Army Corps of Engineers (Corps) and Regional Water Quality Control Board (RWQCB) jurisdiction on the site totals approximately 0.09 acre, none of which consists of jurisdictional wetlands. CDFW jurisdiction at the site totals approximately 0.22 acre, of which approximately 0.05 acre consists of vegetated riparian habitat and 0.17 acre consists of non-riparian streambed. A total of 1,875 linear feet of streambed is present.

The proposed project would avoid all potentially jurisdictional waters under CWA Sections 401 or 404, or Fish and Game Code Section 1602. Therefore, the proposed project would not require permits/authorizations under CWA Sections 401 and 404 or Fish and Game Code Section 1602, and no mitigation would be necessary. With avoidance, **no impact** to wetland and riparian resources would occur as a result of the proposed project.

d) The project site does not contain migratory wildlife corridors. It is surrounded on three sides by residential development and is not included in the MSHCP Cores or Linkages. In addition, the project site and surrounding area do not represent a significant or biologically important wildlife nursery site, as it is largely separated from surrounding wildland areas by development and is subject to on-going human disturbance. The proposed project would not interfere or impact the movement of native resident or migratory fish or wildlife species, affect established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites. **No impact** to wildlife movement corridors would occur with project implementation.

e-f) No native or ornamental trees occur on-site. No impacts associated with tree removal and/or related policies would occur as a result of the proposed project. The project site is located within the Riverside and Norco Area Plan of the MSHCP, but is not located within the MSHCP Criteria Area. The project site is not located within the MSHCP Narrow Endemic Plant Species Survey Area (NEPSSA) or the Criteria Area Plant Species Survey Area (CAPSSA). Avoidance of Narrow Endemic Plant Species is not required, and the project would be consistent with the biological requirements of the MSHCP regarding Narrow Endemic Plant Species.

The project area is located within the MSHCP Burrowing Owl Survey Area, but is not located within the MSHCP Mammal or Amphibian Survey Areas, or Core and Linkage areas. As referenced herein, Burrowing Owl surveys were performed as required per the survey protocol.

The proposed project is not subject to the Habitat Evaluation and Acquisition Negotiation Strategy (HANS) process.

The proposed Project will not impact Riparian/Riverine areas, vernal pools, or associated species outlined in MSHCP Section 6.1.2 (Protection of Species Associated with Riparian/Riverine Areas and Vernal Pools); therefore, a DBESP would not be required for the proposed Project.

The MSHCP Urban/Wildland Interface Guidelines are intended to address indirect effects associated with locating development in proximity to the MSHCP Conservation Area. As the MSHCP Conservation Area is assembled, development is expected to occur adjacent to the Conservation Area. Future development in proximity to the MSHCP Conservation Area may result in edge effects with the potential to adversely affect biological resources within the Conservation Area. As the Project area is not located adjacent to an MSHCP Conservation Area, implementation of MSHCP Urban/Wildland Interface Guideline is not required. **No impact** would occur under these thresholds.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
V. <u>CULTURAL RESOURCES</u> -- Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	☐	☐	☒	☐
b) Cause a substantial adverse change in the significance of an archaeological resource as defined in §15064.5?	☐	☒	☐	☐
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☐	☒
d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☒	☐	☐

The following information is based in part on the results of a *Phase I Cultural Resources Inventory of Tract 37392, APN 243-210-037 & 041,* prepared by AMEC Foster Wheeler (October 2017). The sections of the report that are not confidential are included herein as Appendix C.

To identify and evaluate potential impacts to cultural and/or historic resources associated with the proposed project, AMEC Foster Wheeler conducted a historical/archaeological resources records search, pursued historical background research, contacted Native American representatives, carried out an intensive-level field survey of the entire project area and performed limited subsurface testing. During the field survey, two previously recorded (Site 33-003483) prehistoric granite outcrop milling features (milling slicks) were located. Limited subsurface testing was performed around the perimeter of this resource to determine whether additional resources are present. No items off historic or archaeological value were found.

In summary, the Phase I study did not encounter any historical resources, as defined by CEQA, or any historic properties, as defined by the National Historic Preservation Act (NHPA), within the project site. Shovel testing did not identify any resources of historic or archaeological significance associated with Site 33-003483. Thus, the milling features are temporally ambiguous and appear to lack potential for relaying additional data important to the prehistory of the region. Site 33-003483 is older than 50 years, but is not associated with a significant historic event or broad patterns in history, is not associated with persons of historical significance, does not have distinctive characteristics, and isn't likely to yield important historic information. Therefore, the resource is not eligible for the CRHR or the NRHP and does not qualify as a

"historical resource" under CEQA or an "historic property" under NHPA. Furthermore, 33-003483 does not qualify as a "cultural resources," as defined by City of Riverside Municipal Code Title 20.50.10. However, Native American Tribes consulted during the review process for the proposed project have expressed concern regarding potential impact to this feature and have requested it be relocated on-site prior to grading. The applicant has agreed to relocate this feature to a portion of the open space easement to be recorded for the site. This is addressed in Mitigation Measure CUL-2 below. Impacts to cultural or historic resources would be **less than significant.**

b) On September 11, 2017, AMEC Foster Wheeler submitted a sacred lands file request to the Native American Heritage Commission (NAHC) to determine whether their files indicate the presence of cultural sites within or immediately adjacent to the Project Area. On September 14, 2017, the NAHC responded that the sacred lands record search did not identify any resources within or immediately adjacent to the subject Project Area. The NAHC provided a list of forty-five tribal representatives to further contact regarding the project and the presence of Native American resources within and surrounding the Project Area. With this information, Amec Foster Wheeler sent consultation letters on September 14, 2017, to the forty-five NAHC-recommended tribal representatives to ascertain whether they had specific information regarding resources in or near the Project Area. Follow-up phone calls to each representative were made on October 5, 2017.

Of those Tribal representatives contacted, 15 responded. Of the 15, the Pechanga Band asked that the Tribe be invited to participate in the field surveys, that they be notified and consulted by the lead agency (and provided project/cultural resource documents) and that a qualified archaeologist and a monitor from the Tribe be present during construction activities. The Pechanga Band was invited to attend the field survey and subsurface testing phase of the Phase I project, and sent a cultural resource specialist to assist in the October 6, 2017, subsurface testing. Of the remaining 14 Tribes, the responses varied from no interest in the project based on location to requests for information if resources were discovered during the Phase I study process or during construction.

While the likelihood is remote, previously undiscovered resources may be unearthed during construction. The City of Riverside has incorporated the following mitigation measures to address unanticipated discoveries during construction and the removal and relocation of Site 33-003483. These measures are also applicable to Section XVII, Tribal Cultural Resources. With implementation of mitigation measures CUL-1 through CUL-3, impacts to these resources would be **less than significant**.

> **Mitigation Measure CUL-1 Changes to Project**: Prior to Grading Permit issuance, if there are any changes to Project site design and/or proposed grades, the Applicant and the City shall contact interested tribes to provide an electronic copy of the revised plans for review. Additional consultation shall occur between the City and interested tribes to discuss any proposed changes and review any new impacts and/or potential avoidance/preservation of the cultural resources on the Project site. The City and the

Applicant shall make all attempts to avoid and/or preserve in place as many cultural and paleontological resources as possible that are located on the Project site if the site design and/or proposed grades should be revised.

Mitigation Measure CUL-2: Archaeological Monitoring: At least 30 days prior to application for a grading permit and before any grading, excavation and/or ground disturbing activities on the site take place, the Project Applicant shall retain a Secretary of the Interior's Standards-qualified Project Archaeologist to manage the monitoring of all ground-disturbing activities in an effort to identify any unknown archaeological resources.

1. The Project Archaeologist, in consultation with consulting tribe(s), the Developer and the City, shall develop an Archaeological Monitoring Plan to 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:

    a. Project grading and development scheduling;

    b. The development of a rotating or simultaneous schedule in coordination with the Developer and the Project Archaeologist for designated Native American Tribal Monitors from the Consulting Tribe(s) during grading, excavation and ground disturbing activities on the site: including the scheduling, safety requirements, duties, scope of work, and Native American Tribal Monitors' authority to stop and redirect grading activities in coordination with all Project archaeologists;

    c. Plan for the controlled grading within 50 feet of the boundaries of identified resources. Grading within 50-feet of these sites shall be conducted using controlled grading techniques. Large indiscriminate grading equipment shall not be used, and the controlled grading technique shall be reviewed by the Project Archaeologist, in consultation with the Consulting Tribe(s), the Developer, and the City. The Project Archaeologist and Native American Tribal Monitors shall ensure that the grading efforts in these areas are conducted in a manner that allows for the identification of subsurface cultural resources. Any resources observed shall be addressed in accordance with **MM-CUL-3** below;

    d. The determination by the Project Archaeologist, Project Biologist, Developer, City and Consulting Tribe(s) as to the scope, methods and suitable relocation site(s) for CA-RIV-33-003483. This Removal and Relocation Plan shall be reviewed and approved by City Staff prior to commencement of work. Relocation shall be mutually agreed upon

and completed to the satisfaction of all parties prior to commencement of mass grading. The relocated features will be placed in an area that will be preserved in perpetuity, so that no future disturbances will occur; and

e. The protocols and stipulations that the Developer, City, Tribe(s) and Project archaeologist will follow in the event of inadvertent cultural resources discoveries, including any newly discovered cultural resource deposits that shall be subject to a cultural resources evaluation.

Mitigation Measure CUL-3: Treatment and Disposition of Cultural Resources: In the event that Native American cultural resources are inadvertently discovered during the course of grading for this Project, the following procedures will be carried out for treatment and disposition of the discoveries:

1. **Temporary Curation and Storage:** During the course of construction, all discovered resources shall be temporarily curated in a secure location onsite or at the offices of the Project Archaeologist. The removal of any artifacts from the Project site will need to be thoroughly inventoried with tribal monitor oversite of the process; and

2. **Treatment and Final Disposition:** The landowner(s) shall relinquish ownership of all cultural resources, including sacred items, burial goods, and all archaeological artifacts and non-human remains as part of the required mitigation for impacts to cultural resources. The Applicant shall relinquish the artifacts through one or more of the following methods and provide the City of Riverside Community & Economic Development Department with evidence of same:

    a. Accommodate the process for onsite reburial of the discovered items with the consulting Native American tribes or bands. This shall include measures and provisions to protect the future reburial area from any future impacts. Reburial shall not occur until all cataloguing and basic recordation have been completed;

    b. A curation agreement with an appropriate qualified repository within Riverside County that meets federal standards per 36 CFR Part 79 and therefore would be professionally curated and made available to other archaeologists/researchers for further study. The collections and associated records shall be transferred, including title, to an appropriate curation facility within Riverside County, to be accompanied by payment of the fees necessary for permanent curation:

c. If more than one Native American tribe or band is involved with the Project and cannot come to a consensus as to the disposition of cultural materials, they shall be curated at the Western Science Center by default; and

d. At the completion of grading, excavation and ground disturbing activities on the site, a Phase IV Monitoring Report shall be submitted to the City documenting monitoring activities conducted by the Project Archaeologist and Native Tribal Monitors within 60 days of completion of grading. This report shall document the impacts to the known resources on the property; describe how each mitigation measure was fulfilled; document the type of cultural resources recovered and the disposition of such resources; provide evidence of the required cultural sensitivity training for the construction staff held during the required pre-grade meeting; and, in a confidential appendix, include the daily/weekly monitoring notes from the archaeologist. All reports produced will be submitted to the City of Riverside, Eastern Information Center and interested tribes.

c) The City of Riverside GP 2025 does not indicate the City contains known paleontological resources nor was resource sensitivity noted in the *Phase I Cultural Resources Inventory of Tract 37392, APN 243-210-037 & 041*, prepared for the proposed project. Construction of new development projects is not anticipated to adversely affect known unique paleontological resources or unique geologic features. Given the construction history and depth of previous disturbance in proximity to the site, the potential for locating undiscovered paleontological or geological resources is remote. No mitigation or monitoring was recommended in the *Phase I Cultural Resources Inventory of Tract 37392, APN 243-210-037 & 04.* **No impact** would occur to these resources.

d) The potential for encountering human remains at the project site is low. No known burial sites have been identified on the site or in the vicinity. In the event that human remains (or remains that may be human) are discovered at the Project site during grading or earthmoving, the construction contractors, Project Archaeologist, and/or designated Native American Monitor shall immediately stop all activities within 100 feet of the find. The Project proponent shall then inform the Riverside County Coroner and the City of Riverside Community & Economic Development Department immediately, and the coroner shall be permitted to examine the remains as required by California Health and Safety Code Section 7050.5(b) unless more current State law requirements are in effect at the time of the discovery. Section 7050.5 requires that excavation be stopped in the vicinity of discovered human remains until the coroner can determine whether the remains are those of a Native American. If human remains are determined as those of Native American origin, the Applicant shall comply with the state

relating to the disposition of Native American burials that fall within the jurisdiction of the NAHC (PRC Section 5097). The coroner shall contact the NAHC to determine the most likely descendant(s). The MLD shall complete his or her inspection and make recommendations or preferences for treatment within 48 hours of being granted access to the site. The Disposition of the remains shall be overseen by the most likely descendant(s) to determine the most appropriate means of treating the human remains and any associated grave artifacts.

The specific locations of Native American burials and reburials will be proprietary and not disclosed to the general public. The County Coroner will notify the Native American Heritage Commission in accordance with California Public Resources Code 5097.98.

According to California Health and Safety Code, six or more human burials at one location constitute a cemetery (Section 8100), and disturbance of Native American cemeteries is a felony (Section 7052) determined in consultation between the Project proponent and the MLD. In the event that the Project proponent and the MLD are in disagreement regarding the disposition of the remains, State law will apply and the median and decision process will occur with the NAHC (see Public Resources Code Section 5097.98(e) and 5097.94(k)). With implementation of the above-referenced methods as a standard condition of approval, impacts related to encountering human remains during construction would be reduced to **less than significant.**

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
VI. <u>GEOLOGY AND SOILS</u> – 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?	☐	☐	☒	☐
ii) Strong seismic ground shaking?	☐	☐	☒	☐
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐
iv) Landslides?	☐	☐	☒	☐
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☒	☐
c) Be located on a geologic unit or soil that is unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?	☐	☐	☒	☐
d) Be located on expansive soil, as defined in Table 1-B of the Uniform Building Code, creating substantial risks to life or property?	☐	☐	☒	☐
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	☒

a (i-ii) The City of Riverside is surrounded by three major earthquake faults: San Andreas, San Jacinto and Elsinore faults. At its closest point, the San Andreas fault is 11 miles from downtown Riverside, running through the San Bernardino mountains. The fault has the capability of producing up to an 8.3 magnitude earthquake. The San Jacinto fault extends more than 125 miles, from northwest of El Centro to northwest of San Bernardino. This fault "passes through" the intersection of Interstate Highways 10 and 215, Loma Linda, the Box Springs Mountains across Highway 60 to the northern end of the San Jacinto Valley. This fault has the capability of producing up to a 7.0 magnitude earthquake. At its closest point, this fault is seven miles from downtown Riverside. The Elsinore fault is located southwest of Lake Matthews, running through Corona and south into Lake Elsinore. It is connected to the Whittier fault near Santa Ana River in the Corona/Riverside area. This fault has the capability of producing up to a 6.0 magnitude earthquake. At its closest point, this fault is 13 miles from downtown Riverside.

The project site is not located within the boundaries of an Earthquake Fault Zone as defined by the Alquist-Priolo Earthquake Fault Zoning Act of 1972 or a Riverside County Fault Hazard Zone for surface fault rupture hazards. No active or potentially active faults with the potential for surface fault rupture are known to pass directly beneath the site. There are no known active or potentially active faults traversing the area and the risk of ground rupture resulting from fault displacement beneath the site is low (Pacific Soils Engineering, Inc. 2004).

During the life of the proposed improvements, the property will likely experience moderate to occasionally high ground shaking from known faults, as well as background shaking from other seismically active areas of the Southern California region. However, site preparation and construction of building foundations consistent with the geotechnical report and current California Building Code (CBC) requirements would address seismic concerns and related structural impacts associated with ground shaking. Impacts would be **less than significant.**

a (iii) Liquefaction typically occurs within the upper 50 feet of the surface, when saturated, loose, fine- to medium-grained soils (sand and silt) are present. Earthquake shaking suddenly increases pressure in the water that fills the pores between soil grains, causing the soil to lose strength and behave as a liquid. When liquefaction occurs, the strength of the soil decreases, reducing the ability of the underlying soil to support foundations for buildings and other structures. The type of geologic process that created a soil deposit has a strong influence on its liquefaction susceptibility. Saturated soils that have been created by sedimentation in rivers and lakes can be very susceptible to liquefaction. No groundwater was detected on the site during a 2004 geotechnical investigation and site is underlain by granitic bedrock. Thus, the potential for encountering groundwater and related impacts associated with liquefaction at the subject site is considered low (Pacific Soils Engineering, Inc. 2004). Impacts would be **less than significant.**

a (iv) The project site gently slopes to the south as do parcels surrounding the site. During grading, engineered cut and fill slopes up to a maximum of 25 feet in height would be constructed. The slopes are expected to be no steeper than 2:1 and stabilized to avoid any impacts related to landslides. Impacts related to landslides would be **less than significant**.

b) As noted, the site gently slopes to the south. The site is greater than one acre in size and individual improvements would disturb more than one acre; thus, the project would be subject to State Water Resources Control Board General Construction Permit during construction to minimize soil erosion. For additional information, see Section IX, *Hydrology and Water Quality*. With implementation of Best Management Practices (BMPs) specified in the Stormwater Pollution Prevention Plan (SWPPP) prepared for the project, soil erosion hazard impacts would be **less than significant.**

c, d) Land subsidence is defined as the sinking or settling of land to a lower level. Causes can include: (1) earth movements; (2) lowering of ground water level; (3) removal of underlying supporting materials by mining or solution of solids, either artificially or from natural causes; (4) compaction caused by wetting (hydro-compaction); (5) oxidation of organic matter in soils; or (6) added load on the land surface. The soils on-site are comprised of alluvium overlaying bedrock. With the implementation of site preparation recommendations in the soils report, no land subsidence is expected to occur (Pacific Soils Engineering, Inc. 2004). Therefore, impacts would be **less than significant**.

e) The proposed project would connect to an existing sewer line located along Overlook Parkway. No septic systems would be installed. **No impact** would occur under this threshold.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
VII. GREENHOUSE GAS EMISSIONS Would the project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☒	☐
b) Conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☒	☐

Gases that trap heat in the atmosphere are often referred to as greenhouse gases (GHGs), analogous to the way in which a greenhouse retains heat. Common GHG include water vapor, carbon dioxide (CO_2), methane (CH_4), nitrous oxides (N_2O_x), fluorinated gases, and ozone. GHGs are emitted by both natural processes and human activities. Of these gases, CO_2 and CH_4 are emitted in the greatest quantities from human activities. Emissions of CO_2 are largely by-products of fossil fuel combustion, whereas CH_4 results from off-gassing associated with agricultural practices and landfills. Man-made GHGs, many of which have greater heat-absorption potential than CO_2, include fluorinated gases, such as hydrofluorocarbons (HFCs), perfluorocarbons (PFC), and sulfur hexafluoride (SF_6). The accumulation of GHGs in the atmosphere regulates the earth's temperature. Without the natural heat trapping effect of GHGs, Earth's surface would be about 34° C cooler. However, it is believed that emissions from human activities, particularly the consumption of fossil fuels for electricity production and transportation, have elevated the concentration of these gases in the atmosphere beyond the level of naturally occurring concentrations (Cal EPA, 2006).

Pursuant to the requirements of SB 97, the *CEQA Guidelines* were amended to include feasible mitigation of GHG emissions and analysis of the effects of GHG emissions. The adopted *CEQA Guidelines* provide regulatory guidance on the analysis and mitigation of GHG emissions in CEQA documents, while giving lead agencies the discretion to set quantitative or qualitative thresholds for the assessment and mitigation of GHGs and climate change impacts.

The majority of individual projects do not generate sufficient GHG emissions to create a project-specific impact through a direct influence on climate change; therefore, the issue of climate change typically involves an analysis of whether a project's contribution towards an impact is cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an

individual project are significant when viewed in connection with the effects of past projects, other current projects, and probable future projects (CEQA Guidelines, Section 15355).

Potential GHG impacts are evaluated per the SCAQMD's recommended/preferred option threshold for all land use types of 3,000 metric tons CO_2E per year. GHG emissions associated with the project's construction period were estimated using the CalEEMod emissions modeling software version 2016.3.1. CalEEMod input parameters and output files are shown in Appendix A.

a) Construction activities would generate greenhouse gas (GHG) emissions associated with equipment operation. Site preparation and grading typically generate the greatest emission quantities because the use of heavy equipment is greatest during this phase of construction. Emissions associated with the construction period were estimated based on the projected maximum amount of equipment that would be used onsite at one time. Air districts such as the SCAQMD have recommended amortizing construction-related emissions over a 30-year period to calculate annual emissions. Construction of the project would generate approximately 232 metric tons of GHG emissions during construction. Amortized over 30 years, the project would generate 8 metric tons per year, as shown in Table 6 below.

Table 6 also shows the new construction, operational, and mobile GHG emissions (including 6 metric tons of transportation related NOx emissions) associated with the proposed project. Long-term operational emissions relate to energy use, solid waste, water use, and transportation. Each source is shown below. Cumulatively, the estimated emissions would not exceed the 3,000 MT CO_2E annual emission threshold; thus, no mitigation measures would be required to avoid a significant impact under the CEQA. GHG emissions would be **less than significant.**

Table 6
Combined Annual Greenhouse Gas Emissions

Emission Source	Annual Emissions (CO_2E)
Construction	8 metric tons
Operational	
Energy	40 metric tons
Solid Waste	2 metric tons
Water	3 metric tons
Mobile	137 metric tons
Total	**190 metric tons**

See Appendix A for CalEEMod software program output

b) The proposed project would entail construction and operation of eight single-family residences. As discussed, the project would not exceed the thresholds of significance established for the evaluation of individual projects for GHG emissions. With respect to

consistency with plans or policies related to GHG emissions, the City of Riverside adopted the *Riverside Restorative Growthprint* (RRG) in January 2016, which is the combined *Economic Prosperity Action Plan and Climate Action Plan* (CAP). The plans comprising the RRG work in together to encourage entrepreneurship and smart growth while advancing the City of Riverside's GHG emission reduction goals. Consistent with the principles outlined in the RRG and Measure SR-2 in the CAP, new buildings would be constructed consistent with Title 24 standards and other applicable building code regulations to ensure energy efficiency such as installing low flow plumbing fixtures and implementing a recycling program to improve energy efficiency and reduce related GHG emissions associated with long-term operation of the project. Other CAP measures include the requirement that construction/demolition waste be recycled (Measure SR-13) to reduce the volume of material entering landfills. With implementation of applicable CAP measures summarized herein, the project will not impede or delay local or statewide initiatives to reduce GHG emissions. Impacts would be **less than significant**.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
VIII. <u>HAZARDS AND HAZARDOUS MATERIALS</u> - Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☒	☐
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?	☐	☐	☒	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within ¼ mile of an existing or proposed school?	☐	☐	☒	☐
d) Be located on a site which is included on a list of hazardous material 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?	☐	☐	☐	☒
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?	☐	☐	☐	☒
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?	☐	☐	☐	☒
g) Impair implementation of or	☐	☐	☐	☒

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
VIII. <u>HAZARDS AND HAZARDOUS MATERIALS</u> - Would the project:				
physically interfere with an adopted emergency response plan or emergency evacuation plan?				
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?	☐	☐	☐	☒

a-c) The proposed project would be an eight-lot single-family residential development. Aside from the typical materials (i.e., cleansers, automobile fluids, etc.) used and/or stored in small quantities, no hazardous materials would be used, stored or transported to/from the site.

The nearest school to the project site is Washington Elementary School which is located at 2760 Jane Street in Riverside approximately 1.5 miles northwest of the site. Hawarden Hills Academy is located approximately the same distance from the site as 6696 Via Vista Drive. The schools are located more than ¼ mile from the site and as referenced, no hazardous materials would be used or stored on the site. A **less than significant** impact would occur under these thresholds.

d) No uses or activities that could have caused or contributed to a release of hazardous chemicals or materials on the property occur or have occurred on the site. Based on a review of available databases listing known hazard sites (i.e, Geotracker, Envirostar accessed September 26, 2017); there is no evidence of hazardous environmental conditions on the project site. **No impact** would occur under this threshold.

e, f) Riverside Municipal Airport is located 4.3 miles northwest of the site and is the closest airport. The project site is not located within the Riverside Airport Influence Area, within 2 miles of a public use airport or in proximity to a private airstrip. The project is approximately 5.5 miles northwest of the March Air Reserve Base. Per the *March Air Reserve Base/Inland Port Airport Land Use Compatibility Plan* (adopted November 2014), the project site is located with Compatibility Zone D. Zone D is referred to as a flight corridor buffer and has no restrictions on residential development. **No impact** would occur.

g) The proposed project would not obstruct access to the project vicinity through road closures or other project actions that could impact evacuation routes or otherwise impair evacuation

during emergencies. The project site located at the eastern terminus of Talcey Terrace. Access to areas surrounding the site via Talcey Terrace, Overlook Parkway to the north and Washington Street to the west would be maintained. **No impact** would occur.

h) The project site is located in a developed single-family residential area. The project site is not located in a Fire Hazard Severity Zone as designated in maps prepared by the California Department of Forestry and Fire Protection (Riverside County, 2009). **No impact** would occur.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
IX. <u>HYDROLOGY AND WATER QUALITY</u> – Would the project:				
a) Violate any water quality standards or waste discharge requirements?	☐	☐	☒	☐
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 or 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)?	☐	☐	☒	☐
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?	☐	☐	☒	☐
d) Substantially alter the existing drainage pattern of the site or area, including 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?	☐	☐	☒	☐
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☒	☐
f) Otherwise substantially degrade	☐	☐	☒	☐

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
IX. <u>HYDROLOGY AND WATER QUALITY</u> – Would the project:				
water quality?				
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?	☐	☐	☐	☒
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	☐	☐	☒
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?	☐	☐	☐	☒
j) Inundation by seiche, tsunami, or mudflow?	☐	☐	☐	☒

a, c-f) As referenced, Tentative Tract Map 37392 proposes to subdivide 16.79 vacant acres into 8 single family residential lots. No off-site surface storm water runoff currently enters the project site. The project proposes to develop graded pads on the 8 proposed lots. These graded lots will then be sold to individual buyers. The buyers will then develop their residential and landscape plans, which will then be submitted to the City of Riverside for permit issuances. The Water Quality Management Plan requires that each of these individual lot owners be responsible for meeting the City's Water Quality Management Plan requirements for the construction of their proposed homes, landscaping and hardscaping that lie within the "pad portions" of their individual lots.

The WQMP incorporates "Prototype" Best Management Practices (BMPs) for the "pad portions" of each lot assuming areas of impervious vs pervious surfaces. Because soil infiltration testing has not been completed, the "Prototype" BMP is a Bioretention Basin. As the individual lots within the project are developed with single-family residences over time, individual owners will have the option to design and implement lot-specific structural BMPs as an amendment to the approved WQMP document, or to accept and construct the prototype BMP established by the WQMP (Gable Cook & Associates, Inc. October 2017) (Appendix D).

The WQMP also addresses the surface drainage runoff that is generated over the "street fronting" portion of each lot as well as driveways. These flows will be captured using catch basin inlets with storm drain pipes connecting to infiltration trenches. The infiltration trenches will be sized to contain the capture flow rates and volumes generated by the design storm rainfall event and/or the flow rates and volumes necessary to meet the requirements of the hydromodication design criteria, which ever are greater. Storm volumes will then infiltrate into the existing soils within a 72-hour time period. Any runoff that exceeds the infiltrations trench capacity will bypass the infiltration trenches and flow to Talcey Terrace or the existing drainage course along the project's southerly boundary. Further, native and drought tolerant trees and large shrubs will be planted on individual lots to retain water from storm events.

While the project would modify on-site drainage, it would not alter the course of an existing stream or river that would result in on- or off-site erosion or siltation. Construction of the stormwater treatment system would retain the design capture volume for the project. This would avoid flooding on- or off-site. The project would not substantially degrade water quality or otherwise violate discharge standards. With the implementation of on-site BMPs to capture flows from individual lots and infiltration tranches to capture impervious surface runoff from driveways and street surfaces, impacts related to stormwater would be reduced to **less than significant.**

b) The project site is located in the City of Riverside Public Utilities (RPU) service area. The RPU water supply consists primarily of groundwater from the Bunker Hill Basin, Riverside North and Riverside South. Additional sources of water available to RPU include groundwater from the Rialto-Colton Basin, recycled water from the City of Riverside Regional Water Quality Control Plant and imported water from the Western Municipal Water District through a connection at the Metropolitan Water District (MWD) Henry J. Mills Treatment Plant. Per the 2010 Urban Water Master Plan, RPU is planning to augment water supplies through conjunctive use projects and increased using of reclaimed water.

RPUs potable distribution system consists of approximately 940 miles of pipeline ranging from 2 to 72 inches in diameter. The RPU has sixteen reservoirs with a storage volume of approximately 108 million gallons. Water demand projections as calculated by CalEEMod 2016.3.1 (see Appendix A) is 0.73 million gallons annually or 2,000 gallons per day. The proposed project would be required to comply with federal, State and local plans, policies and regulations and Executive Order B-29-15, which requires reduction of potable water use during construction and implementation of Best Management Practices for new development concerning water conservation, both for potable and non-potable uses. Chapter B.3 of the RRG-CAP contains measures that can be implemented to reduce water consumption and related energy costs associated with water reclamation and transport. The project site is not within a groundwater recharge area. Project impacts on groundwater supply would be **less than significant**.

g, h) The project site is not located within a 100-year mapped flood zone (FEMA Flood

Insurance Rate Map No. 06065C0740G, August 2008). The project would redirect on-site drainage patterns; however, it would not impede or redirect flood flows. As referenced, all drainage would be managed to ensure pre-construction flows off-site are maintained. The project would not expose people or structures to flood hazard from severe storm events. **No impact** would occur under this threshold

i) The reservoirs nearest the project site are Lake Mathews which is located approximately 8 miles southwest and Lake Perris which is located approximately 10 miles to the southeast. The project site is not within the inundation zone for either reservoir per Figure 4.11.2 in the County of Riverside Environmental Impact Report No. 521 Public Review Draft (February 2015). Thus, project implementation would not expose people or structures to flood hazard from a dam failure. **No impact** would occur under this threshold.

j) Seiches are oscillations of the surface of inland bodies of water that vary in period from a few minutes to several hours. Seismic excitations can induce such oscillations. Tsunamis are large sea waves produced by submarine earthquakes or volcanic eruptions. The project is located well inland from the Pacific Ocean and is not subject to tsunami hazard. As referenced, the project site is not within the inundation zone of the nearest reservoirs; and thus, is not expected to be affected by a seiche if a seismic event were to occur. The project generally slopes to the southwest but does not contain steep slopes that could become unstable during grading or other ground disturbing activities. As referenced, grading would be required to construct manufactured slopes up to approximately 25 feet in vertical height, though with most at or below 20 feet in height. The manufactured slopes would be a maximum of 2:1 and would be stabilized as required by the grading plan prepared for the proposed project. The site is not expected to be subject to a mudflow hazard. **No impact** would occur under this threshold.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
X. <u>LAND USE AND PLANNING</u> -- Would the proposal:				
a) Physically divide an established community?	☐	☐	☐	☒
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?	☐	☐	☐	☒
c) Conflict with an applicable habitat conservation plan or natural community conservation plan?	☐	☐	☒	☐

a) The proposed project would allow for the future construction of 8 new single-family residences on a 16.79-acre vacant site. The project is consistent with the RC zoning designation and with the Hillside Residential General Plan designation. A previous iteration of this project was approved by the City Planning Commision on February 26, 2004 and ratified by the City Council on March 16, 2004 under Tentative Tract Map No. 32042 (P03-1530). The site is located in an existing residential area with development to the north and west. Graded residential pads are located to the south/southeast. The proposed project would utilize the existing road network and not result in the construction of improvements that would physically divide an existing community or otherwise impact circulation on public roads surrounding the site. N**o impact** would occur.

b) The proposed project site is located in the Alessandro Heights neighborhood and designated Hillside Residential in the current General Plan 2025. As defined in the Land Use Element of the General Plan, *"the Alessandro Heights neighborhood is known for its three major arroyos (Alessandro, Prenda and Woodcrest), hilly terrain and other natural features. To preserve the area's natural beauty, only very-low-density residential uses have been permitted; the majority of land in the area has been designated as Estate Residential and Hillside Residential".*

Specifically, Objective LU-33 and Policy LU-33.2 pertain to development within the Allesandro Heights neighborhood and provide guidance for future development to ensure the natural features within this area are protected to the extent feasible.

- Objective LU-33: Protect and preserve the natural features of Alessandro Heights while continuing to provide opportunities for residential development compatible with the natural environmental features of the area.

- Policy LU-33.2: Maintain the low-density, large-lot character of the neighborhood through appropriate zoning.

The density proposed by the project would be consistent with the RC zoning designation and support both Objective LU-33 and Policy LU-33.2 as defined above. As designed, the project would yield an average lot size of 1.99 acres, where the RC zoning designation requires a minimum average lot size of 2 acres; thus, a condition of approval will be recommended requiring the proposed private cul-de-sac dimensions be reduced to the minimum standard width in order to increase the overall average lot acreage to more than 2 acres.

The applicant has requested approval of three variances and a Subdivision Code modification for the proposed project. A variance is a deviation from development standards provided in the Zoning Code (Title 19), whereas a modification is a deviation from the standards provided in the Subdivision Code (Title 18). In this case, Chapter 19.100 provides the development standards for projects proposed within the RC zoning district. Chapter 19.720 of the City of Riverside Zoning Code defines the findings of fact that must be made as part of the process for reviewing and granting a variance request. Chapter 18.210 provides the minimum improvement standards for the subdivision of property citywide. Chapter 18.230 defines the findings of fact that must be made in order to approve a modification. The proposed variances and modification are defined below followed by the findings of fact required and justification for granting the variances proposed:

A. Allow Lots 7 & 8 to vary from the two-acre minimum lot size requirement when the average natural ground slope is in excess of 15% (Chapter 19.100.50 (A)(3)(b);
B. Allow Lot 1 to be configured as a corridor access lot (Chapter 18.210.080 (E); and
C. Allow Lot 2 to provide less than 130 feet of lot frontage at the front setback line Chapter 19.100.50 (A)(3)(b) .

As proposed and conditioned, the project would meet the intent of the City of Riverside General Plan and development standards that would facilitate compliance with the Municipal Code. The proposed project would be compliant with goals, objectives and policies contained in the General Plan that pertain to the proposed use on the subject property.

Riverside Municipal Airport is located 4.3 miles northwest of the site and is the closest airport. The project site is not located within the Riverside Airport Influence Area, within 2 miles of a public use airport or in proximity to a private airstrip. The project is approximately 5.5 miles northwest of the March Air Reserve Base. Per the *March Air Reserve Base/Inland Port Airport*

Land Use Compatibility Plan (adopted November 2014), the project site is located within Compatibility Zone D. Zone D is referred to as a flight corridor buffer and has no restrictions on residential development. The project received ALUC approval in 2004 when initially proposed and approved again at the (insert month/day) hearing.

With approval of the project as conditioned, including the requested variances and modification under the procedure established in the Zoning and Subdivision Codes**, no impact** would occur under this threshold.

c) The City of Riverside is a signatory to the Western Riverside MSHCP (September 2007) as referenced above. With the implementation of Mitigation Measures BIO-1 and BIO-2, impacts would be **less than significant** under this threshold.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XI. <u>MINERAL RESOURCES</u> -- 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?	☐	☐	☐	☒
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?	☐	☐	☐	☒

a, b) Per the City of Riverside General Plan Update, quarrying operations have not been active for decades and most extraction sites are now beyond the urban periphery. The area between Market Street and Mission Boulevard between the Santa Ana River and Lake Evans is a state-classified mineral resource zone (MRZ-2). As shown in the Riverside County Integrated Plan, areas in the Sphere of Influence and areas located generally within the eastern half of the City are designated MRZ-3; indicating that the area contains known or inferred mineral occurrences of undetermined mineral resource significance. Areas within the City contain deposits of feldspar, silica, limestone and other rock products. The project is not located within or in proximity to a MRZ. The proposed project would not require excavation of mineral resources nor would construction result in the loss of availability of any known regional or local mineral resources. Therefore, **no impact** to mineral resources would occur.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XII. <u>NOISE</u> – 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?	☐	☐	☒	☐
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐
c) A substantial permanent increase in ambient noise levels above levels existing without the project?	☐	☐	☒	☐
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☒	☐
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
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?	☐	☐	☐	☒

Noise levels (or volume) are generally measured in decibels (dB) using the A-weighted sound pressure level (dBA). The A-weighting scale is an adjustment to the actual sound power levels consistent with the human hearing response, which is most sensitive to frequencies around 4,000 Hertz (about the highest note on a piano) and less sensitive to low frequencies (below 100 Hertz).

Sound pressure level is measured on a logarithmic scale with the 0 dB level based on the lowest

detectable sound pressure level that people can perceive (an audible sound that is not zero sound pressure level). Based on the logarithmic scale, a doubling of sound energy is equivalent to an increase of 3 dB, and a sound that is 10 dB less than the ambient sound level has no effect on ambient noise. Because of the nature of the human ear, a sound must be about 10 dB greater than the reference sound to be judged as twice as loud. In general, a 3 dB change in community noise levels is noticeable, while 1-2 dB changes generally are not perceived. Quiet suburban areas typically have noise levels in the range of 40-50 dBA, while those along arterial streets are in the 50-60+ dBA range. Normal conversational levels are in the 60-65 dBA range, and ambient noise levels greater than 65 dBA can interrupt conversations.

In addition to the instantaneous measurement of sound levels, the duration of sound is important since sounds that occur over a long period of time are more likely to be an annoyance or cause direct physical damage or environmental stress. One of the most frequently used noise metrics that considers both duration and sound power level is the equivalent noise level (L_{eq}). The L_{eq} is defined as the single steady A-weighted level that is equivalent to the same amount of energy as that contained in the actual fluctuating levels over a period of time (essentially, the average noise level). Typically, L_{eq} is summed over a one-hour period.

The time period in which noise occurs is also important since noise that occurs at night tends to be more disturbing than that which occurs during the daytime. Two commonly used noise metrics – the Day-Night average level (L_{dn}) and the Community Noise Equivalent Level (CNEL) recognize this fact by weighting hourly L_{eq} over a 24-hour period. The L_{dn} is a 24-hour average noise level that adds 10 dB to actual nighttime (10:00 PM to 7:00 AM) noise levels to account for the greater sensitivity to noise during that time period. The CNEL is identical to the L_{dn}, except it also adds a 5 dB penalty for noise occurring during the evening (7:00 PM to 10:00 PM).

Vibration is sound radiated through the ground. The rumbling sound caused by the vibration of room surfaces is called ground borne noise. Ground borne vibration is almost exclusively a concern inside buildings and is rarely perceived as a problem outdoors. Ground-borne vibration related to human annoyance is generally related to velocity levels expressed in vibration decibels (VdB). However, construction-related groundborne vibration in relation to its potential for building damage can also be measured in inches per second (in/sec) peak particle velocity (PPV) (Federal Transit Administration, May 2006). Based on the FTA's *Transit Noise and Vibration Impact Assessment* and the California Department of Transportation's 1992 *Transportation-Related Earthborne Vibration, Technical Advisory*, vibration levels decrease by 6 VdB with every doubling of distance.

Noise exposure goals for various types of land uses reflect the varying noise sensitivities associated with those uses. Residences, hospitals, schools, guest lodging, libraries, and parks are most sensitive to noise intrusion; and therefore, have more stringent noise exposure standards than commercial or industrial uses that are not subject to impacts such as sleep disturbance. Sensitive land uses generally should not be subjected to noise levels that would be considered intrusive in character. Therefore, the location, hours of operation, type of use, and extent of development warrant close analysis in an effort to ensure that noise sensitive receptors are not

substantially affected by noise.

Noise Standards

Federal Noise Policies. There are no federal noise requirements or regulations that apply directly to the City of Riverside. However, there are federal regulations that influence the audible landscape, especially for projects where federal funding is involved. For example, the FHWA requires abatement of highway traffic noise for highway projects through rules in the Code of Federal Regulations (23 CFR Part 772), the Federal Transit Administration (FTA), and Federal Railroad Administration (FRA). Each agency recommends thorough noise and vibration assessments through comprehensive guidelines for any highway, mass transit, or high-speed railroad projects that would pass by residential areas.

Federal Vibration Policies. The Federal Transit Administration (FTA) has published guidelines for assessing the impacts of groundborne vibration associated with construction activities, which have been applied by other jurisdictions to other types of projects. The FTA measure of the threshold of architectural damage for non-engineered timber and mason buildings (e.g., residential units) is 0.2 in/sec PPV. The threshold of perception of vibration is 0.01 in/sec PPV (Federal Transit Administration, Office of Planning and the Environment, 2006).

State Noise Policies. Title 24, Section 3501 et. seq. of the California Code of Regulations codifies California Noise Insulation Standards. This code section uses the Community Noise Equivalency Level (CNEL) as its primary noise evaluation measurement. The CNEL measurement assesses noise variation during different times of the day for the purposes of averaging noise over a 24-hour period. Essentially, CNEL takes average sound levels at an observation point and adds a weighted penalty to those sounds that occur during the evening (+5 dBA) and nighttime hours (+10 dBA). An interior noise level of 45 dBA CNEL is often considered the desirable noise exposure level for single-family residential units. An exterior noise level of 65 dBA is generally considered an acceptable level for residential and other noise-sensitive land uses.

State Vibration Policies. There are no state standards for traffic-related vibrations. California Department of Transportation's (Caltrans) position is that highway traffic and construction vibrations generally pose no threat to buildings and structures. For continuous (or steady-state) vibrations; however, Caltrans considers the architectural damage risk level to be somewhere between 0.2 and 2.0 inches/second (California Department of Transportation, 2013).

City of Riverside Noise Ordinance. Chapter 7.35 of the Riverside Municipal Code prohibits the operation of any tools or equipment used in construction, drilling, repair, alteration, grading or demolition work between the hours of 7:00 p.m. and 7:00 a.m. on week days and between 5:00 p.m. and 8:00 a.m. on Saturdays or at any time on Sunday or federal holidays. Construction that occurs weekdays between 7:00 a.m. and 7:00 p.m. and between 8:00 a.m. and 5:00 p.m. on Saturday's is exempt from regulation.

Per Chapter 7.25, Table 7.25.010A, of the Riverside Municipal Code, the maximum allowable exterior noise level at residences is 55 dBA from 7 a.m. to 10 p.m., and 45 dBA from 10 p.m. to 7 a.m.

a) **Construction Noise**. Temporary, construction-related noise would occur during construction of the proposed project. The noise levels associated with the operation of common construction equipment are shown in Table 7. The noise levels are provided for reference purposes; not all equipment shown would be used for the proposed project. Noise levels are expected to occur within the ranges shown.

Table 7
Typical Construction Equipment Noise Levels

Type of Equipment	Range of Maximum Sound Levels Measured (dBA at 50 feet)	Maximum Sound Levels for Analysis (dBA at 50 feet)
Pile Driver 12,000 to 18,000 ft-lb/blow	81–96	93
Rock Drills	83–99	96
Jack Hammers	75–85	82
Pneumatic Tools	78–88	85
Pumps	74–84	80
Scrapers	83–91	87
Haul Trucks	83–94	88
Cranes	79-86	82
Portable Generators	71-87	80
Rollers	75-82	80
Dozers	77–90	85
Tractors	77–82	80
Front-End Loaders	77–90	86
Hydraulic Backhoe	81-90	86
Hydraulic Excavators	81–90	86
Graders	79–89	86

Type of Equipment	Range of Maximum Sound Levels Measured (dBA at 50 feet)	Maximum Sound Levels for Analysis (dBA at 50 feet)
Air Compressors	76–89	86
Trucks	81–87	86
Trencher	73-80	80

Source: Bolt, Beranek & Newman, Noise Control for Buildings and Manufacturing Plants, 1987.
dBA = A-weighted decibels, ft-lb/blow = foot-pounds per blow

Construction of the proposed improvements may utilize dozers, tractors, loaders, trucks and a variety of other types of equipment as individual phases of the construction process progress. No blasting, pile-driving or deep excavation is anticipated for the project. Noise levels associated with the equipment commonly used will range from 80 to 88 dBA at 50 feet from the source. A doubling of sound energy yields an increase of three decibels, so multiple pieces of equipment operating together may cause relatively small but noticeable increases in noise levels above that associated with one piece of equipment. Assuming two pieces of construction equipment, each producing a noise level of 88 dBA, are operating at one time on the site, the worst-case combined noise level during the site preparation phase of construction is an estimated 91 dBA at a distance of 50 feet from the active construction area.

The nearest sensitive property are single family residences that range from 50 to 100 feet north of the property line. Construction noise may be audible at the nearest residences neighboring the site. While noise levels are likely to exceed 55 dBA during periods when construction equipment is operating close to the northern property line. As referenced, Chapter 7.25 of the Riverside Municipal Code allows construction activities between the hours of 7:00 a.m. and 7:00 p.m. weekdays and between the hours of 8:00 a.m. and 5:00 p.m. on Saturdays. Construction occurring consistent with these provisions is exempt from regulation. While not anticipated, if blasting is required during excavation, a blasting permit would be obtained from the City of Riverside per Section 17.28 (F) of the RMC to determine appropriate methods for conducting this activity. Thus, noise impacts during construction of each phase would be **less than significant**.

Operational Noise. Operation of the proposed project would generate noise associated with vehicle traffic. To gather data on the general noise environment at the project site, one weekday morning 15-minute noise measurement was taken on October 10, 2017. The monitoring location is located near the project entrance at the east end of Talcey Terrace. The measurement was taken using an ANSI Type II integrating sound level meter. The predominant noise source was traffic on Overlook Parkway. The temperature during monitoring was 80 degrees Fahrenheit with no perceptible wind. The Leq during monitoring was 38.4 dBA.

Exterior. Traffic is the primary noise source that would be generated by the proposed project. Thus, whether a traffic-related noise impact would occur is based on whether project traffic, when added to the existing traffic, would cause the Leq to noticeably increase (+3 dBA) or exceed the 55-dBA exterior standard referenced in the Riverside Municipal Code. For a noticeable increase to occur, the sound energy (i.e., traffic volumes or speeds) would need to double. Existing noise levels are under the day- and nighttime requirement (55 and 45 dBA, respectively) for residential areas as defined in the municipal code. At 8 units, the project would not increase traffic on Overlook Parkway, Golden Star Avenue or Talcey Terrace enough to have a perceptible impact on sound levels at receivers nearest the site. Because the project would not noticeably increase noise levels off-site over ambient conditions, a **less than significant** impact would occur under this threshold.

b) Vibration is a unique form of noise because its energy is carried through buildings, structures, and the ground, whereas noise is simply carried through the air. Thus, vibration is generally felt rather than heard. Some vibration effects can be caused by noise; e.g., the rattling of windows from truck pass-by events. This phenomenon is caused by the coupling of the acoustic energy at frequencies that are close to the resonant frequency of the material being vibrated. Typically, groundborne vibration generated by manmade activities attenuates rapidly as vibration rapidly diminishes in amplitude with distance from the source. In the U.S., the ground motion caused by vibration is measured as particle velocity in inches per second and is referenced as vibration decibels (VdB).

The vibration velocity level threshold of perception for humans is approximately 65 VdB. A vibration velocity of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels for many people. If a roadway is smooth, the groundborne vibration from traffic is barely perceptible. The range of interest is from approximately 50 VdB, which is the typical background vibration velocity, to 100 VdB, which is the general threshold where minor damage can occur in fragile buildings.

Construction activity on the project site would be temporary and any vibration would likely not persist for long periods. Assuming vibration levels would be simlar to those associated with a large bulldozer, typical groundborne vibration levels would be 87 VdB at 25 feet, 81 VdB at 50 feet, and 75 VdB at 100 feet, based on the Federal Transit Administration's (FTA's) *Transit Noise and Vibration Impact Assessment* (May 2006) as shown in Table 7.

Construction activities that typically generate substantial groundborne vibration include deep excavation and pile driving. Based on the proposed scope of improvements, this type of construction activity is not expected. General construction associated with the project would be confined to the project site and consist of grading and excavation for building footings. It would be temporary in duration. The closest single-family residence to the site is located approximately 200 feet to the north of the property line. Based on the information presented in Table 8, vibration levels would not be perceptible at the nearest receiver during construction assuming a bulldozer is the heaviest piece of equipment used during grading or site clearing.

As discussed, 100 VdB is the threshold where minor damage can occur in fragile buildings. Vibration levels are projected to be under this threshold; thus, structural damage is not expected to occur as a result of construction activities associated with the proposed project.

Table 8
Typical Vibration Source Levels for Construction Equipment

Equipment	Approximate VdB				
	25 Feet	50 Feet	60 Feet	75 Feet	100 Feet
Large Bulldozer	87	81	79	77	75
Loaded Trucks	86	80	78	76	74
Jackhammer	79	73	71	69	67
Small Bulldozer	58	52	50	48	46

Source: Federal Railroad Administration, 1998

Given the distance between the construction area and the residences, would not exceed the groundborne velocity threshold level of 72 VdB for residences and/or buildings where people sleep as discussed above. Maximum vibration levels could be 81 VdB at 50 feet from the source.

As referenced, Chapter 7.25 of the Riverside Municipal Code allows construction activities between the hours of 7:00 a.m. and 7:00 p.m. weekdays and between the hours of 8:00 a.m. and 5:00 p.m. on Saturdays. Construction occurring consistent with these provisions is exempt from regulation. Construction occurring consistent with these provisions is exempt from regulation. Thus, vibration occurring during construction of each phase would be **less than significant**.

c) The existing noise environment at the project site consists primarily of traffic on Overlook Parkway. Post construction, the project would contribute similar noise sources to the existing ambient environment. As referenced above, the proposed project would negligibly increase traffic within the surrounding road network with the greatest concentration on Talcey Terrace at the project site. As discussed, the project would not generate enough traffic to noticeably increase sound levels at residences nearest the site. The addition of project traffic would have no perceptible effect on noise levels as described above. Impacts would be **less than significant**.

d) As referenced, construction noise may be audible at the neighboring residences. As referenced, Chapter 7.25 of the Riverside Municipal Code allows construction activities between the hours of 7:00 a.m. and 7:00 p.m. weekdays and between the hours of 8:00 a.m. and 5:00 p.m. on Saturdays. Construction occurring consistent with these provisions is exempt from

regulation. Thus, noise impacts during construction of each phase would be **less than significant.**

e-f) As referenced, Riverside Municipal Airport is located 4.3 miles northwest of the site and is the closest airport. The project site is not located within the Riverside Airport Influence Area, within 2 miles of a public use airport in proximity to a private airstrip. The project is approximately 5.5 miles northwest of the March Air Reserve Base. Per the *March Air Reserve Base/Inland Port Airport Land Use Compatibility Plan* (adopted November 2014), the project site is located with Compatibility Zone D. Zone D is referred to as a flight corridor buffer and has no restrictions on residential development. While some overflights may occur and be audible, the proposed project would experience noise levels any greater than what occurs in neighboring residential areas. **No impact** would occur under this threshold.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XIII. <u>POPULATION AND HOUSING</u> — 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)?	☐	☐	☐	☒
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

a) The proposed project consists of 8 single-family residences and provide housing for approximately 23 residents. The proposed project would not require the removal of housing to accommodate improvements. The project would house new residents at densities consistent with the applicable Zoning and General Plan Land Use Designations. Typical densities envisioned in the General Plan are depicted in Tables LU-3 and LU-5. Within areas designated Hillside Residential, maximum density is 0.63 units per acre. The project would not induce population growth directly as a result of new development or indirectly through the extension of utility infrastructure to a currently unserved area. All improvements would occur on the project site and adjacent street. **No impact** related to population growth would result from project implementation.

b, c) The project site is vacant. Project implementation would not result in the removal of existing housing or the displacement of residents that would require the construction of replacement housing elsewhere. **No impact** would occur**.**

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

XIV. PUBLIC SERVICES

a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the 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:				
i) Fire protection?	☐	☐	☒	☐
ii) Police protection?	☐	☐	☒	☐
iii) Schools?	☐	☐	☐	☒
iv) Parks?	☐	☐	☐	☒
v) Other public facilities?	☐	☐	☒	☐

a (i-v) The City of Riverside Fire Department provides fire and emergency medical services to the City of Riverside. Fire Station 10 is the nearest station to the project site. It is located at 2590 Jefferson Street approximately 2 miles west of the site. Like any development project, the project may increase demand for fire service; however, the project is consistent with the land use designation for the site and would not increase the population beyond what was anticipated in the General Plan 2025 FPEIR. Further, the project would be designed and constructed consistent with applicable codes and standards for access and fire suppression infrastructure. The project would not require the construction of a new fire station to maintain service ratios.

Law enforcement services are provided by the City of Riverside Police Department. The Police Department Field Operations Division is headquartered at the Lincoln Station which is located at 8181 Lincoln Avenue. The Field Operations Division is the largest division of the Police Department and provides first response to all emergencies, performs preliminary investigations, and provides basic patrol services to the City of Riverside. The Field Operations Division has approximately 130 sworn officers, 24 Sergeants, 6 Lieutenant Watch Commanders, 1 Executive Lieutenant, 1 Traffic Lieutenant and a civilian support staff. Officers are assigned to one of four Neighborhood Policing Centers (NPC) within the City of Riverside.

The project could potentially increase demand for law enforcement services by increasing activity in the area. However, the project is consistent with the land use designation for the site and would not increase the population beyond what was anticipated in the GP 2025 FPEIR. The

project would not require the construction of new or expanded Police Department facilities.

The nearest school operated by the Riverside Unified School District is Washington Elementary School located at 2760 Jane Street, Riverside, CA approximately 1.5 miles northwest of the site. Gage Middle School is located at 6400 Lincoln Avenue, Riverside, CA approximately 2 miles northwest of the site. The project would house approximately 23 new residents but it is not anticipated to affect demand for school services or require the construction of new schools. The payment of impact fees will offset any school impact related to increased enrollment associated with the project.

The Riverside Library System Casa Blanca Branch provides library services to city residents. The library is located at 2985 Madison Street in the City off Riverside. The project would add approximately 23 new residents; however, this increase is not expected to affect demand for library services. No new or expanded library services would be required.

Washington Park is the nearest park to the project site. It is located at 2769 Mary Street in Riverside, approximately 1.5 miles northwest of the project site. Further, the Golden Star Park Site, which is planned for the future construction of a 19-acre public park, is located at 1739 Bradley Street, approximately 1.5 miles southwest of the project site. The project would increase the population (23 residents) of Riverside which may affect demand for park facilities. The project would not remove park or recreational facilities that would require replacement elsewhere. With the payment of impact fees for each unit, the project would cover any fair share costs for the provision of park resources necessary to meet City demand.

The project would not require the provision of new or physically altered governmental facilities to maintain acceptable levels of service. As noted, an increase in demand for fire, police or other services may occur. This would be **less than significant. No impact** would occur to school or recreation services.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XV. RECREATION --				
a) Would the project 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?	☐	☐	☒	☐
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☒	☐

a-b) The project would be an 8-lot single-family residential development. The project would contribute to an increase in the City of Riverside population which may affect demand for recreational resources. As referenced in Section XIV (Public Services), the project would be required to pay an impact fee per unit to cover improvements to recreational resources. The project does not include recreational facilities or the expansion of existing facilities that may adversely affect the environment. With the payment if impact fees, a **less than significant** impact would occur.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XVI. <u>TRANSPORTATION / TRAFFIC</u> -- Would the project:				
a) Conflict with an applicable plan, ordinance or policy establishing a measure 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?	☐	☐	☒	☐
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?	☐	☐	☒	☐
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?	☐	☐	☐	☒
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible use (e.g., farm equipment)?	☐	☐	☐	☒
e) Result in inadequate emergency access?	☐	☐	☐	☒
f) Conflict with adopted policies, plans, or programs regarding public transit, bikeways, or pedestrian facilities, or	☐	☐	☐	☒

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XVI. <u>TRANSPORTATION / TRAFFIC</u> -- Would the project:				
otherwise substantially decrease the performance or safety of such facilities?				

a-b) As discussed in the City of Riverside *Traffic Impact Analysis Preparation Guide* (Exhibit A) (January 2016), single-family residential projects with 10 units or less are generally exempt from the preparation of a traffic impact study. Thus, no further traffic analysis is required for the proposed project. The project would not generate enough traffic to adversely impact the Level of Service (LOS) at the intersections serving the site (i.e., Talcey Terrace/Brandon Court and Gold Star Avenue). While the project would generate traffic, it would not adversely affect applicable congestion management programs, transit, pedestrian or bicycle facilities. Impacts to traffic operations and circulation would be **less than significant.**

c) Riverside Municipal Airport is located 4.3 miles northwest of the site and is the closest airport. There are no private airstrips in proximity to the site. The proposed project would not change air traffic patterns, increase the number of flights, impose any additional safety risks for airport operations, or necessitate a change in location for the airfield. The project is approximately 5.5 miles northwest of the March Air Reserve Base. Per the *March Air Reserve Base/Inland Port Airport Land Use Compatibility Plan* (adopted November 2014), the project site is located with Compatibility Zone D. Zone D is referred to as a flight corridor buffer and has no restrictions on residential development. **No impact** would occur.

d) Road improvements would be limited to the construction of one point of ingress/egress on the project site. The site would be accessed from Talcey Terrace. All construction would occur consistent with city standards. Project design would not increase hazards. **No impact** would occur.

e) The proposed project would not alter emergency access routes. The site is accessed via Talcey Terrace. The proposed private street extending southerly from the terminus of Talcey Terrace would provide access for residents, visitors and emergency service vehicles. No project activity would impair emergency access to the area. **No impact** would occur.

f) The project would be consistent with the current General Plan designation for the project site. No inconsistencies with General Plan Circulation Element policies would occur. **No impact** would occur under this threshold.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XVII. TRIBAL CULTURAL RESOURCES -- Would the project:				
a) Cause a substantial adverse change in the significance of a tribal cultural resource, defined in the Public Resource 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 Historic Places, or in a local register of historical resources as defined in Public Resource Code section 5020.1(k), or	☐	☒	☐	☐
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 Resource Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	☐	☒	☐	☐

a) As required under AB 52, the City of Riverside sent consultation notices to Native American tribal representatives regarding the proposed project. Tribal consultation also occurred

during preparation of the *Phase I Cultural Resources Inventory of Tract 37392, APN 243-210-037 & 041,* as referenced in Section V of this Initial Study. With implementation of Mitigation Measures CUL-1 through CUL-3, potentially significant impacts to Tribal Cultural Resources would be reduced to **less than significant.**

b) The *Phase I Cultural Resources Inventory of Tract 37392, APN 243-210-037 & 041,* did not identify the presence of significant resources on-site pursuant to criteria set forth in subdivision (c) of Public Resource Code Section 5024.1. However, as addressed in Section V, *Cultural and Historic Resources,* Native American Tribes consulted during the review process for the proposed project have expressed concern regarding potential impact to site 33-003483 and have requested it be relocated on-site prior to grading. The applicant has agreed to relocate this feature to a portion of the open space easement to be recorded for the site. This is addressed in Mitigation Measure CUL-2. Impacts to Tribal Cultural Resources would be **less than significant.**

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XVIII. <u>UTILITIES AND SERVICE SYSTEMS</u> -- Would the project:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☒	☐
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?	☐	☐	☒	☐
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?	☐	☐	☒	☐
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☒	☐
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?	☐	☐	☒	☐
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☒	☐
g) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☐	☒

a-b, e) Wastewater would be conveyed to existing sewer lines located along Overlook Parkway to the Regional Water Quality Control Plant located at 5950 Acorn Street in Riverside, CA, approximately 5 miles northwest of the site. The RWQCP provides preliminary, primary, secondary, and tertiary treatment for a rated capacity of approximately 40 million gallons per day (mgd). The City owns and operates a sanitary sewer collection system (collection system) consisting of over 820 miles of sewer lines ranging in size from 4 inches to over 50 inches in diameter with some over 120 years old. There are 19 pump stations located throughout the City that range in size from 100 gallons per minute (gpm) up to 2,000 gpm providing service to those areas of geographic need.

The project would create additional demand on existing facilities. However, per the Integrated Master Plan for Wastewater Collection and Treatment Facilities (2008), projected flows through 2025 would be 52.2 mgd daily. The project is consistent with the General Plan and zoning; thus, wastewater volumes could be accommodated within flows projected for planning purposes. A **less than significant** impact would occur.

c) As discussed in the project description and Section IX, *Hydrology and Water Quality*, all stormwater would be collected and retained on-site in basins. Potential environmental impacts caused by construction of the on-site collection and conveyance system are evaluated as part of the overall project. No impact in additional to those evaluated would occur. Impacts would be **less than significant**.

d) The project site is located in the City of Riverside RPU service area. RPUs potable distribution system consists of approximately 940 miles of pipeline ranging from 2 to 72 inches in diameter. The RPU has sixteen reservoirs with a storage volume of approximately 108 million gallons. Water demand projections as calculated by CalEEMod 2016.3.1 (see Appendix A) is 0.73 million gallons annually or 2,000 gallons per day. The proposed project would be required to comply with federal, State and local plans, policies and regulations and Executive Order B-29-15, which requires reduction of potable water use during construction and implementation of Best Management Practices for new development concerning water conservation, both for potable and non-potable uses. Chapter B.3 of the RRG-CAP contains measures that can be implemented to reduce water consumption and related energy costs associated with water reclamation and transport.

Potable water would be provided by RPU. Per the 2010 Urban Water Management Plan, water demand within the service area was 63.2 mgd in 2015. Demand is expected to increase to 74,600 acre feet by 2020 and 86,000 acre feet by 2035. For planning purposes, supply is projected to be 143,226 are feet. Future supply is expected to exceed demand. The project would minimize water demand by installing low flow fixtures and drought tolerant landscaping. Further, landscaping would be required to comply with the City of Riverside Water Efficient Landscape and Irrigation Ordinance (Chapter 19.570 RMC). The purpose of this ordinance is to reduce potable water demand through the implementation of regulatory controls affecting landscape design in the City of Riverside. With implementation of this ordnance, potable water demand

would be further reduced. No new water entitlements would be necessary to serve the project. A **less than significant** impact would occur.

f) The proposed project would generate construction/demolition waste (CDW) as well as ongoing domestic waste from the commercial uses on-site. Solid waste generated in the City of Riverside is collected by the City of Riverside or Burrtec, Inc. and disposed of in county landfills. The nearest landfill is Badlands Landfill located in Moreno Valley, California. However, it is at or nearing capacity with closure expected by 2022. Thus, solid waste generated by the proposed project would likely be disposed of at the Lamb Canyon landfill. Prior to reaching the landfill, waste would likely be taken to the Agua Mansa Transfer Station/Material Recovery Facility in Jurupa Valley, CA, for consolidation and transport to the sanitary landfill. The Project site is located approximately 24 miles west of the Lamb Canyon Landfill which is located at 16411 Lamb Canyon Road, in Beaumont, California. The landfill is owned and operated by Riverside County Department of Waste Resources. The landfill property area consists of approximately 1,189 acres, including 580.5 acres total permitted area, of which 144.6 acres are permitted for solid waste disposal. The current permitted refuse disposal area includes approximately 74 acres of unlined area and approximately 70.6 acres of lined area. The landfill has a permitted capacity of 5,000 tons per day and has an estimated disposal capacity of 15.646 million tons. As of January 1, 2013, the facility had 7.616 tons of remaining disposal capacity. The disposal capacity is expected to last through the year 2021.

It is presumed that construction waste would be comprised of concrete, metals, wood, landscape and typical domestic material. The California Integrated Waste Management Act (CIWMA) of 1989 mandates that all cities and counties in California reduce solid waste disposed at landfills generated within their jurisdictions by 50% and has a long-term compliance goal of 70%. CDW associated with the proposed project will be recycled to the extent practicable with the remainder sent to a landfill. The construction debris would be processed and recycled or sent to the landfill.

Cal Recycle estimates that an average single-family residence generates approximately 12 pounds daily, or 2.19 tons annually. Assuming 8 residences are constructed, a total of 17.5 tons of solid waste would be generated annually by the project (Cascadia Consulting Group, 2006). Assuming 50% is recycled, a total of 1 ton would go to the landfill annually. Assuming Lamb Canyon receives the waste, this would increase the total volume of material going to landfill daily by well under 1 percent. A **less than significant impact** would occur under this threshold.

g) The applicant and project contractor will comply with all local, state, and federal requirements for integrated waste management (e.g., recycling, green waste) and solid waste disposal as required by the CIWMA of 1989. **No impact** would occur under this threshold.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XVIII. MANDATORY FINDINGS OF SIGNIFICANCE —				
a) Does the project have the potential to substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self- sustaining levels, eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☒	☐	☐
b) Does the project have the potential to achieve short-term environmental goals to the disadvantage of long-term environmental goals?	☐	☐	☐	☒
c) 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)?	☐	☒	☐	☐
d) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☒	☐

a) The project would be constructed on an undeveloped site and will permanently impact approximately 0.90 acre of disturbed Riversidean sage scrub and 6.90 acres of non-native grassland. The project will also impact 6.42 acres of disturbed/developed areas. A focused burrowing owl survey would be required prior to ground disturbance to avoid impacts to this species. With implementation of Mitigation Measures BIO-1 and BIO-2, no significant impacts

to plant or animal species would occur with project implementation.

The project site contains one recorded cultural resource (33-003483). While overall the site was determined to have low sensitivity to cultural or paleontological resources, Native American Tribes consulted during the review process for the proposed project have expressed concern regarding potential impact to site 33-003483 and have requested it be relocated on-site prior to grading. The applicant has agreed to relocate this feature to a portion of the open space easement to be recorded for the site. This is addressed in Mitigation Measure CUL-2. Impacts to historic and Tribal Cultural Resources would be **less than significant** with the implementation of Mitigation Measures CUL-1 through CUL-3.

b) The proposed project would provide a new residential development. Construction of the project would occur consistent with state and local regulations regarding the type of project proposed. This would be consistent with the state's long-term environmental goals by providing new housing consistent with applicable regulations. **No impact** would occur.

c) As presented in the discussion of environmental checklist Sections I through XVIII, the project would have no impact or a less than significant impact with respect to all environmental issues. With mitigation measures, potentially significant biological and cultural resource impacts would be reduced to **less than significant**. Based on the limited scope of direct physical impacts to the environment associated with the proposed project, the impacts are project-specific. Consequently, the project along with other cumulative projects would result in a **less than significant** cumulative impact with respect to all environmental issues.

d) In general, impacts to human beings are associated with air quality, hazards and hazardous materials and noise. As presented in the environmental checklist discussions, the project would have no impact or a less than significant impact with respect to these environmental issues. Therefore, the project would have a **less than significant** impact on human beings.

REFERENCES

AMEC Earth and Environmental, Inc., *Phase I Cultural Resources Inventory of Tract 32042, APN 243-210-037 & 041.* October 2017.

Bolt, Beranek & Newman, *Noise Control for Buildings and Manufacturing Plants*, 1987.

California Emission Estimator Model, Version 2016.3.1, 2016.

CalRecycle. *Estimated Solid Waste Generation Rates.* https://www2.calrecycle.ca.gov/WasteCharacterization/General/Rates. Site accessed November 8, 2017.

California Environmental Protection Agency (CalEPA) and Department of Toxic Substances Control. *Envirostar database.* http://www.envirostor.dtsc.ca.gov/public/.

California Department of Forestry and Fire Protection. *Riverside County West Fire Hazard Severity Map,* November 2009.

California Department of Transportation. *Officially Designated State Scenic Highways,* website visited October 1, 2017.

California Department of Transportation. *Transportation and Construction Vibration Guidance Manual*, September 2013.

California Department of Transportation. *Transportation-Related Earthborne Vibration, Technical Advisory*, 1992

California Environmental Protection Agency. *Climate Action Team Report to the Governor and Legislature*, April 3, 2006

Cascadia Consulting Group. Waste Disposal and Diversion Findings for Select Industry Groups, Integrated Waste Management Board, June 2006.

City of Riverside. *General Plan 2025*, City of Riverside Community Development Department, November 2007.

City of Riverside Website, www.cityofriverside.org, July 2017 (accessed October 2, 2017).

City of Riverside Public Utilities, *2010 Urban Water Management Plan*, July 2011.

City of Riverside Public Utilities, *Wastewater Integrated Master Plan*, February 2008.

County of Riverside Airport Land Use Commission. *March Air Reserve Base/Inland Port Airport Land Use Compatibility Plan.* November 2014

Federal Emergency Management Agency. *Flood Insurance Rate Map No. 06065C0740G,* August 2008.

Federal Transit Administrations (FTA). *Transit Noise and Vibration Impact Assessment*, May 2006

Final Localized Significance Threshold Methodology, SCAQMD, June 2003

Gable Cook & Associates, Inc. Project Specific Water Quality Management Plan, October 2017.

Glenn Lukos Associates, Inc., *Jurisdictional Delineation for the 17.67-Acre Tract 32042 Residential Development Project in the City of Riverside, Riverside County, California.* November 2017.

Glenn Lukos Associates, Inc., *Biological Resources Report for the 17.67-Acre Tract 32042 Residential Development Project in the City of Riverside, Riverside County, California.* November 2017.

Pacific Soils Engineering, Inc. *Updated Preliminary Geotechnical Investigation Tentative Tract 31859 and 32042*, February 2004.

South Coast Air Quality Management District, *Fact Sheet for Applying CalEEMod to Localized Significance Thresholds,* 2011.

South Coast AQMD. *Air Quality Management Plan,* 2007.

Southern California Association of Government. *Regional Transportation Plan*, April 2016.

MITIGATION MONITORING AND REPORTING PROGRAM

The Final Initial Study-Mitigated Negative Declaration identifies the mitigation measures that will be implemented to reduce the impacts associated with the Alabbasi Compound Project. The California Environmental Quality Act (CEQA) was amended in 1989 to add Section 21081.6, which requires a public agency to adopt a monitoring and reporting program for assessing and ensuring compliance with any required mitigation measures applied to proposed development. As stated in Section 21081.6 of the Public Resources Code:

> *... the public agency shall adopt a reporting or monitoring program for the changes made to the project or conditions of project approval, adopted in order to mitigate or avoid significant effects on the environment.*

Section 21081.6 also provides general guidelines for implementing mitigation monitoring programs and indicates that specific reporting and/or monitoring requirements, to be enforced during project implementation, shall be defined as part of adopting a mitigated negative declaration.

The mitigation monitoring table lists those mitigation measures included as conditions of approval for the project. To ensure that the mitigation measures are properly implemented, a monitoring program has been devised which identifies the timing and responsibility for monitoring each measure. The City of Riverside as the lead agency will be primarily responsible for monitoring and reporting the implementation of the mitigation measures.

Alabbasi Compound Initial Study-Mitigated Negative Declaration Mitigation Monitoring and Reporting Plan						
Mitigation Measure		**Responsible Monitoring Party**	**Monitoring Action**	**Implementation Schedule**	**Verification of Completion**	
					Check Box	**Date**
Biological Resources						
BIO-1	**Mitigation Measure BIO-1:** A qualified biologist will conduct a pre-construction presence/absence survey for burrowing owls within 30 days prior to site disturbance. If burrowing owls are detected onsite and may be affected by the project, avoidance measures shall be developed in compliance with the MSHCP and subject to the approval of the Western Riverside Regional Conservation Authority and wildlife agencies.	Community & Economic Development Department, Planning Division; Public Works Department	Perform survey not more than 30 days in advance of construction.	Not more than 30 days in advance of ground disturbing activities. Applicant to provide a report of other evidence of completion to the City of Riverside Planning Division prior to issuance of a Grading Permit.		
BIO-2	**Mitigation Measure BIO-2**: As feasible, vegetation clearing should be conducted outside of the nesting season, which is generally identified as February 1 through September 15. If avoidance of the nesting season is not feasible, then a qualified biologist shall conduct a nesting bird survey within three days prior to any disturbance of the site, including disking and grading. If active nests are identified, the biologist shall establish suitable buffers around the nests based on his/her judgement, and the buffer areas shall be avoided until the nests are no longer occupied and the juvenile birds can survive independently from the nests.	Community & Economic Development Department, Planning Division; Public Works Department	Perform survey not more than 3 days in advance of construction.	Not more than 3 days in advance of ground disturbing activities. Applicant to provide a report of other evidence of completion to the City of Riverside Planning Division.		
Cultural Resources						

Alabbasi Compound Initial Study-Mitigated Negative Declaration Mitigation Monitoring and Reporting Plan						
Mitigation Measure		Responsible Monitoring Party	Monitoring Action	Implementation Schedule	Verification of Completion	
					Check Box	Date
CUL-1	**Mitigation Measure CUL-1 Changes to Project**: Prior to Grading Permit issuance, if there are any changes to Project site design and/or proposed grades, the Applicant and the City shall contact interested tribes to provide an electronic copy of the revised plans for review. Additional consultation shall occur between the City and interested tribes to discuss any proposed changes and review any new impacts and/or potential avoidance/preservation of the cultural resources on the Project site. The City and the Applicant shall make all attempts to avoid and/or preserve in place as many cultural and paleontological resources as possible that are located on the Project site if the site design and/or proposed grades should be revised.	Community & Economic Development Department, Planning Division	Verification of implementation in the field prior to grading and construction. Consultation logs showing Applicant's effort to contact consulting tribes and the outcome of any such consultation.	Prior to site disturbance and grading if the project site design and/or proposed grades change from what has been approved.		
CUL-2	**Mitigation Measure CUL-2: Archaeological Monitoring:** At least 30 days prior to application for a grading permit and before any grading, excavation and/or ground disturbing activities on the site take place, the Project Applicant shall retain a Secretary of the Interior's Standards-qualified Project Archaeologist to manage the monitoring of all ground-disturbing activities in an effort to identify any unknown archaeological resources.	Community & Economic Development Department, Planning Division; Public Works Department; Project Biologist; Qualified Archaeological	Archaeological Monitoring Plan. Evidence that a qualified Archaeological Monitor has been retained by Applicant shall be provided to the city (i.e., signed contract). Removal and Relocation Plan.	At least 30 days prior to application for a grading permit.		

Alabbasi Compound Initial Study-Mitigated Negative Declaration Mitigation Monitoring and Reporting Plan						
Mitigation Measure		Responsible Monitoring Party	Monitoring Action	Implementation Schedule	Verification of Completion	
					Check Box	Date
	1. The Project Archaeologist, in consultation with consulting tribe(s), the Developer and the City, shall develop an Archaeological Monitoring Plan to 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: a. Project grading and development scheduling; b. The development of a rotating or simultaneous schedule in coordination with the Developer and the Project Archaeologist for designated Native American Tribal Monitors from the Consulting Tribe(s) during grading, excavation and ground disturbing activities on the site: including the scheduling, safety requirements, duties, scope of work, and Native American Tribal Monitors' authority to stop and redirect grading activities in coordination with all Project archaeologists; c. Plan for the controlled grading within 50 feet of the boundaries of identified resources. Grading within 50-feet of these sites shall be conducted using	Monitor				

Alabbasi Compound Initial Study-Mitigated Negative Declaration Mitigation Monitoring and Reporting Plan						
Mitigation Measure		Responsible Monitoring Party	Monitoring Action	Implementation Schedule	Verification of Completion	
					Check Box	Date
	controlled grading techniques. Large indiscriminate grading equipment shall not be used, and the controlled grading technique shall be reviewed by the Project Archaeologist, in consultation with the Consulting Tribe(s), the Developer, and the City. The Project Archaeologist and Native American Tribal Monitors shall ensure that the grading efforts in these areas are conducted in a manner that allows for the identification of subsurface cultural resources. Any resources observed shall be addressed in accordance with **MM-CUL-3** below; d. The determination by the Project Archaeologist, Project Biologist, Developer, City and Consulting Tribe(s) as to the scope, methods and suitable relocation site(s) for CA-RIV-33-003483. This Removal and Relocation Plan shall be reviewed and approved by City Staff prior to commencement of work. Relocation shall be mutually agreed upon and completed to the satisfaction of all parties prior to commencement of mass grading. The relocated features will be placed in an area that will be preserved in perpetuity, so that no					

Alabbasi Compound Initial Study-Mitigated Negative Declaration Mitigation Monitoring and Reporting Plan						
Mitigation Measure		Responsible Monitoring Party	Monitoring Action	Implementation Schedule	Verification of Completion	
					Check Box	Date
	future disturbances will occur; and e. The protocols and stipulations that the Developer, City, Tribe(s) and Project archaeologist will follow in the event of inadvertent cultural resources discoveries, including any newly discovered cultural resource deposits that shall be subject to a cultural resources evaluation.					
CUL-3	**Mitigation Measure CUL-3: Treatment and Disposition of Cultural Resources:** In the event that Native American cultural resources are inadvertently discovered during the course of grading for this Project, the following procedures will be carried out for treatment and disposition of the discoveries: 1. **Temporary Curation and Storage:** During the course of construction, all discovered resources shall be temporarily curated in a secure location onsite or at the offices of the Project Archaeologist. The removal of any artifacts from the Project site will need to be thoroughly inventoried with tribal monitor oversite of the process; and	Community & Economic Development Department, Planning Division; Public Works Department; Qualified Archaeological Monitor; Applicant; Consulting Tribes	Report documenting discovery and disposition of any discovered Native American cultural resources. If resources are discovered and curated, a copy of the curation agreement shall be provided to the City. Completed Phase IV Monitoring Report.	As needed during construction. Phase IV Monitoring Report shall be submitted and accepted prior to final inspection of rough grading.		

Alabbasi Compound Initial Study-Mitigated Negative Declaration Mitigation Monitoring and Reporting Plan						
Mitigation Measure		Responsible Monitoring Party	Monitoring Action	Implementation Schedule	Verification of Completion	
					Check Box	Date
	2. **Treatment and Final Disposition:** The landowner(s) shall relinquish ownership of all cultural resources, including sacred items, burial goods, and all archaeological artifacts and non-human remains as part of the required mitigation for impacts to cultural resources. The Applicant shall relinquish the artifacts through one or more of the following methods and provide the City of Riverside Community & Economic Development Department with evidence of same: a. Accommodate the process for onsite reburial of the discovered items with the consulting Native American tribes or bands. This shall include measures and provisions to protect the future reburial area from any future impacts. Reburial shall not occur until all cataloguing and basic recordation have been completed; b. A curation agreement with an appropriate qualified repository within Riverside County that meets federal standards per 36 CFR Part 79 and therefore would be professionally curated and made available to other archaeologists/researchers for further study. The collections and associated					

Alabbasi Compound Initial Study-Mitigated Negative Declaration Mitigation Monitoring and Reporting Plan						
Mitigation Measure		Responsible Monitoring Party	Monitoring Action	Implementation Schedule	Verification of Completion	
					Check Box	Date
	records shall be transferred, including title, to an appropriate curation facility within Riverside County, to be accompanied by payment of the fees necessary for permanent curation: c. If more than one Native American tribe or band is involved with the Project and cannot come to a consensus as to the disposition of cultural materials, they shall be curated at the Western Science Center by default; and d. At the completion of grading, excavation and ground disturbing activities on the site, a Phase IV Monitoring Report shall be submitted to the City documenting monitoring activities conducted by the Project Archaeologist and Native Tribal Monitors within 60 days of completion of grading. This report shall document the impacts to the known resources on the property; describe how each mitigation measure was fulfilled; document the type of cultural resources recovered and the disposition of such resources; provide evidence of the required cultural sensitivity training for the construction staff held during the required pre-grade meeting; and, in a					

Alabbasi Compound Initial Study-Mitigated Negative Declaration Mitigation Monitoring and Reporting Plan						
Mitigation Measure		Responsible Monitoring Party	Monitoring Action	Implementation Schedule	Verification of Completion	
					Check Box	Date
	confidential appendix, include the daily/weekly monitoring notes from the archaeologist. All reports produced will be submitted to the City of Riverside, Eastern Information Center and interested tribes.					

Appendix A

CalEEMod Summer and Annual Emission Output Files

Alabassi Compound

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	8.00	Dwelling Unit	16.79	24,000.00	23

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2020
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Default lot acreage revised to reflect total acreage disturbed

Construction Phase -

Grading - Assumes 5 acres disturbed daily

Construction Off-road Equipment Mitigation -

Mobile Land Use Mitigation -

Area Mitigation -

Water Mitigation -

Waste Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	40	0
tblGrading	AcresOfGrading	75.00	5.00
tblLandUse	BuildingSpaceSquareFeet	14,400.00	24,000.00
tblLandUse	LandUseSquareFeet	14,400.00	24,000.00
tblLandUse	LotAcreage	2.60	16.79
tblProjectCharacteristics	OperationalYear	2018	2020

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	5.2105	59.5984	36.0785	0.0644	18.2675	2.6351	20.8456	9.9840	2.4243	12.3560	0.0000	6,479.0827	6,479.0827	1.9511	0.0000	6,527.8607
2019	7.7807	54.5878	34.2653	0.0643	6.4224	2.3840	8.8064	3.3886	2.1933	5.5819	0.0000	6,367.5239	6,367.5239	1.9490	0.0000	6,416.2491
Maximum	**7.7807**	**59.5984**	**36.0785**	**0.0644**	**18.2675**	**2.6351**	**20.8456**	**9.9840**	**2.4243**	**12.3560**	**0.0000**	**6,479.0827**	**6,479.0827**	**1.9511**	**0.0000**	**6,527.8607**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	5.2105	59.5984	36.0785	0.0644	7.2470	2.6351	9.8252	3.9263	2.4243	6.2983	0.0000	6,479.0827	6,479.0827	1.9511	0.0000	6,527.8607
2019	7.7807	54.5878	34.2653	0.0643	2.6411	2.3840	5.0251	1.3577	2.1933	3.5510	0.0000	6,367.5239	6,367.5239	1.9490	0.0000	6,416.2491
Maximum	**7.7807**	**59.5984**	**36.0785**	**0.0644**	**7.2470**	**2.6351**	**9.8252**	**3.9263**	**2.4243**	**6.2983**	**0.0000**	**6,479.0827**	**6,479.0827**	**1.9511**	**0.0000**	**6,527.8607**

	ROG	**NOx**	**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**	**59.95**	**0.00**	**49.92**	**60.49**	**0.00**	**45.09**	**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	2.6328	0.1737	4.7306	0.0104		0.6148	0.6148		0.6148	0.6148	74.9354	145.1884	220.1238	0.2246	5.0900e-003	227.2552
Energy	8.7800e-003	0.0750	0.0319	4.8000e-004		6.0600e-003	6.0600e-003		6.0600e-003	6.0600e-003		95.7329	95.7329	1.8300e-003	1.7600e-003	96.3018
Mobile	0.1738	1.2441	2.0979	8.1500e-003	0.5778	7.2700e-003	0.5851	0.1546	6.8500e-003	0.1615		830.8140	830.8140	0.0411		831.8411
Total	**2.8154**	**1.4928**	**6.8604**	**0.0190**	**0.5778**	**0.6281**	**1.2059**	**0.1546**	**0.6277**	**0.7823**	**74.9354**	**1,071.7353**	**1,146.6706**	**0.2675**	**6.8500e-003**	**1,155.3980**

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	0.5365	7.6600e-003	0.6622	3.0000e-005		3.6400e-003	3.6400e-003		3.6400e-003	3.6400e-003	0.0000	1.1884	1.1884	1.1600e-003	0.0000	1.2174
Energy	8.7800e-003	0.0750	0.0319	4.8000e-004		6.0600e-003	6.0600e-003		6.0600e-003	6.0600e-003		95.7329	95.7329	1.8300e-003	1.7600e-003	96.3018
Mobile	0.1776	1.2828	2.2132	8.6300e-003	0.6156	7.7000e-003	0.6233	0.1647	7.2600e-003	0.1720		878.9534	878.9534	0.0425		880.0150
Total	**0.7229**	**1.3655**	**2.9073**	**9.1400e-003**	**0.6156**	**0.0174**	**0.6330**	**0.1647**	**0.0170**	**0.1817**	**0.0000**	**975.8746**	**975.8746**	**0.0455**	**1.7600e-003**	**977.5342**

	ROG	NOx	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	**74.32**	**8.53**	**57.62**	**52.00**	**-6.54**	**97.23**	**47.51**	**-6.54**	**97.30**	**76.77**	**100.00**	**8.94**	**14.89**	**83.01**	**74.31**	**15.39**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	10/1/2018	11/9/2018	5	10	
2	Grading	Grading	11/10/2018	1/11/2019	5	30	
3	Building Construction	Building Construction	1/12/2019	8/23/2019	5	300	
4	Paving	Paving	8/24/2019	8/30/2019	5	20	
5	Architectural Coating	Architectural Coating	8/31/2019	11/8/2019	5	20	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 5

Acres of Paving: 0

Residential Indoor: 48,600; Residential Outdoor: 16,200; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Grading	Excavators	2	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
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	2	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
Grading	Scrapers	2	8.00	367	0.48
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	1.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	3.00	1.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
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

Clean Paved Roads

3.2 Site Preparation - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	4.5627	48.1988	22.4763	0.0380		2.5769	2.5769		2.3708	2.3708		3,831.6239	3,831.6239	1.1928		3,861.4448
Total	**4.5627**	**48.1988**	**22.4763**	**0.0380**	**18.0663**	**2.5769**	**20.6432**	**9.9307**	**2.3708**	**12.3014**		**3,831.6239**	**3,831.6239**	**1.1928**		**3,861.4448**

3.2 Site Preparation - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1084	0.0689	0.8902	2.1200e-003	0.2012	1.2600e-003	0.2025	0.0534	1.1600e-003	0.0545		211.1889	211.1889	6.4300e-003		211.3496
Total	**0.1084**	**0.0689**	**0.8902**	**2.1200e-003**	**0.2012**	**1.2600e-003**	**0.2025**	**0.0534**	**1.1600e-003**	**0.0545**		**211.1889**	**211.1889**	**6.4300e-003**		**211.3496**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					7.0458	0.0000	7.0458	3.8730	0.0000	3.8730			0.0000			0.0000
Off-Road	4.5627	48.1988	22.4763	0.0380		2.5769	2.5769		2.3708	2.3708	0.0000	3,831.6239	3,831.6239	1.1928		3,861.4448
Total	**4.5627**	**48.1988**	**22.4763**	**0.0380**	**7.0458**	**2.5769**	**9.6228**	**3.8730**	**2.3708**	**6.2437**	**0.0000**	**3,831.6239**	**3,831.6239**	**1.1928**		**3,861.4448**

3.2 Site Preparation - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1084	0.0689	0.8902	2.1200e-003	0.2012	1.2600e-003	0.2025	0.0534	1.1600e-003	0.0545		211.1889	211.1889	6.4300e-003		211.3496
Total	**0.1084**	**0.0689**	**0.8902**	**2.1200e-003**	**0.2012**	**1.2600e-003**	**0.2025**	**0.0534**	**1.1600e-003**	**0.0545**		**211.1889**	**211.1889**	**6.4300e-003**		**211.3496**

3.3 Grading - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.1988	0.0000	6.1988	3.3293	0.0000	3.3293			0.0000			0.0000
Off-Road	5.0901	59.5218	35.0894	0.0620		2.6337	2.6337		2.4230	2.4230		6,244.4284	6,244.4284	1.9440		6,293.0278
Total	**5.0901**	**59.5218**	**35.0894**	**0.0620**	**6.1988**	**2.6337**	**8.8326**	**3.3293**	**2.4230**	**5.7524**		**6,244.4284**	**6,244.4284**	**1.9440**		**6,293.0278**

3.3 Grading - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1204	0.0766	0.9892	2.3600e-003	0.2236	1.4000e-003	0.2250	0.0593	1.2900e-003	0.0606		234.6543	234.6543	7.1400e-003		234.8329
Total	**0.1204**	**0.0766**	**0.9892**	**2.3600e-003**	**0.2236**	**1.4000e-003**	**0.2250**	**0.0593**	**1.2900e-003**	**0.0606**		**234.6543**	**234.6543**	**7.1400e-003**		**234.8329**

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					2.4176	0.0000	2.4176	1.2984	0.0000	1.2984			0.0000			0.0000
Off-Road	5.0901	59.5218	35.0894	0.0620		2.6337	2.6337		2.4230	2.4230	0.0000	6,244.4284	6,244.4284	1.9440		6,293.0278
Total	**5.0901**	**59.5218**	**35.0894**	**0.0620**	**2.4176**	**2.6337**	**5.0513**	**1.2984**	**2.4230**	**3.7215**	**0.0000**	**6,244.4284**	**6,244.4284**	**1.9440**		**6,293.0278**

3.3 Grading - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1204	0.0766	0.9892	2.3600e-003	0.2236	1.4000e-003	0.2250	0.0593	1.2900e-003	0.0606		234.6543	234.6543	7.1400e-003		234.8329
Total	**0.1204**	**0.0766**	**0.9892**	**2.3600e-003**	**0.2236**	**1.4000e-003**	**0.2250**	**0.0593**	**1.2900e-003**	**0.0606**		**234.6543**	**234.6543**	**7.1400e-003**		**234.8329**

3.3 Grading - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.1988	0.0000	6.1988	3.3293	0.0000	3.3293			0.0000			0.0000
Off-Road	4.7389	54.5202	33.3768	0.0620		2.3827	2.3827		2.1920	2.1920		6,140.0195	6,140.0195	1.9426		6,188.5854
Total	**4.7389**	**54.5202**	**33.3768**	**0.0620**	**6.1988**	**2.3827**	**8.5815**	**3.3293**	**2.1920**	**5.5214**		**6,140.0195**	**6,140.0195**	**1.9426**		**6,188.5854**

3.3 Grading - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1101	0.0676	0.8885	2.2900e-003	0.2236	1.3800e-003	0.2249	0.0593	1.2700e-003	0.0606		227.5045	227.5045	6.3700e-003		227.6637
Total	**0.1101**	**0.0676**	**0.8885**	**2.2900e-003**	**0.2236**	**1.3800e-003**	**0.2249**	**0.0593**	**1.2700e-003**	**0.0606**		**227.5045**	**227.5045**	**6.3700e-003**		**227.6637**

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					2.4176	0.0000	2.4176	1.2984	0.0000	1.2984			0.0000			0.0000
Off-Road	4.7389	54.5202	33.3768	0.0620		2.3827	2.3827		2.1920	2.1920	0.0000	6,140.0195	6,140.0195	1.9426		6,188.5854
Total	**4.7389**	**54.5202**	**33.3768**	**0.0620**	**2.4176**	**2.3827**	**4.8002**	**1.2984**	**2.1920**	**3.4905**	**0.0000**	**6,140.0195**	**6,140.0195**	**1.9426**		**6,188.5854**

3.3 Grading - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1101	0.0676	0.8885	2.2900e-003	0.2236	1.3800e-003	0.2249	0.0593	1.2700e-003	0.0606		227.5045	227.5045	6.3700e-003		227.6637
Total	**0.1101**	**0.0676**	**0.8885**	**2.2900e-003**	**0.2236**	**1.3800e-003**	**0.2249**	**0.0593**	**1.2700e-003**	**0.0606**		**227.5045**	**227.5045**	**6.3700e-003**		**227.6637**

3.4 Building Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.3612	21.0788	17.1638	0.0269		1.2899	1.2899		1.2127	1.2127		2,591.5802	2,591.5802	0.6313		2,607.3635
Total	**2.3612**	**21.0788**	**17.1638**	**0.0269**		**1.2899**	**1.2899**		**1.2127**	**1.2127**		**2,591.5802**	**2,591.5802**	**0.6313**		**2,607.3635**

3.4 Building Construction - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	3.3300e-003	0.1138	0.0213	2.6000e-004	6.4000e-003	8.6000e-004	7.2700e-003	1.8400e-003	8.3000e-004	2.6700e-003		27.7303	27.7303	2.2200e-003		27.7857
Worker	0.0165	0.0101	0.1333	3.4000e-004	0.0335	2.1000e-004	0.0337	8.8900e-003	1.9000e-004	9.0800e-003		34.1257	34.1257	9.6000e-004		34.1496
Total	**0.0199**	**0.1240**	**0.1546**	**6.0000e-004**	**0.0399**	**1.0700e-003**	**0.0410**	**0.0107**	**1.0200e-003**	**0.0118**		**61.8559**	**61.8559**	**3.1800e-003**		**61.9353**

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	2.3612	21.0788	17.1638	0.0269		1.2899	1.2899		1.2127	1.2127	0.0000	2,591.5802	2,591.5802	0.6313		2,607.3635
Total	**2.3612**	**21.0788**	**17.1638**	**0.0269**		**1.2899**	**1.2899**		**1.2127**	**1.2127**	**0.0000**	**2,591.5802**	**2,591.5802**	**0.6313**		**2,607.3635**

3.4 Building Construction - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	3.3300e-003	0.1138	0.0213	2.6000e-004	6.4000e-003	8.6000e-004	7.2700e-003	1.8400e-003	8.3000e-004	2.6700e-003		27.7303	27.7303	2.2200e-003		27.7857
Worker	0.0165	0.0101	0.1333	3.4000e-004	0.0335	2.1000e-004	0.0337	8.8900e-003	1.9000e-004	9.0800e-003		34.1257	34.1257	9.6000e-004		34.1496
Total	**0.0199**	**0.1240**	**0.1546**	**6.0000e-004**	**0.0399**	**1.0700e-003**	**0.0410**	**0.0107**	**1.0200e-003**	**0.0118**		**61.8559**	**61.8559**	**3.1800e-003**		**61.9353**

3.5 Paving - 2019

Unmitigated Construction On-Site

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

3.5 Paving - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0826	0.0507	0.6664	1.7100e-003	0.1677	1.0300e-003	0.1687	0.0445	9.5000e-004	0.0454		170.6284	170.6284	4.7800e-003		170.7478
Total	**0.0826**	**0.0507**	**0.6664**	**1.7100e-003**	**0.1677**	**1.0300e-003**	**0.1687**	**0.0445**	**9.5000e-004**	**0.0454**		**170.6284**	**170.6284**	**4.7800e-003**		**170.7478**

Mitigated Construction On-Site

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

3.5 Paving - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0826	0.0507	0.6664	1.7100e-003	0.1677	1.0300e-003	0.1687	0.0445	9.5000e-004	0.0454		170.6284	170.6284	4.7800e-003		170.7478
Total	**0.0826**	**0.0507**	**0.6664**	**1.7100e-003**	**0.1677**	**1.0300e-003**	**0.1687**	**0.0445**	**9.5000e-004**	**0.0454**		**170.6284**	**170.6284**	**4.7800e-003**		**170.7478**

3.6 Architectural Coating - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	7.5087					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2664	1.8354	1.8413	2.9700e-003		0.1288	0.1288		0.1288	0.1288		281.4481	281.4481	0.0238		282.0423
Total	**7.7751**	**1.8354**	**1.8413**	**2.9700e-003**		**0.1288**	**0.1288**		**0.1288**	**0.1288**		**281.4481**	**281.4481**	**0.0238**		**282.0423**

3.6 Architectural Coating - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	5.5100e-003	3.3800e-003	0.0444	1.1000e-004	0.0112	7.0000e-005	0.0113	2.9600e-003	6.0000e-005	3.0300e-003		11.3752	11.3752	3.2000e-004		11.3832
Total	**5.5100e-003**	**3.3800e-003**	**0.0444**	**1.1000e-004**	**0.0112**	**7.0000e-005**	**0.0113**	**2.9600e-003**	**6.0000e-005**	**3.0300e-003**		**11.3752**	**11.3752**	**3.2000e-004**		**11.3832**

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	7.5087					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2664	1.8354	1.8413	2.9700e-003		0.1288	0.1288		0.1288	0.1288	0.0000	281.4481	281.4481	0.0238		282.0423
Total	**7.7751**	**1.8354**	**1.8413**	**2.9700e-003**		**0.1288**	**0.1288**		**0.1288**	**0.1288**	**0.0000**	**281.4481**	**281.4481**	**0.0238**		**282.0423**

3.6 Architectural Coating - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	5.5100e-003	3.3800e-003	0.0444	1.1000e-004	0.0112	7.0000e-005	0.0113	2.9600e-003	6.0000e-005	3.0300e-003		11.3752	11.3752	3.2000e-004		11.3832
Total	**5.5100e-003**	**3.3800e-003**	**0.0444**	**1.1000e-004**	**0.0112**	**7.0000e-005**	**0.0113**	**2.9600e-003**	**6.0000e-005**	**3.0300e-003**		**11.3752**	**11.3752**	**3.2000e-004**		**11.3832**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Increase Density

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.1776	1.2828	2.2132	8.6300e-003	0.6156	7.7000e-003	0.6233	0.1647	7.2600e-003	0.1720		878.9534	878.9534	0.0425		880.0150
Unmitigated	0.1738	1.2441	2.0979	8.1500e-003	0.5778	7.2700e-003	0.5851	0.1546	6.8500e-003	0.1615		830.8140	830.8140	0.0411		831.8411

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Single Family Housing	76.16	79.28	68.96	258,259	275,147
Total	76.16	79.28	68.96	258,259	275,147

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	0.538064	0.038449	0.184390	0.122109	0.017402	0.005339	0.017250	0.067711	0.001365	0.001213	0.004629	0.000959	0.001120

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	8.7800e-003	0.0750	0.0319	4.8000e-004		6.0600e-003	6.0600e-003		6.0600e-003	6.0600e-003		95.7329	95.7329	1.8300e-003	1.7600e-003	96.3018
NaturalGas Unmitigated	8.7800e-003	0.0750	0.0319	4.8000e-004		6.0600e-003	6.0600e-003		6.0600e-003	6.0600e-003		95.7329	95.7329	1.8300e-003	1.7600e-003	96.3018

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	813.729	8.7800e-003	0.0750	0.0319	4.8000e-004		6.0600e-003	6.0600e-003		6.0600e-003	6.0600e-003		95.7329	95.7329	1.8300e-003	1.7600e-003	96.3018
Total		**8.7800e-003**	**0.0750**	**0.0319**	**4.8000e-004**		**6.0600e-003**	**6.0600e-003**		**6.0600e-003**	**6.0600e-003**		**95.7329**	**95.7329**	**1.8300e-003**	**1.7600e-003**	**96.3018**

5.2 Energy by Land Use - NaturalGas

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	0.813729	8.7800e-003	0.0750	0.0319	4.8000e-004		6.0600e-003	6.0600e-003		6.0600e-003	6.0600e-003		95.7329	95.7329	1.8300e-003	1.7600e-003	96.3018
Total		**8.7800e-003**	**0.0750**	**0.0319**	**4.8000e-004**		**6.0600e-003**	**6.0600e-003**		**6.0600e-003**	**6.0600e-003**		**95.7329**	**95.7329**	**1.8300e-003**	**1.7600e-003**	**96.3018**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Residential Interior

Use Low VOC Paint - Residential Exterior

No Hearths Installed

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.5365	7.6600e-003	0.6622	3.0000e-005		3.6400e-003	3.6400e-003		3.6400e-003	3.6400e-003	0.0000	1.1884	1.1884	1.1600e-003	0.0000	1.2174
Unmitigated	2.6328	0.1737	4.7306	0.0104		0.6148	0.6148		0.6148	0.6148	74.9354	145.1884	220.1238	0.2246	5.0900e-003	227.2552

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	0.0411					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.4752					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	2.0963	0.1660	4.0684	0.0104		0.6111	0.6111		0.6111	0.6111	74.9354	144.0000	218.9354	0.2235	5.0900e-003	226.0378
Landscaping	0.0202	7.6600e-003	0.6622	3.0000e-005		3.6400e-003	3.6400e-003		3.6400e-003	3.6400e-003		1.1884	1.1884	1.1600e-003		1.2174
Total	**2.6328**	**0.1737**	**4.7306**	**0.0104**		**0.6148**	**0.6148**		**0.6148**	**0.6148**	**74.9354**	**145.1884**	**220.1238**	**0.2246**	**5.0900e-003**	**227.2552**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0411					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.4752					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0202	7.6600e-003	0.6622	3.0000e-005		3.6400e-003	3.6400e-003		3.6400e-003	3.6400e-003		1.1884	1.1884	1.1600e-003		1.2174
Total	**0.5365**	**7.6600e-003**	**0.6622**	**3.0000e-005**		**3.6400e-003**	**3.6400e-003**		**3.6400e-003**	**3.6400e-003**	**0.0000**	**1.1884**	**1.1884**	**1.1600e-003**	**0.0000**	**1.2174**

7.0 Water Detail

7.1 Mitigation Measures Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

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

Alabassi Compound

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	8.00	Dwelling Unit	16.79	24,000.00	23

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2020
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Default lot acreage revised to reflect total acreage disturbed

Construction Phase -

Grading - Assumes 5 acres disturbed daily

Construction Off-road Equipment Mitigation -

Mobile Land Use Mitigation -

Area Mitigation -

Water Mitigation -

Waste Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	40	0
tblGrading	AcresOfGrading	75.00	5.00
tblLandUse	BuildingSpaceSquareFeet	14,400.00	24,000.00
tblLandUse	LandUseSquareFeet	14,400.00	24,000.00
tblLandUse	LotAcreage	2.60	16.79
tblProjectCharacteristics	OperationalYear	2018	2020

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2018	0.1635	1.7970	0.9954	1.7600e-003	0.4174	0.0861	0.5035	0.2257	0.0792	0.3049	0.0000	160.2782	160.2782	0.0482	0.0000	161.4822
2019	0.4105	2.0263	1.6227	2.6300e-003	0.1443	0.1193	0.2636	0.0762	0.1121	0.1883	0.0000	230.3590	230.3590	0.0562	0.0000	231.7635
Maximum	**0.4105**	**2.0263**	**1.6227**	**2.6300e-003**	**0.4174**	**0.1193**	**0.5035**	**0.2257**	**0.1121**	**0.3049**	**0.0000**	**230.3590**	**230.3590**	**0.0562**	**0.0000**	**231.7635**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2018	0.1635	1.7970	0.9954	1.7600e-003	0.1670	0.0861	0.2531	0.0892	0.0792	0.1684	0.0000	160.2781	160.2781	0.0482	0.0000	161.4820
2019	0.4105	2.0263	1.6227	2.6300e-003	0.0592	0.1193	0.1785	0.0305	0.1121	0.1426	0.0000	230.3588	230.3588	0.0562	0.0000	231.7632
Maximum	**0.4105**	**2.0263**	**1.6227**	**2.6300e-003**	**0.1670**	**0.1193**	**0.2531**	**0.0892**	**0.1121**	**0.1684**	**0.0000**	**230.3588**	**230.3588**	**0.0562**	**0.0000**	**231.7632**

	ROG	**NOx**	**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**	**59.72**	**0.00**	**43.73**	**60.37**	**0.00**	**36.96**	**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	**10-1-2018**	**12-31-2018**	1.9599	1.9599
2	**1-1-2019**	**3-31-2019**	0.8989	0.8989
3	**4-1-2019**	**6-30-2019**	0.7665	0.7665
4	**7-1-2019**	**9-30-2019**	0.6034	0.6034
		Highest	1.9599	1.9599

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	0.1230	3.0300e-003	0.1336	1.3000e-004		8.0900e-003	8.0900e-003		8.0900e-003	8.0900e-003	0.8498	1.7677	2.6175	2.6700e-003	6.0000e-005	2.7013
Energy	1.6000e-003	0.0137	5.8200e-003	9.0000e-005		1.1100e-003	1.1100e-003		1.1100e-003	1.1100e-003	0.0000	39.7259	39.7259	1.2900e-003	4.9000e-004	39.9055
Mobile	0.0257	0.2205	0.3246	1.3300e-003	0.0986	1.2600e-003	0.0999	0.0264	1.1900e-003	0.0276	0.0000	123.4249	123.4249	6.4600e-003	0.0000	123.5864
Waste						0.0000	0.0000		0.0000	0.0000	1.9142	0.0000	1.9142	0.1131	0.0000	4.7424
Water						0.0000	0.0000		0.0000	0.0000	0.1654	3.3257	3.4911	0.0171	4.3000e-004	4.0471
Total	**0.1503**	**0.2372**	**0.4640**	**1.5500e-003**	**0.0986**	**0.0105**	**0.1091**	**0.0264**	**0.0104**	**0.0368**	**2.9293**	**168.2442**	**171.1735**	**0.1407**	**9.8000e-004**	**174.9826**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0968	9.6000e-004	0.0828	0.0000		4.6000e-004	4.6000e-004		4.6000e-004	4.6000e-004	0.0000	0.1348	0.1348	1.3000e-004	0.0000	0.1381
Energy	1.6000e-003	0.0137	5.8200e-003	9.0000e-005		1.1100e-003	1.1100e-003		1.1100e-003	1.1100e-003	0.0000	39.7259	39.7259	1.2900e-003	4.9000e-004	39.9055
Mobile	0.0263	0.2276	0.3415	1.4100e-003	0.1051	1.3400e-003	0.1064	0.0282	1.2600e-003	0.0294	0.0000	130.5701	130.5701	6.6700e-003	0.0000	130.7367
Waste						0.0000	0.0000		0.0000	0.0000	0.9571	0.0000	0.9571	0.0566	0.0000	2.3712
Water						0.0000	0.0000		0.0000	0.0000	0.1323	2.8932	3.0255	0.0137	3.5000e-004	3.4711
Total	**0.1247**	**0.2423**	**0.4301**	**1.5000e-003**	**0.1051**	**2.9100e-003**	**0.1080**	**0.0282**	**2.8300e-003**	**0.0310**	**1.0894**	**173.3239**	**174.4133**	**0.0784**	**8.4000e-004**	**176.6226**

	ROG	NOx	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	**17.02**	**-2.13**	**7.32**	**3.23**	**-6.53**	**72.18**	**1.02**	**-6.55**	**72.76**	**15.83**	**62.81**	**-3.02**	**-1.89**	**44.30**	**14.29**	**-0.94**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	10/1/2018	11/9/2018	5	10	
2	Grading	Grading	11/10/2018	1/11/2019	5	30	
3	Building Construction	Building Construction	1/12/2019	8/23/2019	5	300	
4	Paving	Paving	8/24/2019	8/30/2019	5	20	
5	Architectural Coating	Architectural Coating	8/31/2019	11/8/2019	5	20	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 5

Acres of Paving: 0

Residential Indoor: 48,600; Residential Outdoor: 16,200; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Grading	Excavators	2	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
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	2	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
Grading	Scrapers	2	8.00	367	0.48
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	1.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	3.00	1.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
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

Clean Paved Roads

3.2 Site Preparation - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.2710	0.0000	0.2710	0.1490	0.0000	0.1490	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0684	0.7230	0.3371	5.7000e-004		0.0387	0.0387		0.0356	0.0356	0.0000	52.1399	52.1399	0.0162	0.0000	52.5457
Total	**0.0684**	**0.7230**	**0.3371**	**5.7000e-004**	**0.2710**	**0.0387**	**0.3096**	**0.1490**	**0.0356**	**0.1845**	**0.0000**	**52.1399**	**52.1399**	**0.0162**	**0.0000**	**52.5457**

3.2 Site Preparation - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.4700e-003	1.1100e-003	0.0114	3.0000e-005	2.9700e-003	2.0000e-005	2.9900e-003	7.9000e-004	2.0000e-005	8.1000e-004	0.0000	2.6448	2.6448	8.0000e-005	0.0000	2.6467
Total	**1.4700e-003**	**1.1100e-003**	**0.0114**	**3.0000e-005**	**2.9700e-003**	**2.0000e-005**	**2.9900e-003**	**7.9000e-004**	**2.0000e-005**	**8.1000e-004**	**0.0000**	**2.6448**	**2.6448**	**8.0000e-005**	**0.0000**	**2.6467**

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					0.1057	0.0000	0.1057	0.0581	0.0000	0.0581	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0684	0.7230	0.3371	5.7000e-004		0.0387	0.0387		0.0356	0.0356	0.0000	52.1398	52.1398	0.0162	0.0000	52.5456
Total	**0.0684**	**0.7230**	**0.3371**	**5.7000e-004**	**0.1057**	**0.0387**	**0.1443**	**0.0581**	**0.0356**	**0.0937**	**0.0000**	**52.1398**	**52.1398**	**0.0162**	**0.0000**	**52.5456**

3.2 Site Preparation - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.4700e-003	1.1100e-003	0.0114	3.0000e-005	2.9700e-003	2.0000e-005	2.9900e-003	7.9000e-004	2.0000e-005	8.1000e-004	0.0000	2.6448	2.6448	8.0000e-005	0.0000	2.6467
Total	**1.4700e-003**	**1.1100e-003**	**0.0114**	**3.0000e-005**	**2.9700e-003**	**2.0000e-005**	**2.9900e-003**	**7.9000e-004**	**2.0000e-005**	**8.1000e-004**	**0.0000**	**2.6448**	**2.6448**	**8.0000e-005**	**0.0000**	**2.6467**

3.3 Grading - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1395	0.0000	0.1395	0.0749	0.0000	0.0749	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0916	1.0714	0.6316	1.1200e-003		0.0474	0.0474		0.0436	0.0436	0.0000	101.9673	101.9673	0.0317	0.0000	102.7609
Total	**0.0916**	**1.0714**	**0.6316**	**1.1200e-003**	**0.1395**	**0.0474**	**0.1869**	**0.0749**	**0.0436**	**0.1185**	**0.0000**	**101.9673**	**101.9673**	**0.0317**	**0.0000**	**102.7609**

3.3 Grading - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.9500e-003	1.4800e-003	0.0152	4.0000e-005	3.9600e-003	3.0000e-005	3.9800e-003	1.0500e-003	2.0000e-005	1.0700e-003	0.0000	3.5263	3.5263	1.1000e-004	0.0000	3.5290
Total	**1.9500e-003**	**1.4800e-003**	**0.0152**	**4.0000e-005**	**3.9600e-003**	**3.0000e-005**	**3.9800e-003**	**1.0500e-003**	**2.0000e-005**	**1.0700e-003**	**0.0000**	**3.5263**	**3.5263**	**1.1000e-004**	**0.0000**	**3.5290**

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					0.0544	0.0000	0.0544	0.0292	0.0000	0.0292	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0916	1.0714	0.6316	1.1200e-003		0.0474	0.0474		0.0436	0.0436	0.0000	101.9672	101.9672	0.0317	0.0000	102.7608
Total	**0.0916**	**1.0714**	**0.6316**	**1.1200e-003**	**0.0544**	**0.0474**	**0.1018**	**0.0292**	**0.0436**	**0.0728**	**0.0000**	**101.9672**	**101.9672**	**0.0317**	**0.0000**	**102.7608**

3.3 Grading - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.9500e-003	1.4800e-003	0.0152	4.0000e-005	3.9600e-003	3.0000e-005	3.9800e-003	1.0500e-003	2.0000e-005	1.0700e-003	0.0000	3.5263	3.5263	1.1000e-004	0.0000	3.5290
Total	**1.9500e-003**	**1.4800e-003**	**0.0152**	**4.0000e-005**	**3.9600e-003**	**3.0000e-005**	**3.9800e-003**	**1.0500e-003**	**2.0000e-005**	**1.0700e-003**	**0.0000**	**3.5263**	**3.5263**	**1.1000e-004**	**0.0000**	**3.5290**

3.3 Grading - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1395	0.0000	0.1395	0.0749	0.0000	0.0749	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0213	0.2453	0.1502	2.8000e-004		0.0107	0.0107		9.8600e-003	9.8600e-003	0.0000	25.0656	25.0656	7.9300e-003	0.0000	25.2639
Total	**0.0213**	**0.2453**	**0.1502**	**2.8000e-004**	**0.1395**	**0.0107**	**0.1502**	**0.0749**	**9.8600e-003**	**0.0848**	**0.0000**	**25.0656**	**25.0656**	**7.9300e-003**	**0.0000**	**25.2639**

3.3 Grading - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.5000e-004	3.3000e-004	3.4100e-003	1.0000e-005	9.9000e-004	1.0000e-005	1.0000e-003	2.6000e-004	1.0000e-005	2.7000e-004	0.0000	0.8547	0.8547	2.0000e-005	0.0000	0.8552
Total	**4.5000e-004**	**3.3000e-004**	**3.4100e-003**	**1.0000e-005**	**9.9000e-004**	**1.0000e-005**	**1.0000e-003**	**2.6000e-004**	**1.0000e-005**	**2.7000e-004**	**0.0000**	**0.8547**	**0.8547**	**2.0000e-005**	**0.0000**	**0.8552**

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					0.0544	0.0000	0.0544	0.0292	0.0000	0.0292	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0213	0.2453	0.1502	2.8000e-004		0.0107	0.0107		9.8600e-003	9.8600e-003	0.0000	25.0656	25.0656	7.9300e-003	0.0000	25.2638
Total	**0.0213**	**0.2453**	**0.1502**	**2.8000e-004**	**0.0544**	**0.0107**	**0.0651**	**0.0292**	**9.8600e-003**	**0.0391**	**0.0000**	**25.0656**	**25.0656**	**7.9300e-003**	**0.0000**	**25.2638**

3.3 Grading - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.5000e-004	3.3000e-004	3.4100e-003	1.0000e-005	9.9000e-004	1.0000e-005	1.0000e-003	2.6000e-004	1.0000e-005	2.7000e-004	0.0000	0.8547	0.8547	2.0000e-005	0.0000	0.8552
Total	**4.5000e-004**	**3.3000e-004**	**3.4100e-003**	**1.0000e-005**	**9.9000e-004**	**1.0000e-005**	**1.0000e-003**	**2.6000e-004**	**1.0000e-005**	**2.7000e-004**	**0.0000**	**0.8547**	**0.8547**	**2.0000e-005**	**0.0000**	**0.8552**

3.4 Building Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1889	1.6863	1.3731	2.1500e-003		0.1032	0.1032		0.0970	0.0970	0.0000	188.0834	188.0834	0.0458	0.0000	189.2288
Total	**0.1889**	**1.6863**	**1.3731**	**2.1500e-003**		**0.1032**	**0.1032**		**0.0970**	**0.0970**	**0.0000**	**188.0834**	**188.0834**	**0.0458**	**0.0000**	**189.2288**

3.4 Building Construction - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.7000e-004	9.2300e-003	1.8400e-003	2.0000e-005	5.1000e-004	7.0000e-005	5.7000e-004	1.5000e-004	7.0000e-005	2.1000e-004	0.0000	1.9809	1.9809	1.7000e-004	0.0000	1.9852
Worker	1.1900e-003	8.7000e-004	9.1100e-003	3.0000e-005	2.6400e-003	2.0000e-005	2.6500e-003	7.0000e-004	2.0000e-005	7.2000e-004	0.0000	2.2791	2.2791	6.0000e-005	0.0000	2.2806
Total	**1.4600e-003**	**0.0101**	**0.0110**	**5.0000e-005**	**3.1500e-003**	**9.0000e-005**	**3.2200e-003**	**8.5000e-004**	**9.0000e-005**	**9.3000e-004**	**0.0000**	**4.2600**	**4.2600**	**2.3000e-004**	**0.0000**	**4.2658**

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	0.1889	1.6863	1.3731	2.1500e-003		0.1032	0.1032		0.0970	0.0970	0.0000	188.0831	188.0831	0.0458	0.0000	189.2286
Total	**0.1889**	**1.6863**	**1.3731**	**2.1500e-003**		**0.1032**	**0.1032**		**0.0970**	**0.0970**	**0.0000**	**188.0831**	**188.0831**	**0.0458**	**0.0000**	**189.2286**

3.4 Building Construction - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.7000e-004	9.2300e-003	1.8400e-003	2.0000e-005	5.1000e-004	7.0000e-005	5.7000e-004	1.5000e-004	7.0000e-005	2.1000e-004	0.0000	1.9809	1.9809	1.7000e-004	0.0000	1.9852
Worker	1.1900e-003	8.7000e-004	9.1100e-003	3.0000e-005	2.6400e-003	2.0000e-005	2.6500e-003	7.0000e-004	2.0000e-005	7.2000e-004	0.0000	2.2791	2.2791	6.0000e-005	0.0000	2.2806
Total	**1.4600e-003**	**0.0101**	**0.0110**	**5.0000e-005**	**3.1500e-003**	**9.0000e-005**	**3.2200e-003**	**8.5000e-004**	**9.0000e-005**	**9.3000e-004**	**0.0000**	**4.2600**	**4.2600**	**2.3000e-004**	**0.0000**	**4.2658**

3.5 Paving - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	3.6400e-003	0.0381	0.0367	6.0000e-005		2.0600e-003	2.0600e-003		1.9000e-003	1.9000e-003	0.0000	5.1188	5.1188	1.6200e-003	0.0000	5.1593
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**3.6400e-003**	**0.0381**	**0.0367**	**6.0000e-005**		**2.0600e-003**	**2.0600e-003**		**1.9000e-003**	**1.9000e-003**	**0.0000**	**5.1188**	**5.1188**	**1.6200e-003**	**0.0000**	**5.1593**

3.5 Paving - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.9000e-004	1.4000e-004	1.4200e-003	0.0000	4.1000e-004	0.0000	4.1000e-004	1.1000e-004	0.0000	1.1000e-004	0.0000	0.3561	0.3561	1.0000e-005	0.0000	0.3564
Total	**1.9000e-004**	**1.4000e-004**	**1.4200e-003**	**0.0000**	**4.1000e-004**	**0.0000**	**4.1000e-004**	**1.1000e-004**	**0.0000**	**1.1000e-004**	**0.0000**	**0.3561**	**0.3561**	**1.0000e-005**	**0.0000**	**0.3564**

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	3.6400e-003	0.0381	0.0367	6.0000e-005		2.0600e-003	2.0600e-003		1.9000e-003	1.9000e-003	0.0000	5.1188	5.1188	1.6200e-003	0.0000	5.1593
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**3.6400e-003**	**0.0381**	**0.0367**	**6.0000e-005**		**2.0600e-003**	**2.0600e-003**		**1.9000e-003**	**1.9000e-003**	**0.0000**	**5.1188**	**5.1188**	**1.6200e-003**	**0.0000**	**5.1593**

3.5 Paving - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.9000e-004	1.4000e-004	1.4200e-003	0.0000	4.1000e-004	0.0000	4.1000e-004	1.1000e-004	0.0000	1.1000e-004	0.0000	0.3561	0.3561	1.0000e-005	0.0000	0.3564
Total	**1.9000e-004**	**1.4000e-004**	**1.4200e-003**	**0.0000**	**4.1000e-004**	**0.0000**	**4.1000e-004**	**1.1000e-004**	**0.0000**	**1.1000e-004**	**0.0000**	**0.3561**	**0.3561**	**1.0000e-005**	**0.0000**	**0.3564**

3.6 Architectural Coating - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.1877					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	6.6600e-003	0.0459	0.0460	7.0000e-005		3.2200e-003	3.2200e-003		3.2200e-003	3.2200e-003	0.0000	6.3831	6.3831	5.4000e-004	0.0000	6.3966
Total	**0.1944**	**0.0459**	**0.0460**	**7.0000e-005**		**3.2200e-003**	**3.2200e-003**		**3.2200e-003**	**3.2200e-003**	**0.0000**	**6.3831**	**6.3831**	**5.4000e-004**	**0.0000**	**6.3966**

3.6 Architectural Coating - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.2000e-004	9.0000e-005	9.5000e-004	0.0000	2.7000e-004	0.0000	2.8000e-004	7.0000e-005	0.0000	7.0000e-005	0.0000	0.2374	0.2374	1.0000e-005	0.0000	0.2376
Total	**1.2000e-004**	**9.0000e-005**	**9.5000e-004**	**0.0000**	**2.7000e-004**	**0.0000**	**2.8000e-004**	**7.0000e-005**	**0.0000**	**7.0000e-005**	**0.0000**	**0.2374**	**0.2374**	**1.0000e-005**	**0.0000**	**0.2376**

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	0.1877					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	6.6600e-003	0.0459	0.0460	7.0000e-005		3.2200e-003	3.2200e-003		3.2200e-003	3.2200e-003	0.0000	6.3831	6.3831	5.4000e-004	0.0000	6.3966
Total	**0.1944**	**0.0459**	**0.0460**	**7.0000e-005**		**3.2200e-003**	**3.2200e-003**		**3.2200e-003**	**3.2200e-003**	**0.0000**	**6.3831**	**6.3831**	**5.4000e-004**	**0.0000**	**6.3966**

3.6 Architectural Coating - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.2000e-004	9.0000e-005	9.5000e-004	0.0000	2.7000e-004	0.0000	2.8000e-004	7.0000e-005	0.0000	7.0000e-005	0.0000	0.2374	0.2374	1.0000e-005	0.0000	0.2376
Total	**1.2000e-004**	**9.0000e-005**	**9.5000e-004**	**0.0000**	**2.7000e-004**	**0.0000**	**2.8000e-004**	**7.0000e-005**	**0.0000**	**7.0000e-005**	**0.0000**	**0.2374**	**0.2374**	**1.0000e-005**	**0.0000**	**0.2376**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Increase Density

	ROG	NOx	CO	SO2	Fugitive 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	0.0263	0.2276	0.3415	1.4100e-003	0.1051	1.3400e-003	0.1064	0.0282	1.2600e-003	0.0294	0.0000	130.5701	130.5701	6.6700e-003	0.0000	130.7367
Unmitigated	0.0257	0.2205	0.3246	1.3300e-003	0.0986	1.2600e-003	0.0999	0.0264	1.1900e-003	0.0276	0.0000	123.4249	123.4249	6.4600e-003	0.0000	123.5864

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Single Family Housing	76.16	79.28	68.96	258,259	275,147
Total	76.16	79.28	68.96	258,259	275,147

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	0.538064	0.038449	0.184390	0.122109	0.017402	0.005339	0.017250	0.067711	0.001365	0.001213	0.004629	0.000959	0.001120

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	23.8763	23.8763	9.9000e-004	2.0000e-004	23.9617
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	23.8763	23.8763	9.9000e-004	2.0000e-004	23.9617
NaturalGas Mitigated	1.6000e-003	0.0137	5.8200e-003	9.0000e-005		1.1100e-003	1.1100e-003		1.1100e-003	1.1100e-003	0.0000	15.8497	15.8497	3.0000e-004	2.9000e-004	15.9438
NaturalGas Unmitigated	1.6000e-003	0.0137	5.8200e-003	9.0000e-005		1.1100e-003	1.1100e-003		1.1100e-003	1.1100e-003	0.0000	15.8497	15.8497	3.0000e-004	2.9000e-004	15.9438

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	297011	1.6000e-003	0.0137	5.8200e-003	9.0000e-005		1.1100e-003	1.1100e-003		1.1100e-003	1.1100e-003	0.0000	15.8497	15.8497	3.0000e-004	2.9000e-004	15.9438
Total		**1.6000e-003**	**0.0137**	**5.8200e-003**	**9.0000e-005**		**1.1100e-003**	**1.1100e-003**		**1.1100e-003**	**1.1100e-003**	**0.0000**	**15.8497**	**15.8497**	**3.0000e-004**	**2.9000e-004**	**15.9438**

5.2 Energy by Land Use - NaturalGas

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	297011	1.6000e-003	0.0137	5.8200e-003	9.0000e-005		1.1100e-003	1.1100e-003		1.1100e-003	1.1100e-003	0.0000	15.8497	15.8497	3.0000e-004	2.9000e-004	15.9438
Total		**1.6000e-003**	**0.0137**	**5.8200e-003**	**9.0000e-005**		**1.1100e-003**	**1.1100e-003**		**1.1100e-003**	**1.1100e-003**	**0.0000**	**15.8497**	**15.8497**	**3.0000e-004**	**2.9000e-004**	**15.9438**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Single Family Housing	74936.2	23.8763	9.9000e-004	2.0000e-004	23.9617
Total		**23.8763**	**9.9000e-004**	**2.0000e-004**	**23.9617**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Single Family Housing	74936.2	23.8763	9.9000e-004	2.0000e-004	23.9617
Total		**23.8763**	**9.9000e-004**	**2.0000e-004**	**23.9617**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Residential Interior

Use Low VOC Paint - Residential Exterior

No Hearths Installed

	ROG	NOx	CO	SO2	Fugitive 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	0.0968	9.6000e-004	0.0828	0.0000		4.6000e-004	4.6000e-004		4.6000e-004	4.6000e-004	0.0000	0.1348	0.1348	1.3000e-004	0.0000	0.1381
Unmitigated	0.1230	3.0300e-003	0.1336	1.3000e-004		8.0900e-003	8.0900e-003		8.0900e-003	8.0900e-003	0.8498	1.7677	2.6175	2.6700e-003	6.0000e-005	2.7013

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	7.5100e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0867					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0262	2.0700e-003	0.0509	1.3000e-004		7.6400e-003	7.6400e-003		7.6400e-003	7.6400e-003	0.8498	1.6329	2.4827	2.5300e-003	6.0000e-005	2.5632
Landscaping	2.5200e-003	9.6000e-004	0.0828	0.0000		4.6000e-004	4.6000e-004		4.6000e-004	4.6000e-004	0.0000	0.1348	0.1348	1.3000e-004	0.0000	0.1381
Total	**0.1230**	**3.0300e-003**	**0.1336**	**1.3000e-004**		**8.1000e-003**	**8.1000e-003**		**8.1000e-003**	**8.1000e-003**	**0.8498**	**1.7677**	**2.6175**	**2.6600e-003**	**6.0000e-005**	**2.7013**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	7.5100e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0867					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.5200e-003	9.6000e-004	0.0828	0.0000		4.6000e-004	4.6000e-004		4.6000e-004	4.6000e-004	0.0000	0.1348	0.1348	1.3000e-004	0.0000	0.1381
Total	**0.0968**	**9.6000e-004**	**0.0828**	**0.0000**		**4.6000e-004**	**4.6000e-004**		**4.6000e-004**	**4.6000e-004**	**0.0000**	**0.1348**	**0.1348**	**1.3000e-004**	**0.0000**	**0.1381**

7.0 Water Detail

7.1 Mitigation Measures Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	3.0255	0.0137	3.5000e-004	3.4711
Unmitigated	3.4911	0.0171	4.3000e-004	4.0471

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Single Family Housing	0.521232 / 0.328603	3.4911	0.0171	4.3000e-004	4.0471
Total		**3.4911**	**0.0171**	**4.3000e-004**	**4.0471**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Single Family Housing	0.416986 / 0.328603	3.0255	0.0137	3.5000e-004	3.4711
Total		**3.0255**	**0.0137**	**3.5000e-004**	**3.4711**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.9571	0.0566	0.0000	2.3712
Unmitigated	1.9142	0.1131	0.0000	4.7424

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Single Family Housing	9.43	1.9142	0.1131	0.0000	4.7424
Total		**1.9142**	**0.1131**	**0.0000**	**4.7424**

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Single Family Housing	4.715	0.9571	0.0566	0.0000	2.3712
Total		**0.9571**	**0.0566**	**0.0000**	**2.3712**

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

Appendix B

Combined Biological Resources Report

BIOLOGICAL TECHNICAL REPORT

FOR

TRACT 37392 (FORMERLY TRACT 32042) RESIDENTIAL DEVELOPMENT PROJECT

LOCATED IN THE CITY OF RIVERSIDE RIVERSIDE COUNTY, CALIFORNIA

Prepared For:

AlAbassi Construction and Engineering
764 West Ramona Expressway
Suite C
Perris, California 92571
Contact: Marwan AlAbassi
Phone: 909-262-8668

Prepared By:

Glenn Lukos Associates, Inc.
29 Orchard
Lake Forest, California 92630
Phone: (949) 340-3851 and (949) 340-6490
Report Preparer: Martin Rasnick and Zack West

February 16, 2018

INFORMATION SUMMARY

A. Report Date: February 16, 2018

B. Report Title: Biological Technical Report for Tract 37392 (Formerly Tract 32042) Residential Development Project

C. Project Area Location: City of Riverside, Riverside County, California

D. Owner/Applicant: Marwan AlAbassi
764 West Ramona Expressway
Suite C
Perris, California 92571
Phone: 909-262-8668
Email: marwan@alabassi.biz

E. Principal Investigator: Glenn Lukos Associates, Inc.
29 Orchard
Lake Forest, California 92630
Phone: (949) 340-3851 and (949) 340-6490
Fax: (949) 837-5834
Report Preparer: Martin Rasnick and Zack West

F. Individuals Conducting Fieldwork: Zack West, Martin Rasnick

TABLE OF CONTENTS

Page #

INFORMATION SUMMARY ii

1.0 INTRODUCTION 1

1.1 Background and Scope of Work 1
1.2 Project Location 1
1.3 Project Description 2
1.4 Existing Conditions 2
1.5 Relationship of Project Area to the MSHCP 2

2.0 METHODOLOGY 4

2.1 Summary of Surveys 4
2.2 Botanical Resources 5
2.3 Wildlife Resources 7
2.4 Jurisdictional Delineation 8
2.5 MSHCP Riparian/Riverine Areas and Vernal Pools 9

3.0 REGULATORY SETTING 10

3.1 State and/or Federally Listed Plants and Animals 10
3.2 California Environmental Quality Act 12
3.3 Jurisdictional Waters 15

4.0 RESULTS 20

4.1 Existing Conditions 20
4.2 Vegetation Mapping 20
4.3 Special-Status Vegetation Communities 22
4.4 Special-Status Plants 22
4.5 Special-Status Animals 33
4.6 Raptor Use 44
4.7 Nesting Birds 45
4.8 Soil Mapping 45
4.9 Jurisdictional Delineation 46
4.10 MSHCP Riparian/Riverine Areas and Vernal Pools 46

5.0 IMPACT ANALYSIS 47

5.1 California Environmental Quality Act (CEQA) 48
5.2 Impacts to Vegetation 49

5.3 Impacts to Special-Status Plants 50
5.4 Impacts to Stephens' Kangaroo Rat 50
5.5 Impacts to Coastal California Gnatcatcher 51
5.6 Impacts to Burrowing Owl 51
5.7 Impacts to Other Special-status Animals 51
5.8 Impacts to Critical Habitat 52
5.9 Indirect Impacts to Nesting Birds 52
5.10 Impacts to Wildlife Migrations/Nurseries 52
5.11 Impacts to Jurisdictional Waters 53
5.12 Impacts to MSHCP Riparian/Riverine Areas 53
5.13 Indirect Impacts to Biological Resources 53
5.14 Cumulative Impacts to Biological Resources 53

6.0 MITIGATION/AVOIDANCE MEASURES 54

6.1 Stephens' Kangaroo Rat 54
6.2 Coastal California Gnatcatcher 54
6.3 Burrowing Owl 54
6.4 Nesting Birds 54
6.5 Jurisdictional Waters 54

7.0 MSHCP CONSISTENCY ANALYSIS 55

7.1 Project Relationship to Reserve Assembly 55
7.2 Protection of Species Associated with Riparian/Riverine Areas and Vernal Pools 55
7.3 Protection of Narrow Endemic Plants 55
7.4 Guidelines Pertaining to the Urban/Wildland Interface 56
7.5 Additional Survey Needs and Procedures 56
7.6 Conclusion of MSHCP Consistency 56

8.0 REFERENCES 57

9.0 CERTIFICATION 59

TABLES

Table 2-1. Summary of Biological Surveys for the Project Area 5
Table 3-1. CNPS Ranks 1, 2, 3, and 4 and Threat Code Extensions 14
Table 4-1. Summary of Vegetation/Land Cover Types for the Project Area 21
Table 4-2. Special-Status Plants Evaluated for the Project Area 23
Table 4-3. Special-Status Wildlife Evaluated for the Project Area 34
Table 4-4. Corps, Regional Board, and CDFW Jurisdiction 46
Table 5-1. Summary of Vegetation/Land Use Impacts 50

EXHIBITS

Exhibit 1	Regional Map
Exhibit 2	Vicinity Map
Exhibit 3A	Corps/RWQCB Jurisdictional Delineation Map
Exhibit 3B	CDFW Jurisdictional Delineation Map
Exhibit 4	Soils Map
Exhibit 5	Vegetation Map
Exhibit 6	MSHCP Overlay Map
Exhibit 7	Impacts Map
Exhibit 8	Site Photographs

APPENDICES

Appendix A	Floral Compendium
Appendix B	Faunal Compendium
Appendix C	Jurisdictional Delineation for the 17.67-Acre Tract 37392 (Formerly Tract 32042) Residential Development Project in the City of Riverside, Riverside County, California (GLA 2018)

1.0 INTRODUCTION

1.1 Background and Scope of Work

This document provides the results of general biological surveys for the approximately 17.67-acre Tract 37392 (formerly Tract 32042) Residential Development Project (the Project) located in the City of Riverside, Riverside County, California. This report identifies and evaluates impacts to biological resources associated with the proposed Project in the context of the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP), the California Environmental Quality Act (CEQA), and State and Federal regulations such as the Endangered Species Act (ESA), Clean Water Act (CWA), and the California Fish and Game Code.

The scope of this report includes a discussion of existing conditions for the approximately 17.67-acre Project area, all methods employed regarding the general biological surveys, the documentation of botanical and wildlife resources identified (including special-status species), and an analysis of impacts to biological resources. Methods of the study include a review of relevant literature, field surveys, and a Geographical Information System (GIS)-based analysis of vegetation communities. As appropriate, this report is consistent with accepted scientific and technical standards and survey guideline requirements issued by the U.S. Fish and Wildlife Service (USFWS), the California Department of Fish and Wildlife (CDFW), the California Native Plant Society (CNPS), and other applicable agencies/organizations.

For this report, the term *Project area* (property boundary) is defined as the 17.67 acres of land composed of Assessor's Parcel Numbers (APNs): 243-210-037 and 243-210-041, controlled by the applicant. The term *Project footprint* is defined as the land proposed for direct impact by the Project, either temporary or permanently. For this document we have assumed that all direct impacts would be permanent. The term, *Open Space* is land not proposed for development and thus occurs outside of the Project footprint but within the Project area.

The field study focused on a number of primary objectives that would comply with CEQA requirements, including (1) general reconnaissance survey and vegetation mapping; (2) general biological surveys; (3) habitat assessments for special-status plant species (including species with applicable MSHCP survey requirements); (4) habitat assessments for special-status wildlife species (including species with applicable MSHCP survey requirements); (5) assessments for MSHCP riparian/riverine areas and vernal pools; and (6) assessments for areas subject to the jurisdiction of the U.S. Army Corps of Engineers (Corps) jurisdiction pursuant to Section 404 of the Clean Water Act, and CDFW jurisdiction pursuant to Division 2, Chapter 6, Section 1600–1616 of the California Fish and Game Code. Observations of all plant and wildlife species were recorded during the general biological surveys and are included as Appendix A: Floral Compendium and Appendix B: Faunal Compendium.

1.2 Project Location

The Project area comprises approximately 17.67 acres in the City of Riverside, Riverside County, California [Exhibit 1 – Regional Map] and is located within Section 12 of Township 3 South, Range 5 West, of the U.S. Geological Survey (USGS) 7.5” quadrangle map Riverside East

(dated 1967 and photorevised in 1980) [Exhibit 2 – Vicinity Map]. The Project area is bordered primarily by low-density single family residential development, with undeveloped lands located to the southwest.

1.3 Project Description

The proposed project is a Tentative Map that would subdivide the Project area into 8 single-family residential lots. Lots would range from 1.01 to 3.79 acres in size.

Grading is proposed to accommodate the street system and residential pads generally ranging between 18,650 and 21,926 square feet in size, involving manufactured slopes up to approximately 25 feet in vertical height, though with most at or below 20 feet in height. The Project area was the subject of Tentative Map 32042 approved by the City of Riverside in 2004 for the same project and scope as proposed herein.

1.4 Existing Conditions

The Project area is situated in the Alessandro Heights area in the City of Riverside, and is made up of gently rolling hills and arroyos associated with the Hawarden Hills. Elevations on site range from 1,275 to 1,370 feet above mean sea level (amsl), and generally slope from north to south.

1.5 Relationship of the Project Area to the MSHCP

1.5.1 MSHCP Background

The Western Riverside County MSHCP is a comprehensive habitat conservation/planning program for Western Riverside County. The intent of the MSHCP is to preserve native vegetation and meet the habitat needs of multiple species, rather than focusing preservation efforts on one species at a time. The MSHCP provides coverage (including take authorization for listed species) for special-status plant and animal species, as well as mitigation for impacts to special-status species and associated native habitats.

Through agreements with the U.S. Fish and Wildlife Service (USFWS) and CDFW, the MSHCP designates 146 special-status animal and plant species as Covered Species, of which the majority have no project-specific survey/conservation requirements. The MSHCP provides mitigation for project-specific impacts to these species for Projects that are compliant/consistent with MSHCP requirements, such that the impacts are reduced to below a level of significance pursuant to CEQA.

The Covered Species that are not yet adequately conserved have additional requirements in order for these species to ultimately be considered “adequately conserved”. A number of these species have survey requirements based on a project’s occurrence within a designated MSHCP survey area and/or based on the presence of suitable habitat. These include Narrow Endemic Plant Species (MSHCP *Volume I, Section 6.1.3*), as identified by the Narrow Endemic Plant Species Survey Areas (NEPSSA); Criteria Area Plant Species (MSHCP *Volume I, Section 6.3.2*)

identified by the Criteria Area Plant Species Survey Areas (CAPSSA); animals species (burrowing owl, mammals, amphibians) identified by survey areas (MSHCP *Volume I, Section 6.3.2*); and species associated with riparian/riverine areas and vernal pool habitats, i.e., least Bell's vireo, southwestern willow flycatcher, western yellow-billed cuckoo, and three species of listed fairy shrimp (MSHCP *Volume I, Section 6.1.2*). An additional 28 species (MSHCP *Volume I, Table 9.3*) not yet adequately conserved have species-specific objectives in order for the species to become adequately conserved. However, these species do not have project-specific survey requirements.

The goal of the MSHCP is to have a total Conservation Area in excess of 500,000 acres, including approximately 347,000 acres on existing Public/Quasi-Public (PQP) Lands, and approximately 153,000 acres of Additional Reserve Lands targeted within the MSHCP Criteria Area. The MSHCP is divided into 16 separate Area Plans, each with its own conservation goals and objectives. Within each Area Plan, the Criteria Area is divided into Subunits, and further divided into Criteria Cells and Cell Groups (a group of criteria cells). Each Cell Group and ungrouped, independent Cell has designated "criteria" for the purpose of targeting additional conservation lands for acquisition. Projects located within the Criteria Area are subject to the Habitat Evaluation and Acquisition Negotiation Strategy (HANS) process to determine if lands are targeted for inclusion in the MSHCP Reserve. In addition, all Projects located within the Criteria Area are subject to the Joint Project Review (JPR) process, where the Project is reviewed by the Regional Conservation Authority (RCA) to determine overall compliance/consistency with the biological requirements of the MSHCP.

1.5.2 Relationship of the Project Area to the MSHCP

The Project area is located within the Cities of Riverside and Norco Area Plan of the MSHCP, but is not located within the MSHCP Criteria Area [Exhibit 6 – MSHCP Overlay Map]. The Project area is not located within the MSHCP Narrow Endemic Plant Species Survey Area (NEPSSA) or the Criteria Area Plant Species Survey Area (CAPSSA). The Project area is located within the MSHCP Burrowing Owl Survey Area, but is not located within the MSHCP Mammal or Amphibian Survey Areas, or Core and Linkage areas.

Within the designated Survey Areas, the MSHCP requires habitat assessments, and focused surveys within areas of suitable habitat. For locations with positive survey results, the MSHCP requires that 90 percent of those portions of the property that provide for long-term conservation value for the identified species shall be avoided until it is demonstrated that conservation goals for the particular species have been met throughout the MSHCP. Findings of equivalency shall be made demonstrating that the 90-percent standard has been met, if applicable. If equivalency findings cannot be demonstrated, then "biologically equivalent or superior preservation" must be provided.

2.0 METHODOLOGY

In order to adequately identify biological resources in accordance with the requirements of CEQA, Glenn Lukos Associates (GLA) assembled biological data consisting of two main components:

- Performance of vegetation mapping for the Project area; and
- Performance of habitat assessments, and site-specific biological surveys to evaluate the presence/absence of special-status species in accordance with the requirements of CEQA.

The focus of the biological surveys was determined through initial site reconnaissance, a review of the CNDDB [CDFW 2017], CNPS 8th edition online inventory (CNPS 2017), Natural Resource Conservation Service (NRCS) soil data, MSHCP species and habitat maps and sensitive soil maps (Dudek 2003), other pertinent literature, and knowledge of the region. Site-specific general surveys within the Project area were conducted on foot in the proposed development areas for each target plant or animal species identified below.

Vegetation was mapped directly onto a 200-scale (1”=200’) aerial photograph following the currently accepted List of Vegetation Alliances and Associations (or Natural Communities List) or Holland (1986). The list is based on A Manual of California Vegetation, Second Edition or MCVII, which is the California expression of the National Vegetation Classification. All flora and fauna identified on site during vegetation mapping were included in floral and faunal compendia prepared for the property. Vegetation communities not listed under the above-mentioned vegetation classification systems were named based on the dominant plant species present.]

2.1 <u>Summary of Surveys</u>

GLA conducted biological studies in order to identify and analyze actual or potential impacts to biological resources associated with the Project area. Observations of all plant and wildlife species were recorded during each of the above-mentioned survey efforts [Appendix A: Floral Compendium and Appendix B: Faunal Compendium]. The studies conducted include the following:

- Performance of vegetation mapping;
- Performance of site-specific habitat assessments and biological surveys to evaluate the potential presence/absence of special-status species (or potentially suitable habitat) to the satisfaction of CEQA, federal and state regulations, and MSHCP requirements; and
- Delineation of aquatic resources (including wetlands and riparian habitat) subject to the jurisdiction of the U.S. Army Corps of Engineers (Corps), Regional Water Quality Control Board (Regional Board), and CDFW.

Table 2-1 provides a summary list of survey dates, survey types and personnel.

Table 2-1. Summary of Biological Surveys for the Project Area.

Survey Type	Survey Dates	Biologists
General Biological Survey	10/3/2017	ZW
Jurisdictional Delineation	10/20/2017, 10/24/2017, 01/31/2018	ZW, MR
Focused Burrowing Owl Surveys	To be completed during 2018 burrowing owl breeding season	TBD

ZW = Zack West MR = Martin Rasnick TBD= To Be Determined

Individual plants and wildlife species are evaluated in this report based on their "special-status." For the purpose of this report, plants were considered "special-status" based on one or more of the following criteria:

- Listing through the Federal and/or State Endangered Species Act (ESA);
- Occurrence in the CNPS Rare Plant Inventory (Rank 1A/1B, 2A/2B, 3, or 4); and/or
- Occurrence in the CNDDB inventory.

Wildlife species were considered "special-status" based on one or more of the following criteria:

- Listing through the Federal and/or State ESA; and
- Designation by the State as a Species of Special Concern (SSC) or California Fully Protected (CFP) species.

Vegetation communities and habitats were considered "special-status" based on one or more of the following criteria:

- Occurrence in the CNDDB inventory; and
- Riparian habitat.

2.2 Botanical Resources

A site-specific survey program was designed to accurately document the botanical resources within the Project area, and consisted of five components: (1) a literature search; (2) preparation of a list of target special-status plant species and sensitive vegetation communities that could occur within the Project area; (3) general field reconnaissance surveys; (4) vegetation mapping according to the Preliminary Descriptions of the Terrestrial Natural Communities of California (Holland 1986); and (5) habitat assessments for special-status plant species that could pose a potential constraint under CEQA, taking into account that the Project area is not located within a NEPSSA or CASSA; therefore, does not have MSHCP survey requirements for narrow endemic plant species.

2.2.1 Literature Search

Prior to conducting fieldwork, pertinent literature on the flora of the region was examined. A thorough archival review was conducted using available literature and other historical records. These resources included the following:

- California Native Plant Society, Rare Plant Program. 2017. Inventory of Rare and Endangered Plants of California (online edition, v8-03 0.39) (CNPS 2017); and

- CNDDB for the USGS 7.5' quadrangles: Fontana, Lake Matthews, Perris, Redlands, Riverside East, Riverside West, San Bernardino South, Steele Peak, and Sunnymead, California (CNDDB 2017).

2.2.2 Vegetation Mapping

Vegetation communities within the Project area were mapped according to Preliminary Descriptions of the Terrestrial Natural Communities of California (Holland 1986). Where necessary, deviations were made when areas did not fit into exact habitat descriptions. These vegetation communities were named based on the dominant plant species present. Plant communities were mapped in the field directly onto a 200-scale (1"=200') aerial photograph. A vegetation map is included as Exhibit 4. Representative site photographs are included as Exhibit 8.

2.2.3 Special-Status Plant Species and Habitats Evaluated for the Project Area

A literature search was conducted to obtain a list of special status plants with the potential to occur within the Project area. The CNDDB was initially consulted to determine well-known occurrences of plants and habitats of special concern in the region. Other sources used to develop a list of target species for the survey program included the CNPS online inventory (2017).

Based on this information, vegetation profiles and a list of target sensitive plant species and habitats that could occur within the Project area were developed and incorporated into a mapping and survey program to achieve the following goals: (1) characterize the vegetation associations and land use; (2) prepare a detailed floristic compendium; (3) identify the potential for any special status plants that may occur within the Project area; and (4) prepare a map showing the distribution of any sensitive botanical resources associated with the Project area, if applicable.

The Project area is not located within the MSHCP Narrow Endemic Plant Species Survey Area (NEPSSA) or Criteria Area Plant Species Survey Area (CAPSSA). As such, focused plant surveys are not required pursuant to the MSHCP.

2.2.4 Botanical Surveys

GLA biologist Zack West visited the site on October 3, 2017 to conduct general plant surveys and a habitat assessment for special-status plant species that could potentially pose a constraint

under CEQA. An aerial photograph, a soil map, and/or a topographic map were used to determine the community types and other physical features that may support sensitive and uncommon taxa or communities within the Project area. Surveys were conducted by following meandering transects within target areas of suitable habitat. All plant species encountered during the field surveys were identified and recorded. A complete list of the plant species observed is provided in Appendix A. Scientific nomenclature and common names used in this report follow Baldwin et al (2012), and Munz (1974).

2.3 Wildlife Resources

Wildlife species were evaluated and detected during field surveys by sight, call, tracks, and scat. Site reconnaissance was conducted in such a manner as to allow inspection of the entire Project area by direct observation, including the use of binoculars. Observations of physical evidence and direct sightings of wildlife were recorded in field notes during the visit. A complete list of wildlife species observed within the Project area is provided in Appendix B. Scientific nomenclature and common names for vertebrate species referred to in this report follow the Complete List of Amphibian, Reptile, Bird, and Mammal Species in California (CDFG 2008), Standard Common and Scientific Names for North American Amphibians, Turtles, Reptiles, and Crocodilians 6th Edition, Collins and Taggert (2009) for amphibians and reptiles, and the American Ornithologists' Union Checklist 7th Edition (2009) for birds. The methodology (including any applicable survey protocols) utilized to conduct general surveys, habitat assessments, and/or focused surveys for special-status animals are included below.

2.3.1 General Surveys

Birds

During the general biological and reconnaissance survey within the Project area, birds were identified incidentally within each habitat type. Birds were detected by both direct observation and by vocalizations, and were recorded in field notes.

Mammals

During general biological and reconnaissance survey within the Project area, mammals were identified incidentally within each habitat type. Mammals were detected both by direct observations and by the presence of diagnostic sign (i.e., tracks, burrows, scat, etc.).

Reptiles and Amphibians

During general biological and reconnaissance surveys within the Project area, reptiles and amphibians were identified incidentally during surveys within each habitat type. Habitats were examined for diagnostic reptile sign, which include shed skins, scat, tracks, snake prints, and lizard tail drag marks. All reptiles and amphibian species observed, as well as diagnostic sign, were recorded in field notes.

2.3.2 Special-Status Animal Species Evaluated for the Project Area

A literature search was conducted in order to obtain a list of special-status wildlife species with the potential to occur within the Project area. Species were evaluated based on two factors, including: 1) species identified by the CNDDB as occurring (either currently or historically) on or in the vicinity of the Project area, and 2) any other special-status animals that are known to occur within the vicinity of the Project area, or for which potentially suitable habitat occurs on the Project area.

2.3.3 Habitat Assessment for Special Status Animal Species

GLA biologist Zack West conducted habitat assessments for special-status animal species on October 3, 2017. An aerial photograph, soil map and/or topographic map were used to determine the community types and other physical features that may support special-status and uncommon taxa within the Project area.

2.3.4 Focused Surveys for Special-Status Animals Species

Burrowing Owl

Portions of the Project area are located within the MSHCP survey area for the burrowing owl (*Athene cunicularia*). The habitat assessment for this species confirmed the presence of potential habitat and that suitable burrows area present. Focused surveys are scheduled to be conducted during the 2018 burrowing owl breeding season (March 1 through August 31). The results of the focused surveys will be provided in a memorandum under a separate cover.

2.4 Jurisdictional Delineation

Prior to beginning the field delineation, a 200-scale color aerial photograph and the previously cited USGS topographic maps were examined to determine the locations of potential areas of Corps/CDFW jurisdiction. Suspected jurisdictional areas were field checked by GLA biologist Zack West and regulatory specialist Martin Rasnick for the presence of definable channels and/or wetland vegetation, soils and hydrology. Potential wetland habitats at the subject site were evaluated using the methodology set forth in the U.S. Army Corps of Engineers 1987 Wetland Delineation Manual[1] (Wetland Manual) and the 2008 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Supplement (Arid West Supplement)[2]. The presence of an Ordinary High Water Mark (OHWM) was determined using the 2008 Field Guide to Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States[3] in conjunction with the Updated Datasheet for the Identification of

---

[1] Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual, Technical Report Y-87-1, U.S. Army Engineer Waterways Experimental Station, Vicksburg, Mississippi.

[2] U.S. Army Corps of Engineers. 2008. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Supplement (Version 2.0). Ed. J.S. Wakeley, R.W. Lichvar, and C.V. Noble. ERDC/EL TR-06-16. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

[3] Lichvar, R. W., and S. M. McColley. 2008. A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States. ERDC/CRREL TR-08-12. Hanover, NH: U.S.

the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States.[4] While in the field the limits of the OHWM, wetlands, and CDFW jurisdiction were recorded using GPS technology and/or on copies of the aerial photography. Other data were recorded onto the appropriate datasheets. The results of the Jurisdictional Delineation are depicted on Exhibits 3A – Corps/RWQCB Jurisdictional Delineation Map and 3B – CDFW Jurisdictional Delineation Map.

2.5 MSHCP Riparian/Riverine Areas and Vernal Pools

GLA biologist Zack West and regulatory specialist Martin Rasnick surveyed the site for riparian/riverine areas and vernal pool/seasonal pool habitat. *Volume I, Section 6.1.2* of the MSHCP describes the process through which protection of riparian/riverine areas and vernal pools would occur within the MSHCP Plan Area. The purpose is to ensure that the biological functions and values of these areas throughout the MSHCP Plan Area are maintained such that habitat values for species inside the MSHCP Conservation Area are maintained. The MSHCP requires that as projects are proposed within the overall Plan Area, the effect of those projects on riparian/riverine areas and vernal pools must be addressed.

The MSHCP defines riparian/riverine areas as *lands which contain Habitat dominated by trees, shrubs, persistent emergent mosses and lichens, which occur close to or which depend upon soils moisture from a nearby fresh water source; or areas with fresh water flow during all or a portion of the year.*

The MSHCP defines vernal pools as *seasonal wetlands that occur in depression areas that have wetlands indicators of all three parameters (soils, vegetation, and hydrology) during the wetter portion of the growing season but normally lack wetland indictors of hydrology and/or vegetation during the drier portion of the growing season.*

With the exception of wetlands created for the purpose of providing wetland habitat or resulting from human actions to create open waters or from the alteration of natural stream courses, areas demonstrating characteristics as described above which are artificially created are not included in these definitions.

Army Engineer Research and Development Center, Cold Regions Research and Engineering Laboratory. (http://www.crrel.usace.army.mil/library/technicalreports/ERDC-CRREL-TR-08-12.pdf).

[4] Curtis, Katherine E. and Robert Lichevar. 2010. Updated Datasheet for the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States. ERDC/CRREL TN-10-1. Hanover, NH: U.S. Army Engineer Research and Development Center, Cold Regions Research and Engineering Laboratory.

3.0 REGULATORY SETTING

The proposed Project is subject to state and federal regulations associated with a number of regulatory programs. These programs often overlap and were developed to protect natural resources, including: state- and federally listed plants and animals; aquatic resources including rivers and creeks, ephemeral streambeds, wetlands, and areas of riparian habitat; other special-status species which are not listed as threatened or endangered by the state or federal governments; and other special-status vegetation communities.

3.1 State and/or Federally Listed Plants or Animals

3.1.1 State of California Endangered Species Act

California's Endangered Species Act (CESA) defines an endangered species as "a native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant which is in serious danger of becoming extinct throughout all, or a significant portion, of its range due to one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, or disease." The State defines a threatened species as "a native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant that, although not presently threatened with extinction, is likely to become an endangered species in the foreseeable future in the absence of the special protection and management efforts required by this chapter. Any animal determined by the commission as rare on or before January 1, 1985 is a threatened species." Candidate species are defined as "a native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant that the commission has formally noticed as being under review by the department for addition to either the list of endangered species or the list of threatened species, or a species for which the commission has published a notice of proposed regulation to add the species to either list." Candidate species may be afforded temporary protection as though they were already listed as threatened or endangered at the discretion of the Fish and Game Commission. Unlike the Federal Endangered Species Act (FESA), CESA does not list invertebrate species.

Article 3, Sections 2080 through 2085, of the CESA addresses the taking of threatened, endangered, or candidate species by stating "No person shall import into this state, export out of this state, or take, possess, purchase, or sell within this state, any species, or any part or product thereof, that the commission determines to be an endangered species or a threatened species, or attempt any of those acts, except as otherwise provided." Under the CESA, "take" is defined as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." Exceptions authorized by the state to allow "take" require permits or memoranda of understanding and can be authorized for endangered species, threatened species, or candidate species for scientific, educational, or management purposes and for take incidental to otherwise lawful activities. Sections 1901 and 1913 of the California Fish and Game Code provide that notification is required prior to disturbance.

3.1.2 Federal Endangered Species Act

The FESA of 1973 defines an endangered species as "any species that is in danger of extinction throughout all or a significant portion of its range." A threatened species is defined as "any

species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." Under provisions of Section 9(a)(1)(B) of the FESA it is unlawful to "take" any listed species. "Take" is defined in Section 3(18) of FESA: "...harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Further, the USFWS, through regulation, has interpreted the terms "harm" and "harass" to include certain types of habitat modification that result in injury to, or death of species as forms of "take." These interpretations, however, are generally considered and applied on a case-by-case basis and often vary from species to species. In a case where a property owner seeks permission from a Federal agency for an action that could affect a federally listed plant and animal species, the property owner and agency are required to consult with USFWS. Section 9(a)(2)(b) of the FESA addresses the protections afforded to listed plants.

3.1.3 State and Federal Take Authorizations for Listed Species

Federal or state authorizations of impacts to or incidental take of a listed species by a private individual or other private entity would be granted in one of the following ways:

- Section 7 of the FESA stipulates that any federal action that may affect a species listed as threatened or endangered requires a formal consultation with USFWS to ensure that the action is not likely to jeopardize the continued existence of the listed species or result in destruction or adverse modification of designated critical habitat. 16 U.S.C. 1536(a)(2).
- In 1982, the FESA was amended to give private landowners the ability to develop Habitat Conservation Plans (HCP) pursuant to Section 10(a) of the FESA. Upon development of an HCP, the USFWS can issue incidental take permits for listed species where the HCP specifies at minimum, the following: (1) the level of impact that will result from the taking, (2) steps that will minimize and mitigate the impacts, (3) funding necessary to implement the plan, (4) alternative actions to the taking considered by the applicant and the reasons why such alternatives were not chosen, and (5) such other measures that the Secretary of the Interior may require as being necessary or appropriate for the plan.
- Sections 2090-2097 of the CESA require that the state lead agency consult with CDFW on projects with potential impacts on state-listed species. These provisions also require CDFW to coordinate consultations with USFWS for actions involving federally listed as well as state-listed species. In certain circumstances, Section 2080.1 of the California Fish and Game Code allows CDFW to adopt the federal incidental take statement or the 10(a) permit as its own based on its findings that the federal permit adequately protects the species under state law.

3.1.4 Take Authorizations Pursuant to the MSHCP

The Western Riverside County MSHCP was adopted on June 17, 2003, and an Implementing Agreement (IA) was executed between the Federal and State Wildlife Agencies (USFWS and CDFW) and participating entities. The MSHCP is a comprehensive habitat conservation-planning program for western Riverside County. The intent of the MSHCP is to preserve native vegetation and meet the habitat needs of multiple species, rather than focusing preservation efforts on one species at a time. As such, the MSHCP is intended to streamline review of individual projects with respect to the species and habitats addressed in the MSHCP, and to provide for an overall

Conservation Area that would be of greater benefit to biological resources than would result from a piecemeal regulatory approach. The MSHCP provides coverage (including take authorization for listed species) for special-status plant and animal species, as well as mitigation for impacts to sensitive species.

Through agreements with the U.S. Fish and Wildlife Service (USFWS) and the California Department of Fish and Wildlife (CDFW), the MSHCP designates 146 special-status animal and plant species that receive some level of coverage under the plan. Of the 146 "Covered Species" designated under the MSHCP, the majority of these species have no additional survey/conservation requirements. In addition, through project participation with the MSHCP, the MSHCP provides mitigation for project-specific impacts to Covered Species so that the impacts would be reduced to below a level of significance pursuant to CEQA. As noted above, project-specific survey requirements exist for species designated as "Covered Species not yet adequately conserved". These include Narrow Endemic Plant Species, as identified by the Narrow Endemic Plant Species Survey Areas (NEPSSA); Criteria Area Plant Species identified by the Criteria Area Species Survey Areas (CASSA); animal species as identified by survey area; and plant and animal species associated with riparian/riverine areas and vernal pool habitats (*Volume I, Section 6.1.2* of the MSHCP document).

3.2 California Environmental Quality Act

3.2.1 CEQA Guidelines Section 15380

CEQA requires evaluation of a project's impacts on biological resources and provides guidelines and thresholds for use by lead agencies for evaluating the significance of proposed impacts. Sections 5.1.1 and 5.2.2 below set forth these thresholds and guidelines. Furthermore, pursuant to the CEQA Guidelines Section 15380, CEQA provides protection for non-listed species that could potentially meet the criteria for state listing. For plants, CDFW recognizes that plants on Lists 1A, 1B, or 2 of the CNPS *Inventory of Rare and Endangered Plants in California* may meet the criteria for listing and should be considered under CEQA. CDFW also recommends protection of plants, which are regionally important, such as locally rare species, disjunct populations of more common plants, or plants CNPS Ranked 3 or 4.

3.2.2 Non-Listed Special-Status Plants, Wildlife and Vegetation Communities Evaluated Under CEQA

Federally Designated Special-Status Species

Within recent years, the USFWS instituted changes in the listing status of candidate species. Former C1 (candidate) species are now referred to simply as candidate species and represent the only candidates for listing. Former C2 species (for which the USFWS had insufficient evidence to warrant listing) and C3 species (either extinct, no longer a valid taxon or more abundant than was formerly believed) are no longer considered as candidate species. Therefore, these species are no longer maintained in list form by the USFWS, nor are they formally protected. This term is employed in this document, but carries no official protections. All references to federally protected species in this report (whether listed, proposed for listing, or candidate) include the

most current published status or candidate category to which each species has been assigned by USFWS.

For this report the following acronyms are used for federal special-status species:

- FE Federally listed as Endangered
- FT Federally listed as Threatened
- FPE Federally proposed for listing as Endangered
- FPT Federally proposed for listing as Threatened
- FC Federal Candidate Species (former C1 species)

State-Designated Special-Status Species

Some mammals and birds are protected by the state as Fully Protected (SFP) Mammals or Fully Protected Birds, as described in the California Fish and Game Code, Sections 4700 and 3511, respectively. California SSC are designated as vulnerable to extinction due to declining population levels, limited ranges, and/or continuing threats. This list is primarily a working document for the CDFW's CNDDB project. Informally listed taxa are not protected, but warrant consideration in the preparation of biotic assessments. For some species, the CNDDB is only concerned with specific portions of the life history, such as roosts, rookeries, or nest sites.

For this report the following acronyms are used for State special-status species:

- SE State-listed as Endangered
- ST State-listed as Threatened
- SR State-listed as Rare
- SCE State Candidate for listing as Endangered
- SCT State Candidate for listing as Threatened
- SFP State Fully Protected
- SP State Protected
- SSC State Species of Special Concern

California Native Plant Society

The CNPS is a private plant conservation organization dedicated to the monitoring and protection of sensitive species in California. The CNPS's Eighth Edition of the *California Native Plant Society's Inventory of Rare and Endangered Plants of California* separates plants of interest into five ranks. CNPS has compiled an inventory comprised of the information focusing on geographic distribution and qualitative characterization of Rare, Threatened, or Endangered vascular plant species of California. The list serves as the candidate list for listing as threatened and endangered by CDFW. CNPS has developed five categories of rarity that are summarized in Table 3-1.

Table 3-1. CNPS Ranks 1, 2, 3, & 4, and Threat Code Extensions

CNPS Rank	Comments
Rank 1A – Plants Presumed Extirpated in California and Either Rare or Extinct Elsewhere	Thought to be extinct in California based on a lack of observation or detection for many years.
Rank 1B – Plants Rare, Threatened, or Endangered in California and Elsewhere	Species, which are generally rare throughout their range that are also judged to be vulnerable to other threats such as declining habitat.
Rank 2A – Plants presumed Extirpated in California, But Common Elsewhere	Species that are presumed extinct in California but more common outside of California
Rank 2B – Plants Rare, Threatened or Endangered in California, But More Common Elsewhere	Species that are rare in California but more common outside of California
Rank 3 – Plants About Which More Information Is Needed (A Review List)	Species that are thought to be rare or in decline but CNPS lacks the information needed to assign to the appropriate list. In most instances, the extent of surveys for these species is not sufficient to allow CNPS to accurately assess whether these species should be assigned to a specific rank. In addition, many of the Rank 3 species have associated taxonomic problems such that the validity of their current taxonomy is unclear.
Rank 4 – Plants of Limited Distribution (A Watch List)	Species that are currently thought to be limited in distribution or range whose vulnerability or susceptibility to threat is currently low. In some cases, as noted above for Rank 3 species, CNPS lacks survey data to accurately determine status in California. Many species have been placed on Rank 4 in previous editions of the "Inventory" and have been removed as survey data has indicated that the species are more common than previously thought. CNPS recommends that species currently included on this list should be monitored to ensure that future substantial declines are minimized.
Extension	**Comments**
.1 – Seriously endangered in California	Species with over 80% of occurrences threatened and/or have a high degree and immediacy of threat.
.2 – Fairly endangered in California	Species with 20-80% of occurrences threatened.
.3 – Not very endangered in California	Species with <20% of occurrences threatened or with no current threats known.

3.3 Jurisdictional Waters

3.3.1 Army Corps of Engineers

Pursuant to Section 404 of the Clean Water Act, the Corps regulates the discharge of dredged and/or fill material into waters of the United States. The term "waters of the United States" is defined in Corps regulations at 33 CFR Part 328.3(a)[5] as:

> *(1) All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;*
> *(2) All interstate waters including interstate wetlands;*
> *(3) All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect foreign commerce including any such waters:*
> > *(i) Which are or could be used by interstate or foreign travelers for recreational or other purposes; or*
> > *(ii) From which fish or shell fish are or could be taken and sold in interstate or foreign commerce; or*
> > *(iii) Which are used or could be used for industrial purpose by industries in interstate commerce...*
> *(4) All impoundments of waters otherwise defined as waters of the United States under the definition;*
> *(5) Tributaries of waters identified in paragraphs (a) (1)-(4) of this section;*
> *(6) The territorial seas;*
> *(7) Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a) (1)-(6) of this section.*
> (8) Waters of the United States do not include prior converted cropland.[6] Notwithstanding the determination of an area's status as prior converted cropland by any other federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with the EPA.

---

[5] On October 9, 2015, the U.S. 6th District Circuit Court of Appeals ordered a nationwide stay on the Corps and EPA's definition of waters of the United States under the Clean Water Rule ("Clean Water Rule: Definition of 'Waters of the United States"; Final Rule," 80 Federal Register 124 (29 June, 2015), pp. 37054-37127). As a result, the Corps' regulations that were in effect prior to the August 28, 2015 Clean Water Rule is again in effect until such a time as the Court order is satisfied, if this occurs. In addition, President Trump signed an Executive Order on February 28, 2017 that instructs the EPA and Corps to formally reconsider the Rule, which could lead to a re-write of the law or a complete repeal.

[6] The term "prior converted cropland" is defined in the Corps' Regulatory Guidance Letter 90-7 (dated September 26, 1990) as "wetlands which were both manipulated (drained or otherwise physically altered to remove excess water from the land) and cropped before 23 December 1985, to the extent that they no longer exhibit important wetland values. Specifically, prior converted cropland is <u>inundated for no more than 14 consecutive days</u> during the growing season…." [Emphasis added.]

Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA (other than cooling ponds as defined in 40 CFR 123.11(m) which also meet the criteria of this definition) are not waters of the United States.

In the absence of wetlands, the limits of Corps jurisdiction in non-tidal waters, such as intermittent streams, extend to the OHWM which is defined at 33 CFR 328.3(e) as:

> *...that line on the shore established by the fluctuation of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.*

1. Solid Waste Agency of Northern Cook County v. United States Army Corps of Engineers, et al.

Pursuant to Article I, Section 8 of the U.S. Constitution, federal regulatory authority extends only to activities that affect interstate commerce. In the early 1980s the Corps interpreted the interstate commerce requirement in a manner that restricted Corps jurisdiction on isolated (intrastate) waters. On September 12, 1985, EPA asserted that Corps jurisdiction extended to isolated waters that are used or could be used by migratory birds or endangered species, and the definition of "waters of the United States" in Corps regulations was modified as quoted above from 33 CFR 328.3(a).

On January 9, 2001, the Supreme Court of the United States issued a ruling on *Solid Waste Agency of Northern Cook County v. United States Army Corps of Engineers, et al.* (SWANCC). In this case the Court was asked whether use of an isolated, intrastate pond by migratory birds is a sufficient interstate commerce connection to bring the pond into federal jurisdiction of Section 404 of the Clean Water Act.

The written opinion notes that the court's previous support of the Corps' expansion of jurisdiction beyond navigable waters (*United States v. Riverside Bayview Homes, Inc*.) was for a wetland that <u>abutted</u> a navigable water and that the court did not express any opinion on the question of the authority of the Corps to regulate wetlands that are not adjacent to bodies of open water. The current opinion goes on to state:

> *In order to rule for the respondents here, we would have to hold that the jurisdiction of the Corps extends to ponds that are not adjacent to open water. We conclude that the text of the statute will not allow this.*

Therefore, we believe that the court's opinion goes beyond the migratory bird issue and says that no isolated, intrastate water is subject to the provisions of Section 404(a) of the Clean Water Act (regardless of any interstate commerce connection). However, the Corps and EPA have issued a joint memorandum which states that they are interpreting the ruling to address only the migratory bird issue and leaving the other interstate commerce clause nexuses intact.

2. Rapanos v. United States and Carabell v. United States

On June 5, 2007, the U.S. Environmental Protection Agency (EPA) and Corps issued joint guidance that addresses the scope of jurisdiction pursuant to the Clean Water Act in light of the Supreme Court's decision in the consolidated cases *Rapanos v. United States* and *Carabell v. United States* ("Rapanos"). The chart below was provided in the joint EPA/Corps guidance.

For Project areas that include waters other than Traditional Navigable Waters (TNWs) and/or their adjacent wetlands or Relatively Permanent Waters (RPMs) tributary to TNWs and/or their adjacent wetlands as set forth in the chart below, the Corps must apply the significant nexus standard.

For "isolated" waters or wetlands, the joint guidance also requires an evaluation by the Corps and EPA to determine whether other interstate commerce clause nexuses, not addressed in the SWANCC decision are associated with isolated features on Project areas for which a jurisdictional determination is being sought from the Corps.

The agencies will assert jurisdiction over the following waters:

- Traditional navigable waters
- Wetlands adjacent to traditional navigable waters
- Non-navigable tributaries of traditional navigable waters that are relatively permanent where the tributaries typically flow year-round or have continuous flow at least seasonally (e.g., typically three months)
- Wetlands that directly abut such tributaries

The agencies will decide jurisdiction over the following waters based on a fact-specific analysis to determine whether they have a significant nexus with a traditional navigable water:

- Non-navigable tributaries that are not relatively permanent
- Wetlands adjacent to non-navigable tributaries that are not relatively permanent
- Wetlands adjacent to but that do not directly abut a relatively permanent non-navigable tributary

The agencies generally will not assert jurisdiction over the following features:

- Swales or erosional features (e.g., gullies, small washes characterized by low volume, infrequent or short duration flow)
- Ditches (including roadside ditches) excavated wholly in and draining only uplands and that do not carry a relatively permanent flow of water

The agencies will apply the significant nexus standard as follows:

- A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by all wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical and biological integrity of downstream traditional navigable waters
- Significant nexus includes consideration of hydrologic and ecologic factors

3. Wetland Definition Pursuant to Section 404 of the Clean Water Act

The term “wetlands” (a subset of “waters of the United States”) is defined at 33 CFR 328.3(b) as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support...a prevalence of vegetation typically adapted for life in saturated soil conditions." In 1987 the Corps published a manual to guide its field personnel in determining jurisdictional wetland boundaries. The methodology set forth in the 1987 Wetland Delineation Manual and the Arid West Supplement generally require that, in order to be considered a wetland, the vegetation, soils, and hydrology of an area exhibit at least minimal hydric characteristics. While the manual and Supplement provide great detail in methodology and allow for varying special conditions, a wetland should normally meet each of the following three criteria:

- more than 50 percent of the dominant plant species at the site must be typical of wetlands (i.e., rated as facultative or wetter in the Arid West 2016 Regional Wetland Plant List[7] [8];

- soils must exhibit physical and/or chemical characteristics indicative of permanent or periodic saturation (e.g., a gleyed color, or mottles with a matrix of low chroma indicating a relatively consistent fluctuation between aerobic and anaerobic conditions); and

- Whereas the 1987 Manual requires that hydrologic characteristics indicate that the ground is saturated to within 12 inches of the surface for at least five percent of the growing season during a normal rainfall year, the Arid West Supplement does not include a quantitative criteria with the exception for areas with “problematic hydrophytic vegetation”, which require a minimum of 14 days of ponding to be considered a wetland.

3.3.2 Regional Water Quality Control Board

Section 401 of the Clean Water Act requires any applicant for a Section 404 permit to obtain certification from the State that the discharge (and the operation of the facility being constructed) will comply with the applicable effluent limitation and water quality standards. In California, this 401 certification is obtained from the Regional Water Quality Control Board. The Corps, by law, cannot issue a Section 404 permit until a 401 certification is issued or waived.

[7] Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016. Arid West 2016 Regional Wetland Plant List. Phytoneuron 2016-30: 1-17. Published 28 April 2016.

[8] Note the Corps also publishes a National List of Plant Species that Occur in Wetlands (Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016. The National Wetland Plant List: 2016 wetland ratings. Phytoneuron 2016-30: 1-17. Published 28 April 2016.); however, the Regional Wetland Plant List should be used for wetland delineations within the Arid West Region.

Subsequent to the SWANCC decision, the Chief Counsel for the State Water Resources Control Board issued a memorandum that addressed the effects of the SWANCC decision on the Section 401 Water Quality Certification Program. The memorandum states:

> *California's right and duty to evaluate certification requests under section 401 is pendant to (or dependent upon) a valid application for a section 404 permit from the Corps, or another application for a federal license or permit. Thus, if the Corps determines that the water body in question is not subject to regulation under the COE's 404 program, for instance, no application for 401 certification will be required…*
>
> *The SWANCC decision does not affect the Porter Cologne authorities to regulate discharges to isolated, non-navigable waters of the states….*
>
> *Water Code section 13260 requires "any person discharging waste, or proposing to discharge waste, within any region that could affect the waters of the state to file a report of discharge (an application for waste discharge requirements)." (Water Code § 13260(a)(1) (emphasis added).) The term "waters of the state" is defined as "any surface water or groundwater, including saline waters, within the boundaries of the state." (Water Code § 13050(e).) The U.S. Supreme Court's ruling in SWANCC has no bearing on the Porter-Cologne definition. While all waters of the United States that are within the borders of California are also waters of the state, the converse is not true—waters of the United States is a subset of waters of the state. Thus, since Porter-Cologne was enacted California always had and retains authority to regulate discharges of waste into any waters of the state, regardless of whether the COE has concurrent jurisdiction under section 404. The fact that often Regional Boards opted to regulate discharges to, e.g., vernal pools, through the 401 program in lieu of or in addition to issuing waste discharge requirements (or waivers thereof) does not preclude the regions from issuing WDRs (or waivers of WDRs) in the absence of a request for 401 certification….*

In this memorandum, the SWRCB's Chief Counsel has made the clear assumption that fill material to be discharged into isolated waters of the United States is to be considered equivalent to "waste" and therefore subject to the authority of the Porter Cologne Water Quality Act.

3.3.3 California Department of Fish and Wildlife

Pursuant to Division 2, Chapter 6, Sections 1600-1603 of the California Fish and Game Code, the CDFW regulates all diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake, which supports fish or wildlife.

CDFW defines a stream (including creeks and rivers) as "a body of water that flows at least periodically or intermittently through a bed or channel having banks and supports fish or other aquatic life. This includes watercourses having surface or subsurface flow that supports or has supported riparian vegetation." CDFW's definition of "lake" includes "natural lakes or man-

made reservoirs." CDFW also defines a stream as “a body of water that flows, or has flowed, over a given course during the historic hydrologic regime, and where the width of its course can reasonably be identified by physical or biological indicators.”

It is important to note that the Fish and Game Code defines fish and wildlife to include: all wild animals, birds, plants, fish, amphibians, invertebrates, reptiles, and related ecological communities including the habitat upon which they depend for continued viability (FGC Division 5, Chapter 1, section 45 and Division 2, Chapter 1 section 711.2(a) respectively). Furthermore, Division 2, Chapter 5, Article 6, Section 1600 et seq. of the California Fish and Game Code does not limit jurisdiction to areas defined by specific flow events, seasonal changes in water flow, or presence/absence of vegetation types or communities.

4.0 RESULTS

This section provides the results of general biological surveys, vegetation mapping, habitat assessments for special-status plants and wildlife, an assessment for MSHCP riparian/riverine areas and vernal pools, and a jurisdictional delineation for Waters of the United States (including wetlands) subject to the jurisdiction of the Corps and Regional Board, and streams (including riparian vegetation) and lakes subject to the jurisdiction of CDFW.

4.1 Existing Conditions

The Project area is situated in the Alessandro Heights area in the City of Riverside, and is made up of gently rolling hills and arroyos associated with the Hawarden Hills. Elevations on site range from 1,275 to 1,370 feet above mean sea level (amsl), and generally slope from north to south.

4.2 Vegetation Mapping

During vegetation mapping of the Project area, four different vegetation communities/land cover types were identified. Table 4-1 provides a summary of vegetation communities/land cover types and the corresponding acreage. Detailed descriptions of each vegetation community/land cover type follow the table. A Vegetation Map is attached as Exhibit 5. Photographs depicting the various vegetation communities/land cover types are attached as Exhibit 8 – Site Photographs. *Sum of individual rows may vary from Total due to rounding

Table 4-1. Summary of Vegetation Communities/Land Cover Types for the Project Area

Vegetation Community/Land Cover Type	Project Area (acres)*	Project Impact (acres)
Disturbed Riversidean Sage Scrub	2.94	0.90
Mulefat Scrub	0.05	0.00
Non-native Grassland	7.21	6.90
Developed/Disturbed	6.58	6.42
Total	**16.80**	**14.22**

*Sum of individual rows may vary from Total due to rounding

4.2.1 *Disturbed Riversidean Sage Scrub*

Approximately 2.94 acres of the Project area is vegetated with disturbed Riversidean sage scrub primarily consisting of areas adjacent to on-site drainage features. This vegetation community has been subject to intensive human disturbance in the form of disking, which appears to have been on-going for more than a decade based on review of aerial photographs from various years (Google Earth 2017). Dominant species observed in association with this vegetation community on site include brittle bush (*Encelia farinosa*), California buckwheat (*Eriogonum fasciculatum*), deerweed (*Acmispon glaber*), sand aster (*Corethrogyne filaginifolia*), short-pod mustard (*Hirschfeldia incana*), Russian thistle (*Salsola tragus*), foxtail chess (*Bromus madritensis*), and Mediterranean grass (*Schismus barbatus*).

4.2.2 *Mule Fat Scrub*

Approximately 0.05 acre of the Project area located within the two main drainages on site is vegetated with mule fat scrub. This vegetation community consists of sparse areas vegetated nearly entirely with a monotypic stands of mule fat (*Baccharis salicifolia*).

4.2.3 *Non-native Grassland*

Approximately 7.21 acres of the Project area is vegetated with non-native grassland. As with the disturbed Riversidean sage scrub, this vegetation community has been subject to intensive human disturbance in the form of disking, which appears to have been on-going for more than a decade based on review of aerial photographs from various years (Google Earth 2017), and is dominated by grasses and forbs such as common ripgut grass (*Bromus diandrus*), short-pod mustard, Russian thistle, wall barley (*Hordeum murinum*), Mediterranean grass (*Schismus barbatus*), and rattlesnake weed (*Euphorbia albomarginata*).

4.2.4 *Developed/Disturbed*

Approximately 6.58 acres located throughout the Project area consist of developed disturbed land. These areas consist of a rough-graded area and unnamed access roads.

4.3 Special-Status Vegetation Communities

The CNDDB identifies the following seven special-status vegetation communities for the Fontana, Lake Matthews, Perris, Redlands, Riverside East, Riverside West, San Bernardino South, Steele Peak, and Sunnymead , California quadrangle maps: Southern California Arroyo Chub/Santa Ana Sucker Stream, Southern Coast Live Oak Riparian Forest, Southern Cottonwood Willow Riparian Forest, Southern Riparian Forest, Southern Riparian Scrub, Southern Sycamore Alder Riparian Woodland, and Southern Willow Scrub. The Project area contains Mule Fat Scrub, a vegetation type that is treated as special-status due to its riparian association, and disturbed Riversidean sage scrub a vegetation type that is treated as special-status due to its regional decline over recent decades.

4.4 Special-Status Plants

Table 4-2 provides a list of special-status plants evaluated for the Project area through general biological surveys and habitat assessments. Species were evaluated based on the following factors: 1) species identified by the CNDDB and CNPS as occurring (either currently or historically) on or in the vicinity of the Project area, 2) applicable MSHCP survey areas, and 3) any other special-status plants that are known to occur within the vicinity of the Project area, or for which potentially suitable habitat occurs within the site.

Table 4-2. Special-Status Plants Evaluated for the Project Area

Status

Federal
FE – Federally Endangered
FT – Federally Threatened
FC – Federal Candidate

State
SE – State Endangered
ST – State Threatened

CNPS
Rank 1A – Plants presumed extirpated in California and either rare or extinct elsewhere.
Rank 1B – Plants rare, threatened, or endangered in California and elsewhere.
Rank 2A – Plants presumed extirpated in California, but common elsewhere.
Rank 2B – Plants rare, threatened, or endangered in California, but more common elsewhere.
Rank 3 – Plants about which more information is needed (a review list).
Rank 4 – Plants of limited distribution (a watch list).

MSHCP
MSHCP = No additional action necessary
MSHCP(a) = Surveys may be required as part of wetlands mapping
MSHCP(b) = Surveys may be required within the Narrow Endemic Plant Species survey area
MSHCP(c) = Surveys may be required within locations shown on survey maps
MSHCP(d) = Surveys may be required within Criteria Area
MSHCP(e) = Conservation requirements identified in species-specific conservation objectives need to be met before classified as a Covered Species
MSHCP(f) = Covered species when a Memorandum of Understanding is executed with the Forest Service Land

Threat Code extension
.1 – Seriously endangered in California (over 80% occurrences threatened)
.2 – Fairly endangered in California (20-80% occurrences threatened)
.3 – Not very endangered in California (<20% of occurrences threatened or no current threats known)

Occurrence

- Does not occur – The site does not contain habitat for the species and/or the site does not occur within the geographic range of the species.
- Absent – The site contains suitable habitat for the species, but the species has been confirmed absent through site inspection.
- Not expected to occur – The species is not expected to occur onsite due to low habitat quality, however absence cannot be ruled out.
- Potential to occur – The species has a potential to occur onsite based on suitable habitat, however its presence/absence could not be confirmed.
- Present – The species was detected onsite incidentally or through focused surveys.

Species Name	Status	Habitat Requirements	Occurrence
chaparral sand-verbena *Abronia villosa* var. *aurita*	Federal: - State: - CNPS: 1B.1	Found in sandy soil within coastal scrub and mostly broad alluvial fans and benches. Known to occur in northern Orange County, western Riverside County, San Diego County and southern Imperial County. It blooms from January to August at elevations from 262 feet to 5,248 feet amsl.	Does not occur.
Munz's onion *Allium munzii*	Federal: FE State: ST CNPS: 1B.1 MSHCP(b)	Found on mesic exposures or seasonally moist microsites in grassy openings in coastal sage scrub, chaparral, juniper woodland, and valley and foothill grasslands in clay soils. Associated with a special "clay soil flora" found in southwestern Riverside County. At least one population (Bachelor Mountain) is reported to be associated with pyroxenite outcrops instead of clay.	Does not occur.
San Diego ambrosia *Ambrosia pumila*	Federal: FE State: - CNPS: 1B.1 MSHCP(b)	Occurs in open floodplain terraces or in the watershed margins of vernal pools. This species occurs in a variety of associations that are dominated by sparse nonnative grasslands or ruderal habitat in association with river terraces, vernal pools, and alkali playas. San Diego ambrosia generally occurs at low elevations generally less than 1,600 feet amsl in the Riverside County populations and less than 600 feet amsl in San Diego County.	Does not occur.
marsh sandwort *Arenaria paludicola*	Federal: - State: - CNPS: 4.2	Found in sandy substrate where there are openings. Associated with marshes and swamps.	Does not occur.
Horn's milk-vetch *Astragalus hornii* var. *hornii*	Federal: - State: - CNPS: 1B.1	This annual herb occurs on lake margins, playas, alkaline meadows, and seeps from 200 to 2,800 feet amsl. It blooms from May through October.	Does not occur.

Species Name	Status	Habitat Requirements	Occurrence
San Jacinto Valley crownscale *Atriplex coronata* var. *notatior*	Federal: FE State: - CNPS: 1B.1 MSHCP(d)	Occurs primarily in floodplains (seasonal wetlands) dominated by alkaline scrub, playas, vernal pools, and to a lesser extent, alkaline grasslands. Restricted to highly alkaline, silty-clay soils in association with the Traver-Domino-Willows soil association; the majority (approximately 80 %) of the populations are associated with the Willows soil series.	Does not occur.
South Coast saltscale *Atriplex pacifica*	Federal: - State: - CNPS: 1B.2	An annual herb that occurs on coastal bluff scrub, coastal dunes, coastal scrub, and playas. It is found at elevations ranging from 0 to 459 feet amsl and blooms from March to October. Records of this species within Riverside County were misidentified and are actually Atriplex davidsonii (Roberts et al. 2004).	Does not occur.
Parish's brittlescale *Atriplex parishii*	Federal: - State: - CNPS: 1B.1 MSHCP(d)	Habitats where species is found include chenopod scrub, alkaline vernal pools and playas. Blooms from June to October and ranges from 82 to 6,232 feet amsl in elevation.	Does not occur.
Davidson's saltscale *Atriplex serenana* var. *davidsonii*	Federal: - State: - CNPS: 1B.2 MSHCP(d)	Found in alkaline soils in coastal bluff scrub and coastal sage scrub from 10 feet to 820 feet amsl. Within Riverside county, uncommon on alkaline flats along the San Jacinto River, and west of Hemet (Roberts et al., 2004).	Does not occur.
Nevin’s barberry *Berberis nevinii*	Federal: FE State: SE CNPS: 1B.1 MSHCP(d)	This perennial evergreen shrub prefers sandy or gravelly soils in chaparral, cismontane woodland, coastal scrub, and riparian scrub at elevations ranging from 230–2,700 feet amsl. The blooming period is from February-June.	Absent. This species was confirmed absent during the general biological survey.

Species Name	Status	Habitat Requirements	Occurrence
thread-leaved brodiaea Brodiaea filifolia	Federal: FT State: SE CNPS: 1B.1 MSHCP(d)	Found in heavy soils (e.g., clay) in coastal sage scrub, chaparral, cismontane woodland, and vernal pools from 1,575 feet – 4,000 feet. Within western Riverside County found in southern Santa Ana Mountains, Santa Rosa Plateau, and alkali flats of the San Jacinto River flood plain and west of Hemet (Roberts et al., 2004).	Does not occur.
round-leaved filaree *California macrophylla*	Federal: - State: - CNPS: 1B.2 MSHCP(d)	This annual herb prefers clay soils in cismontane woodland and valley and foothill grassland at elevations ranging from 15-1,200 m. The blooming period is from March-May.	Does not occur.
Plummer's mariposa-lily *Calochortus plummerae*	Federal: - State: - CNPS: 4.2 MSHCP	This perennial bulbiferous herb prefers granitic, rocky soils within chaparral, cismontane woodland, coastal sage scrub, lower montane coniferous forest, and valley and foothill grassland at elevations ranging from 100-1,700 m. The blooming period is from May-July.	Very low potential to occur.
bristly sedge *Carex comosa*	Federal: - State: - CNPS: 2B.1	This perennial rhizomatus herb occurs on lake margins, marshes and swamps, and mesic areas in coastal prairies and valley and foothill grasslands from sea level to 2,000 feet amsl. It blooms from May through September.	Does not occur.
Payson's jewelflower *Caulanthus simulans*	Federal: - State: - CNPS: 4.2 MSHCP	Occurs within chaparral and coastal sage scrub in sandy/granitic rocky soils. Fairly tolerant of lands disturbed by fire. Blooms between February and June and has been recorded at elevations between 300 to 7,225 feet amsl.	Very low potential to occur.

Species Name	Status	Habitat Requirements	Occurrence
smooth tarplant *Centromadia pungens* ssp. *laevis*	Federal: - State: - CNPS: 1B.1 MSHCP(d)	Found in fine or alkaline soils of seasonally wet chenopod scrub, meadows and seeps, playas, riparian woodland, fallow fields, drainage ditches, and moist situations within valley and foothill grasslands below about 1,575 feet elevation. Tolerant of rural and agricultural land use. Found primarily in southwestern Riverside County, but also a few sites in the interior valleys of San Bernardino, Los Angeles, and San Diego Counties.	Does not occur.
salt marsh bird's-beak *Chloropyron maritimum* ssp. *maritimum*	Federal: FE State: SE CNPS: 1B.2	Found in sandy loam substrate within coastal dunes and marshes and swamps with high salt concentrations. Presumed extant population exists in San Bernardino South USGS quad. Elevation range is from 0 feet to 98 feet.	Does not occur.
Peninsular spineflower *Chorizanthe leptotheca*	Federal: - State: - CNPS: 4.2 MSHCP	This annual herb occurs in chaparral, coastal scrub, and lower montane coniferous forest associated with alluvial fans and granitic soils. Found at elevations from 984 to 6,234 feet amsl.	Not expected to occur.
Parry's spineflower *Chorizanthe parryi* var. *parryi*	Federal: - State: - CNPS: 1B.1 MSHCP	This annual herb prefers sandy or rocky soils in open habitats of chaparral and coastal sage scrub at elevations ranging from 900 to 4,000 feet amsl. The blooming period is from April-June.	Very low potential to occur.
long-spined spineflower *Chorizanthe polygonoides* var. *longispina*	Federal: - State: - CNPS: 1B.2 MSHCP	Associated primarily with heavy, often rocky, clay soils in southern needlegrass grassland, and openings in coastal sage scrub and chaparral. The species has been described as occurring on sandy and gravelly soil but this appears to be infrequently the case.	Not expected to occur.

Species Name	Status	Habitat Requirements	Occurrence
small-flowered morning-glory *Convolvulus simulans*	Federal: - State: - CNPS: 4.2 MSHCP	Annual herb on open, friable to crumbling clay soils and serpentine seeps in openings within chaparral, sage scrub, and grasslands from Baja California, Mexico north to central California. Vulnerable to competition from nonnative plants. Not associated with alkaline or saline conditions. Found at elevations from 100 to 2300 feet.	Does not occur.
Peruvian dodder *Cuscuta obtusiflora* var. *glandulosa*	Federal: - State: - CNPS: 2B.2	This parasitic annual vine occurs in freshwater marshes and swamps from 50 to 980 feet amsl. It blooms from July through October.	Does not occur.
snake cholla *Cylindropuntia californica* var. *californica*	Federal: - State: - CNPS: 1B.1	Perennial stem succulent found in chaparral and coastal scrub habitats. Elevation range is from 98 feet to 492 feet. The blooming period is from April to May. Presumed extant population recorded in Riverside East USGS quad. This species is threatened by development and vehicles.	Absent. This species was confirmed absent during general biological surveys.
paniculate tarplant *Deinandra paniculata*	Federal: - State: - CNPS: 4.2	This annual herb prefers vernally mesic, sometimes sandy soils in coastal scrub, valley and foothill grassland, and vernal pools at elevations ranging from 25-940 m. The blooming period is from April-November.	Absent. This species was confirmed absent during general biological surveys.
slender-horned spineflower *Dodecahema leptoceras*	Federal: FE State: SE CNPS: 1B.1 MSHCP(b)	This annual herb prefers sandy soils in alluvial scrub, chaparral, cismontane woodland at elevations ranging from 200-760 m. The blooming period is from April-June.	Does not occur.

Species Name	Status	Habitat Requirements	Occurrence
many-stemmed dudleya *Dudley multicaulis*	Federal: - State: - CNPS: 1B.2 MSHCP(b)	Found on the coastal slopes of southern California from Los Angeles and San Bernardino counties south, from about 50 feet to 2,600 feet in elevation. It usually grows on poor soils, often on clay or at the margins of gabbroic rock outcrops in coastal sage scrub and grassland communities.	Does not occur.
Santa Ana River woollystar *Eriastrum densifolium* ssp. *sanctorum*	Federal: FE State: SE CNPS: 1B.1 MSHCP	Found in sandy or gravelly substrate within chaparral and coastal scrub alluvial fan habitats subject to episodic flood events. Elevation range is from 299 feet to 2001 feet. Presumed extant populations recorded in Corona North and Riverside West USGS quads.	Does not occur.
Alvin Meadow bedstraw *Galium californicum* ssp. *primum*	Federal: - State: - CNPS: 1B.2	This perennial herb occurs on sandy, granitic soils in chaparral and lower montane coniferous forest from 4,400 to 5,600 feet amsl. It blooms from May through July.	Does not occur.
Palmer's grapplinghook *Harpagonella palmeri*	Federal: - State: - CNPS: 4.2 MSHCP	This annual herb prefers chaparral, coastal sage scrub, and valley and foothill grassland, occurring in clay soils at elevations ranging from 20-955 m. The blooming period is from March-May.	Does not occur.
Los Angeles sunflower *Helianthus nuttallii* ssp. *parishii*	Federal: - State: - CNPS: 1A	This perennial rhizomatous herb occurs in marshes and swamps from 30 to 5,000 feet amsl. It blooms from August through October.	Does not occur.
vernal barley *Hordeum intercedens*	Federal: - State: - CNPS: 3.2 MSHCP	This annual herb prefers coastal dunes, saline flats and depressions in coastal sage scrub and valley and foothill grassland, and vernal pools at elevations ranging from 5-1,000 m. The blooming period is from March-June.	Does not occur.

Species Name	Status	Habitat Requirements	Occurrence
mesa horkelia *Horkelia cuneata* var. *puberula*	Federal: - State: - CNPS: 1B.1	This annual perennial herb prefers sandy or gravelly soils in maritime chaparral, cismontane woodland, and coastal scrub at elevations ranging from 70–810 m. The blooming period is from February-September.	Does not occur.
California satintail *Imperata brevifolia*	Federal: - State: - CNPS: 2B.1	This perennial rhizomatous herb occurs in mesic areas in chaparral, coastal scrub, Mojavean desert scrub, riparian scrub, and meadows and seeps from sea level to 4,000 feet amsl. It blooms from September through May.	Absent. This species was confirmed absent during the general biological survey and jurisdictional delineation field effort.
Coulter's goldfields *Lasthenia glabrata* ssp. *coulteri*	Federal: - State: - CNPS: 1B.1 MSHCP(d)	Wide-ranging herb in southern California, with known occurrences including Los Angeles, Orange, Riverside, San Bernardino, San Diego, and other Counties. This is an annual herb, blooming from February through June in saline places such as coastal saltmarsh, inland playas, and vernal pools below about 4,002 feet in elevation.	Does not occur.
Robinson’s pepper-grass *Lepidium virginicum* var. *robinsonii*	Federal: - State: - CNPS: 4.3	This annual herb prefers chaparral and coastal scrub at elevations ranging from 1-885 m. The blooming period is from January-July.	Low potential to occur.
Parish’s desert-thorn *Lycium parishii*	Federal: - State: - CNPS: 2B.3	This perennial shrub occurs in coastal scrub and Sonoran desert scrub from 140 to 3,300 feet amsl. It blooms from March through April.	Absent. This species was confirmed absent during the general biological survey.
Parish's bush-mallow *Malacothamnus parishii*	Federal: - State: - CNPS: 1A	This perennial deciduous shrub occurs in coastal scrub chaparral from 1,000 to 1,500 feet amsl. It blooms from June through July.	Absent. This species was confirmed absent during the general biological survey.

Species Name	Status	Habitat Requirements	Occurrence
small-flowered microseris *Microseris douglasii* ssp. *platycarpha*	Federal: - State: - CNPS: 4.2 MSHCP	Annual herb found in heavy clay soils in cismontane woodland, coastal scrub, valley and foothill grassland, and vernal pools. The blooming period is from March to May. This species is severely declining due to urban developments and threatened by non-native plants (Roberts et al. 2004).	Does not occur.
Pringle's monardella *Monardella pringlei*	Federal: - State: - CNPS: 1A	This annual herb occurs on sandy soils in coastal scrub from 1,000 to 1,300 feet amsl. It blooms from May through June.	Not expected.
little mousetail *Myosurus minimus* ssp. *apus*	Federal: - State: - CNPS: 3.1 MSHCP(d)	Occurs in association with vernal pools and within the alkali vernal pools and alkali annual grassland components of alkali vernal plains. Little Mousetail is found in areas that have semiregular inundation. Within Riverside County species is locally common in the alkaline vernal pools near Hemet; otherwise scarce and local in Perris Basin and Santa Rosa Plateau (Roberts et al., 2004).	Does not occur.
Gambel's water cress *Nasturtium gambelii*	Federal: FE State: ST CNPS: 1B.1	This perennial rhizomatous herb occurs in marshes and swamps from 16 to 1,080 feet amsl. It blooms from April through October.	Does not occur.
spreading navarretia *Navarretia fossalis*	Federal: FT State: - CNPS: 1B.1 MSHCP(b)	This annual herb prefers vernal pools, playas, chenopod scrub, and shallow freshwater marshes and swamps at elevations ranging from 30-655 m. The blooming period is from April-June.	Does not occur.
Brand's star phacelia *Phacelia stellaris*	Federal: - State: - CNPS: 1B.1 MSHCP(b)	Found in coastal dunes and coastal scrub habitats. Elevation range is from 3 feet to 1,312 feet amsl. Presumed extant population recorded in Riverside West USGS quad.	Very low potential to occur.

Species Name	Status	Habitat Requirements	Occurrence
white rabbit-tobacco *Pseudognaphalium leucocephalum*	Federal: - State: - CNPS: 2B.2	This perennial herb prefers sandy or gravelly soils in chaparral, cismontane woodland, coastal scrub, and riparian scrub at elevations ranging from 0-2,100 m. The blooming period is from July-December.	Very low potential to occur.
Parish's gooseberry *Ribes divaricatum* var. *parishii*	Federal: - State: - CNPS: 1A	This perennial deciduous herb occurs in riparian woodland from 200 to 1,000 feet amsl. It blooms from February through April.	Does not occur.
Coulter's matilija poppy *Romneya coulteri*	Federal: - State: - CNPS: 4.2 MSHCP	Species is a perennial rhizomatous herb often found in burns within chaparral and sage scrub. Blooming period is March through July. Locally common along eastern margins of the Santa Ana mountains.	Absent. This species was confirmed absent during the general biological survey.
chaparral ragwort *Senecio aphanactis*	Federal: - State: - CNPS: 2B.2	This annual herb is sometimes associated with alkaline soils and prefers chaparral, cismontane woodland, and coastal scrub at elevations ranging from 15-800 m. The blooming period is from January-April.	Very low potential to occur.
salt spring checkerbloom *Sidalcea neomexicana*	Federal: - State: - CNPS: 2B.2	Mesic, alkaline soils in chaparral, coastal sage scrub, lower montane coniferous forest, Mojavean desert scrub, and playas.	Does not occur.
prairie wedge grass *Sphenopholis obtusata*	Federal: - State: - CNPS: 2B.2	This perennial herb occurs in mesic areas in cismontane woodland and meadows and seeps from 1,000 to 6,560 feet amsl. It blooms from April through July.	Does not occur.
San Bernardino aster *Symphyotrichium defoliatum*	Federal: - State: - CNPS: 1B.2	Found near ditches, streams, and springs in cismontane woodland, coastal scrub, lower montane coniferous forest, meadows and seeps, marshes and swamps, and valley and foothill grassland. Blooms from July to November at elevations from 6 to 6700 feet amsl.	Does not occur.

Species Name	Status	Habitat Requirements	Occurrence
woven-spored lichen *Texosporium sancti-jacobi*	Federal: - State: - CNPS: 3	This species is restricted to occurring on biotic crusts in arid and semi-arid habitats, such as chaparral or on decaying organic matter. Occurs at elevations from 951 to 2,165 feet amsl. Intolerant of disturbed sites (USDA Forest Service 2007).	Does not occur.
Wright's trichocoronis *Trichocoronis wrightii* var. *wrightii*	Federal: - State: - CNPS: 2B.1 MSHCP(b)	In western Riverside County, found in the alkali vernal plains and associated with alkali playa, alkali annual grassland, and alkali vernal pool habitats. This species occupies the more mesic portions of these habitats.	Does not occur.

No special-status plant species have been detected at the Project area to date. Seven species have a reasonable potential to occur within the Project area, ranging from very low to low. These are Plummer's mariposa-lily, Payson's jewelflower, Parry's spineflower, Robinson's pepper-grass, Brand's phacelia, white rabbit-tobacco, and chaparral ragwort.

Of these species, Plummer's mariposa lily, Payson's jewelflower, Parry's spineflower, and Brand's phacelia are covered under the MSHCP, and no survey, compensatory, or avoidance action would be required, as the Project area is not located within a Narrow Endemic Plant Species Survey Area.

4.5 Special-Status Animals

Table 4-3 provides a list of special-status animals evaluated for the Project area through general biological surveys, habitat assessments, and focused surveys. Species were evaluated based on the following factors, including: 1) species identified by the CNDDB as occurring (either currently or historically) on or in the vicinity of the Project area, 2) applicable MSHCP survey areas, and 3) any other special-status animals that are known to occur within the vicinity of the Project area, for which potentially suitable habitat occurs on the site.

Table 4-3. Special Status Animals Evaluated for the Project Area

Status

Federal
FE – Federally Endangered
FT – Federally Threatened
FPT – Federally Proposed Threatened
FC – Federal Candidate
BGEPA– Bald and Golden Eagle Protection Act

State
SE – State Endangered
ST – State Threatened
SC– State Candidate
CFP – California Fully-Protected Species
SSC – Species of Special Concern

MSHCP
MSHCP = No additional action necessary
MSHCP(a) = Surveys may be required as part of wetlands mapping
MSHCP(b) = Surveys may be required within the Narrow Endemic Plant Species survey area
MSHCP(c) = Surveys may be required within locations shown on survey maps
MSHCP(d) = Surveys may be required within Criteria Area
MSHCP(e) = Conservation requirements identified in species-specific conservation objectives need to be met before classified as a Covered Species
MSHCP(f) = Covered species when a Memorandum of Understanding is executed with the Forest Service Land

Western Bat Working Group (WBWG)
H – High Priority
LM – Low-Medium Priority
M – Medium Priority
MH – Medium-High Priority

Occurrence

- Absent – The species is absent from the site, either because the site lacks suitable habitat for the species, the site is located outside of the known range of the species, or focused surveys has confirmed the absence of the species.
- Not expected to occur – The species is not expected to occur onsite due to low habitat quality, however absence cannot be ruled out.
- Potential to occur – The species has a potential to occur onsite based on suitable habitat, however its presence/absence could not be confirmed.
- Present – The species was detected onsite incidentally or through focused surveys.

Species Name	Status	Habitat Requirements	Occurrence
Invertebrates			
vernal pool fairy shrimp (*Branchinecta lynchi*)	Federal: FT State: - MSHCP(a)	Restricted to seasonal vernal pools. The vernal pool fairy shrimp prefers cool-water pools that have low to moderate dissolved solids, which are unpredictable, and often short-lived.	Absent. Pools and depressions not present on site.
quino checkerspot butterfly *Euphydryas editha quino*	Federal: FE State: - MSHCP	Larval and adult phases each have distinct habitat requirements tied to host plant species and	Absent. Although the Project area is located within the historic range for this species, the Project

Species Name	Status	Habitat Requirements	Occurrence
		topography. Larval host plants include *Plantago erecta* and *Castilleja exserta*. Adults occur on sparsely vegetated rounded hilltops and ridgelines, and are known to disperse through disturbed habitats to reach suitable nectar plants.	area is in a disturbed condition and does not support the host plant species required as for occupation of an area by this species.
Delhi sands flower-loving fly *Rhaphiomidas terminates abdominalis*	Federal: FE State: - MSHCP		Absent. Delhi sand soils do not occur on or within the vicinity of the site.
Riverside fairy shrimp *Streptocephalus woottoni*	Federal: FE State: - MSHCP(a)		Absent. Pools and depressions not present on site.
Fish			
Santa Ana sucker *Catostomus santaanae*	Federal: FT State: - MSHCP	Small, shallow streams, less than 7 meters in width, with currents ranging from swift in the canyons to sluggish in the bottom lands. Preferred substrates are generally coarse and consist of gravel, rubble, and boulders with growths of filamentous algae, but occasionally they are found on sand/mud substrates.	Absent. Habitat for this species is not present on site.
arroyo chub *Gila orcuttii*	Federal: - State: SSC MSHCP	Slow-moving or backwater sections of warm to cool streams with substrates of sand or mud.	Absent. Habitat for this species is not present on site.
Santa Ana speckled dace *Rhinichthys osculus* ssp. *3*	Federal: - State: SSC	Occurs in the headwaters of the Santa Ana and San Gabriel Rivers. May be extirpated from the Los Angeles River system. Requires permanent flowing streams with summer water temperatures of 17-20 C. Usually inhabits shallow cobble and gravel riffles.	Absent. Habitat for this species is not present on site.
Amphibians			

Species Name	Status	Habitat Requirements	Occurrence
southern mountain yellow-legged frog *Rana muscosa*	Federal: FE State: SE MSHCP(c)	Streams and small pools in ponderosa pine, montane hardwood-conifer, and montane riparian habitat types.	Absent. Habitat for this species is not present on site.
western spadefoot *Spea hammondii*	Federal: - State: SSC MSHCP	Seasonal pools in coastal sage scrub, chaparral, and grassland habitats.	Not expected to occur. Pools and depressions do not occur on site.
Reptiles			
Southern California legless lizard *Anniella stebbinsii*	Federal: - State: SSC	Occurs in areas of loose mesic soil within coastal dunes, alluvial fans, and sandy washes. Moisture within the loose soil is required for this species.	Absent. Habitat for this species is not present on site.
California glossy snake *Arizona elegans occidentalis*	Federal: - State: SSC	Inhabits arid scrub, rocky washes, grasslands, chaparral.	Very low potential to occur.
coastal whiptail *Aspidoscelis tigris stejnegeri*	Federal: - State: SSC MSHCP	Open, often rocky areas with little vegetation, or sunny microhabitats within shrub or grassland associations.	Moderate potential to occur.
San Diego banded gecko *Coleonyx variegatus abbotti*	Federal: - State: SSC MSHCP	This species inhabits rocky areas that support coastal sage scrub and chaparral vegetation communities.	Low potential to occur.
northern red-diamond rattlesnake *Crotalus ruber ruber*	Federal: - State: SSC MSHCP	As far north as Puente Hills in Yorba Linda and southwest San Bernardino County, and occurs south to Loreto, Baja California, Mexico; known elevation range is sea level to just under15,000 feet amsl, but apparently rare above about 3,940 feet amsl; greatest frequency in areas of heavy brush, such as chamise chaparral, but also in open areas at lower densities; boulders and rocky outcrops.	Moderate potential to occur.
western pond turtle *Emys marmorata*	Federal: - State: SSC MSHCP	Slow-moving permanent or intermittent streams, small ponds and lakes, reservoirs, abandoned gravel pits, permanent and	Absent. Habitat for this species is not present on site.

Species Name	Status	Habitat Requirements	Occurrence
		ephemeral shallow wetlands, stock ponds, and treatment lagoons. Abundant basking sites and cover necessary, including logs, rocks, submerged vegetation, and undercut banks.	
coast horned lizard *Phrynosoma blainvillii*	Federal: - State: SSC MSHCP	Occurs in a variety of vegetation types including coastal sage scrub, chaparral, annual grassland, oak woodland, and riparian woodlands.	Moderate potential to occur.
coast patch-nosed snake *Salvadora hexalepis virgultea*	Federal: - State: SSC	Mostly restricted to habitats with a strong but broken shrub component, especially somewhat open chaparral and black sage (*Salvia mellifera*) or relatively mature, dense coastal sage scrub (personal communication, W. E. Haas, Varanus Biological Services), and may require ground burrows of unknown characteristics for overwintering and refuge.	Not expected to occur.
two-striped garter snake *Thamnophis hammondii*	Federal: - State: SSC	Aquatic snake typically associated with wetland habitats such as streams, creeks, and pools.	Absent. Habitat for this species is not present on site.
Birds			
tricolored blackbird *Agelaius tricolor*	Federal: - State: SC, SSC MSHCP	Nests in dense colonies in marshes and occasionally in moist thickets, agricultural fields, or sewage treatment plants.	Foraging: Not expected to occur Breeding: Absent
long-eared owl *Asio outs* (nesting role)	Federal: - State: SSC	In southern California, the species breeds and roosts in riparian and oak forests, and hunts small mammals at night in adjacent open habitats; known to breed at several dozen locales in San Diego and Orange counties (Bloom 1994; personal communication, W. E. Haas), and probably	Foraging: Absent. Breeding: Absent

Species Name	Status	Habitat Requirements	Occurrence
		do so in smaller numbers in other coastal Southern California counties as well. Species is relatively intolerant to man-made disturbances and in particular night lighting. Foraging lands need to be rodent rich and relatively close to roosting and/or nesting habitat.	
burrowing owl *Athene cunicularia*	Federal: - State: SSC MSHCP(c)	Shortgrass prairies, grasslands, lowland scrub, agricultural lands (particularly rangelands), coastal dunes, desert floors, and some artificial, open areas as a year-long resident. Occupies abandoned ground squirrel burrows as well as artificial structures such as culverts and underpasses.	Foraging: Very low potential to occur Breeding: Very low potential to occur
Swainson's hawk *Buteo swainsoni* (nesting role)	Federal: - State: ST MSHCP	Summer in wide open spaces of the American West. Nest in grasslands, but can use sage flats and agricultural lands. Nests are placed in lone trees.	Foraging: Low potential to occur Breeding: Absent
western yellow-billed cuckoo *Coccyzus americanus occidentalis*	Federal: FT State: SE MSHCP(a)	Dense, wide riparian woodlands with well-developed understories.	Foraging: Absent Breeding: Absent
white-tailed kite *Elanus leucurus* (nesting role)	Federal: - State: CFP MSHCP	Low elevation open grasslands, savannah-like habitats, agricultural areas, wetlands, and oak woodlands. Dense canopies used for nesting and cover.	Foraging: Very low potential for foraging Breeding: Absent
southwestern willow flycatcher *Empidonax traillii extimus* (nesting role)	Federal: FE State: SE MSHCP(a)	Riparian woodlands along streams and rivers with mature dense thickets of trees and shrubs.	Foraging: Absent Breeding: Absent
bald eagle *Haliaeetus leucocephalus* (nesting and wintering role)	Federal: BGEPA State: SE, CFP MSHCP	Primarily in or near seacoasts, rivers, swamps, and large lakes. Perching sites consist of large trees	Foraging: Absent Breeding: Absent

Species Name	Status	Habitat Requirements	Occurrence
		or snags with heavy limbs or broken tops.	
yellow-breasted chat *Icteria virens* (nesting role)	Federal: - State: SSC MSHCP	Dense, relatively wide riparian woodlands and thickets of willows, vine tangles, and dense brush with well-developed understories.	Foraging: Absent Breeding: Absent
loggerhead shrike *Lanius ludovicianus* (nesting role)	Federal: - State: SSC MSHCP	Forages over open ground within areas of short vegetation, pastures with fence rows, old orchards, mowed roadsides, cemeteries, golf courses, riparian areas, open woodland, agricultural fields, desert washes, desert scrub, grassland, broken chaparral and beach with scattered shrubs.	Foraging: Moderate potential to occur Breeding: Absent
California black rail *Laterallus jamaicensis coturniculus*	Federal: - State: ST	Breeds in marshes and mesic grasslands. Inhabits marshes, swamps, and wet meadows.	Foraging: Absent Breeding: Absent
coastal California gnatcatcher *Polioptila californica californica*	Federal: FT State: SSC MSHCP	Low elevation coastal sage scrub and coastal bluff scrub.	Foraging: Very low potential to occur Breeding: Very low potential to breed on site
yellow warbler *Setophaga petechia* (nesting role)	Federal: - State: SSC MSHCP	Breed in lowland and foothill riparian woodlands dominated by cottonwoods, alders, or willows and other small trees and shrubs typical of low, open-canopy riparian woodland. During migration, forages in woodland, forest, and shrub habitats.	Foraging: Very low potential to occur Breeding: Absent
least Bell's vireo *Vireo bellii pusillus* (nesting role)	Federal: FE State: SE MSHCP(a)	Dense riparian habitats with a stratified canopy, including southern willow scrub, mule fat scrub, and riparian forest.	Foraging: Absent Breeding: Absent
Mammals			

Species Name	Status	Habitat Requirements	Occurrence
pallid bat *Antrozous pallidus*	Federal: - State: SSC	Deserts, grasslands, shrublands, woodlands, and forests. Most common in open, dry habitats with rocky areas for roosting.	Low potential in a foraging role. No roosting habitat.
northwestern San Diego pocket mouse *Chaetodipus fallax fallax*	Federal: - State: SSC MSHCP	Sandy herbaceous areas, usually in association with rocks and course gravel in southwest California; coastal and desert border areas in San Bernardino, Riverside, & San Diego counties. Elevation ranges from sea level to 6,000 feet amsl. Vegetation community preferences include sage scrub, chamise-redshank chaparral, mixed chaparral, sage brush, desert wash, desert scrub, desert succulent scrub, pinyon-juniper, annual grassland.	Moderate potential to occur.
San Bernardino kangaroo rat *Dipodomys merriami parvus*	Federal: FE State: SSC MSHCP(c)	Found in Riversidean alluvial fan sage scrub and sandy loam soils, alluvial fans and flood plains, and along washes with nearby sage scrub. Primarily granivores, but do consume herbaceous material and insects when available.	Absent. Habitat for this species is not present on site.
Stephens' kangaroo rat *Dipodomys stephensi*	Federal: FE State: ST MSHCP	The Stephens' kangaroo rat is found almost exclusively in open grasslands or sparse shrublands with cover of less than 50 % during the summer. Species avoids dense grasses (for example, nonnative bromes [*Bromus* spp.]) and are more likely to inhabit areas where the annual forbs disarticulate in the summer and leave more open areas.	Low potential to occur.

Species Name	Status	Habitat Requirements	Occurrence
		Soil type also is an important habitat factor. As a fossorial (burrowing) animal, the species typically is found in sandy and sandy loam soils with a low clay to gravel content, although there are exceptions where they can utilize the burrows of Botta's Pocket Gopher (*Thomomys bottae*) and California Ground Squirrel (*Spermophilus beecheyi*). Tends to avoid rocky soils. Slope is a factor in occupation; tends to use flatter slopes (i.e., < 30 %), but may be found on steeper slopes in trace densities (i.e., < 1 individual per hectare). Furthermore, the species may use steeper slopes for foraging, but not for burrows. In general, the highest abundances of species occur on gentle slopes less than 15 percent.	
western mastiff bat *Eumops perotis californicus*	Federal: - State: SSC	Occurs in many open, semi-arid to arid habitats, including conifer and deciduous woodlands, coastal scrub, grasslands, and chaparral. Roosts in crevices in cliff faces, high buildings, trees, and tunnels.	Low potential in a foraging role; no potential for roosting.
western yellow bat *Lasiurus xanthinus*	Federal: - State: SSC	Occurs from southern California and western Arizona south into Mexico. Apparently non-colonial and non-hibernating. Roosts primarily in the untrimmed, dead fronds of fan palms (native and nonnative) but will also use other trees including cottonwoods. California movement data not yet	Low potential in a foraging role; no potential for roosting.

Species Name	Status	Habitat Requirements	Occurrence
		clear, with indications both of some seasonal movement and year-round residence. Foraging is associated with open water (also lawns, orchards, and riparian vegetation) in grassy and scrub landscapes; feeds on varied insects. No specific threats known apart from cosmetic trimming of dead fronds on ornamentally planted palms. Vulnerable to widespread or intensive use of chemicals such as pesticides. Data indicates range expansion in California in recent decades, perhaps due to increase planting of ornamental palms, but knowledge regarding status and trends is limited.	
San Diego black-tailed jackrabbit *Lepus californicus bennettii*	Federal: - State: SSC MSHCP	Occupies a variety of habitats, but is most common among shortgrass habitats. Also occurs in sage scrub, but needs open habitats.	Present. This species was incidentally observed during the jurisdictional delineation field effort.
San Diego desert woodrat *Neotoma lepida intermedia*	Federal: - State: SSC MSHCP	Occurs in a variety of shrub and desert habitats, primarily associated with rock outcrops, boulders, cacti, or areas of dense undergrowth.	Foraging potential only. Woodrat homes were not detected during general biological surveys or incidentally during the jurisdictional delineation field effort.
pocketed free-tailed bat *Nyctinomops femorosaccus*	Federal: - State: SSC	Found rarely in southwestern California; found in southeastern deserts of California, with portions of western Riverside County apparently on the periphery of their range. Found in pinyon-juniper and Joshua tree woodlands, desert scrub, desert succulent scrub, desert riparian areas, desert washes, alkali desert	Not expected to occur for either foraging. Roosting habitat is absent.

Species Name	Status	Habitat Requirements	Occurrence
		scrub, and palm oases. Roosts in high rock crevices in cliffs, bridges, roofs, and buildings. The species must drop from roost to gain flight speed. Forages primarily on large moths, especially over open water.	
southern grasshopper mouse *Onychomys torridus ramona*	Federal: - State: SSC	Desert areas, especially scrub habitats with friable soils for digging. Prefers low to moderate shrub cover.	Low to moderate potential to occur.
Los Angeles pocket mouse *Perognathus longimembris brevinasus*	Federal: - State: SSC MSHCP(c)	Habitat requirements for this subspecies are poorly known; it inhabits areas of open ground, prefers fine sandy soils (for burrowing), but is also found commonly on gravel washes and on stony soils, within brush and woodland habitats. It is rarely found on sites with a high cover of rocks.	Not expected to occur.
American badger *Taxidea taxus*	Federal: - State: SSC	Most abundant in drier open stages of most scrub, forest, and herbaceous habitats, with friable soils.	Low potential for foraging. Badger burrows were not detected during general biological surveys or incidentally during the jurisdictional delineation field effort.

4.5.1 Special-Status Wildlife Species Observed within the Project area

A single special-status animal species, San Diego black-tailed jack rabbit, a SSC, was incidentally observed on the Project area during the jurisdictional delineation field effort. This species is fully covered by the MSHCP.

4.5.2 Special-Status Wildlife Species Not Observed but with a Potential to Occur at the Project area

The Project area contains low quality habitat marginally suitable to support Stephens' kangaroo. Focused surveys for Stephens' kangaroo rat are not required as this species is fully covered by the MSHCP.

The Project area contains very low quality habitat marginally suitable to support federally listed as Threatened coastal California gnatcatchers, which are also a SSC. Focused surveys for coastal

California gnatcatcher are not required as coastal California gnatcatcher is fully covered by the MSHCP. No coastal California gnatcatchers were observed during the general biological survey or incidentally during the jurisdictional delineation field effort; however, there is a very low potential for coastal California gnatcatcher to occur on the Project area.

The Project area contains very low quality habitat marginally suitable to support burrowing owls, a SSC. Focused burrowing owl surveys are required by the MSHCP, as the Project area is located within the Burrowing Owl Survey Area. No burrowing owls have been observed within or adjacent to the Project area to date during general biological surveys or incidentally during the jurisdictional delineation field effort; however, focused surveys are scheduled to be conducted during the 2018 burrowing owl breeding season (March 1 through August 31). The results of the focused surveys will be provided in a memorandum under a separate cover.

The Project area contains habitat suitable for several non-listed special-status animals with a potential to reside or breed on the Project area ranging from very low to moderate, which include reptiles: California glossy snake, coastal whiptail, San Diego banded gecko, Northern red-diamond rattlesnake, and coast horned lizard; birds: burrowing owl, and coastal California gnatcatcher; and mammals: northwestern San Diego pocket mouse, Stephens' kangaroo rat, and southern grasshopper mouse.

In addition, the Project area contains habitat with the potential to support foraging by the state listed as Threatened Swainson's hawk, as well as non-listed special-status species. Special-status animals that are not expected to reside or breed within the Project area, yet hold the potential for foraging include birds: white-tailed kite, loggerhead shrike, and yellow warbler; and mammals: pallid bat, western mastiff bat, western yellow bat, San Diego desert woodrat, and American badger.

With the exception of the burrowing owl, for those species covered under the MSHCP, no survey, compensatory, or avoidance action would be required, as the Project area is not located within a Small Mammal, Amphibian, or Criteria Area Species Survey Area. This includes state or federally listed species such as coastal California gnatcatcher, which is considered adequately conserved by the MSHCP.

4.5.3 Critical Habitat

There is no federally designated Critical Habitat mapped within or adjacent to the Project area. The nearest Critical Habitat is located approximately four miles northwest of the Project area.

4.6 Raptor Use

The Project area provides suitable foraging and breeding habitat for a number of raptor species, including special-status raptors.

Southern California holds a diversity of birds of prey (raptors), and many of these species are in decline. For most of the declining species, foraging requirements include extensive open, undisturbed, or lightly disturbed areas, especially grasslands. This type of habitat has declined

severely in the region, affecting many species, but especially raptors. A few species, such as Red-tailed Hawk (*Buteo jamaicensis*) and American Kestrel (*Falco sparverius*), are somewhat adaptable to low-level human disturbance and can be readily observed adjacent to neighborhoods and other types of development. These species still require appropriate foraging habitat and low levels of disturbance in vicinity of nesting sites.

Many of the raptors that would be expected to forage and nest within western Riverside are fully covered species under the MSHCP with the MSHCP providing the necessary conservation of both foraging and nesting habitats. Some common raptor species (e.g., American kestrel and Red-tailed Hawk) are not covered by the MSHCP but are expected to be conserved with implementation of the Plan due to the parallel habitat needs with those raptors covered under the Plan.

It is important to understand that the MSHCP does not provide MBTA and Fish and Game Code take for raptors covered under the Plan.

Appendix B (faunal compendium) provides a list of the hawks and falcons detected over the course of the field studies. These species were red-tailed hawk, American kestrel, and turkey vulture (*Cathartes aura*). Great horned owl (*Bubo virginianus*) and barn owl (*Tyto alba*) may also be present. The Project area lacks potential nesting habitat (e.g., mature trees, tall shrubs) for these and other raptor species but is expected to provide foraging habitat for all of these species in the form of insects, spiders, lizards, snakes, small mammals, and other birds.

4.7 Nesting Birds

The Project area contains shrubs and ground cover that provide suitable habitat for nesting migratory birds. Impacts to nesting birds are prohibited under the Migratory Bird Treaty Act (MBTA) and California Fish and Game Code.[9]

4.8 Soil Mapping

The Natural Resource Conservation Service (NRCS) identifies the following soil types (series) as occurring (currently or historically) within the Project area [Exhibit 4]: Cieneba Rocky Sandy Loam, 15 to 50 Percent Slopes, Eroded; Fallbrook Sandy Loam, 8 to 15 Percent Slopes, Eroded; and Vista Coarse Sandy Loam, 8 to 15 Percent Slopes, Eroded.

None of these soil units are identified as hydric in the SCS's publication, Hydric Soils of the United States[10].

---

[9] The MBTA makes it unlawful to take, possess, buy, sell, purchase, or barter any migratory bird listed in 50 C.F.R. Part 10, including feathers or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 C.F.R.21). In addition, sections 3505, 3503.5, and 3800 of the California Department of Fish and Game Code prohibit the take, possession, or destruction of birds, their nests or eggs.

[10] United States Department of Agriculture, Soil Conservation Service. 1991. Hydric Soils of the United States, 3rd Edition, Miscellaneous Publication Number 1491. (In cooperation with the National Technical Committee for Hydric Soils.)

4.9 Jurisdictional Delineation

Four drainage courses are associated with the study area and are described herein as Drainages 1 through 4. The Project area does not contain any isolated non-federal waters.

Corps jurisdiction associated with the study area totals approximately 0.09 acre of waters of the United States, none of which consists of jurisdictional wetlands. CDFW jurisdiction associated with the study area totals approximately 0.22 acre, 0.05 acre of which consists of CDFW jurisdictional riparian vegetation.

All waters within the Project area that were determined to be potential waters of the United States pursuant to Section 404 of the CWA potentially fall within Regional Board jurisdiction pursuant to Section 401 of the Clean Water Act and/or the Porter Cologne Water Quality Act. None of the features at the Site were determined to be non-federal waters that would require separate analysis.

Feature descriptions are included in Appendix C –*Jurisdictional Delineation for the 17.67-Acre Tract 37392 (Formerly Tract 32042) Residential Development Project in the City of Riverside, Riverside County, California* (GLA 2018), and exhibits depicting the location and extent of each drainage feature are included on Exhibits 3A – Corps/RWQCB Jurisdictional Delineation Map and 3B – CDFW Jurisdictional Delineation Map. A summary of jurisdictional areas within the Site is provided below in Table 4-4.

Table 4-4: Corps, Regional Board, and CDFW Jurisdiction

		Corps/Regional Board			CDFW			
Drainage Feature	**Resource Type**	**Wetland (acres)**	**Non-wetland Waters (acres)**	**Total (acres)**	**Riparian (acres)**	**Unvegetated Streambed (acres)**	**Total (acres)**	**Length (linear feet)**
Drainage 1	Ephemeral	0.00	0.02	0.02	0.02	0.04	0.06	205
Drainage 2	Ephemeral	0.00	0.06	0.06	0.03	0.11	0.14	1,403
Drainage 3	Ephemeral	0.00	0.01	0.01	0.00	0.02	0.02	203
Drainage 4	Ephemeral	0.00	<0.01	<0.01	0.00	<0.01	<0.01	64
TOTAL		**0.00**	**0.09***	**0.09***	**0.05**	**0.17***	**0.22***	**1,875**

*Total may differ from sum of individual values due to rounding.

4.10 MSHCP Riparian/Riverine Areas and Vernal Pools

Vegetation communities associated with riparian systems are depleted natural vegetation communities because, similar to coastal sage scrub, they have declined throughout Southern California during past decades. In addition, they support a large variety of special-status wildlife species. Most species associated with riparian/riverine are covered species under the MSHCP (under Section 6.1.2 of the Plan). The MSHCP has specific policies and procedures regarding the evaluation and conservation of riparian/riverine resources (including riparian vegetation) because it supports MSHCP covered species. Specifically, the MSHCP states that “riparian/riverine areas

are natural lands which contain habitat dominated by trees, shrubs, persistent emergents, or emergent mosses and lichens, which occur close to or which depend upon soil moisture from a nearby fresh water source; or areas with fresh water flow during all or a portion of the year." Thus, the MSHCP classification of riparian/riverine includes both riparian (depleted natural vegetation communities) as well as ephemeral drainages that are natural in origin but may lack riparian vegetation. For this analysis, all non-man-made features that qualify as state streambeds are considered MSHCP riparian/riverine resources.

The riparian/riverine jurisdiction in the Study area is identical to that of CDFW jurisdiction. It totals 0.22 acre, 0.05 acre of which consists of riparian vegetation, and includes 1,875 linear feet of ephemeral streambed. Refer to Table 4-4 above, and the description of CDFW jurisdiction in Appendix C for a full summary.

5.0 IMPACT ANALYSIS

The following discussion examines the potential impacts to plant and wildlife resources that would occur as a result of the proposed project. Impacts (or effects) can occur in two forms, direct and indirect. Direct impacts are considered to be those that involve the loss, modification or disturbance of plant communities, which in turn, directly affect the flora and fauna of those habitats. Direct impacts also include the destruction of individual plants or animals, which may also directly affect regional population numbers of a species or result in the physical isolation of populations thereby reducing genetic diversity and population stability.

Indirect impacts pertain to those impacts that result in a change to the physical environment, but which is not immediately related to a project. Indirect (or secondary) impacts are those that are reasonably foreseeable and caused by a project, but occur at a different time or place. Indirect impacts can occur at the urban/wildland interface of projects, to biological resources located downstream from projects, and other off site areas where the effects of the project may be experienced by plants and wildlife. Examples of indirect impacts include the effects of increases in ambient levels of noise or light; predation by domestic pets; competition with exotic plants and animals; introduction of toxics, including pesticides; and other human disturbances such as hiking, off-road vehicle use, unauthorized dumping, etc. Indirect impacts are often attributed to the subsequent day-to-day activities associated with project build-out, such as increased noise, the use of artificial light sources, and invasive ornamental plantings that may encroach into native areas. Indirect effects may be both short-term and long-term in their duration. These impacts are commonly referred to as "edge effects" and may result in a slow replacement of native plants by non-native invasives, as well as changes in the behavioral patterns of wildlife and reduced wildlife diversity and abundance in habitats adjacent to Project areas.

Cumulative impacts refer to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts. A cumulative impact can occur from multiple individual effects from the same project, or from several projects. The cumulative impact from several projects is the change in the environment resulting from the incremental impact of the project when added to other closely related past, present, and

reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time.

5.1 California Environmental Quality Act (CEQA)

5.1.1 Thresholds of Significance

Environmental impacts to biological resources are assessed using impact significance threshold criteria, which reflect the policy statement contained in CEQA, Section 21001(c) of the California Public Resources Code. Accordingly, the State Legislature has established it to be the policy of the State of California:

> *"Prevent the elimination of fish or wildlife species due to man's activities, ensure that fish and wildlife populations do not drop below self-perpetuating levels, and preserve for future generations representations of all plant and animal communities..."*

Determining whether a project may have a significant effect, or impact, plays a critical role in the CEQA process. According to CEQA, Section 15064.7 (Thresholds of Significance), each public agency is encouraged to develop and adopt (by ordinance, resolution, rule, or regulation) thresholds of significance that the agency uses in the determination of the significance of environmental effects. A threshold of significance is an identifiable quantitative, qualitative or performance level of a particular environmental effect, non-compliance with which means the effect will normally be determined to be significant by the agency and compliance with which means the effect normally will be determined to be less than significant. In the development of thresholds of significance for impacts to biological resources CEQA provides guidance primarily in Section 15065, Mandatory Findings of Significance, and the CEQA Guidelines, Appendix G, Environmental Checklist Form. Section 15065(a) states that a project may have a significant effect where:

> *"The project has the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or wildlife community, reduce the number or restrict the range of an endangered, rare, or threatened species, ..."*

Therefore, for the purpose of this analysis, impacts to biological resources are considered potentially significant (before considering offsetting mitigation measures) if one or more of the following criteria discussed below would result from implementation of the proposed project.

5.1.2 Criteria for Determining Significance Pursuant to CEQA

Appendix G of the 2017 State CEQA guidelines indicate that a project may be deemed to have a significant effect on the environment if the project is likely to:

> *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 Game or U.S. Fish and Wildlife Service.

b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service.

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.

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.

e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.

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.

5.2 Impacts to Vegetation

Table 5-1 provides a summary of vegetation community impacts and avoidance/preservation. The proposed Project will permanently impact approximately 0.90 acre of disturbed Riversidean sage scrub and 6.90 acre of non-native grassland. The Project will also impact 6.42 acres of disturbed/developed areas. Impacts to special-status vegetation communities include 0.90 acre of disturbed Riversidean sage scrub, which is considered special-status because of its regional decline over the past several decades.

The proposed permanent removal of 0.90 acre of disturbed Riversidean sage scrub vegetation would not be a significant impact under CEQA because of the very low quantity of this vegetation community being removed is not expected to support a biologically important population of native species, neither would the removal of 6.42 acres of disturbed/ruderal vegetation because this land cover type generally holds very low biological value. However, the removal of disturbed Riversidean sage scrub by the proposed Project would be fully mitigated through compliance with the biological requirements of the MSHCP.

The proposed permanent removal of 6.90 acres of non-native grassland may potentially be a significant impact under CEQA prior to mitigation, as this habitat type provides live-in and foraging resources for native species. However, the removal of non-native grassland by the proposed Project would be fully mitigated through compliance with the biological requirements of the MSHCP.

Table 5-1. Summary of Vegetation/Land Use Impacts

Vegetation Community/Land Use Type	Impacted	Avoided
Mule Fat Scrub	0.00	0.05
Disturbed Riversidean Sage Scrub	0.90	2.04
Non-native Grassland	6.90	0.31
Disturbed/Developed	6.42	0.17
Total	**14.22**	**2.57**

Approximately 2.57 acres, consisting of the area nearest to the southeastern boundary of the Project will be avoided and placed under conservation under a deed restriction, conservation easement, or similar protective mechanism. This area includes 0.05 acre of mule fat scrub, 2.04 acres of disturbed Riversidean sage scrub, 0.31 acre of non-native grassland, and 0.17 acre of disturbed/developed areas, which will be conserved.

5.3 Impacts to Special-Status Plants

No special-status plant species have been detected at the Project area to date. Seven CNPS Rank species have a reasonable potential to occur within the Project area, ranging from very low to low. These are Plummer's mariposa-lily, Payson's jewelflower, Parry's spineflower, Robinson's pepper-grass, Brand's phacelia, white rabbit-tobacco, and chaparral ragwort.

Although potential Project impacts to Plummer's mariposa lily, Payson's jewelflower, Parry's spineflower, and Brand's phacelia are not considered significant under CEQA as only 0.90 acre of disturbed Riversidean sage scrub with a very low to low potential to support these would be impacted; therefore, populations of these species, if present, are not expected to represent a number potentially significant under CEQA within this small area being impacted, these species are covered under the MSHCP, and no compensatory or avoidance action would be required, as the Project area is not located within a Narrow Endemic Plant Species Survey Area.

Potential Project impacts to Robinson's pepper-grass, white rabbit-tobacco, and chaparral ragwort are not significant under CEQA, as only 0.90 acre of disturbed Riversidean sage scrub with a very low to low potential to support these would be impacted; therefore, populations of these species, if present, are not expected to represent a number potentially significant under CEQA within this small area being impacted. No compensatory or avoidance action would be required for these species under CEQA.

5.4 Impacts to Stephens' Kangaroo Rat

Approximately 7.88 acres of habitat consisting of disturbed Riversidean sage scrub and non-native grassland with a low potential to support Stephens' kangaroo rat would be permanently impacted by the proposed Project. If unmitigated, impacts to Stephens' kangaroo rat, if present, could be potentially significant under CEQA; however, take would be authorized and these impacts would be mitigated through payment of the SKR fee as required under the Habitat

Conservation Plan for the Stephens' Kangaroo Rat in Western Riverside County, California (RCHCA 1996).

5.5 Impacts to Coastal California Gnatcatcher

Approximately 0.90 acres of disturbed Riversidean sage scrub habitat with a very low potential to support coastal California gnatcatcher would be permanently impacted by the proposed Project. If unmitigated, impacts to coastal California gnatcatcher, if present, could be potentially significant under CEQA; however, take would be authorized and these impacts would be mitigated through payment of the MSHCP development fee, as this species is considered adequately conserved by the Plan.

5.6 Impacts to Burrowing Owl

No burrowing owls have been detected within or adjacent to the Project during general biological surveys or incidentally during the jurisdictional delineation field effort to date; however, there is a very low potential for burrowing owls to be detected during focused surveys scheduled to be conducted during the 2018 burrowing owl breeding season.

If burrowing owls are detected during the focused survey visits (including during the pre-construction survey that will be required under the MSHCP), impacts to burrowing owls could occur from the development of the Project and may be potentially significant under CEQA prior to mitigation. A project-specific mitigation measure is identified in Section 6.0 of this report to reduce impacts to below a level of significance.

If burrowing owls are not detected during the remaining the focused survey visits or during the pre-construction survey, the Project would have no impact to burrowing owls.

5.7 Impacts to Other Special-Status Animals

The Project area contains habitat suitable for several non-listed special-status animals with a potential to reside or breed on the Project area ranging from very low to moderate, which include reptiles: California glossy snake, coastal whiptail, San Diego banded gecko, Northern red-diamond rattlesnake, and coast horned lizard; birds: burrowing owl, and coastal California gnatcatcher; and mammals: northwestern San Diego pocket mouse, Stephens' kangaroo rat, and southern grasshopper mouse.

In addition, the Project area contains habitat with the potential to support foraging by the state listed as Threatened Swainson's hawk, as well as non-listed special-status species. Non-listed special-status animals that are not expected to reside or breed within the Project area, yet hold the potential for foraging include birds: white-tailed kite, loggerhead shrike, and yellow warbler; and mammals: pallid bat, western mastiff bat, western yellow bat, San Diego desert woodrat, and American badger.

With the exception of the burrowing owl, for those species covered under the MSHCP, no additional survey, compensatory, or avoidance action would be required, as the Project area is

not located within a Small Mammal, Amphibian, or Criteria Area Species Survey Area. Potential impacts to these species by development of the Project would be mitigated through payment of MSHCP fees and SKR fees. This includes state or federally listed species such as Stephens' kangaroo rat, which is covered by the SKR HCP and coastal California gnatcatcher, which is considered adequately conserved by the MSHCP.

Potential impacts to special-status animals not covered by the MSHCP include reptiles: California glossy snake; and mammals: southern grasshopper mouse. Although the Project could potentially impact these species, due to the disturbed and relatively fragmented nature of the Project area, the expected number of impacted individuals will not reach a level of significance.

The Project will remove habitat with the potential to support foraging by the state listed as Threatened Swainson's hawk, as well as non-listed, special-status species not covered by the MSHCP. Special-status animals not covered by the MSHCP that are not expected to reside or breed within the Project area, yet hold the potential for foraging include mammals: pallid bat, western mastiff bat, western yellow bat, and American badger. Due to the disturbed and relatively fragmented nature of the Project area, the removal of foraging habitat resulting from the project will not reach a level of significance.

5.8 Impacts to Critical Habitat

The proposed Project will not impact lands designated as critical habitat by the USFWS.

5.9 Impacts to Nesting Birds

The project has the potential to impact active bird nests if vegetation is removed during the nesting season (February 1 to August 31). Impacts to nesting birds are prohibited by the MBTA and California Fish and Game Code. A project-specific mitigation measure is identified in Section 6.0 of this report to avoid impacts to nesting birds.

Although impacts to native birds are prohibited by MBTA and similar provisions of California Fish and Game Code, impacts to native birds by the proposed Project would not be a significant impact under CEQA. The native birds with potential to nest on the Project area would be those that are extremely common to the region and highly adapted to human landscapes (e.g., house finch, killdeer). The number of individuals potentially affected by the Project would not be biologically significant regionally, let alone local populations of such species. A measure is identified in Section 6.0 of this report to avoid impacts to nesting birds, as required by the MBTA and California Fish and Game Code.

5.10 Impacts to Wildlife Migration/Nurseries

The Project area lacks migratory wildlife corridors as it is surrounded on three sides by residential development and does not occur within MSHCP Cores or Linkages. In addition, the Project area does not represent a significant or biologically important wildlife nursery site, as it is largely fragmented from surrounding wildlands by development, and is subject to on-going human disturbance, such as disking. The proposed Project would not interfere or impact (1) the movement

of native resident or migratory fish or wildlife species or (2) established native resident or migratory wildlife corridors, or (3) impede the use of native wildlife nursery sites. No impact would occur.

5.11 Impacts to Jurisdictional Waters

The proposed Project would not result in impacts to potentially jurisdictional waters under CWA Sections 401 or 404, or Fish and Game Code Section 1602. Therefore, the proposed project would not require permits/authorizations under CWA Sections 401 and 404 or Fish and Game Code Section 1602, and no mitigation would be required.

5.12 Impacts to MSHCP Riparian/Riverine Areas

Pursuant to Volume I, Section 6.1.2 of the MSHCP, projects must consider alternatives providing for 100% percent avoidance of riparian/riverine areas. If avoidance is infeasible, then the unavoidable impacts must be mitigated and a Determination of Biologically Equivalent or Superior Preservation (DBESP) is required.

The Project would not result in impacts to riparian/riverine resources; therefore, a DBESP would not be required for the proposed Project.

5.13 Indirect Impacts to Biological Resources

In the context of biological resources, indirect effects are those effects associated with developing areas adjacent to adjacent native open space. Potential indirect effects associated with development include: water quality impacts associated with drainage into adjacent open space/downstream aquatic resources; lighting effects; noise effects; invasive plant species from landscaping; and effects from human access into adjacent open space, such as recreational activities (including off-road vehicles and hiking), pets, dumping, etc. Temporary, indirect effects may also occur as a result of construction-related activities. This includes potential indirect effects to the approximately 2.57-acre conserved portion of the Project area.

The Project has the potential for both temporary and permanent indirect effects. These indirect effects such as increased noise and dust during construction can cause temporary impacts such as increased depredation to wildlife using the adjacent lands. The Project may increase lighting to adjacent undeveloped lands and increase vehicular traffic at the Project area, both with the potential to permanently and indirectly impact wildlife resources through increased predation, road mortality, overall reduced function and value of the adjacent undeveloped habitats to wildlife resources.

Section 6.0 of this report identifies measures to reduce indirect effects to below a level of significance under CEQA.

5.14 Cumulative Impacts to Biological Resources

Cumulative impacts are defined as the direct and indirect effects of a proposed project which, when considered alone, would not be deemed a substantial impact, but when considered in addition to the impacts of related projects in the area, would be considered potentially

significant, hence that the project could make a cumulatively considerable impact to the regional decline of such resources. "Related projects" refers to past, present, and reasonably foreseeable probable future projects, which would have similar impacts to the proposed project.

Given the low-level of expected use of the Project area by special-status plant and animal species, along with the implementation the avoidance, minimization, and mitigation measures outlined in Section 6, below, the Project would not result in significant cumulative impacts.

6.0 MITIGATION/AVOIDANCE MEASURES

The following discussion provides project-specific mitigation/avoidance measures for actual or potential impacts to special-status resources.

6.1 Stephens' Kangaroo Rat

Compensation for potential Project impacts to Stephens' kangaroo rat will occur through payment of the SKR fee, as required by the Plan.

6.2 Coastal California Gnatcatcher

Compensation for potential Project impacts to coastal California gnatcatcher will occur through payment of MSHCP fees.

6.3 Burrowing Owl

A focused survey for burrowing, following current MSHCP protocol will be performed during the 2018 burrowing owl breeding season. If burrowing owls are detected, the owls will be excluded from the Project area outside of the breeding season following accepted protocols under the MSHCP, and subject to the approval of the RCA and wildlife agencies.

Compensation for the loss of burrowing owl habitat will occur through payment of MSHCP fees.

MSHCP Objective 6 for burrowing owls requires that pre-construction surveys prior to site grading. As such, the following measure is recommended to avoid direct impacts to burrowing owls and to ensure consistency with the MSHCP:

- A qualified biologist will conduct a pre-construction presence/absence survey for burrowing owls within 30 days prior to site disturbance. If burrowing owls are detected onsite, the owls will be excluded from the site outside of the breeding season following accepted protocols, and subject to the approval of the RCA and wildlife agencies.

6.4 Nesting Birds

The Project area contains vegetation with the potential to support nesting birds. As discussed above, the MBTA and California Fish and Game Code prohibit impacts to nesting birds. The

following measure is recommended to avoid impacts to nesting birds, however because potential impacts to nesting birds is judged less than significant under CEQA for this Project this measure would be superseded by any USFWS and/or CDFW nesting bird requirements that may be included in the aquatic permits/certifications/agreements:

- As feasible, vegetation clearing should be conducted outside of the nesting season, which is generally identified as February 1 through September 15. If avoidance of the nesting season is not feasible, then a qualified biologist shall conduct a nesting bird survey within three days prior to any disturbance of the site, including disking and grading. If active nests are identified, the biologist shall establish suitable buffers around the nests based on his/her judgement, and the buffer areas shall be avoided until the nests are no longer occupied and the juvenile birds can survive independently from the nests.

7.0 MSHCP CONSISTENCY ANALYSIS

The purpose of this section is to provide an analysis of the proposed Project with respect to compliance with biological aspects of the Western Riverside County MSHCP. Specifically, this analysis evaluates the proposed Project with respect to the Project's consistency with MSHCP Reserve assembly requirements, *Section 6.1.2* (Protection of Species Associated with Riparian/Riverine Areas and Vernal Pools), *Section 6.1.3* (Protection of Narrow Endemic Plant Species), *Section 6.1.4* (Guidelines Pertaining to the Urban/Wildlands Interface), and *Section 6.3.2* (Additional Survey Needs and Procedures).

7.1 Project Relationship to Reserve Assembly

The Project area is located within the Cities of Riverside and Norco Area Plan of the MSHCP, but is not located within the MSHCP Criteria Area [Exhibit 6 – MSHCP Overlay Map]. The Project area is not located within the MSHCP Narrow Endemic Plant Species Survey Area (NEPSSA) or the Criteria Area Plant Species Survey Area (CAPSSA). The Project area is located within the MSHCP Burrowing Owl Survey Area, but is not located within the MSHCP Mammal or Amphibian Survey Areas, or Core and Linkage areas.

The proposed Project is not subject to the Habitat Evaluation and Acquisition Negotiation Strategy (HANS) process.

7.2 Protection of Species Associated with Riparian/Riverine Areas and Vernal Pools

The proposed Project will not impact Riparian/Riverine areas, vernal pools, or associated species outlined in MSHCP *Section 6.1.2* (Protection of Species Associated with Riparian/Riverine Areas and Vernal Pools); therefore, a DBESP would not be required for the proposed Project.

7.3 Protection of Narrow Endemic Plants

Volume I, Section 6.1.3 of the MSHCP requires that within identified Narrow Endemic Plant Species Survey Areas (NEPSSA), site-specific focused surveys for Narrow Endemic Plants

Species will be required for all public and private projects where appropriate soils and habitat are present.

The Project area is not located within a NEPSSA; therefore, avoidance of Narrow Endemic Plant Species is not required, and the Project is consistent with the biological requirements of the MSHCP regarding Narrow Endemic Plant Species.

7.4 Guidelines Pertaining to the Urban/Wildland Interface

The MSHCP Urban/Wildland Interface Guidelines are intended to address indirect effects associated with locating development in proximity to the MSHCP Conservation Area. As the MSHCP Conservation Area is assembled, development is expected to occur adjacent to the Conservation Area. Future development in proximity to the MSHCP Conservation Area may result in edge effects with the potential to adversely affect biological resources within the Conservation Area. As the Project area is not located adjacent to an MSHCP Conservation Area, implementation of MSHCP Urban/Wildland Interface Guideline is not required.

7.5 Additional Survey Needs and Procedures

The Project area is not located within the MSHCP Narrow Endemic Plant Species Survey Area (NEPSSA) or the Criteria Area Plant Species Survey Area (CAPSSA). The Project area is located within the MSHCP Burrowing Owl Survey Area, but is not located within the MSHCP Mammal or Amphibian Survey Areas, or Core and Linkage areas.

Focused surveys for burrowing owl are scheduled to occur during the 2018 burrowing owl breeding season and a pre-construction burrowing owl survey will occur within 30 days of Project-related impacts for consistency with survey requirements of the MSHCP Burrowing Owl Survey Area.

7.6 Conclusion of MSHCP Consistency

As outlined above, the proposed Project will be consistent with the biological requirements of the MSHCP; specifically pertaining to the Project's relationship to reserve assembly, *Section 6.1.2* (Protection of Species Associated with Riparian/Riverine Areas and Vernal Pools), *Section 6.1.3* (Protection of Narrow Endemic Plant Species), *Section 6.1.4* (Guidelines Pertaining to the Urban/Wildlands Interface), and *Section 6.3.2* (Additional Survey Needs and Procedures)

8.0 REFERENCES

American Ornithologists' Union (AOU). 2009. Checklist of North American Birds, (7th Edition; 1998-2009).

Baldwin, B.G., D.H. Goldman, D.J. Keil, R. Patterson, T.J. Rosatti, and D.H. Wilken. 2012. The Jepson Manual: Vascular Plants of California. University of California Press. 1,568 pp.

California Department of Fish and Wildlife. 2016. Complete List of Amphibian, Reptile, Bird and Mammal Species in California. Dated May 2016.

[CDFG] California Department of Fish and Game. 2009. Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities. State of California, California Natural Resources Agency, Department of Fish and Game. Dated November 24, 2009.

California Department of Fish and Wildlife. 2017. Special Animals. State of California Resources Agency, Sacramento, California. Dated October 2017.

California Department of Fish and Wildlife. 2017. State and Federally Listed Endangered and Threatened Animals of California. State of California Resources Agency. Sacramento, California. Dated October 2017.

California Department of Fish and Wildlife. 2017. California Natural Diversity Database: RareFind 5. Records of occurrence for U.S.G.S. 7.5- minute Quadrangle maps: Fontana, Lake Matthews, Perris, Redlands, Riverside East, Riverside West, San Bernardino South, Steele Peak, and Sunnymead, California. California Department of Fish and Wildlife, State of California Resources Agency. Sacramento, California.

[Cal-IPC] California Invasive Plant Council. California Invasive Plant Inventory Database. Website: http://cal-ipc.org/paf/. [accessed October 2017]

[CNPS] California Native Plant Society. 2001. Inventory of Rare and Endangered Plants of California (sixth edition). Rare Plant Scientific Advisory Committee, David P. Tibor, Convening Editor. California Native Plant Society. Sacramento, CA. x + 388pp.

[CNPS] California Native Plant Society, Rare Plant Program. 2017. Inventory of Rare and Endangered Plants of California (online edition, v8-03 0.39). Website http://www.rareplants.cnps.org [accessed October 2017].

Collins, Joseph T. and Travis W. Taggart. 2009. Standard Common and Current Scientific Names for North American Amphibians, Turtles, Reptiles, and Crocodilians. Sixth Edition. Publication of The Center For North American Herpetology, Lawrence. iv+44p.

[Dudek] Dudek & Associates. 2003. Western Riverside County Multiple Species Habitat Conservation Plan. Volumes 1 – 5. Prepared for the Transportation and Land Management Agency, County of Riverside, California as part of the Riverside County Integrated Project. Adopted June 2003, currently available at http://www.rcip.org/conservation.htm.

[GLA] Glenn Lukos Associates, Inc. 2017. Jurisdictional Delineation for the 17.67-Acre Tract 37392 (Formerly Tract 32042) Residential Development Project in the City of Riverside, Riverside County, California. Dated December 11, 2017.

Holland, R. F. 1986. Preliminary Descriptions of the Terrestrial Natural Communities of California. Nongame-Heritage Program, California Department of Fish and Wildlife.

Munz, P.A. 1974. A Flora of Southern California. University of California Press. 1,086 pp.

Nelson, J. 1984. Rare plant survey guidelines. In: Inventory of rare and endangered vascular plants of California. J. Smith and R. York (eds.). Special Publication No. 1. California Native Plant Society.

[RCHCA] Riverside County Habitat Conservation Agency. 1996. Habitat Conservation Plan for the Stephens' Kangaroo Rat in Western Riverside County, California. Riverside, CA: Riverside County Habitat Conservation Agency.

Sawyer, J.O, T. Keeler-Wolf, and J.M. Evens. A Manual of California Vegetation. Second Edition. California Native Plant Society Press. Sacramento, California. 1,300 pp.

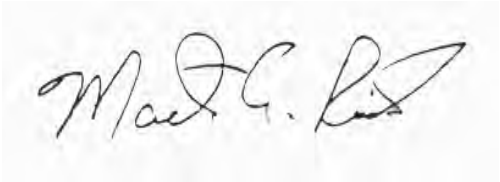
Stebbins, R. C. 1954. Amphibians and reptiles of western North America. McGraw-Hill, New York. 536pp.

Stebbins, R.C. 1985. A field guide to western reptiles and amphibians, 2nd ed. Houghton Mifflin Co., Boston, Massachusetts.

[USFWS] U.S. Fish and Wildlife Service. 2000. Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants. Sacramento, CA: U.S. Fish and Wildlife Service. Unpublished memorandum, dated January 2000.

9.0 CERTIFICATION

I hereby certify that the statements furnished above and in the attached exhibits present data and information required for this biological evaluation, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

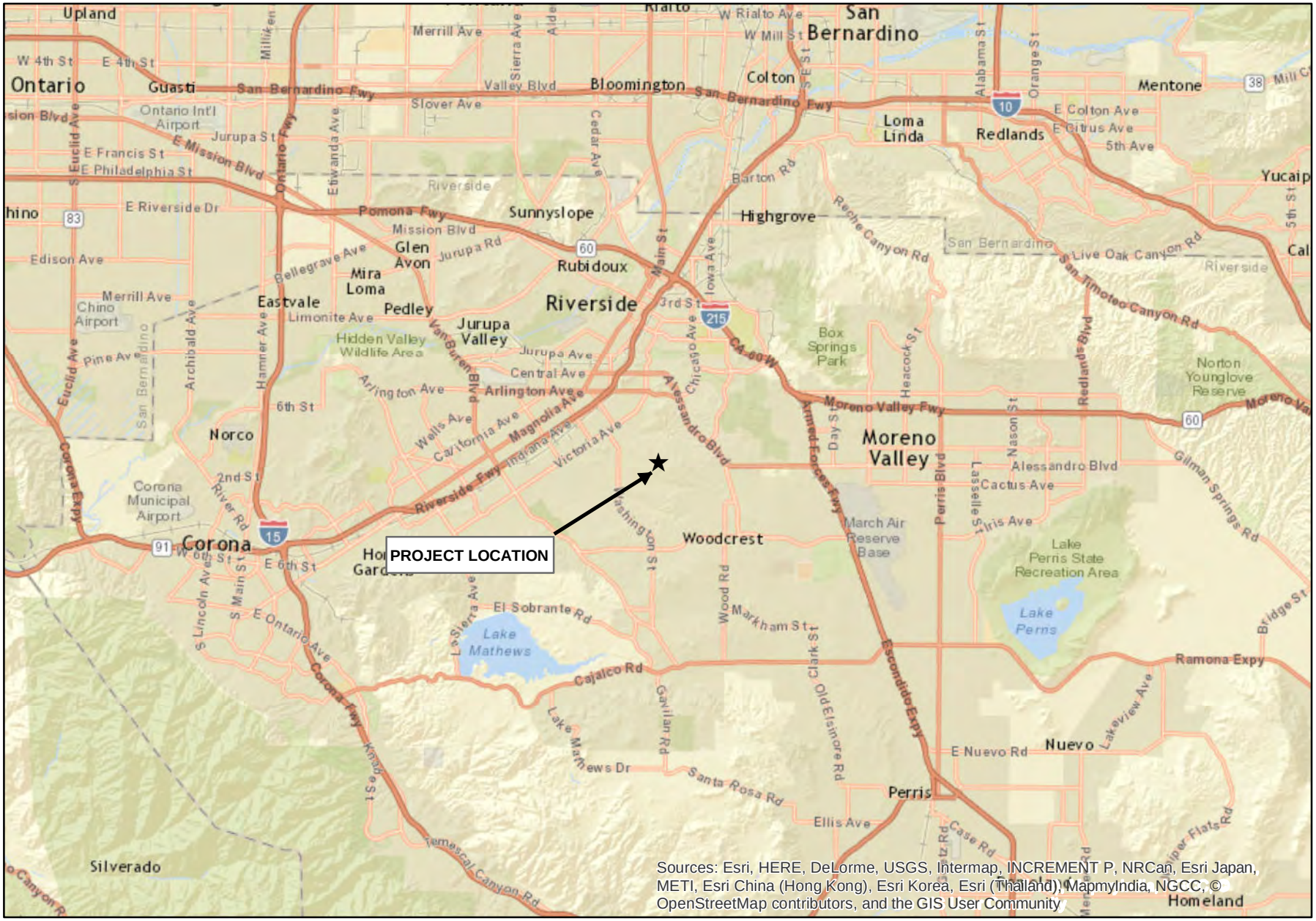


Signed:_____

Date: _____February 20, 2018_____

p:1311-1a.Biological Technical Report.docx

Source: ESRI World Street Map



N

0 2 4 8 Miles

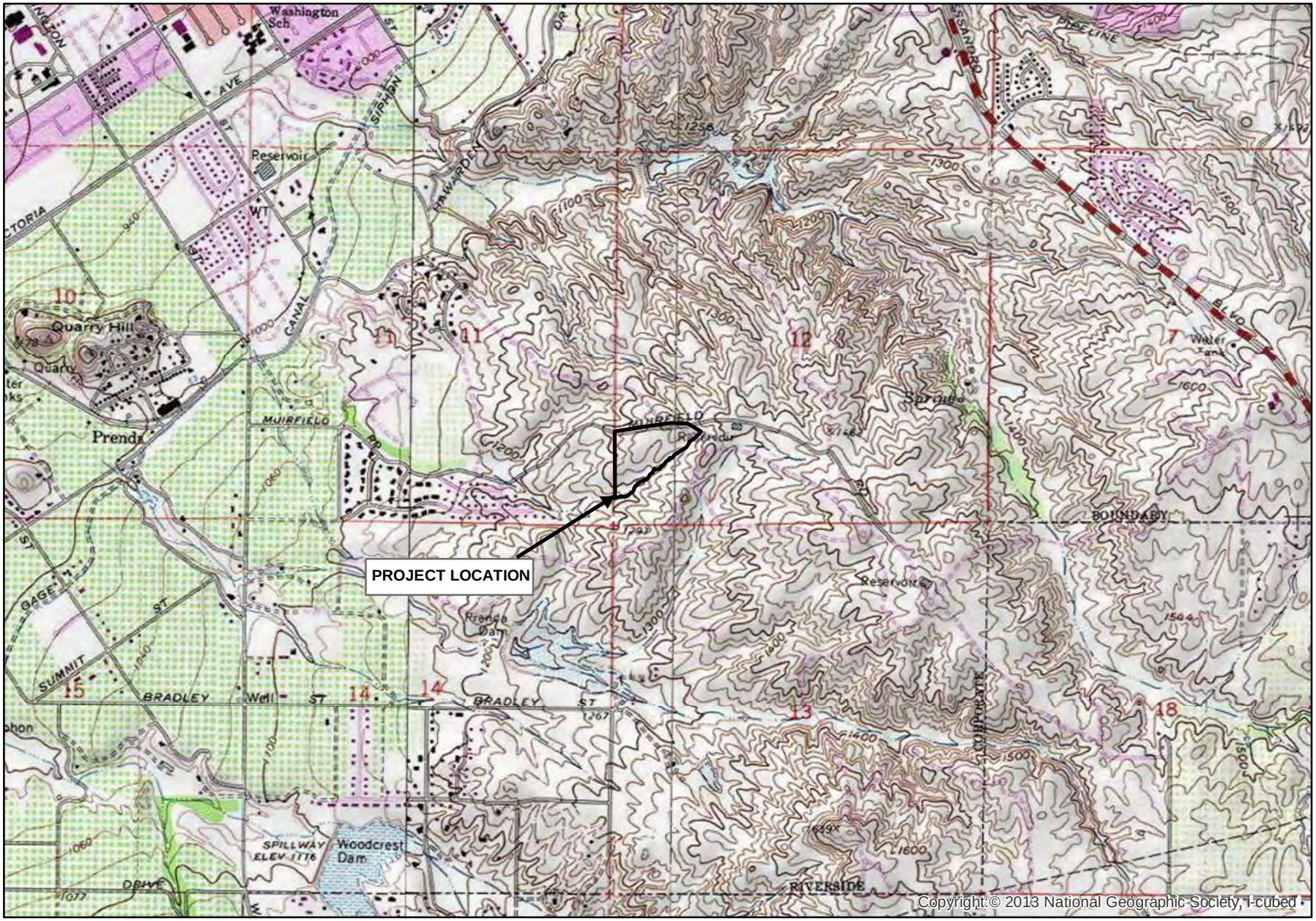
TRACT 32042
RESIDENTIAL DEVELOPMENT PROJECT

Regional Map

GLENN LUKOS ASSOCIATES

Exhibit 1

Adapted from USGS Riverside East, CA quadrangle



N

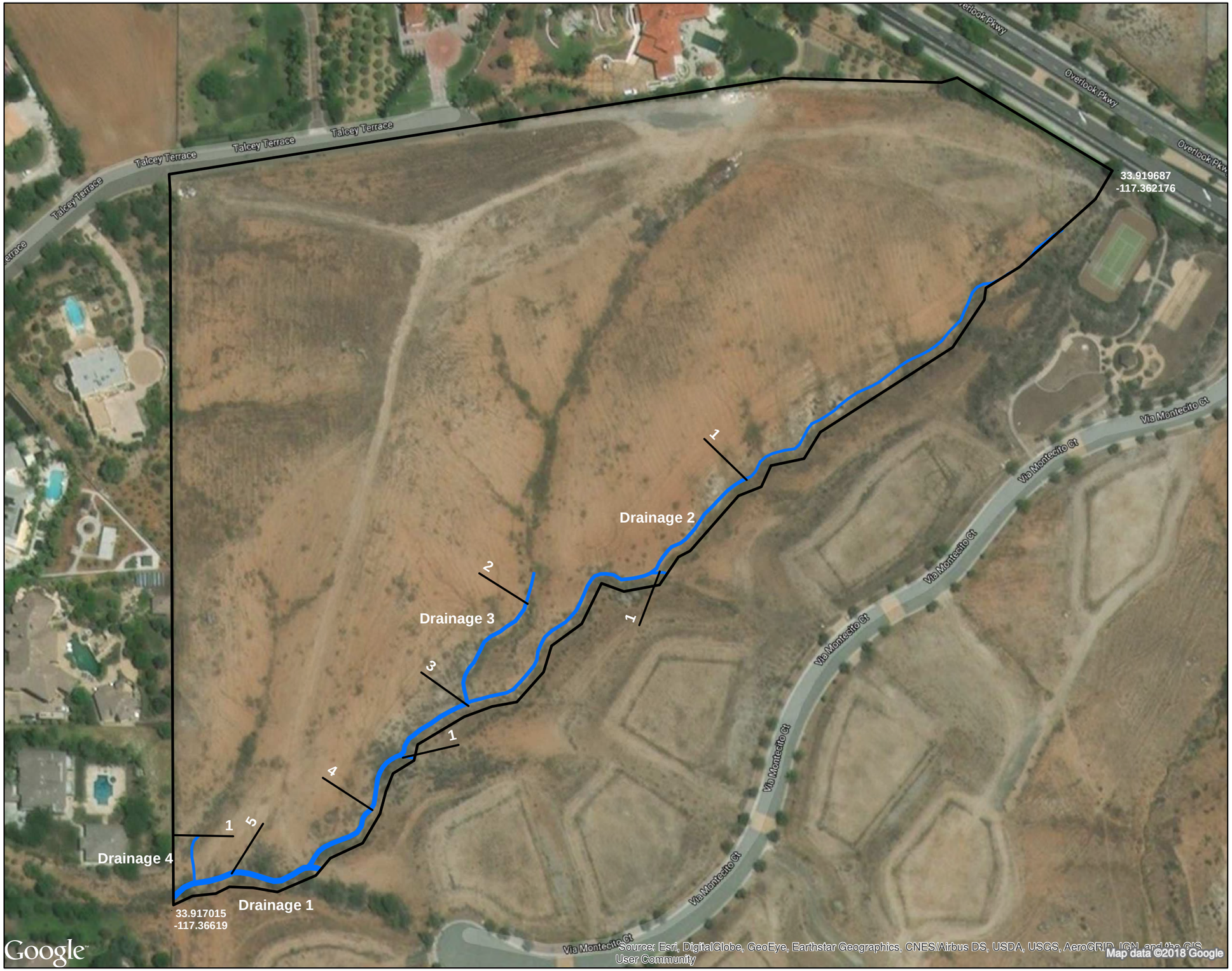
0 1,000 2,000 4,000 Feet

TRACT 32042
RESIDENTIAL DEVELOPMENT PROJECT

Vicinity Map

GLENN LUKOS ASSOCIATES

Exhibit 2



Property Boundary

Corps/RWQCB Non-Wetland Waters

1 Width of Non-Wetland Waters in Feet

N

0 62.5 125 250

Feet

1 inch = 125 feet

Coordinate System: State Plane 6 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: K. Kartunen, GLA
Date Prepared: November 3, 2017

TRACT 32042
RESIDENTIAL DEVELOPMENT PROJECT

Corps/RWQCB Jurisdictional Delineation Map

GLENN LUKOS ASSOCIATES

Exhibit 3A

X:\1100 AFTER THE REST\1311-01RIVE\1311-1GIS\DelineationGIS\REV1\1311-1 CorpsLayoutREV1.mxd

Property Boundary

CDFW Non-Riparian Streambed

CDFW Riparian

1 Width of Non-Riparian Streambed Waters in Feet

N

0 62.5 125 250

Feet

1 inch = 125 feet

Coordinate System: State Plane 6 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: K. Kartunen, GLA
Date Prepared: November 3, 2017

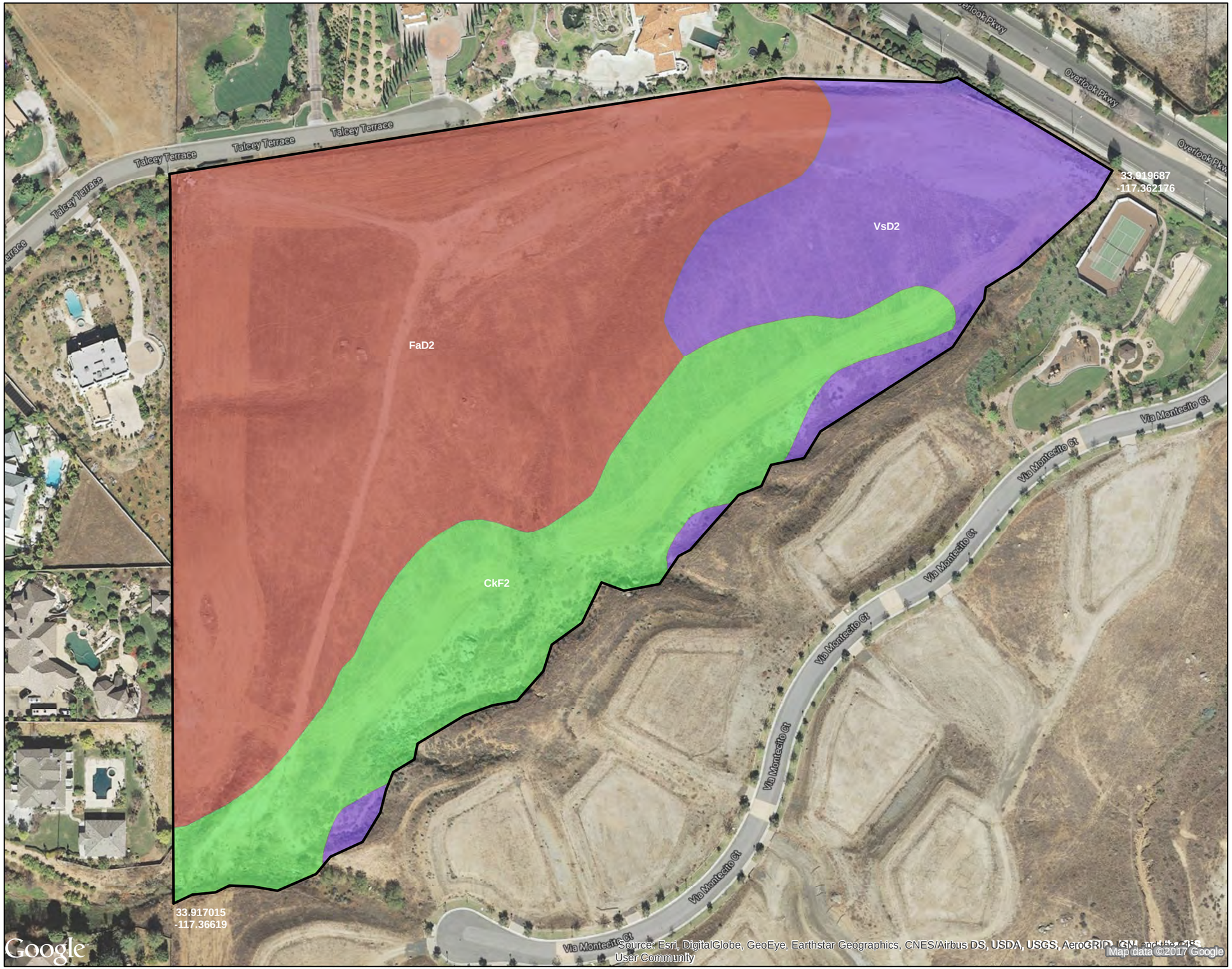
TRACT 32042
RESIDENTIAL DEVELOPMENT PROJECT

CDFW Jurisdictional Delineation Map

GLENN LUKOS ASSOCIATES

Exhibit 3B

X:\1100 AFTER THE REST\1311-01RIVE\1311-1GIS\DelineationGIS\REV1\1311-1 CDFWLayoutREV1.mxd



Property Boundary

CkF2 - Cieneba rocky sandy loam, 15 to 50 percent slopes, eroded

FaD2 - Fallbrook sandy loam, 8 to 15 percent slopes, eroded

VsD2 -Vista coarse sandy loam, 8 to 15 percent slopes, eroded

N

0 62.5 125 250

Feet

1 inch = 125 feet

Coordinate System: State Plane 6 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: K. Kartunen, GLA
Date Prepared: November 3, 2017

TRACT 32042
RESIDENTIAL DEVELOPMENT PROJECT

Soils Map

GLENN LUKOS ASSOCIATES

Exhibit 5

X:\1100 AFTER THE REST\1311-01RIVE\1311-1GIS\SoilsGIS\1311-1 Soils.mxd

Property Boundary
D RSS - Disturbed Riversidean Sage Scrub
D/D - Disturbed/Developed
MFS - Mulefat Scrub
NNG - Non-Native Grassland

N

0 62.5 125 250
Feet

1 inch = 125 feet

Coordinate System: State Plane 6 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: K. Kartunen, GLA
Date Prepared: November 3, 2017

TRACT 32042
RESIDENTIAL DEVELOPMENT PROJECT

Vegetation Map

GLENN LUKOS ASSOCIATES

Exhibit 5

X:\1100 AFTER THE REST\1311-01RIVE\1311-1GIS\VegetationGIS\1311-1 VegetationLayout.mxd

Property Boundary

Burrowing Owl Survey Area

N

0 62.5 125 250

Feet

1 inch = 125 feet

Coordinate System: State Plane 6 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: K. Kartunen, GLA
Date Prepared: November 3, 2017

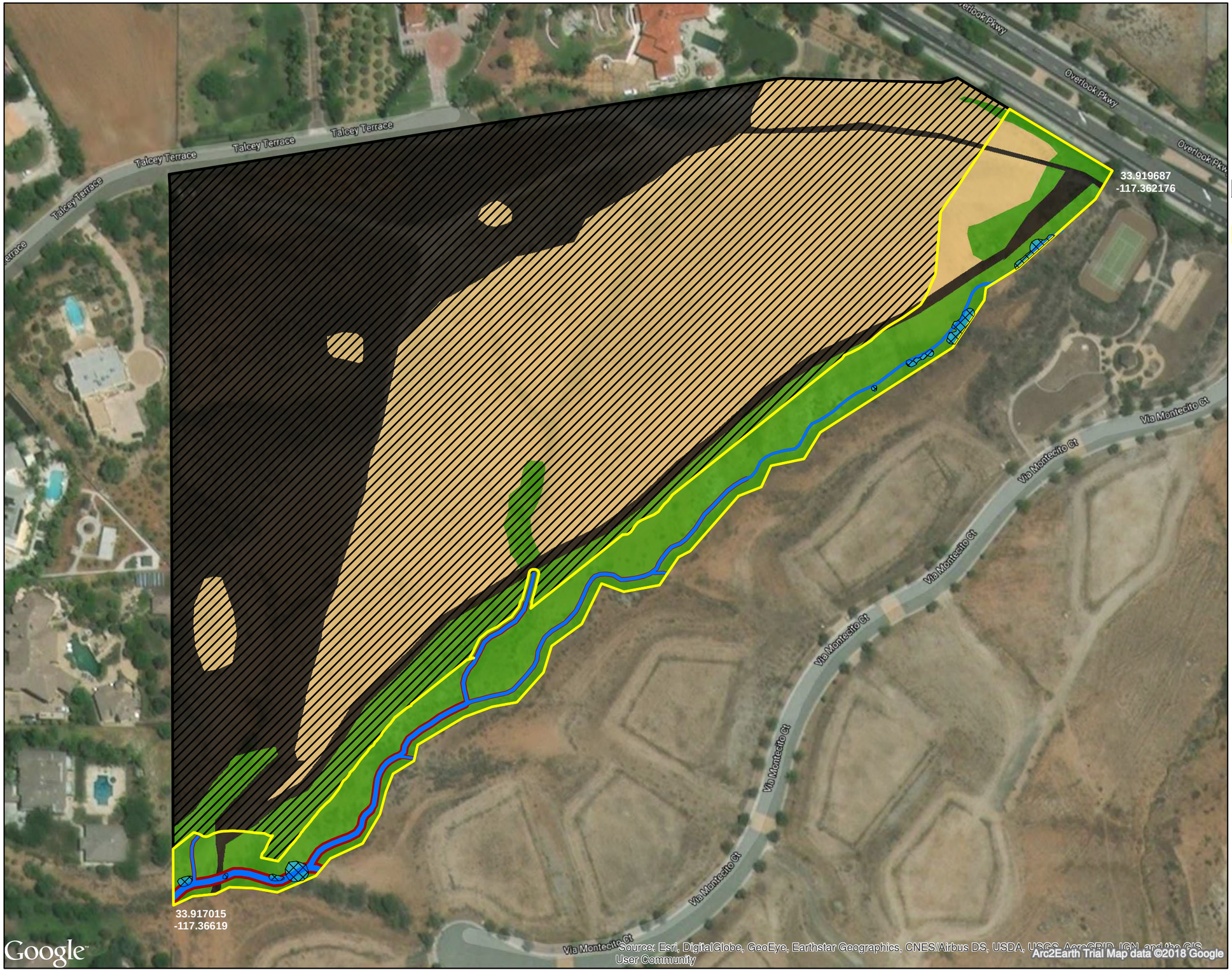
TRACT 32042
RESIDENTIAL DEVELOPMENT PROJECT

MSHCP Overlay Map

GLENN LUKOS ASSOCIATES

Exhibit 6

X:\1100 AFTER THE REST\1311-01RIVE\1311-1GIS\MSHCPGIS\1311-1 MSHCP Layout.mxd



- Property Boundary
- Impact Boundary
- Open Space
- D RSS - Disturbed Riversidean Sage Scrub
- D/D - Disturbed/Developed
- MFS - Mulefat Scrub
- NNG - Non-Native Grassland
- Corps/RWQCB Non-Wetland Waters/CDFW Non-Riparian
- CDFW Non-Riparian Streambed Only
- CDFW Riparian

N

0 62.5 125 250
Feet

1 inch = 125 feet

Coordinate System: State Plane 6 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: K. Kartunen, GLA
Date Prepared: November 3, 2017

TRACT 32042
RESIDENTIAL DEVELOPMENT PROJECT

Impact Map

GLENN LUKOS ASSOCIATES

Exhibit 7

X:\1100 AFTER THE REST\1311-01RIVE\1311-1GIS\ImpactsGIS\1311-1Impacts Layout.mxd

Photograph 1: View of mule fat scrub habitat located within the 2.53-acre Conservation Area.

Photograph 2: View of disturbed Riversidean sage scrub habitat located within the 2.53-acre Conservation Area.

Photograph 3: View of disturbed/developed area in the central portion of the Project area.

Photograph 4: View of non-native grassland habitat located within the central portion of the Project area.

GLENN LUKOS ASSOCIATES

Exhibit 8

TRACT 32042 RESIDENTIAL DEVELOPMENT PROJECT

Site Photographs

Appendix A

Floral Compendium

FLORAL COMPENDIUM

The floral compendium lists all species identified during floristic level/focused plant surveys conducted for the Project site. Taxonomy typically follows the Angiosperm Phylogeny Group (APG), which in some cases differs from The Jepson Manual 2nd Edition (2012). Common plant names are taken from Baldwin et al (2012), Munz (1974), and Roberts et al (2004) and Roberts (2008). An asterisk (*) denotes a non-native species. A dot (•) indicates an ornamental planting.

SCIENTIFIC NAME	COMMON NAME
MAGNOLIOPHYTA	**FLOWERING PLANTS**
MONOCOTYLEDONS	**MONOCOTS**
POACEAE	**Grass Family**
* *Bromus madritensis*	foxtail chess
* *Hordeum murinum*	wall barley
* *Schismus barbatus*	Mediterranean grass
EUDICOTYLEDONS	**EUDICOTS**
ASTERACEAE	**Sunflower Family**
Ambrosia acanthicarpa	annual bur-sage
Artemisia californica	California sagebrush
Baccharis salicifolia	mule fat
Corethrogyne filaginifolia	sand aster
Encelia farinosa	brittlebush
Gutierrezia californica	California matchweed
Heterotheca grandiflora	telegraph weed
Isocoma menziesii	coastal goldenbush
Stephanomeria exigua	wire-lettuce
BORAGINACEAE	**Borage Family**
Amsinckia intermedia	common fiddleneck
BRASSICACEAE	**Mustard Family**
* *Brassica nigra*	black mustard
* *Brassica tournefortii*	Sahara mustard
* *Hirschfeldia incana*	short-pod mustard
Lepidium virginicum	peppergrass
* *Sisymbrium irio*	London rocket

CHENOPODEACEAE	**Goosefoot Family**
* *Salsola tragus*	Russian thistle
CUCURBITACEAE	**Gourd Family**
Marah macrocarpus	wild cucumber
EUPHORBIACEAE	**Spurge Family**
* *Euphorbia albomarginata*	rattlesnake spurge
Croton setiger	turkey-mullein
FABACEAE	**Legume Family**
Acmispon glaber	deerweed
LAMIACEAE	**Mint Family**
* *Marrubium vulgare*	horehound
POLYGONACEAE	**Buckwheat Family**
Eriogonum davidsonii	Davidson's buckwheat
Eriogonum fasciculatum	California buckwheat
ROSACEAE	**Rose Family**
• *Heteromeles arbutifolia*	toyon
• *Photinia cultivar*	photinia
SALICACEAE	**Willow Family**
Salix gooddingii	Goodding's black willow
SCROPHULAREACEAE	**Figwort Family**
Scrophularia californica	California figwort
SOLANACEAE	**Nightshade Family**
Lycium andersonii	Anderson's box-thorn
* *Nicotiana glauca*	tree tobacco
TAMARICACEAE	**Tamarisk Family**
* *Tamarix ramosissima*	saltcedar
VITACEAE	**Grape Family**
• *Parthenocissus tricuspidata*	Boston ivy

Appendix B

Faunal Compendium

FAUNAL COMPENDIUM

The faunal compendium lists all species identified during general/focused wildlife surveys conducted for the Project site. Scientific nomenclature and common names for vertebrate species referred to in this compendium follow the Complete List of Amphibian, Reptile, Bird, and Mammal Species in California (CDFW 2016), Standard Common and Scientific Names for North American Amphibians, Turtles, Reptiles, and Crocodilians 6th Edition, Collins and Taggert (2009) for amphibians and reptiles, and the American Ornithologists' Union Checklist 7th Edition (2015) for birds. An asterisk (*) denotes a non-native species.

SCIENTIFIC NAME	COMMON NAME
INSECTA	**INSECTS**
FORMICIDAE	**Ants**
Messor sp.	harvester ant
LEPIDOPTERA	**BUTTERFLIES**
PIERIDAE	**Whites and Sulphurs**
Pieris protodice	checkered white
REPTILIA	**REPTILES**
PHYRYNOSOMATIDAE	**Spiny Lizards**
Sceloporus occidentalis	western fence lizard
AVES	**BIRDS**
ACCIPITRIDAE	**Hawks and Old World Vultures**
Buteo jamaicensis	red-tailed hawk
CATHARTIDAE	**New World Vultures**
Cathartes aura	turkey vulture
COLUMBIDAE	**Pigeons And doves**
Zenaida macroura	mourning dove
CORVIDAE	**Crows And Jays**
Aphelocoma californica	California scrub-jay
Corvus corax	common raven
EMBERIZIDAE	**Emberizids**
Aimophila ruficeps canescens	Southern California rufous-crowned

	Sparrow
Melozone crissalis	California towhee
Zonotrichia leucophrys	white-crowned sparrow
FALCONIDAE	**Caracaras and Falcons**
Falco sparverius	American kestrel
MIMIDAE	**Mockingbirds and Thrashers**
Mimus polyglottos	northern mockingbird
MOTACILLIDAE	**Pigeons And doves**
Anthus rubescens	American pipit
ODONTOPHORIDAE	**New World Quails**
Callipepla californica	California quail
PICIDAE	**Woodpeckers**
Melanerpes formicivorus	acorn woodpecker
TIMALIIDAE	**Babblers**
Chamaea fasciata	wrentit
TROCHILIDAE	**Hummingbirds**
Calypte anna	Anna's hummingbird
TROGLODYTIDAE	**Wrens**
Thryomanes bewickii	Bewick's wren
MAMMALIA	**MAMMALS**
CANIDAE	**Foxes, Wolves and Allies**
Canis latrans	coyote
GEOMYIDAE	**Pocket Gophers**
Thomomys bottae	Botta's pocket gopher
LEPORIDAE	**Rabbits and Hares**
Lepus californicus bennettii	San Diego black-tailed jack rabbit
Sylvilagus auduboni	desert cottontail

Appendix C

Project Jurisdictional Delineation Report

GLENN LUKOS ASSOCIATES
Regulatory Services

February16, 2018

Marwan AlAbassi
AlAbassi Construction and Engineering
764 West Ramona Expressway
Suite C
Perris, California 92571

SUBJECT: Jurisdictional Delineation for the 17.67-Acre Tract 37392 (Formerly Tract 32042) Residential Development Project in the City of Riverside, Riverside County, California

Dear Mr. AlAbassi:

This letter report summarizes our preliminary findings of U.S. Army Corps of Engineers (Corps), Santa Ana Regional Water Quality Control Board (Regional Board), and California Department of Fish and Wildlife (CDFW) jurisdiction for the above-referenced property.[1]

The AlAbassi Project in the City of Riverside, Riverside County, California [Exhibit 1], comprises approximately 17.67 acres and is depicted on the U.S. Geological Survey (USGS) topographic map Riverside East, California quadrangle [dated 1967 and photorevised in 1980]) [Exhibit 2]. On October 20 and 24, 2017, regulatory specialists of Glenn Lukos Associates, Inc. (GLA) examined the project site to determine the limits of (1) Corps jurisdiction pursuant to Section 404 of the Clean Water Act (CWA), (2) Regional Board jurisdiction pursuant to Section 401 of the CWA and Section 13260 of the California Water Code (CWC) [the Porter-Cologne Act], and (3) CDFW jurisdiction pursuant to Division 2, Chapter 6, Section 1600-1617 of the Fish and Game Code. Enclosed is a 200-scale map [Exhibits 3A and 3B] that depicts the areas of Corps and CDFW jurisdiction. A Soils Map is attached as Exhibit 4. Photographs to document the topography, vegetative communities, and general widths of each of the features are provided as Exhibit 4 – Site Photographs.

[1] This report presents our best effort at estimating the subject jurisdictional boundaries using the most up-to-date regulations and written policy and guidance from the regulatory agencies. Only the regulatory agencies can make a final determination of jurisdictional boundaries. If a final jurisdictional determination is required, GLA can assist in getting written confirmation of jurisdictional boundaries from the agencies.

29 Orchard ▪ Lake Forest ▪ California 92630-8300
Telephone: (949) 837-0404 Facsimile: (949) 837-5834

Potential Corps and Regional Board jurisdiction at the site totals approximately 0.09 acre, none of which consists of jurisdictional wetlands. A total of 1,875 linear feet of streambed is present.

Potential CDFW jurisdiction at the site totals approximately 0.22 acre, of which approximately 0.05 acre consists of vegetated riparian habitat and 0.17 acre consists of non-riparian streambed. A total of 1,875 linear feet of streambed is present.

I. METHODOLOGY

Prior to beginning the field delineation, a color aerial photograph, a topographic base map of the property, and the previously cited USGS topographic map were examined to determine the locations of potential areas of Corps/CDFW jurisdiction. Suspected jurisdictional areas were field checked for the presence of definable channels and/or wetland vegetation, soils and hydrology. Suspected wetland habitats on the site were evaluated using the methodology set forth in the U.S. Army Corps of Engineers 1987 Wetland Delineation Manual[2] (Wetland Manual) and the 2006 Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Supplement (Arid West Supplement)[3]. While in the field the limits of Corps and CDFW jurisdiction were recorded onto a color aerial photograph using visible landmarks and collected with sub-meter accuracy Global Positioning Satellite unit (Trimble Geo 7X handheld).

The Soil Conservation Service (SCS)[4] has mapped the following soil types as occurring in the general vicinity of the project site: Cieneba Rocky Sandy Loan, 15 to 50 Percent Slopes, Eroded; Fallbrook Sandy Loam, 8 to 15 Percent Slopes, Eroded; and Vista Coarse Sandy Loam, 8 to 15 Percent Slopes, Eroded (Exhibit 5 – Soils Map).

None of these soil units are identified as hydric in the SCS's publication, Hydric Soils of the United States[5].

---

[2] Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual, Technical Report Y-87-1, U.S. Army Engineer Waterways Experimental Station, Vicksburg, Mississippi.

[3] U.S. Army Corps of Engineers. 2008. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0), ed. J. S. Wakeley, R. W. Lichvar, and C. V. Noble. ERDC/EL TR-08-28. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

[4] SCS is now known as the National Resource Conservation Service or NRCS.

[5] United States Department of Agriculture, Soil Conservation Service. 1991. Hydric Soils of the United States, 3rd Edition, Miscellaneous Publication Number 1491. (In cooperation with the National Technical Committee for Hydric Soils.)

II. JURISDICTION

A. Army Corps of Engineers

Pursuant to Section 404 of the CWA, the Corps regulates the discharge of dredged and/or fill material into waters of the United States. The term "waters of the United States" is defined in Corps regulations at 33 CFR Part 328.3(a)[6] as:

> *(1) All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;*
> *(2) All interstate waters including interstate wetlands;*
> *(3) All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect foreign commerce including any such waters:*
> > *(i) Which are or could be used by interstate or foreign travelers for recreational or other purposes; or*
> > *(ii) From which fish or shell fish are or could be taken and sold in interstate or foreign commerce; or*
> > *(iii) Which are used or could be used for industrial purpose by industries in interstate commerce...*
> *(4) All impoundments of waters otherwise defined as waters of the United States under the definition;*
> *(5) Tributaries of waters identified in paragraphs (a) (1)-(4) of this section;*
> *(6) The territorial seas;*
> *(7) Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a) (1)-(6) of this section.*
> (8) Waters of the United States do not include prior converted cropland.[7] Notwithstanding the determination of an area's status as prior converted cropland by any other federal

---

[6] On October 9, 2015, the U.S. 6th District Circuit Court of Appeals ordered a nationwide stay on the Corps and EPA's definition of waters of the United States under the Clean Water Rule ("Clean Water Rule: Definition of 'Waters of the United States"; Final Rule," 80 Federal Register 124 (29 June, 2015), pp. 37054-37127). As a result, the Corps' regulations that were in effect prior to the August 28, 2015 Clean Water Rule is again in effect until such a time as the Court order is satisfied, if this occurs. In addition, President Trump signed an Executive Order on February 28, 2017 that instructs the EPA and Corps to formally reconsider the Rule, which could lead to a re-write of the law or a complete repeal.

[7] The term "prior converted cropland" is defined in the Corps' Regulatory Guidance Letter 90-7 (dated September 26, 1990) as "wetlands which were both manipulated (drained or otherwise physically altered to remove excess

agency, for the purposes of the CWA, the final authority regarding CWA jurisdiction remains with the EPA.

Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA (other than cooling ponds as defined in 40 CFR 123.11(m) which also meet the criteria of this definition) are not waters of the United States.

In the absence of wetlands, the limits of Corps jurisdiction in non-tidal waters, such as intermittent streams, extend to the OHWM which is defined at 33 CFR 328.3(e) as:

> *...that line on the shore established by the fluctuation of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.*

1. Solid Waste Agency of Northern Cook County v. United States Army Corps of Engineers, et al.

Pursuant to Article I, Section 8 of the U.S. Constitution, federal regulatory authority extends only to activities that affect interstate commerce. In the early 1980s the Corps interpreted the interstate commerce requirement in a manner that restricted Corps jurisdiction on isolated (intrastate) waters. On September 12, 1985, EPA asserted that Corps jurisdiction extended to isolated waters that are used or could be used by migratory birds or endangered species, and the definition of "waters of the United States" in Corps regulations was modified as quoted above from 33 CFR 328.3(a).

On January 9, 2001, the Supreme Court of the United States issued a ruling on *Solid Waste Agency of Northern Cook County v. United States Army Corps of Engineers, et al.* (SWANCC). In this case the Court was asked whether use of an isolated, intrastate pond by migratory birds is a sufficient interstate commerce connection to bring the pond into federal jurisdiction of Section 404 of the Clean Water Act.

The written opinion notes that the court's previous support of the Corps' expansion of jurisdiction beyond navigable waters (*United States v. Riverside Bayview Homes, Inc*.) was for a wetland that <u>abutted</u> a navigable water and that the court did not express any opinion on the

---

water from the land) and cropped before 23 December 1985, to the extent that they no longer exhibit important wetland values. Specifically, prior converted cropland is <u>inundated for no more than 14 consecutive days</u> during the growing season…." [Emphasis added.]

question of the authority of the Corps to regulate wetlands that are not adjacent to bodies of open water. The current opinion goes on to state:

> *In order to rule for the respondents here, we would have to hold that the jurisdiction of the Corps extends to ponds that are not adjacent to open water. We conclude that the text of the statute will not allow this.*

Therefore, we believe that the court's opinion goes beyond the migratory bird issue and says that no isolated, intrastate water is subject to the provisions of Section 404(a) of the Clean Water Act (regardless of any interstate commerce connection). However, the Corps and EPA have issued a joint memorandum which states that they are interpreting the ruling to address only the migratory bird issue and leaving the other interstate commerce clause nexuses intact.

2. Rapanos v. United States and Carabell v. United States

On June 5, 2007, the U.S. Environmental Protection Agency (EPA) and Corps issued joint guidance that addresses the scope of jurisdiction pursuant to the Clean Water Act in light of the Supreme Court's decision in the consolidated cases *Rapanos v. United States* and *Carabell v. United States* ("Rapanos"). The chart below was provided in the joint EPA/Corps guidance.

For project sites that include waters other than Traditional Navigable Waters (TNWs) and/or their adjacent wetlands or Relatively Permanent Waters (RPWs) tributary to TNWs and/or their adjacent wetlands as set forth in the chart below, the Corps must apply the significant nexus standard.

For "isolated" waters or wetlands, the joint guidance also requires an evaluation by the Corps and EPA to determine whether other interstate commerce clause nexuses, not addressed in the SWANCC decision are associated with isolated features on project sites for which a jurisdictional determination is being sought from the Corps.

The agencies will assert jurisdiction over the following waters:

- Traditional navigable waters
- Wetlands adjacent to traditional navigable waters
- Non-navigable tributaries of traditional navigable waters that are relatively permanent where the tributaries typically flow year-round or have continuous flow at least seasonally (e.g., typically three months)
- Wetlands that directly abut such tributaries

The agencies will decide jurisdiction over the following waters based on a fact-specific analysis to determine whether they have a significant nexus with a traditional navigable water:

- Non-navigable tributaries that are not relatively permanent
- Wetlands adjacent to non-navigable tributaries that are not relatively permanent
- Wetlands adjacent to but that do not directly abut a relatively permanent non-navigable tributary

The agencies generally will not assert jurisdiction over the following features:

- Swales or erosional features (e.g., gullies, small washes characterized by low volume, infrequent or short duration flow)
- Ditches (including roadside ditches) excavated wholly in and draining only uplands and that do not carry a relatively permanent flow of water

The agencies will apply the significant nexus standard as follows:

- A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by all wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical and biological integrity of downstream traditional navigable waters
- Significant nexus includes consideration of hydrologic and ecologic factors

3. Wetland Definition Pursuant to Section 404 of the Clean Water Act

The term “wetlands” (a subset of “waters of the United States”) is defined at 33 CFR 328.3(b) as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support...a prevalence of vegetation typically adapted for life in saturated soil conditions." In 1987 the Corps published a manual to guide its field personnel in determining jurisdictional wetland boundaries. The methodology set forth in the 1987 Wetland Delineation Manual and the Arid West Supplement generally require that, in order to be considered a wetland, the vegetation, soils, and hydrology of an area exhibit at least minimal hydric characteristics. While the manual and Supplement provide great detail in methodology and allow for varying special conditions, a wetland should normally meet each of the following three criteria:

- more than 50 percent of the dominant plant species at the site must be typical of wetlands (i.e., rated as facultative or wetter in the Arid West 2016 Regional Wetland Plant List[8] [9];

- soils must exhibit physical and/or chemical characteristics indicative of permanent or periodic saturation (e.g., a gleyed color, or mottles with a matrix of low chroma indicating a relatively consistent fluctuation between aerobic and anaerobic conditions); and

- Whereas the 1987 Manual requires that hydrologic characteristics indicate that the ground is saturated to within 12 inches of the surface for at least five percent of the growing season during a normal rainfall year, the Arid West Supplement does not include a quantitative criteria with the exception for areas with "problematic hydrophytic vegetation", which require a minimum of 14 days of ponding to be considered a wetland.

B. Regional Water Quality Control Board

Regional Board jurisdiction includes all areas that are determined to be WoUS, as well as isolated features that are not subject to Corps jurisdiction (e.g., isolated vernal pools, wetlands, or other aquatic habitats). In addition, areas that are determined to not have a significant nexus to WoUS, as determined through the Corps' Approved JD process, would be included in Regional Board jurisdiction. The lateral extent of Regional Board jurisdiction is determined using the Corps' definition of OHWM.

Section 401 of the Clean Water Act requires any applicant for a Section 404 permit to obtain certification from the State that the discharge (and the operation of the facility being constructed) will comply with the applicable effluent limitation and water quality standards. In California this 401 certification is obtained from the Regional Water Quality Control Board. The Corps, by law, cannot issue a Section 404 permit until a 401 certification is issued or waived.

Subsequent to the SWANCC decision, the Chief Counsel for the State Water Resources Control Board issued a memorandum[10] that addressed the effects of the SWANCC decision on the Section 401 Water Quality Certification Program. The memorandum states:

---

[8] Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016. Arid West 2016 Regional Wetland Plant List. Phytoneuron 2016-30: 1-17. Published 28 April 2016.

[9] Note the Corps also publishes a National List of Plant Species that Occur in Wetlands (Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016. The National Wetland Plant List: 2016 wetland ratings. Phytoneuron 2016-30: 1-17. Published 28 April 2016.); however, the Regional Wetland Plant List should be used for wetland delineations within the Arid West Region.

[10] Wilson, Craig M. January 25, 2001. Memorandum addressed to State Board Members and Regional Board Executive Officers.

> *California's right and duty to evaluate certification requests under section 401 is pendant to (or dependent upon) a valid application for a section 404 permit from the Corps, or another application for a federal license or permit. Thus if the Corps determines that the water body in question is not subject to regulation under the COE's 404 program, for instance, no application for 401 certification will be required…*
>
> *The SWANCC decision does not affect the Porter Cologne authorities to regulate discharges to isolated, non-navigable waters of the states….*
>
> *Water Code section 13260 requires "any person discharging waste, or proposing to discharge waste, within any region that could affect the waters of the state to file a report of discharge (an application for waste discharge requirements)." (Water Code § 13260(a)(1) (emphasis added).) The term "waters of the state" is defined as "any surface water or groundwater, including saline waters, within the boundaries of the state." (Water Code § 13050(e).) The U.S. Supreme Court's ruling in SWANCC has no bearing on the Porter-Cologne definition. While all waters of the United States that are within the borders of California are also waters of the state, the converse is not true—waters of the United States is a subset of waters of the state. Thus, since Porter-Cologne was enacted California always had and retains authority to regulate discharges of waste into any waters of the state, regardless of whether the COE has concurrent jurisdiction under section 404. The fact that often Regional Boards opted to regulate discharges to, e.g., vernal pools, through the 401 program in lieu of or in addition to issuing waste discharge requirements (or waivers thereof) does not preclude the regions from issuing WDRs (or waivers of WDRs) in the absence of a request for 401 certification….*

In this memorandum the SWRCB's Chief Counsel has made the clear assumption that fill material to be discharged into isolated waters of the United States is to be considered equivalent to "waste" and therefore subject to the authority of the Porter Cologne Water Quality Act.

C. <u>California Department of Fish and Wildlife</u>

Pursuant to Division 2, Chapter 6, Sections 1600-1617 of the California Fish and Game Code, the CDFW regulates all diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake, which supports fish or wildlife.

CDFW defines a stream (including creeks and rivers) as "a body of water that flows at least periodically or intermittently through a bed or channel having banks and supports fish or other aquatic life. This includes watercourses having surface or subsurface flow that supports or has supported riparian vegetation." CDFW's definition of "lake" includes "natural lakes or man-made reservoirs." CDFW also defines a stream as “a body of water that flows, or has flowed, over a given course during the historic hydrologic regime, and where the width of its course can reasonably be identified by physical or biological indicators.”

It is important to note that the Fish and Game Code defines fish and wildlife to include: all wild animals, birds, plants, fish, amphibians, invertebrates, reptiles, and related ecological communities including the habitat upon which they depend for continued viability (FGC Division 5, Chapter 1, section 45 and Division 2, Chapter 1 section 711.2(a) respectively). Furthermore, Division 2, Chapter 5, Article 6, Section 1600 et seq. of the California Fish and Game Code does not limit jurisdiction to areas defined by specific flow events, seasonal changes in water flow, or presence/absence of vegetation types or communities.

III. RESULTS

A. <u>Corps Jurisdiction</u>

Corps jurisdiction associated with the study area totals approximately 0.09 acre of waters of the United States, none of which consists of jurisdictional wetlands. The locations of the waters of the United States are depicted on the enclosed map [Exhibit 3A – Corps Jurisdictional Delineation Map]. A summary of Corps jurisdiction within the Site is provided below in Table 1.

Four drainage courses are associated with the study area and are described herein as Drainages 1 through 4. The Project site does not contain any isolated non-federal waters.

Per the Corps’ Los Angeles District Office, the Santa Ana River is the closest TNW to the Site.

1. Drainage 1

Drainage 1 is an earthen ephemeral drainage that originates to the east and bisects the southern extent Project site as it flows in a westerly direction for approximately 205 linear feet, where flows then leave the Project site.

OHWM indicators observed in association with Drainage 1 within the study area include sediment deposition, sediment sorting, destruction of terrestrial vegetation, and break in bank

slope, with an OHWM width averaging approximately 5 feet (Exhibit 3A – Corps/RWQCB Jurisdictional Delineation Map).

Corps jurisdiction associated with Drainage 1 within the study area totals approximately 0.02 acre, none of which consists of jurisdictional wetlands (see Table 1, below).

2. Drainage 2

Drainage 2 is an earthen ephemeral drainage that originates within the central portion of the study area and flows in a southwesterly direction for approximately 1,403 linear feet, where it enters Drainage 1 and flows westerly away from the Project site.

OHWM indicators observed in association with Drainage 2 within the study area include sediment deposition, sediment sorting, destruction of terrestrial vegetation, and break in bank slope, with an OHWM width ranging from approximately 1 – 4 feet (Exhibit 3A – Corps/RWQCB Jurisdictional Delineation Map).

Corps jurisdiction associated with Drainage 2 within the study area totals approximately 0.06 acre, none of which consists of jurisdictional wetlands (see Table 1, below).

3. Drainage 3

Drainage 3 is an earthen ephemeral drainage that originates within the northern portion of the study area and flows in a southwesterly direction for approximately 203 linear feet, where it enters Drainage 2 and flows southwesterly, reaching Drainage 1.

OHWM indicators observed in association with Drainage 3 within the study area include sediment deposition, destruction of terrestrial vegetation, and break in bank slope, with an OHWM width ranging from approximately 1 – 2 feet (Exhibit 3A – Corps/RWQCB Jurisdictional Delineation Map).

Corps jurisdiction associated with Drainage 3 within the study area totals approximately 0.01 acre, none of which consists of jurisdictional wetlands (see Table 1, below).

4. Drainage 4

Drainage 4 is an earthen ephemeral drainage that originates within the southwestern portion of the study area and flows in a southerly direction for approximately 64 linear feet, where it enters Drainage 1 and flows westerly away from the Project site.

OHWM indicators observed in association with Drainage 4 within the study area include sediment deposition, sediment sorting, destruction of terrestrial vegetation, and break in bank slope, with an OHWM width of approximately 1 foot (Exhibit 3A – Corps/RWQCB Jurisdictional Delineation Map).

Corps jurisdiction associated with Drainage 4 within the study area totals less than 0.01 acre, none of which consists of jurisdictional wetlands (see Table 1, below).

B. Regional Water Quality Control Board Jurisdiction

All waters within the Project Site that were determined to be potential waters of the United States pursuant to Section 404 of the CWA (Features 1 and 2) potentially fall within Regional Board jurisdiction pursuant to Section 401 of the Clean Water Act and/or the Porter Cologne Water Quality Act. None of the features at the Site were determined to be non-federal waters that would require separate analysis. A summary of Regional Board jurisdiction within the Project Site is provided below in Table 1.

C. CDFW Jurisdiction

1. Drainage 1

Drainage 1 is an earthen ephemeral drainage that originates to the east and bisects the southern extent Project site as it flows in a westerly direction for approximately 205 linear feet, where flows then leave the Project site.

Drainage 1 exhibits a top-of-bank measurement of 12 feet within the study area (Exhibit 3B – CDFW Jurisdictional Delineation Map), and supports approximately 0.02 acre of mulefat scrub.

CDFW jurisdiction associated with Drainage 1 within the study area totals approximately 0.06 acre, of which 0.02 acre consists of CDFW jurisdictional riparian vegetation and 0.04 acre consists of non-riparian streambed (see Table 1, below).

2. Drainage 2

Drainage 2 is an earthen ephemeral drainage that originates within the central portion of the study area and flows in a southwesterly direction for approximately 1,403 linear feet, where it enters Drainage 1 and flows westerly away from the Project site.

Drainage 2 exhibits a top-of-bank measurement ranging from 1 - 10 feet within the study area (Exhibit 3B – CDFW Jurisdictional Delineation Map), and supports approximately 0.03 acre of mulefat scrub.

CDFW jurisdiction associated with Drainage 2 within the study area totals approximately 0.11 acre, of which 0.03 acre consists of CDFW jurisdictional riparian vegetation and 0.08 acre consists of non-riparian streambed (see Table 1, below).

3. Drainage 3

Drainage 3 is an earthen ephemeral drainage that originates within the northern portion of the study area and flows in a southwesterly direction for approximately 203 linear feet, where it enters Drainage 2 and flows southwesterly, reaching Drainage 1.

Drainage 3 exhibits a top-of-bank measurement ranging from 1 - 4 feet within the study area (Exhibit 3B – CDFW Jurisdictional Delineation Map), is vegetated entirely with upland species, and does not support a riparian vegetation community.

CDFW jurisdiction associated with Drainage 3 within the study area totals approximately 0.02 acre, none of which consists of CDFW jurisdictional riparian vegetation and all of which consists of non-riparian streambed (see Table 1, below).

4. Drainage 4

Drainage 4 is an earthen ephemeral drainage that originates within the southwestern portion of the study area and flows in a southerly direction for approximately 64 linear feet, where it enters Drainage 1 and flows westerly away from the Project site.

Drainage 4 exhibits a top-of-bank measurement of 3 feet within the study area (Exhibit 3B – CDFW Jurisdictional Delineation Map), is vegetated entirely with upland species, and does not support a riparian vegetation community.

CDFW jurisdiction associated with Drainage 4 within the study area totals less than 0.01 acre, none of which consists of CDFW jurisdictional riparian vegetation and all of which consists of non-riparian streambed (see Table 1, below).

Table 1. Corps, Regional Board, and CDFW Jurisdiction for the Tract 37392 (Formerly Tract 32042) Residential Development Project

		Corps/Regional Board			CDFW			
Drainage Feature	**Resource Type**	**Wetland (acres)**	**Non-wetland Waters (acres)**	**Total (acres)**	**Riparian (acres)**	**Unvegetated Streambed (acres)**	**Total (acres)**	**Length (linear feet)**
Drainage 1	Ephemeral	0.00	0.02	0.02	0.02	0.04	0.06	205
Drainage 2	Ephemeral	0.00	0.06	0.06	0.03	0.11	0.14	1,403
Drainage 3	Ephemeral	0.00	0.01	0.01	0.00	0.02	0.02	203
Drainage 4	Ephemeral	0.00	<0.01	<0.01	0.00	<0.01	<0.01	64
TOTAL		**0.00**	**0.09***	**0.09***	**0.05**	**0.17***	**0.22***	**1,875**

*Total may differ from sum of individual values due to rounding.

If you have any questions about this letter report, please contact Zack West at (949) 340-6490.

Sincerely,

GLENN LUKOS ASSOCIATES, INC.

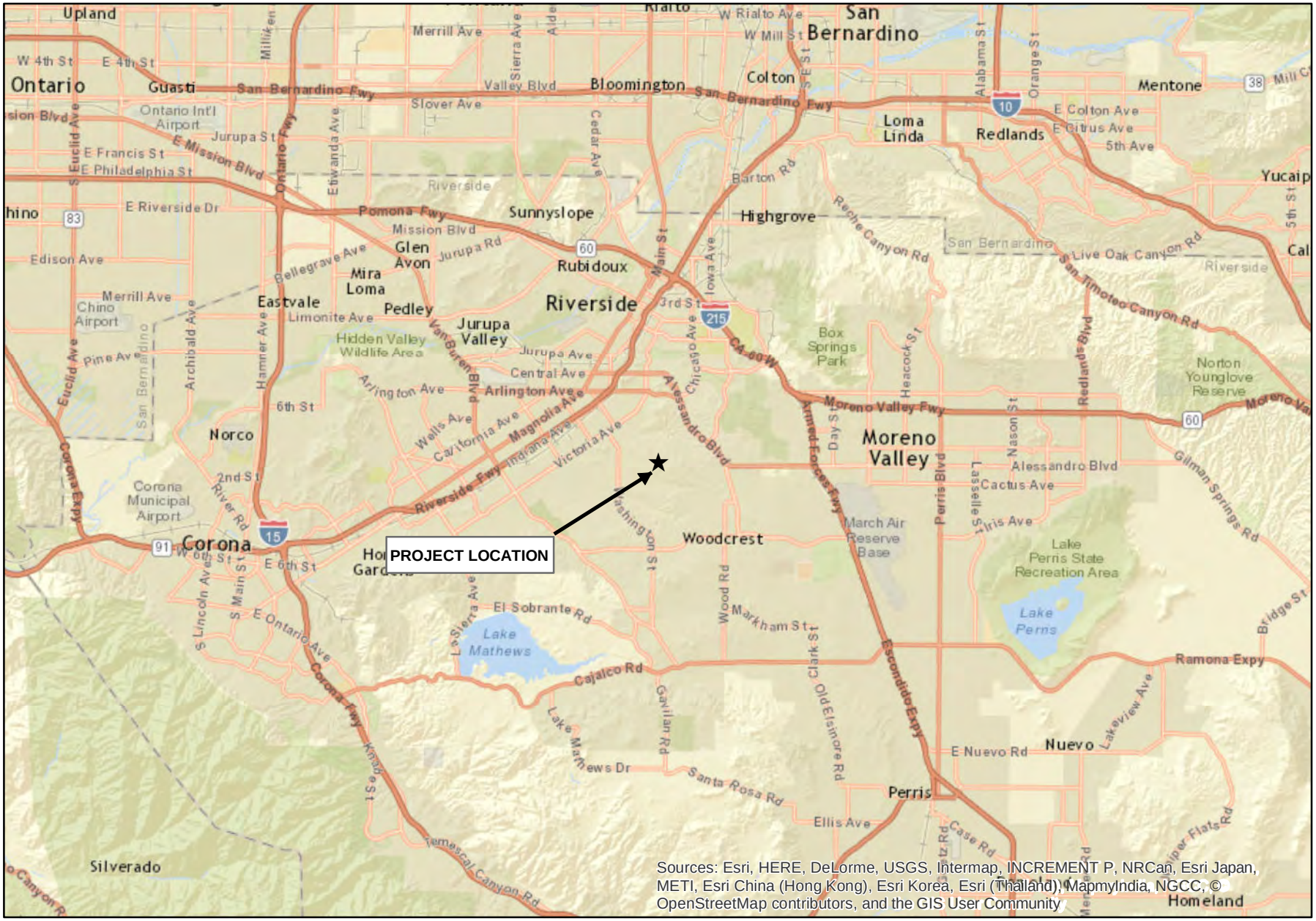
Martin A. Rasnick

For

Zack West
Senior Biologist/Regulatory Specialist

Attachments: Exhibits

Source: ESRI World Street Map



N

0 2 4 8 Miles

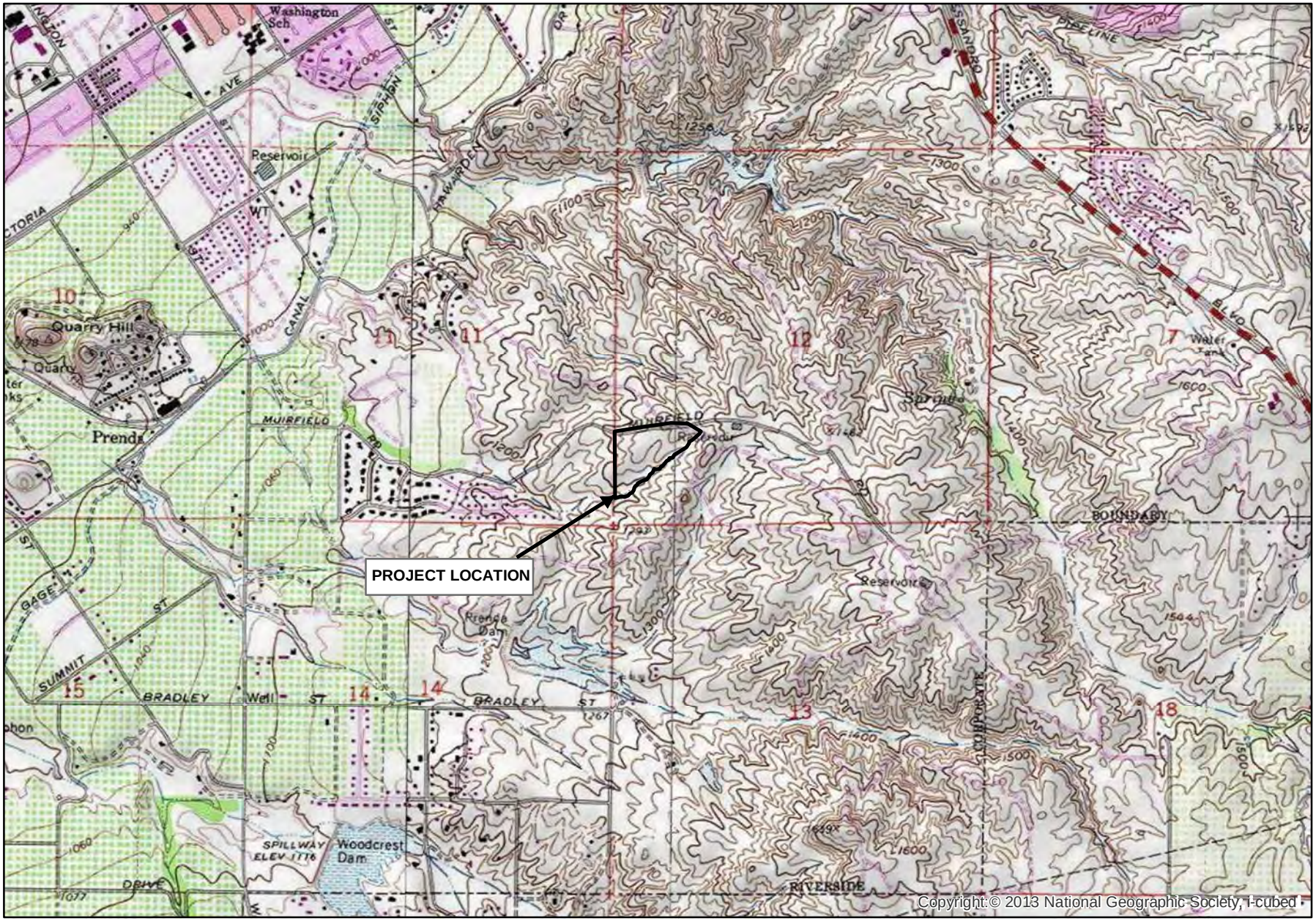
TRACT 32042
RESIDENTIAL DEVELOPMENT PROJECT

Regional Map

GLENN LUKOS ASSOCIATES

Exhibit 1

Adapted from USGS Riverside East, CA quadrangle



N

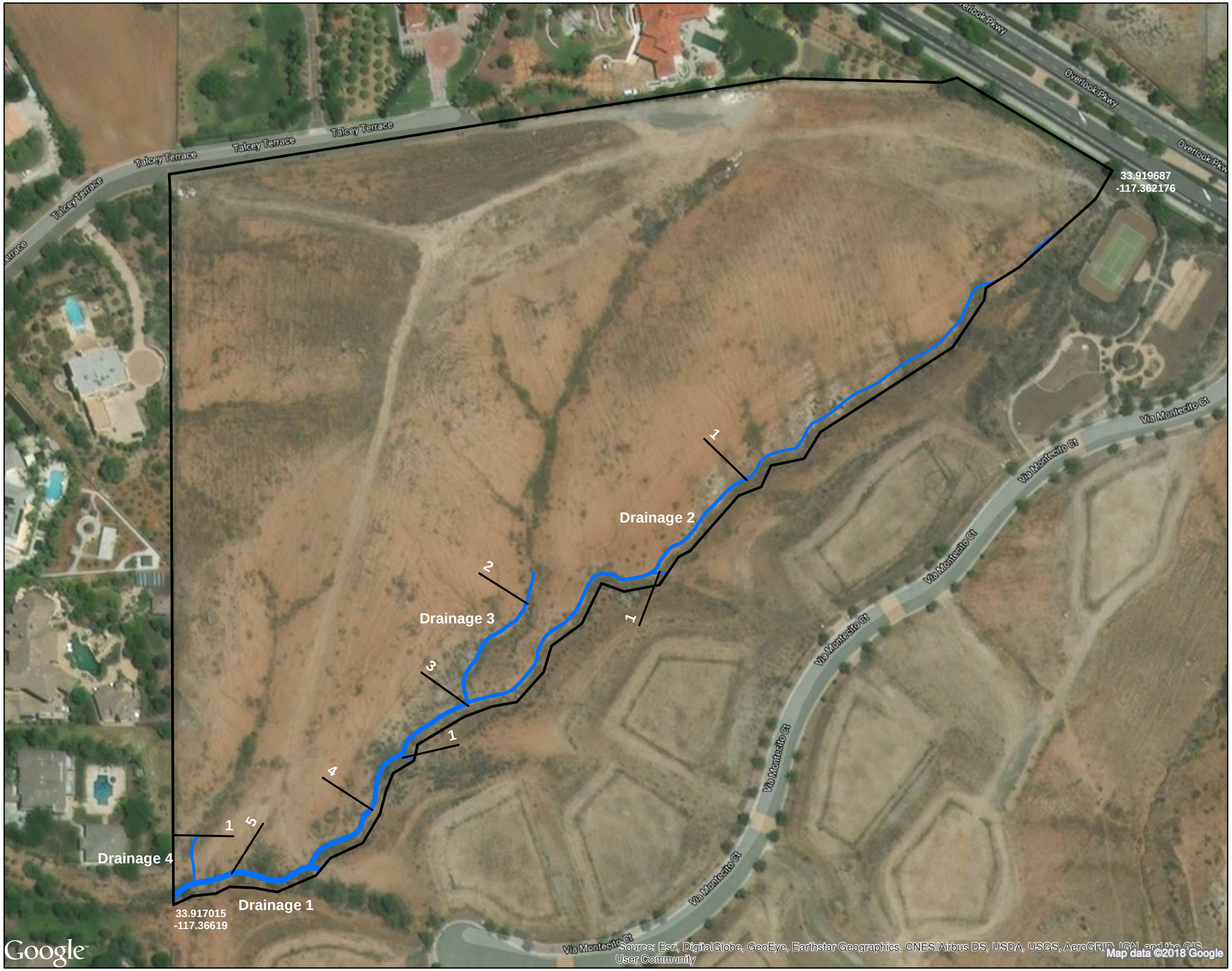
0 1,000 2,000 4,000 Feet

TRACT 32042
RESIDENTIAL DEVELOPMENT PROJECT

Vicinity Map

GLENN LUKOS ASSOCIATES

Exhibit 2



Property Boundary

Corps/RWQCB Non-Wetland Waters

1 Width of Non-Wetland Waters in Feet

N

0 62.5 125 250

Feet

1 inch = 125 feet

Coordinate System: State Plane 6 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: K. Kartunen, GLA
Date Prepared: November 3, 2017

TRACT 32042
RESIDENTIAL DEVELOPMENT PROJECT

Corps/RWQCB Jurisdictional Delineation Map

GLENN LUKOS ASSOCIATES

Exhibit 3A

X:\1100 AFTER THE REST\1311-01RIVE\1311-1GIS\DelineationGIS\REV1\1311-1 CorpsLayoutREV1.mxd

Property Boundary

CDFW Non-Riparian Streambed

CDFW Riparian

1 Width of Non-Riparian Streambed Waters in Feet

N

0 62.5 125 250

Feet

1 inch = 125 feet

Coordinate System: State Plane 6 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: K. Kartunen, GLA
Date Prepared: November 3, 2017

TRACT 32042
RESIDENTIAL DEVELOPMENT PROJECT

CDFW Jurisdictional Delineation Map

GLENN LUKOS ASSOCIATES

Exhibit 3B

X:\1100 AFTER THE REST\1311-01RIVE\1311-1GIS\DelineationGIS\REV1\1311-1 CDFWLayoutREV1.mxd

Photograph 1: Upstream view of Drainage 1, facing east. Note the mulefat scrub occupying this drainage feature located in the background of the photo.

Photograph 2: Downstream view of the lower portion of Drainage 2, facing southwest. Note that this portion of Drainage 2 is vegetated entirely by upland species, and does not support a riparian vegetation community.

Photograph 3: Upstream view of the upper portion of Drainage 2, facing northeast. Note the mulefat scrub occupying this drainage feature located in the background of the photo.

Photograph 3: Downstream view of Drainage 3, facing southwest. Note that Drainage 3 is vegetated entirely by upland species, and does not support a riparian vegetation community.

GLENN LUKOS ASSOCIATES

Exhibit 4
Sheet 1

TRACT 32042 RESIDENTIAL DEVELOPMENT PROJECT

Site Photographs

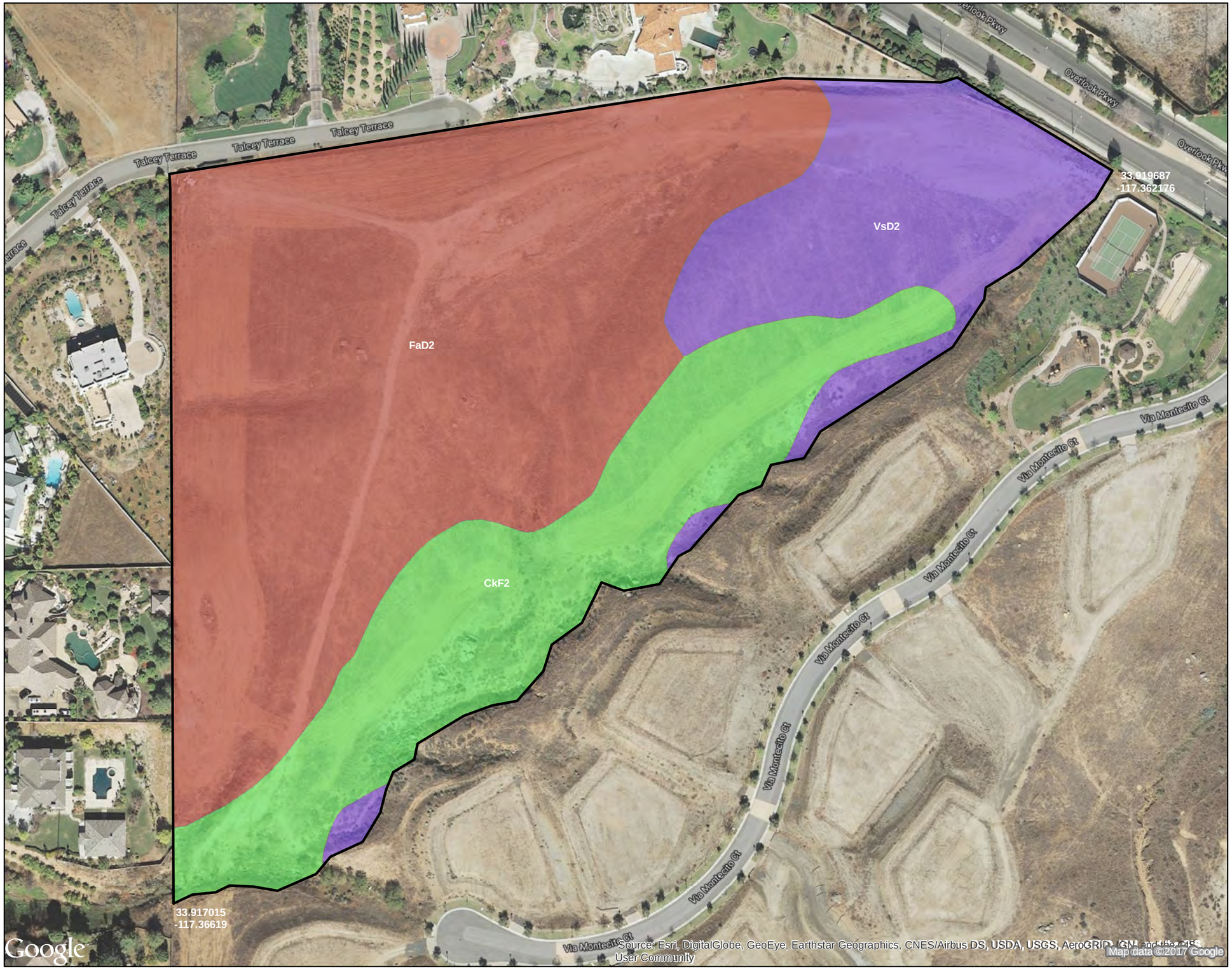
Photograph 5: Overview photo of the southern portion of the Project site. Drainage 4 is visible in the middle-right portion of the photo.

GLENN LUKOS ASSOCIATES

Exhibit 4
Sheet 2

TRACT 32042 RESIDENTIAL DEVELOPMENT PROJECT

Site Photographs



Property Boundary

CkF2 - Cieneba rocky sandy loam, 15 to 50 percent slopes, eroded

FaD2 - Fallbrook sandy loam, 8 to 15 percent slopes, eroded

VsD2 -Vista coarse sandy loam, 8 to 15 percent slopes, eroded

N

0 62.5 125 250

Feet

1 inch = 125 feet

Coordinate System: State Plane 6 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: K. Kartunen, GLA
Date Prepared: November 3, 2017

TRACT 32042
RESIDENTIAL DEVELOPMENT PROJECT

Soils Map

GLENN LUKOS ASSOCIATES

Exhibit 5

X:\1100 AFTER THE REST\1311-01RIVE\1311-1GIS\SoilsGIS\1311-1 Soils.mxd

Appendix C

Phase I Cultural Resources Assessment

FINAL
EXTENDED PHASE I CULTURAL RESOURCES INVENTORY
TRACT 37392, APN 243-210-037 & 041
CITY OF RIVERSIDE, RIVERSIDE COUNTY, CALIFORNIA

Submitted to:
Community Development Department/
Neighborhood Engagement Division
City of Riverside
3900 Main Street, 3rd Floor
Riverside, CA 92522

Submitted by:
Amec Foster Wheeler Environment & Infrastructure, Inc.
3120 Chicago Avenue, Suite 110
Riverside, California 92507

Jesse Yorck, M.A., RPA – Principal Investigator
Virginia Austerman Freedman, M.A., RPA – Project Archaeologist

December 2017

Amec Foster Wheeler Project No./Proposal No. 1755100019

CONFIDENTIAL

©2017 Amec Foster Wheeler. All Rights Reserved.

USGS Riverside East, Calif. 7.5' quadrangle. Acreage: approximately 16.79 acres

Keywords: Extended Phase I Cultural Resources Inventory; Sections 12, Township 3S, Range 5W; City of Riverside, Riverside County; Granite Rock Outcrop Milling Features; Primary # 33-003483

EXECUTIVE SUMMARY

Between the months of September and December, 2017, and at the request of AlAbbasi Construction & Engineering (Client), Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler) performed an Extended Phase I Cultural Resources Inventory of approximately 16.79 acres of undeveloped and semi-developed land at Tract 37392, APN 243-210-037 & 041 in the City of Riverside, Riverside County, California. The Project Area is bound by Overlook Parkway and Talcey Terrace to the north and Via Montecito Court to the southeast, in Sections 12, Township 3S, Range 5W San Bernardino Baseline and Meridian, as depicted in the U.S. Geological Survey Riverside East, California, 7.5' quadrangle.

The Client is proposing to develop the properties into private residential dwellings. The Project will include the development of house pads, the installation of utilities, parking, landscaping and other residential property amenities. The scope the proposed Project requires that an Extended Phase I Cultural Resources Inventory survey be completed. The fieldwork for the Extended Phase I Cultural Resources Inventory was conducted on September 22 and October 6, 2017, and covered the entire 16.79 -acre study area.

The study is being conducted as a part of the environmental review process for the proposed residential development. The City of Riverside is the lead agency for the Project and required the study to support the preparation of City of Riverside Municipal Code Title 20, California Environmental Quality Act (CEQA), and National Historic Preservation Act (NHPA)-compliant documentation for the proposed Project. The purpose of this study is to provide the City of Riverside with the necessary information and analysis to determine whether the Project would cause an alteration to any "cultural resources," as defined by City of Riverside Municipal Code Title 20.50.10, a significant adverse impact to any "historical resources," as defined by CEQA, or an adverse effect to "historic properties," as defined by NHPA, that may exist in or around the Project Area. In order to identify such resources, Amec Foster Wheeler conducted historical background research, completed an archaeological and historical resources records search, consulted the Native American Heritage Commission and appropriate tribal representatives and carried out an Extended Phase I Cultural Resources Inventory, which included limited shovel testing.

Through the research approaches listed above, this study did not encounter any "cultural resources," "historical resources" or "historic properties" within the Project Area. Two granite outcrop milling features, Primary # 33-003483, were documented as a resource during the study, but the resource does not appear to qualify as a "cultural resource," "historical resource" or "historic property." Amec Foster Wheeler recommends to the City of Riverside that *no cultural resources exist within the Project Area* for the purposes of the City of Riverside Municipal Code Title 20, *no historical resources exist within the Project Area* for the purposes of CEQA and that *No Historic Properties* were encountered within the Project Area for the purposes of NHPA. No further cultural resource studies are necessary at this time. If resources are encountered during the undertaking, all work shall cease and the City of Riverside will be notified immediately and will task a qualified archaeologist with assessing the nature of the find.

TABLE OF CONTENTS

Page

EXECUTIVE SUMMARY 1
1.0 INTRODUCTION 1-1
2.0 NATURAL SETTING 2-1
3.0 PREHISTORIC AND HISTORIC SETTING 3-1
3.1 Prehistoric Context 3-1
3.2 Ethnographic Context 3-4
3.3 Historic Context and Overview 3-6
4.0 METHODS AND RESULTS 4-1
4.1 Record Search 4-1
4.2 Native American Consultation 4-5
4.3 Field Survey 4-7
5.0 DISCUSSION AND RECOMMENDATIONS 5-1
5.1 Discussion 5-1
5.2 Recommendations 5-2
6.0 REFERENCES 6-1

LIST OF TABLES

Table 1. Characteristics of the Prehistoric Periods of Riverside County 3-1
Table 2. Previous Cultural Resource Studies within the Scope of the Records Search 4-1

LIST OF FIGURES

Figure 1. Project Area Overview 1-2
Figure 2. Representative Photograph of the Project Area, View Southeast 2-1
Figure 3. Previous Cultural Resources Studies Within the Scope of the Record Search, Listed by Report Number 4-4

LIST OF APPENDICES

APPENDIX A PERSONNEL QUALIFICATIONS
APPENDIX B PREVIOUSLY RECORDED CULTURAL RESOURCES AND STP LOCATIONS
APPENDIX C DEPARTMENT OF PARKS AND RECREATION SERIES 523 SITE FORMS
APPENDIX D NATIVE AMERICAN SCOPING DOCUMENTATION

1.0 INTRODUCTION

Between the months of September and December, 2017, and at the request of AlAbbasi Construction & Engineering (Client), Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler) performed an Extended Phase I Cultural Resources Inventory of approximately 16.79 acres of undeveloped and semi-developed land at Tract 37392, APN 243-210-037 & 041 in the City of Riverside, Riverside County, California. The Project Area is bound by Overlook Parkway and Talcey Terrace to the north and Via Montecito Court to the southeast, in Sections 12, Township 3S, Range 5W San Bernardino Baseline and Meridian, as depicted in the U.S. Geological Survey Riverside East, California, 7.5' quadrangle. (**Figure 1**).

The study is being conducted as a part of the environmental review process for the proposed residential development. The City of Riverside is the lead agency for the Project and required the study to support the preparation of City of Riverside Municipal Code Title 20, California Environmental Quality Act (CEQA), and National Historic Preservation Act (NHPA)-compliant documentation for the proposed Project. The purpose of this study is to provide the City of Riverside with the necessary information and analysis to determine whether the Project would cause an alteration to any "cultural resources," as defined by City of Riverside Municipal Code Title 20.50.10, a significant adverse impact to any "historical resources," as defined by CEQA, or an adverse effect to "historic properties," as defined by NHPA, that may exist in or around the Project Area. The Project will include building a family-style compound with several dwellings and structures and will require building housing pads, as well as road grading, utility trenching, drainage improvements and other pertinent construction efforts. In order to identify such resources, Amec Foster Wheeler conducted historical background research, completed an archaeological and historical resources records search, consulted the Native American Heritage Commission and appropriate tribal representatives and carried out an Extended Phase I pedestrian field survey, which included limited shovel testing. The qualifications of staff who participated in this study are detailed in **Appendix A** of the following report.

Figure 1. Project Area Overview

2.0 NATURAL SETTING

The Project Area situated on land owned by AlAbbasi Construction & Engineering, and is located Alessandro Heights neighborhood of the City of Riverside, California, just northwest of Via Montecito Court of and just south of Overlook Parkway. The Project Area is located near Mockingbird Canyon on an expanse of semi-developed rolling hills, and has moderate annual temperatures ranging from over 100ºF in the summertime to just above freezing in the winter. The Project Area also contains an intermittent drainage at its south and eastern boundaries that flows to the southwest.

Located in the Coastal Sage Scrub plant community, the Project Area's dominant vegetation consist of sage brush (Artemisia californica), buckwheat (Eriogonum fasciculatum), cholla (Cylindropuntia bigelovii), brittlebrush (Encelia californica) and a variety of other noxious and ruderal weeds and grasses. Disturbed areas (i.e., barren dirt roads and trails), as well as stretches of grubbed and graded land are also intermittently present throughout various areas of the Project Area. The Project Area consist mostly of rolling hills, slopes and an intermittent drainage. The majority of the surface sediments comprising the Project Area are comprised of 10YR 5/4 yellowish brown silty loam with approximately 40% of sub angular to sub rounded granite pebble inclusions. It is estimated that the ground surface of the Project Area is 40% disturbed. The Project Area is currently vacant and is at an elevation of approximately 1,310 to 1,340 feet (399 to 408 meters) above mean sea level (ASML). (**Figure 2**)

Figure 2. Representative Photograph of the Project Area, View Southeast

3.0 PREHISTORIC AND HISTORIC SETTING

3.1 Prehistoric Context

Numerous chronological sequences have been proposed for southern California, of these, two primary regional syntheses are commonly used in the archaeological literature. The first was proposed by Wallace in 1955, which is organized as four cultural horizons. They are Early Man Horizon, Millingstone, Intermediate, and Late Prehistoric. In 1986 Warren proposed a more ecological approach which defined five periods in southern California prehistory: Lake Mojave, Pinto, Gypsum, Saratoga Springs, and Protohistoric (**Table 1**). Warren presented cultural continuity and change in terms of various significant environmental shifts. These shifts were defined by a cultural ecological approach for archaeological research of the California deserts and coast. Cultural adaptations to a changing environment have resulted in adaptations in settlement patterns and subsistence that began with the gradual environmental warming in the late Pleistocene, the drying of the desert lakes during the early Holocene, the short return to pluvial conditions during the middle Holocene, and the general warming and drying trend, with periodic reversals, that continues to this day (Warren 1986).

Table 1.
Characteristics of the Prehistoric Periods of Riverside County

Colorado Desert[1]			Westernmost County[2]		
Period	**Chronological Range**	**Diagnostic Projectile Points**	**Period**	**Chronological Range**	**Diagnostic Artifacts/Features**
Proto-historic	A.D. 1200 – 1850	Desert Side-notched	Late Prehistoric	A.D. 500 – historic	Ceramics, Cottonwood Triangular and Desert side-notched projectile points (arrow points), cremations
Saratoga Springs	A.D. 500 – 1200	Rosegate series; pottery	Intermediate	2000 B.C. – A.D. 500	Mortars, pestles, discoidals, abundant projectile points (dart points), land and sea mammal bone
Gypsum	2000 B.C. – A.D. 500	Elko Series, Gypsum, Humboldt series; T-shaped drills, occasional large scraper planes, mortar and pestle	Millingstone	6500 – 2000 B.C.	Metates, manos, cogstones, discoidals, core tools, paucity of projectile points, inhumations
Pinto	5000 – 2000 B.C.	Pinto series; heavy keeled scrapers, flat millingstones	Early Man	9000 B.C.? – 6500 B.C.	Large, often fluted, points, such as Clovis and Folsom types in association with extinct fauna

Colorado Desert[1]			Westernmost County[2]		
Period	**Chronological Range**	**Diagnostic Projectile Points**	**Period**	**Chronological Range**	**Diagnostic Artifacts/Features**
Lake Mojave	7000 – 5000 B.C.	Lake Mojave series; well-made bifacial knives and other cutting tools, large domed or keeled scrapers			

[1] Warren 1984, 1986.

[2] Wallace 1955, 1962.

Early Holocene Period

In southern California the Early Holocene Period is generally characterized as a hunting tradition, which dates from the earliest human presence, around 10,000 or 9000 B.C. in some areas, to approximately 5000 B.C. The Early Holocene Period focuses on big game hunting. This period is the earliest cited for the coast (Wallace 1955) as well as the California high desert (Warren 1984), but may actually be absent in California. With only a few isolated Clovis and Folsom points known for the desert region, the typical Clovis occupation, based on the hunting of large late Pleistocene megafauna, has yet to be demonstrated for California or neighboring areas.

In the California desert, the Lake Mojave Period (7000 to 5000 B.C.) is associated with the now-dry lakes. The Lake Mojave Period material culture is dominated by stylized dart points of the Lake Mojave and Silver Lake series, well-made bifacial knives and other cutting tools, large domed or keeled scrapers, and other characteristic artifact types (Wallace 1962). Ground stone tools are rare or absent at most sites.

Middle Holocene Period

Southern Coastal Millingstone traditions enjoyed a long history during the Early Holocene Period. In the desert, the Pinto Period (5000 to 2000 B.C.) followed the Lake Mojave Period. Climatic stress, with resultant changes in environment and staple resources, appears to have affected cultural adaptations. Plant and animal resources changed as lakes and rivers dried up. Warren (1984) postulated the populations adjusted to hostile arid conditions by moving to oases in the deserts or to the edges of the desert. This dry period was followed by a moister period in which people returned to the deserts and more plant resources were utilized (Wallace 1962; Warren 1984).

Milling equipment became more prevalent, but dart points, especially Pinto series points, still dominated the material culture. Heavy keeled scrapers, flat milling stones, and manos are still found and associated with sites from this period. Desert populations decreased during another dry spell that followed this wet period. This subsequently led into the Little Pluvial at about 2000 B.C. (Warren 1984). Sites in the Mojave Desert associated with the Pinto Period are generally small and usually limited to surface debris (Warren 1984).

The Millingstone Period persists until approximately 2000 or 1500 B.C. The Millingstone tools consist of metates and manos, informal cobble and flake tools but little to no bifacial tools. Diagnostic artifacts include discoidal and cogstone artifacts. This tool assemblage continues into Intermediate times (Wallace 1955). Characteristic mortuary practice of the Millingstone Period includes interment beneath a cairn of milling stones or rocks.

An increase in exchange and interregional trade is noted in the Middle Holocene/Late Holocene transition. In inland regions, the start of the Little Pluvial and the start of the Gypsum Period (2000 B.C. to A.D. 500) coincide with Elko series points. The mortar and pestle are introduced during this period. This new tool set was an important innovation in seed processing technology. Manos and milling stones are commonly found at Gypsum Period sites. Flake scrapers see wider use, although the occasional large scraper plane is also found (Warren 1984). Minor (1975) suggests that the first of the pit and groove petroglyphs were produced during the latter half of the Gypsum Period.

During this time the earliest Takic migrations may have proceeded across the desert to the coast. The change from flexed burials to cremations is viewed as a Takic cultural trait. A shift in settlement patterns may also indicate the Takic migration into former Hokan territory (Moratto 1984).

Late Holocene Occupations

The Late Prehistoric Period began around A.D. 500 or 600 in the southern California coastal region. This period is marked by the introduction of small projectile points used with the bow and arrow (Wallace 1955). It continued until the time of European contact in A.D. 1769 with establishment of the Mission San Diego de Alcala in San Diego, the first of 21 missions established by the Spanish in California. In the southern California desert region, cultural periods in this time frame include the Saratoga Springs Period (A.D. 500 to 1200) and the Protohistoric Period (A.D. 1200 to historic times, which is as late as 1850 in some locales) (Warren 1984).

The Saratoga Springs Period continues the successful adaptation to a desert environment through increasingly complex subsistence strategies and technology. These adaptations were influenced by the Hakataya Culture of the lower Colorado River area (Warren 1984). Pottery and projectile point types are distinguishing characteristics of the Saratoga Springs culture. Ceramic vessel technology appear first on the lower Colorado River approximately A.D. 800 and spread west into the southern California deserts by A.D. 900. Brown Ware and Buff Ware ceramics are found at Saratoga Springs Period sites. Associated with the use of ceramics are Desert Side-notched and Cottonwood triangular projectile points. Increased use of steatite for ornaments, beads, and pendants is also characteristic of this period (Warren 1984).

The Protohistoric Period sites contain flaked stone assemblages made almost exclusively of pressure flaked cryptocrystalline silicates (CCS). Sites of the Protohistoric Period exhibit an increase in the quantity of flake cores and large flake blanks, and a decrease density in flaked stone density. The Protohistoric Period is characterized by the continuation of the generalized archaic lifestyle based on hunting and gathering practices with a strong reliance on plant foods

and small game (Warren 1984; Warren and Crabtree 1986). Another indicator of the Protohistoric Period is the presence of Obsidian Butte obsidian, especially at southern California sites (Wilke 1978).

3.2 Ethnographic Context

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; Bean and Smith 1978). The territory of the Luiseño included portions of San Diego, Riverside, and Orange Counties (Kroeber 1925; Bean and Smith 1978).

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).

<u>Gabrielino</u>

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 Santa Ana River 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 1978; 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).

3.3 Historic Context and Overview

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). Early exploration of the Riverside County area began slowly until 1772 when Lieutenant Pedro Fages, then the military governor of San Diego, crossed through the San Jacinto Valley.

Spanish Period

Substantial European settlement of California began with the establishment of 21 missions and 4 presidios between San Diego and Sonoma, most of which were located along the coast. The missions dominated economic and political life over most of the California region (Castillo 1978). During the Spanish Period, Riverside County was too far inland to include any missions or asistencias within its limits. The Juan Bautista de Anza expedition crossed the Colorado River and into California in January of 1774. This was his second expedition into Riverside County. Bautista de Anza, with his group of soldiers and their families, would ultimately 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 Sixteen ranchos were granted in Riverside County; one of these was the El Sobrante de San Jacinto, granted to Miguel de Pedrorena and Rosario Estudillo de Aguirre, comprising over one hundred thousand acres (Beattie and Beattie 1939). The other

nearby rancho from which the Riverside community and project development takes its name is La Sierra (meaning "the saw-toothed mountain range"). Sepulveda was granted by Mexican Governor Pio Pico to Vicente Yorba in 1846. The Project Area is situated between the La Sierra and the El Sobrante de Jacinto Rancho lands (Beattie 1925; Beattie and Beattie 1951).

American Period

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).

The City of Riverside

The name was chosen at the first meeting of stockholders of Judge John W. North's newly-formed Southern Californian Colony Association in December 1870. Until that date, the colony had been called Gurupi because of its location on part of the Gurupi Rancho (North 1900:468) and mail had been delivered under that name. Dr. James P. Greves, Secretary of the Association, later recalled that the minority at the first meeting still favored Gurupi as the name. On June 19, 1889, the Riverside Press and Horticulturist, in an article detailing the history of the town, states that Dr. Greves, the "Father of Riverside," was the one to whom "we owe the name." In Judge North's 1871 pamphlet advertising the new town he wrote that "The Association have laid out a town … east of the River, which, from its location, is called Riverside." Many years later, his son John G. North stated that the name Riverside was "more euphonious" than Gurupi because of its "reference to the Santa Ana River, from which the water supply of the new colony was derived" (North 1900; Gunther 1984).

Riverside lies nearly 50 miles southeast of Los Angeles among a series of foothills including Victoria Hills, Pedley Hill, and Jurupa, Spring, and Rubidoux Mountains. A system of arroyos leads from these foothills toward the Santa Ana River, which runs through the center of the Riverside plain. The largest of which, the Tesquesquite Arroyo, confined the development of the original town site of Riverside for over 40 years (Gunther 1984).

In September of 1870, John W. North and the Southern California Colony Association founded the City of Riverside. Lands were purchased from the Jurupa Rancho, surveyed and platted, and work began on an irrigation canal. A one-mile square town site, known as Mile Square, was the center of the commercial development and was surrounded by residential areas and 10-acre parcels to the north and south (Patterson 1996).

In 1888, after acquiring extensive water rights in the Riverside area, Matthew Gage constructed the canal that would bear his name to its terminus between the southern ends of John and McAllister Streets just east of the Project Area. The canal was a major facilitator of the development of the Riverside area (Lech 2004). Gage was not only a 'water baron' but also a

land speculator, acquiring 3,200 acres of land above the level of the Riverside Land & Irrigating Company canals in 1887. Arlington Heights was serviced by the canal and was first developed during the 1890s by Gage as a highly productive agricultural area specializing in citrus crops. The canal trends northeast to southwest passing through Grand Terrace, Highgrove, Canyon Crest Heights, and Arlington Heights; a distance of about 20 miles. The Gage Canal contributed extensively to the growth and development of the City of Riverside (Wlodarski 1992). The Project Area (in the foothills just northeast of Arlington Heights) was occupied by the late 1890s and, by the late 1930s, this area was completely planted in citrus groves. The foothills northeast of Arlington Heights has remained largely undeveloped through the historical-period.

4.0 METHODS AND RESULTS

4.1 Record Search

A record search for this study was conducted September 8, 2017 by Amec Foster Wheeler archaeologist Jesse Yorck, M.A., RPA, at the Eastern Information Center (EIC) of University of California, Riverside. Information regarding previously identified resources and existing cultural resources reports within a mile radius of the Project Area were compiled, the results of which are provided below.

Resources consulted by the EIC indicate that two archaeological studies have been conducted within the Project Area (Parr and Wilke 1989; Drover, C.E. 1988), and that 17 resource studies have been conducted within a mile of the Project Area, 18 of which have been cultural resource inventory surveys. The studies have also included a single impact evaluation study (Gardner 1971). (**Table 2**). There has been a single previously identified resources recorded within the Project Area. The previous cultural resource studies conducted within a mile of the Project Area are listed below.

Table 2.
Previous Cultural Resource Studies within the Scope of the Records Search

Previously Conducted Archaeological Studies within Scope of the Records Search		
Report Number	**Author/Year**	**Report Title**
RI-00029	Gardner, Michael C. 1971	Mary Street Dam And Channels Flood Control Project: Expected Impact On Archaeological Resources.
RI-01648	Archaeological Research, Inc. 1974	Archaeological Report - Project W.O. 5-3764, Box Springs Feeder.
RI-01649	Lerch, Michael K. 1983	Cultural Resources Assessment of The Santa Ana Watershed Project Authority Proposed Imported Water Conveyance System, Riverside County, California.
RI-02183	Pinto, Diana G. 1987	An Archaeological Assessment of 10 Acres, Tentative Tract No. 21399, Near Alessandro Avenue, Riverside, California.
RI-02289	Drover, C.E. 1988	An Archaeological Assessment of Vista Valley Company Parcel, Riverside, California.
RI-02290	Drover, C.E. 1988	An Archaeological Assessment of Tract 21156 And 21156-2, Riverside County, California.
RI-02367	McCarthy, Daniel F. 1988	An Archaeological Assessment of Assessor's Parcels #241-210-011 and #241-210-013, Located In The City Of Riverside, Riverside County, California.
RI-02368	Drover, C.E. 1988	An Archaeological Assessment of a 79- Acre Residential Site, Riverside County, California.
RI-02369	Drover, C.E. 1988	An Archaeological Assessment of Tract 24016, Riverside, California.
RI-02391	Parr, Robert E. and P.J. Wilke 1989	Cultural Resources Assessment of The Alessandro Heights Project Located In The City of Riverside, Riverside County, California.
RI-02463	Drover, C.E. 1988	An Archaeological Assessment of Tract Map 23678, Riverside, California.

Previously Conducted Archaeological Studies within Scope of the Records Search		
Report Number	**Author/Year**	**Report Title**
RI-02464	Drover, C.E. 1988	An Archaeological Assessment of Tract Map 23804, Riverside, California.
RI-04102	Love, Bruce and Bai "Tom" Tang 1998	Cultural Resources Report: Assessor's Parcel No. 242-290-009, 1551 Washington Street, City Of Riverside, Riverside County, California.
RI-04153	Mclean, Deborah 1998	Letter Report: Archaeological Assessment for a Pacific Bell Mobile Services Telecommunications Facility CM 825-01, 2299 Washington Street, City and County Of Riverside, California.
RI-07374	Tang, Bai and Hogan, Michael 2007	Historical/ Archaeological Resources Survey Report: Assessor's Parcel Nos. 241-140-034, 241-480-003 and -004 in the City of Riverside, Riverside County, California.
RI-07495	Sanka, Jennifer M. and Marnie Aislin-Kay 2007	Phase I Cultural Resources Assessment and Phase II Cultural Resources Testing Tentative Tract Map No. 32270, Riverside, Riverside County, California.
RI-08803	McKenna, Jeanette A. 2012	A Phase I Cultural Resource Investigation of Tentative Parcel Map No. 36458, The Pitchford-Lawson Property in the City of Riverside, Riverside County, California.
RI-09523	Pigniolo, Andrew R. 2015	Cultural Resources Survey Report for the 910 Highridge Street Project Riverside, California (APN 272-190-010-00).
RI-09823	Blumel , Wendy (Jones) and Andrew Myers 2017	Phase I Cultural Resources Assessment for the 0.55-Acre Sprint Tower RV25XC276 Project Near Redlands, Riverside County, California.

A total of 85 resources have been previously recorded within a mile of the Project Area, while a single resource has been previously recorded within the Project Area. A summary table and graphic representation detailing the previously recorded resources within the scope of the record search can be viewed in **Appendix B** of this report.

Eighty one of the previously recorded resources within a mile of the proposed Project Area location were prehistoric in origin, three were historic-era resources and one was a multicomponent resource (having both historic and prehistoric attributes). Milling features are ubiquitous throughout the region and accounted for 91% of the resources documented within a mile of the Project Area. The only prehistoric resource previously recorded within the Project Area consists of two milling slicks on two adjacent bedrock boulders. Within a mile of the Project Area, the eighty one previously documented prehistoric resources include more than 290 milling features, two “power rocks” with an adjacent tamped pathway; an andesite flake scatter and associated milling features and an occupation site with seven milling slicks; a bedrock basin metate; groundstone milling tools and a shallow midden deposit.

The three historic-era resources within a mile radius of the Project Area include an historic refuse scatter containing barbed wire, sanitary cans, a 55 gallon drum, remnants of a child’s wagon, three enamel pots, a 1 gallon rectangular can, clear and amber beverage bottles, various jars and a 5 gallon water container; an historic refuse scatter comprised of 200 historical items including bottles, approximately 50 sanitary cans, tableware, burnt bone, crock fragments,

a sardine can, a condiment can, a milk can, a shoe sole, a syrup can and galvanized buckets; and a House foundation and chimney comprised of poured concrete. A single site has been identified as multicomponent in nature (having both historic and prehistoric attributes), which includes a bedrock milling feature, a quartz flake and two historic cans.

Given the results of previous archaeological studies in the Project Area vicinity and the proximity of previously documented resources, the historic archaeological sensitivity of the Project Area and surrounding vicinity appear to be low-to-moderate, while the prehistoric archaeological sensitivity appears to be high.

Figure 3. Previous Cultural Resources Studies Within the Scope of the Record Search, Listed by Report Number

4.2 Native American Consultation

On September 11, 2017, Amec Foster Wheeler submitted a sacred lands file request to the Native American Heritage Commission (NAHC) to determine whether their files indicate the presence of cultural sites within or immediately adjacent to the Project Area. On September 14, 2017, the NAHC responded that the sacred lands record search did not identify any resources within or immediately adjacent to the subject Project Area. The NAHC did however provide a list of forty five tribal representatives to further contact regarding the Project and potential Native American resources within and surrounding the Project Area. With this information, Amec Foster Wheeler sent consultation letters on September 14, 2017, to the forty five NAHC-recommended tribal representatives to ascertain whether they had specific information regarding resources in or near the Project Area. Follow-up phone calls to each representative were made on October 5, 2017.

The NAHC-recommended tribal representatives contacted during the Native American consultation process are:

- Jeff Grubbe, Chairperson, Agua Caliente Band of Cahuilla Indians
- Patricia Garcia-Plotkin, Director, Agua Caliente Band of Cahuilla Indians
- Amanda Vanco, Chairperson, Augustine Band of Cahuilla Mission Indians
- Doug Welmas, Chairperson, Cabazon Band of Mission Indians
- Daniel Salgado, Chairperson, Cahuilla Band of Mission Indians
- Ralph Goff, Chairperson, Campo Band of Mission Indians
- Michael Garcia, Vice Chairperson, Ewiiaapaayp Tribal Office
- Robert Pinto, Chairperson, Ewiiaapaayp Tribal Office
- Andrew Salas, Chairperson, Gabrieleno Band of Mission Indians - Kizh Nation
- Anthony Morales, Chairperson, Gabrieleno/Tongva San Gabriel Band of Mission Indians
- Sandonne Goad, Chairperson, Gabrielino/Tongva Nation
- Robert Dorame, Chairperson, Gabriellno Tongva Indians of California Tribal Council
- Charles Alvarez, Gabrielino-Tongva Tribe
- Erica Pinto, Chairperson, Jamul Indian Village
- Thomas Rodriguez, Chairperson, La Jolla Band of Luiseño Indians
- Javaughn Miller, Tribal Administrator, La Posta Band of Mission Indians
- Gwendolyn Parada, Chairperson, La Posta Band of Mission Indians
- John Perada, Environmental Director, Los Coyotes Band of Mission Indians
- Shane Chapparosa, Chairperson, Los Coyotes Band of Mission Indians
- Nick Elliott, Cultural Resources Coordinator, Manzanita Band of Kumeyaay Nation

- Angela Elliot Santos, Chairperson, Manzanita Band of Kumeyaay Nation
- Robert Martin, Chairperson, Morongo Band of Mission Indians
- Denisa Torres, Cultural Resources Manager, Morongo Band of Mission Indians
- Shasta Gaughen, Tribal Historic Preservation Manager, Pala Band of Mission Indians
- Temet Aguilar, Chairperson, Pauma Band of Luiseño Indians-Pauma & Yuima Reservation
- Paul Macarro, Cultural Resources Coordinator, Pechanga Band of Luiseño Indians
- Mark Macarro, Chairperson, Pechanga Band of Luiseño Indians
- Joseph Hamilton, Chairperson, Ramona Band of Cahuilla Mission Indians
- John Gomez, Environmental Coordinator, Ramona Band of Cahuilla Mission Indians
- Jim McPherson, Tribal Historic Preservation Officer, Rincon Band of Mission Indians
- Bo Mazzetti, Chairperson, Rincon Band of Mission Indians
- John Valenzuela, Chairperson, San Fernando Band of Mission Indians
- Lee Clauss, Director of Cultural Resources, San Manuel Band of Mission Indians
- Allen E. Lawson, Chairperson, San Pasqual Band of Mission Indians
- John Flores, Environmental Coordinator, San Pasqual Band of Mission Indians
- Steven Estrada, Chairperson, Santa Rosa Band of Mission Indians
- Goldie Walker, Chairperson, Serrano Nation of Mission Indians
- Carrie Garcia, Cultural Resources Manager, Soboba Band of Luiseño Indians
- Joseph Ontiveros, Cultural Resources Department, Soboba Band of Luiseño Indians
- Scott Cozart, Chairperson, Soboba Band of Luiseño Indians
- Lisa Haws, Cultural Resources Manager, Sycuan Band of the Kumeyaay Nation
- Cody J. Martinez, Chairperson, Sycuan Band of the Kumeyaay Nation
- Michael Mirelez, Cultural Resources Coordinator, Torres-Martinez Desert Cahuilla Indians
- Julie Hagen, Viejas Band of Kumeyaay Indians
- Robert Welch, Chairperson, Viejas Band of Kumeyaay Indians

As of this time, 16 tribal representatives have responded to the September 14, 2017, consultation letter. Six replied via letter, two via email and eight via telephone. On behalf of Robert Martin, Jessica Mauck of the Morongo Band replied stating that the Project is located just outside of Serrano ancestral territory and, as such, the Tribe will not be taking part in the consultation process. Amanda Vance of the Augustine Band replied that she had no specific information on resources within or near the Project Area; she also recommended a cultural monitor be present during all phases of construction. Ray Teran of the Viejas Band stated that the Project Area is of little cultural significance to the Tribe, but requested to be notified of any resources discovered. Tuba Ebru Ozdil of the Pechanga Band asked that the Tribe be invited to participate included in the field surveys, that they be notified and consulted by the lead agency

(and provided project/cultural resource documents) and that a qualified archaeologist and a monitor from the Tribe be present during construction activities. The Pechanga Band was invited to attend the field survey and subsurface testing phase of the Phase I project, and sent a cultural resource specialist to assist in the October 6, 2017, subsurface testing effort.

On behalf of Jeff Grubbe, Katie Croft of the Agua Caliente Band stated that the Project Area not within the Tribe's traditional use area and asked that the Project area be surveyed by a qualified archaeologist and that the ensuing report and documentation be sent to the Tribe. Shasta Gaughen of the Pala Band stated that the Project Area is outside of the Tribe's traditional use area and deferred to tribes in closer proximity to the Project. On behalf of Temet Aguilar, Chris Devers of the Pauma Band stated that the Tribe is unaware of any resources within the Project Area, but that they would like to review the cultural study.

Anthony Morales of the Gabrieleno/Tongva San Gabriel Band deferred to the Pechanga Band, but asked to be notified if more resources are found. Robert Dorame of the Gabriellno Tongva Indians of California Tribal Council asked that in the event of any cultural resources or human remains are unearthed during construction, he would like to be notified. John Gomez of the Ramona Band requested the scoping letter via email. A second follow-up letter was sent to Mr. Gomez on October 5, 2017. Cultural Resource Specialist Jessica Mauck of the San Manuel Band replied that the project area is outside of Serrano ancestral territory and will not be participating in the project scoping process. Erica Ortiz-Martinez of the Rincon Band requested shape/CAD files of the project area and provided information on Luiseño place names more than 4.5 miles from the project area. Shapefiles were sent electronically to the Rincon Band on October 9, 2017. Michael Mirelez of the Torres-Martinez Desert Cahuilla Indians deferred to the Soboba Band. Joseph Ontiveros of the Soboba Band asked that the lead agency initiate and continue correspondence with the Tribe, that he receive project information, that the Tribe have the opportunity to monitor any ground disturbing activities during project implementation, that the proper procedures and requests of the Tribe be honored and included a regulatory framework for the treatment of cultural items and human remains. Ralph Goff of the Campo Band and John Perada of the Los Coyotes Band were reached, but had no comment.

The remaining Tribal representatives were called on October 5, 2017, but have not replied as of this time.

4.3 Field Survey

An intensive field survey of the Project Area was conducted on September 22, 2017, and limited subsurface testing along the perimeter of Site 33-003483 was conducted on October 6, 2017, by Amec Foster Wheeler senior archaeologist Jesse Yorck, RPA. The Pechanga Band of Luiseño Indians were contacted prior to the field survey and invited to participate, and were able to able to have Pechanga Band cultural resources specialist Cameron Linton accompany Mr. Yorck during the October 6, 2017 shovel testing effort. The methodology of the pedestrian survey included walking north-south transects of the entire Project Area, spaced no more than 15 meters (approximately 49.2 ft) apart. The ground surface was visually inspected for any signs of human use dating to more than 50 years old. Areas with disturbed or exposed soils were particularly scrutinized for indications of cultural materials. Ground visibility was generally

good to excellent (80-100%). Modern trash including concrete rubble, vehicle tires, landscaping refuse, bottles, plastic fragments, rebar, lengths of hose, and lengths of polyvinyl chloride (PVC) pipe were observed on the ground surface. These items did not have historic or archaeological value. It appears as though nearly 40% of the Project Area ground surface has been previously disturbed by access roads, as well as grubbing and grading activities. It is also possible that the remainder of the Project Area has experienced ground disturbance associated with citrus production and weed abatement activities.

A single prehistoric resource was encountered during the intensive field survey. This previously recorded resource was comprised of two shallow milling slicks located on two adjacent boulders (Site 33-003483). The milling slicks measure 25 centimeters (cm) long x 20 cm wide and less than 1 cm deep (Feature 1), and 23 cm long x 21 cm wide and less than 1 cm deep (Feature 2). No associated artifacts were identified near Site 33-003483 or within the Project Area as a whole. The site has been documented previously to the current study on California Department of Parks and Recreation Series 523 site forms, which can be found in **Appendix C** of this report.

In order to establish whether a subsurface component of Site 33-003483 existed along the perimeter of the milling slicks, a subsurface testing effort, in the form of 50 cm diameter shovel test probes (STPs) was conducted. All sediments were excavated in arbitrary 10 centimeter (cm) levels and sifted through a ¼ inch mesh screen. Three shovel test probes (STPs) were excavated along the perimeter of the Site, during which no subsurface resources were encountered. The sediments encountered in the three STPs consisted of 10 YR 4/4 dark yellowish brown sandy clay loam containing ample roots and rootlets from approximately 0-10 centimeters below surface (cmbs), 10 YR 4/4 dark yellowish brown sandy clay with 30-40% decomposing granite pebble inclusions from approximately 10-65 cmbs and 10 YR 4/6 dark yellowish brown sandy clay from approximately 65-80 cmbs. All STPs were excavated through sterile material (containing no resources) and were terminated at 80 cmbs, where the sterile sediments became impenetrable. Ample modern bottle glass fragments were encountered from 0-55 cmbs in STP 1, from 0-20 cmbs in STP 2 and from 0-5 cmbs in STP 3. STP 3 also contained a segment of a concrete slab at the 0-5 cmbs and a 22 long rifle rim-fire casing at 30 cmbs. These items did not have historic or archaeological value. The locations of STP 1-3 and their proximity to Site 33-003483 can be found in **Appendix B** of this report.

5.0 DISCUSSION AND RECOMMENDATIONS

5.1 Discussion

The purpose of the subject study is to establish whether resources dating to the historic and/or prehistoric periods exist near or immediately adjacent to the Project Area to support the City of Riverside in determining whether the proposed Project will have any significant effects on historical resources.

The California Environmental Quality Act (CEQA), as established in the State of California's Public Resources Code (PRC) defines the criteria for historical resources. As defined by to PRC §5020.1(j), a historical resource consist of, but is not limited to, "any object, building, site, area, place, record, or manuscript which is historically or archaeologically significant, or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California." In addition, CEQA guidelines define historical resources as 1) resources listed in or eligible for listing in the California Register of Historical Resources (CRHR), 2) listed in a local register of cultural resources, or 3) determined to be significant by a Lead Agency (Title 14 CCR §15064.5(a)(1)-(3)). A resource may be eligible for listing in the California Register if it meets any one of the ensuing criteria:

1. Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.
2. Is associated with the lives of persons important in our past.
3. 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.
4. Has yielded, or may be likely to yield, information important in prehistory or history. (PRC §5024.1(c))

As the lead agency for the proposed Project is the City of Riverside, who require that all resources also be evaluated at the National Level, this study also addresses any potential impacts that the project may have on historic properties, as defined by the National Historic Preservation Act of 1966, as amended. As established by the Advisory Council on Historic Preservation (ACHP), historic properties are defined as "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places (NRHP) maintained by the Secretary of the Interior" (36 CFR 800.16(l)). Pursuant to the NHPA of 1966, the National Park Service has established eligibility criteria for the NRHP. A resource may be eligible for listing in the NRHP if it meets any one of the four ensuing criteria:

The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and:

a) that are associated with events that have made a significant contribution to the broad patterns of our history; or

b) that are associated with the lives of persons significant in our past; or

c) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

d) that have yielded, or may be likely to yield, information important in prehistory or history. (36 CFR 60.4)

During the Extended Phase I Cultural Resources Inventory, previously recorded Site 33-003483 was encountered within the Project Area. Site 33-003483 was formerly recorded as a prehistoric resource on California Department of Parks and Recreation 523 series forms. Three STPs were excavated along the perimeter of Site 33-003483 to ascertain whether or not the Site contained a subsurface resource component.

5.2 Recommendations

Through the research and inventory methodologies described in this report, this study did not encounter any historical resources, as defined by CEQA, or any historic properties, as defined by NHPA, within the Project Area. During the Extended Phase I Cultural Resources Inventory, a previously documented resource (Site 33-003483), comprised of two shallow milling slicks located on adjacent granitic boulders, was observed in the northwest portion of the Project Area. The milling features underwent shovel testing with negative results. The milling surfaces were lightly worn, apparently expedient milling slicks with no associated surface or subsurface artifacts identified. Therefore, the milling features are temporally ambiguous and appear to lack potential for relaying additional data important to the prehistory of the region. Site 33-003483 is older than 50 years, but is not associated with a significant historic event or broad patterns in history (Criterion 1 of the CRHR and Criterion A of the NRHP), is not associated with persons of historical significance (Criterion 2 of the CRHR and Criterion B of the NRHP), does not have distinctive characteristics (Criterion 3 of the CRHR and Criterion C of the NRHP), and isn't likely to yield important data (Criterion 4 of the CRHR and Criterion D of the NRHP). Therefore, Site 33-0034831 does not appear eligible for the CRHR or the NRHP and does not qualify as a "historical resource" under CEQA or an "historic property" under NHPA. Furthermore, Site 33-003483 does not appear to qualify as a "cultural resources," as defined by City of Riverside Municipal Code Title 20.50.10.

Through the research approaches listed above, this study did not encounter any "cultural resources," "historical resources" or "historic properties" within the Project Area. Aside from Site 33-003483, no other historic or prehistoric resources were encountered within the Project Area during this study. Amec Foster Wheeler recommends to the City of Riverside that no cultural resources exist within the Project Area for the purposes of the City of Riverside Municipal Code Title 20.50.10, no historical resources exist within the Project Area for the purposes of CEQA and that No Historic Properties were encountered within the Project Area for the purposes of

NHPA. No further cultural resource studies are necessary at this time. If cultural resources are encountered during the undertaking, all work shall cease and the City of Riverside will be notified immediately and will retain a qualified archaeologist to assess the nature of the find.

6.0 REFERENCES

Archaeological Research, Inc., 1974. Archaeological Report - Project W.O. 5-3764, Box Springs Feeder.

Bean, Lowell John, 1978. Cahuilla. In California, edited by R. F. Heizer, pp. 575–587. Handbook of North American Indians, vol. 8, W.C. Sturtevant, general editor, Smithsonian Institution, Washington, D.C.

Bean, Lowell John, and Florence C. Shipek, 1978. Luiseño. In California, edited by R.F. Heizer, pp.550–563. Handbook of North American Indians, vol. 8, W.C. Sturtevant, general editor, Smithsonian Institution, Washington, D.C.

Bean, Lowell John, and Charles R. Smith, 1978. Gabrielino. In California, edited by R.F. Heizer, pp.538–549. Handbook of North American Indians, vol. 8, W.C. Sturtevant, general editor, Smithsonian Institution, Washington, D.C.

Beattie, George W., 1925. Development of Travel Between Southern Arizona and Los Angeles as it Related to the San Bernardino Valley. Historical Society of Southern California, Annual Publications 13(2):228–257.

Beattie, George W., and Helen P. Beattie, 1939. Heritage of the Valley: San Bernardino's First Century. Biobooks: Oakland.

1951 Heritage of the Valley: San Bernardino's First Century. Biobooks: Oakland.

Blumel, Wendy (Jones) and Andrew Myers, 2017. Phase I Cultural Resources Assessment for the 0.55-Acre Sprint Tower RV25XC276 Project Near Redlands, Riverside County, California.

Castillo, Edward D., 1978. The Impact of Euro-American Exploration and Settlement, in Handbook of the North American Indians, Volume 8, California, edited by Robert F. Heizer, Smithsonian Institution, Washington D.C.

Drover, C.E., 1988. An Archaeological Assessment of Tract 21156 And 21156-2, Riverside County, California.

Drover, C.E., 1988. An Archaeological Assessment of Vista Valley Company Parcel, Riverside, California.

Drover, C.E., 1988. An Archaeological Assessment of a 79- Acre Residential Site, Riverside County, California.

Drover, C.E., 1988. An Archaeological Assessment of Tract 24016, Riverside, California.

Drover, C.E., 1988. An Archaeological Assessment of Tract Map 23678, Riverside, California.

Drover, C.E., 1988. An Archaeological Assessment of Tract Map 23804, Riverside, California.

Gardner, Michael C., 1971. Mary Street Dam and Channels Flood Control Project: Expected Impact on Archaeological Resources.

Gunther, Jane Davies, 1984. Riverside County, California Place Names, Their Origins and Their Stories. Printed by Rubidoux Printing Co., Riverside, CA.

Harley, R. Bruce, 1988. Rev. Juan Caballeria: Historian or Storyteller? Rethinking the 1810 Dumetz Expedition. San Bernardino County Museum Quarterly 35(2), 42p.

Heizer, Robert F., 1968. The Indians of Los Angeles County. Hugo Reid's Letters of 1852. Southwest Museum Papers 21. Los Angeles, California.

Hudson, D. Travis, 1971. Proto-Gabrielino Patterns of Territorial Organization in Southern Coastal California. Pacific Coast Archaeological Society Quarterly 7(2):49–76.

Kroeber, Alfred L., 1925. Handbook of the Indians of California. Bureau of American Ethnology Bulletin No. 78. Washington D.C.: Smithsonian Institution. Reprinted in 1976, New York: Dover Publications.

Lech, Steve, 2004. Along Old Roads. A History of the Portion of Southern California that Became Riverside County, 1772–1893. Published by the Author.

Lerch, Michael K., 1983. Cultural Resources Assessment of The Santa Ana Watershed Project Authority Proposed Imported Water Conveyance System, Riverside County, California.

Love, Bruce and Bai "Tom" Tang, 1998. Cultural Resources Report: Assessor's Parcel No. 242-290-009, 1551 Washington Street, City Of Riverside, Riverside County, California.

McCarthy, Daniel F., 1988. An Archaeological Assessment of Assessor's Parcels #241-210-011 and #241-210-013, Located In the City Of Riverside, Riverside County, California.

McKenna, Jeanette A., 2012. A Phase I Cultural Resource Investigation of Tentative Parcel Map No. 36458, The Pitchford-Lawson Property in the City of Riverside, Riverside County, California.

Mclean, Deborah, 1998. Letter Report: Archaeological Assessment for a Pacific Bell Mobile Services Telecommunications Facility CM 825-01, 2299 Washington Street, City and County Of Riverside, California.

Minor, Rick, 1975. The Pit-and-Groove Petroglyph Style in Southern California. San Diego Museum of Man, Ethnic Technology Notes No. 15.

Moratto, Michael J., 1984. California Archaeology. San Diego: Academic Press.

North, J.G., 1900. "The Fulfillment of a Prophecy," in Land of Sunshine.

Oxendine, Joan, 1983. *The Luiseño Village During the Late Prehistoric Era*. Unpublished Ph.D. dissertation, Department of Anthropology, University of California, Riverside.

Parr, Robert E. and P.J. Wilke, 1989. Cultural Resources Assessment of The Alessandro Heights Project Located In The City Of Riverside, Riverside County, California.

Patterson, Tom, 1996. A Colony for California: Riverside's First Hundred Years. Second edition. The Museum Press of the Riverside Museum Associates. Riverside, California.

Pigniolo, Andrew R., 2015. Cultural Resources Survey Report for the 910 Highridge Street Project Riverside, California (APN 272-190-010-00).

Pinto, Diana G., 1987. An Archaeological Assessment of 10 Acres, Tentative Tract No. 21399, Near Alessandro Avenue, Riverside, California.

Robinson, W.W., 1979. Land in California. Berkeley and Los Angeles: University of California Press.

Sanka, Jennifer M. and Marnie Aislin-Kay, 2007. Phase I Cultural Resources Assessment and Phase II Cultural Resources Testing Tentative Tract Map No. 32270, Riverside, Riverside County, California.

Tang, Bai and Hogan, Michael, 2007. Historical/ Archaeological Resources Survey Report: Assessor's Parcel Nos. 241-140-034, 241-480-003 and -004 in the City of Riverside, Riverside County, California.

USGS (United States Geological Survey, U.S. Department of the Interior), 2015. Map: Riverside East, Calif. (7.5'); File Modification Date, 2016. Scale 1:24,000. 7.5 Minute Series (Topographic). Reston, VA: USGS.

USGS, 2015. Map: Riverside West, Calif. (7.5'); File Modification Date, 2016. Scale 1:24,000. 7.5 Minute Series (Topographic). Reston, VA: USGS.

Wallace, William J., 1955. A Suggested Chronology for Southern California Coastal Archaeology. Southwestern Journal of Anthropology 11(3):214–230.

1962. Prehistoric Cultural Development in the Southern California Deserts. American Antiquity 28 (2) 172-180.

Warren, Claude N., 1984. The Desert Region. In California Archaeology, by M. Moratto with contributions by D.A. Fredrickson, C. Raven, and C. N. Warren, pp. 339–430. Academic Press, Orlando, Florida.

1986. Fort Irwin Historic Preservation Plan, Volume 2: The Research Overview. Coyote Press, Salinas, California. Copies also available from National Park Service-Western Region, San Francisco, and National Technical Information Service, Washington, D.C.

Warren, C.N. and R.H. Crabtree, 1986. Prehistory of the Southwestern Area. In Great Basin, edited by Warren L. D'Azevedo, Handbook of the North American Indians, Volume 11, William C. Sturtevant, general editor, Smithsonian Institution, Washington D.C.

Wilke, P.J., 1978. Late Prehistoric Human Ecology at Lake Cahuilla, Coachella Valley, California. Contributions of the University of California Archaeological Research Facility Number 38. University of California, Berkeley

Wlodarski, 1992. State of California Site Record Form for Site CA-RIV-004768. Ms. on file, Eastern Information Center, University of California, Riverside.

APPENDIX A

PERSONNEL QUALIFICATIONS

APPENDIX B

PREVIOUSLY RECORDED CULTURAL RESOURCES AND STP LOCATIONS

(CONFIDENTIAL)

Table 3.
Previously Recorded Cultural Resources within the Scope of the Records Search

Site/Isolate No.	Recorded by/Date	Description
33-001839	Pinto 1987	Bedrock milling features, numerous (unquantified)
33-002024	Gardner 1971	Bedrock milling features (6-8)
33-002323	Pritchett 1982	“Power Rocks” (2), bedded quartz stone surrounded by tamped path
33-002553	Parr and Leavens 1989	Bedrock milling feature (1)
33-002554	Parr and Everson 1989	Bedrock milling features (4)
33-002555	Drover 1988	Bedrock milling features (4)
33-002556	Drover 1988	Bedrock milling feature (1)
33-003274	Pinto 1987	Bedrock milling features (4)
33-003275	Parr and Lehman 1989	Bedrock milling features (5)
33-003276	Parr and Lehman 1989	Bedrock milling features (2)
33-003414	Drover and Jackson 1987	Bedrock milling features (2)
33-003483	Parr, et al 1989	Bedrock milling features (2)
33-003484	Goodman, et al 1989	Bedrock milling features (5)
33-003485	Goodman, et al 1989	Bedrock milling features (12)
33-003486	Goodman, et al 1989	Bedrock milling features (9)
33-003487	Parr, et al 1989	Bedrock milling features (2)
33-003488	Goodman, et al 1989	Bedrock milling features (2)
33-003489	Goodman 1989	Bedrock milling features (11)
33-003514	Parr and Pinto 1989	Bedrock milling features (2)
33-003533	Parr, et al 1989	Bedrock milling features (2)
33-003535	Goodman and Hogan 1989	Bedrock milling features (9)
33-003536	Parr, et al 1989	Bedrock milling features (12)
33-003537	Parr and	Bedrock milling feature (1)

	Everson 1989	
33-003538	Parr, et al 1989	Bedrock milling features (4)
33-003539	Parr and Alcock 1989	Bedrock milling features (2)
33-003540	Wiewall and Ballester 1999	Bedrock milling features (5)
33-003541	Wiewall and Ballester 1999	Bedrock milling feature (1)
33-003542	Parr and Hogan 1989	Bedrock milling feature (1)
33-003543	Parr and Hogan 1989	Bedrock milling feature (1)
33-003546	Parr, et al 1989	Bedrock milling features (2)
33-003547	Parr and Goodman 1989	Bedrock milling feature (1)
33-003548	Parr, et al 1989	Bedrock milling features (2)
33-003550	Parr and Hogan 1989	Bedrock milling features (5)
33-003551	Wiewall and Ballester 1999	Bedrock milling feature (1)
33-003552	Parr 1989	Bedrock milling features (3)
33-003553	Parr, et al 1989	Bedrock milling features (2)
33-003554	Goodman and Leavens 1989	Bedrock milling features (2)
33-003556	Parr and Hogan 1989	Bedrock milling features (2)
33-003557	Parr 1989	Bedrock milling feature (1)
33-003558	Goodman 1989	Bedrock milling feature (1)
33-003561	Goodman 1989	Bedrock milling feature (1), possibly the result of several overlapping slicks
33-003562	Goodman 1989	Bedrock milling feature (1)
33-003564	Goodman and Weingartner 1989	Bedrock milling features (2)
33-003565	Goodman and	Bedrock milling features (5)

	Weingartner 1989	
33-003566	Goodman 1989	Bedrock milling features (4)
33-003567	Goodman 1989	Bedrock milling feature (1)
33-003568	Goodman 1989	Bedrock milling feature (1)
33-003569	Goodman 1989	Bedrock milling features (4)
33-003570	Goodman 1989	Bedrock milling feature (1)
33-003571	Goodman and Weingartner 1989	Bedrock milling feature (1)
33-003573	Goodman 1989	Bedrock milling features (2)
33-003574	Goodman 1989	Bedrock milling feature (1)
33-003575	Goodman 1989	Bedrock milling features (4)
33-003576	Goodman 1989	Bedrock milling features (2)
33-003577	Goodman 1989	Bedrock milling features (3)
33-003578	Goodman 1989	Bedrock milling features (2)
33-003579	Goodman 1989	Bedrock milling features (9)
33-003580	Goodman and Weingartner 1989	Bedrock milling feature (1)
33-003581	Parr, et al 1989	Bedrock milling features (69)
33-003595	Parr, et al 1989	Bedrock milling features (5)
33-003596	Parr, et al 1989	Bedrock milling features (2)
33-003597	Parr 1989	Bedrock milling feature (1)
33-003598	Parr 1989	Bedrock milling feature (1)
33-003599	Parr, et al 1989	Bedrock milling features (8)
33-003600	Parr and Yohe 1989	Bedrock milling feature (1)
33-003635	Parr and Lehman 1989	Bedrock milling features (4)
33-003637	Parr and	Bedrock milling features (4)

	Lehman 1989	
33-003638	Parr and Lehman 1989	Bedrock milling feature (1)
33-003639	Parr and Lehman 1989	Bedrock milling feature (1)
33-003640	Parr and Lehman 1989	Occupation site containing bedrock milling slicks (7), a bedrock basin metate (1), ground stone milling tools (2) and a midden deposit.
33-009039	Wiewall and Ballester 1999	Bedrock milling feature (1)
33-009040	Wiewall and Ballester 1999	Bedrock milling features (3)
33-009041	Wiewall and Ballester 1999	Bedrock milling features (2)
33-009042	Wiewall and Ballester 1999	Bedrock milling feature (1)
33-013303	Goodwin 2004	Bedrock milling features (3)
33-013737	Smallwood 2004	Bedrock milling feature (1) and a light andesite flake scatter (4)
33-014132	Bergin and Ferraro 2004	Historic refuse: barbed wire, sanitary cans, 55 gallon drum, remants of a child's wagon, three enamel pots, I gallon rectangular can, clear and amber beverage bottles, various jars, 5 gallon water container. A casual dump site dating to the mid-20th century.
33-014133	Bergin, et al 2005	Bedrock milling features (2)
33-014134	Ferraro and Viejo 2004	Historic refuse: 200 historical items including bottles, approximately 50 sanitary cans, bottles, tableware, burnt bone, crock fragments, a sardine can, a condiment can, a milk can, a shoe sole, a syrup can and galvanized buckets.
33-015434	Hoover 2006	Bedrock milling feature (1)
33-016645	Aislin-Kay and Sanka 2007	Bedrock milling feature (1), quartz flake (1) and historic cans (2)
33-016646	Aislin-Kay and Sanka 2007	Bedrock milling feature (1)
33-016647	Aislin-Kay and Sanka 2007	Bedrock milling features (2)
33-021017	Price and Zepeda-Herman 2011	Bedrock milling feature (1)
33-021018	Price and Zepeda-Herman 2011	Bedrock milling feature (1)
33-021019	Price and	House foundation and chimney comprised of poured concrete

	Zepeda-Herman 2011	

Figure B-1. Previously Recorded Cultural Resources within a Mile of the Project Area

Figure B-2. Location of Shovel Test Probes in Relation to Site 33-003483

APPENDIX C

DEPARTMENT OF PARKS AND RECREATION SERIES 523 SITE FORMS

(CONFIDENTIAL)

APPENDIX D

NATIVE AMERICAN SCOPING DOCUMENTATION

(CONFIDENTIAL)

SACRED LANDS FILE & NATIVE AMERICAN CONTACTS LIST REQUEST

NATIVE AMERICAN HERITAGE COMMISSION
915 Capitol Mall, RM 364
Sacramento, CA 95814
(916) 653-4082
(916) 657-5390 (fax)
nahc@pacbell.net

Project: Two Bunch Palms Trail DHS Project; APN 665-030-062 (CRM TECH Contract No. 3000)

County: Riverside

USGS Quadrangle Name: Desert Hot Springs, Calif.

Township 3 South **Range** 4 East SB **BM; Section(s)** 1

Company/Firm/Agency: CRM TECH

Contact Person: Nina Gallardo

Street Address: 1016 E. Cooley Drive, Suite A/B

City: Colton, CA **Zip:** 92324

Phone: (909) 824-6400 **Fax:** (909) 824-6405

Email: ngallardo@crmtech.us

Project Description: The primary component of the project is to install develop 1.1-acres of land just east of the intersection of Cabot Road and Tow Bunch Trail in the City of Desert Hot Springs, Riverside County, California.

September 14, 2017

Jeff Grubbe, Chairperson
Agua Caliente Band of Cahuilla Indians
5401 Dinah Shore Drive
Palm Springs, CA 92264

RE: Native American Scoping for Tract 3204, APNs 243-210-037 & 041, City of Riverside, California.

Dear Mr. Grubbe,

Amec Foster Wheeler is conducting environmental studies pursuant to the California Environmental Quality Act (CEQA) for the proposed residential development of Tract 3204, APNs 243-210-037 & 041, located in the City of Riverside, California. The accompanying map, based on the USGS Riverside East and Riverside West, Calif. quadrangle, shows the location of the proposed Project Area. More specifically, the Project Area is located in Section 12 of Township 3S, Range 5W, just northwest of Via Montecito Court of and just south of Overlook Parkway (see attached figure). Amec Foster Wheeler has been hired to complete a cultural resource study for the proposed undertaking.

In response to Amec Foster Wheeler's Sacred Land File request, The California Native American Heritage Commission (NAHC) stated in a letter dated September 14, 2017, that the sacred lands record search did not identify Native American cultural resources within the Project Area. However, the NAHC recommended that specific Native American tribal representatives be contacted who may have information regarding cultural resources in and near the Project Area. As part of the cultural resources study for the project, I am writing you to invite your feedback on any cultural resources in or near the Project Area that are of religious and/or cultural significance to your community.

Please respond at your earliest convenience if you have any specific information regarding cultural resources within or near the Project Area so that they may be considered during the study. You may reach me at 909-654-8814 or jesse.yorck@amecfw.com. Thank you in advance for your time in addressing this important matter.

Sincerely,

Jesse Yorck, M.A., RPA
Cultural Resources Manager
Amec Foster Wheeler
3120 Chicago Avenue, Suite 110
Riverside, CA 92507

Table 4.
Native American Scoping Record

Representative Contacted	Tribe/Affiliation	Telephone Contact Dates	Comments
Jeff Grubbe, Chairperson	Agua Caliente Band of Cahuilla Indians	Reply via email on 10/04/2017	Archaeologist Katie Croft stated that the project area not within the Tribe's traditional use area and asked that the project area be surveyed by a qualified archaeologist and that the ensuing report and documentation be sent to the Tribe
Patricia Garcia-Plotkin, Director	Agua Caliente Band of Cahuilla Indians	Reply via email on 10/04/2017	see above
Amanda Vance, Chairperson	Augustine Band of Cahuilla Mission Indians	Reply via letter on 10/02/2017	Chairperson Amanda Vance replied that no specific information on resources within or near the Project Area; recommended a cultural monitor be present during all phases of construction
Doug Welmas, Chairperson	Cabazon Band of Mission Indians	Voicemail left 10/05/2017 at 3:24pm	No reply
Daniel Salgado, Chairperson	Cahuilla Band of Mission Indians	Voicemail left 10/05/2017 at 3:26pm	No reply
Ralph Goff, Chairperson	Campo Band of Mission Indians	Called on 10/05/2017 at 3:28pm	No comment at this time
Michael Garcia, Vice Chairperson	Ewiiaapaayp Tribal Office	Called on 10/05/2017 at 3:39pm	No voicemail available
Robert Pinto, Chairperson	Ewiiaapaayp Tribal Office	Called on 10/05/2017 at 3:39pm	No voicemail available
Andrew Salas, Chairperson	Gabrieleno Band of Mission Indians - Kizh Nation	Called on 10/05/2017 at 3:45pm	Left voicemail
Anthony Morales, Chairperson	Gabrieleno/Tongva San Gabriel Band of Mission Indians	Called on 10/05/2017 at 3:47pm	Mr. Morales deferred to Pechanga. He asked to be notified if more resources are found.
Sandonne Goad, Chairperson	Gabrielino/Tongva Nation	Called on 10/05/2017 at 3:52pm	Left voicemail
Robert Dorame, Chairperson	Gabriellno Tongva Indians of California Tribal Council	Called on 10/05/2017 at 3:53pm	In the event of any cultural resources or human remains are unearthed during construction, Mr. Dorame would like to be notified
Charles Alvarez	Gabrielino-Tongva	Called on	Left voicemail

	Tribe	10/05/2017 at 3:55pm	
Erica Pinto, Chairperson	Jamul Indian Village	Called on 10/05/2017 at 3:56pm	Left voicemail
Thomas Rodriguez, Chairperson	La Jolla Band of Luiseño Indians	Called on 10/05/2017 at 3:59pm	Voicemail not accepting messages
Javaughn Miller, Tribal Administrator	La Posta Band of Mission Indians	Called on 10/05/2017 at 4:01pm	Left voicemail
Gwendolyn Parada, Chairperson	La Posta Band of Mission Indians	Called on 10/05/2017 at 4:02pm	Left voicemail
John Perada, Environmental Director	Los Coyotes Band of Mission Indians	Called on 10/05/2017 at 4:04pm	No comment at this time
Shane Chapparosa, Chairperson	Los Coyotes Band of Mission Indians	Called on 10/05/2017 at 4:06pm	Message left with administrative assistant
Nick Elliott, Cultural Resources Coordinator	Manzanita Band of Kumeyaay Nation	Called on 10/05/2017 at 4:07pm	No voicemail available
Angela Elliot Santos, Chairperson	Manzanita Band of Kumeyaay Nation	Called on 10/05/2017 at 4:07pm	see above
Robert Martin, Chairperson	Morongo Band of Mission Indians	Reply via email on 9/21/2017	Cultural Resource Analyst Jessica Mauck replied stating that the project is located just outside of Serrano ancestral territory and, as such, SMBMI will not be taking part in the consultation process
Denisa Torres, Cultural Resources Manager	Morongo Band of Mission Indians	Reply via email on 9/21/2017	see above
Shasta Gaughen, Tribal Historic Preservation Manager	Pala Band of Mission Indians	Reply via email on 10/04/2017	Shasta Gaughen stated that the project area is outside of the Tribe's traditional use area and deferred to tribes in closer proximity to the project.
Temet Aguilar, Chairperson	Pauma Band of Luiseño Indians-Pauma & Yuima	Reply via email on 10/04/2017	Cultural Liason Chris Devers stated that the Tribe is unaware of any resources within the project area, but that they would like to review

	Reservation		the cultural study.
Paul Macarro, Cultural Resources Coordinator	Pechanga Band of Luiseño Indians	Reply via letter on 9/29/2017	Planning Specialist Tuba Ebru Ozdil asked that the Tribe be invited to participate included in the field surveys, that they be notified and consulted by the lead agency (and provided project/cultural resource documents) and that a qualified archaeologist and Tribe monitor be present during construction activities
Mark Macarro, Chairperson	Pechanga Band of Luiseño Indians	Reply via letter on 9/29/2017	See above
Joseph Hamilton, Chairperson	Ramona Band of Cahuilla Mission Indians	Called on 10/05/2017 at 4:09pm	Message left with administrative assistant
John Gomez, Environmental Coordinator	Ramona Band of Cahuilla Mission Indians	Called on 10/05/2017 at 4:18pm	Mr. Gomez requested the letter via email. Follow up letter sent 10/05/2017
Jim McPherson, Tribal Historic Preservation Officer	Rincon Band of Mission Indians	Reply via email on 10/16/2017	Erica Ortiz-Martinez requested shape/CAD files of the project area and provided information on Luiseño place names more than 4.5 miles from the project area.
Bo Mazzetti, Chairperson	Rincon Band of Mission Indians	Called on 10/05/2017 at 4:26pm	See above
John Valenzuela, Chairperson	San Fernando Band of Mission Indians	Called on 10/05/2017 at 4:30pm	Left voicemail
Lee Clauss, Director of Cultural Resources	San Manuel Band of Mission Indians	Reply via email on 9/18/2017	Cultural Resource Specialist Jessica Mauck replied that the project area is outside of Serrano ancestral territory and will not be participating in the project scoping process
Allen E. Lawson, Chairperson	San Pasqual Band of Mission Indians	Called on 10/05/2017 at 4:35pm	Left voicemail
John Flores, Environmental Coordinator	San Pasqual Band of Mission Indians	Called on 10/05/2017 at 4:35pm	Left voicemail
Steven Estrada, Chairperson	Santa Rosa Band of Mission Indians	Called on 10/05/2017 at 4:37pm	Left voicemail
Goldie Walker, Chairperson	Serrano Nation of Mission Indians	Called on 10/05/2017 at 4:39pm	Left voicemail
Carrie Garcia, Cultural Resources	Soboba Band of Luiseño Indians	Called on 10/05/2017 at	An administrative assistant asked me to call Joseph Ontiveros

Manager		4:40pm	
Joseph Ontiveros, Cultural Resources Department	Soboba Band of Luiseño Indians	Reply via letter on 11/20/2017	Mr. Ontiveros asked that the lead agency initiate and continue correspondence with the Tribe, that he receive project information, that the Tribe monitor any ground disturbing activities during project implementation, that the proper procedures and requests of the Tribe be honored and included a regulatory framework for the treatment of cultural items and human remains.
Scott Cozart, Chairperson	Soboba Band of Luiseño Indians	Called on 10/05/2017 at 4:43pm	Left voicemail
Lisa Haws, Cultural Resources Manager	Sycuan Band of the Kumeyaay Nation	Called on 10/05/2017 at 4:45pm	Left voicemail
Cody J. Martinez, Chairperson	Sycuan Band of the Kumeyaay Nation	Called on 10/05/2017 at 4:47pm	Left voicemail
Michael Mirelez, Cultural Resources Coordinator	Torres-Martinez Desert Cahuilla Indians	Called on 10/05/2017 at 4:49pm	Mr. Mirelez deferred to the Soboba Band
Julie Hagen	Viejas Band of Kumeyaay Indians	Reply via letter on 9/22/2017	Resource Manager Ray Teran stated that the Project Area is of little cultural significance to the Tribe, but requested to be notified of any cultural resources discovered.
Robert Welch, Chairperson	Viejas Band of Kumeyaay Indians	Reply via letter on 9/22/2017	See above

From: JMauck@sanmanuel-nsn.gov
To: jesse.yorck@amecfw.com

Hello Jesse,
Thank you for contacting the San Manuel Band of Mission Indians (SMBMI) regarding the above referenced project. SMBMI appreciates the opportunity to review the project documentation, which was received by our Cultural Resources Management Department on 18 September 2017. The proposed project area is located just outside of Serrano ancestral territory and, as such, SMBMI will not be taking part in information sharing, requesting consulting party status with the lead agency, or requesting to participate in the scoping, development, and/or review of documents created pursuant to these legal and regulatory mandates.
Regards,

Jessica Mauck
CULTURAL RESOURCES ANALYST
O: (909) 864-8933 x3249
M: (909) 725-9054
26569 Community Center Drive, Highland California 92346

From: cultural@ pauma-nsn.gov
To: jesse.yorck@amecfw.com
CC: pdixon@palomar.edu; jeremyzagarella@hotmail.com

Mr. Yorck,

The Cultural Office of the Pauma Band of Luiseno Indians has received your September 14 notice for the Residential Development of Tract 3204 in Riverside. We are unaware of any Cultural sites or resources on the project property. We would like to review the Cultural Study to determine if there would be any impacts to cultural sites or to the possibility of inadvertent discoveries. Please contact us if there are any questions.

Thank you,

Mr. Chris Devers
Cultural Liaison
Pauma Band of Luiseno Indians

Appendix D

Water Quality Management Plan

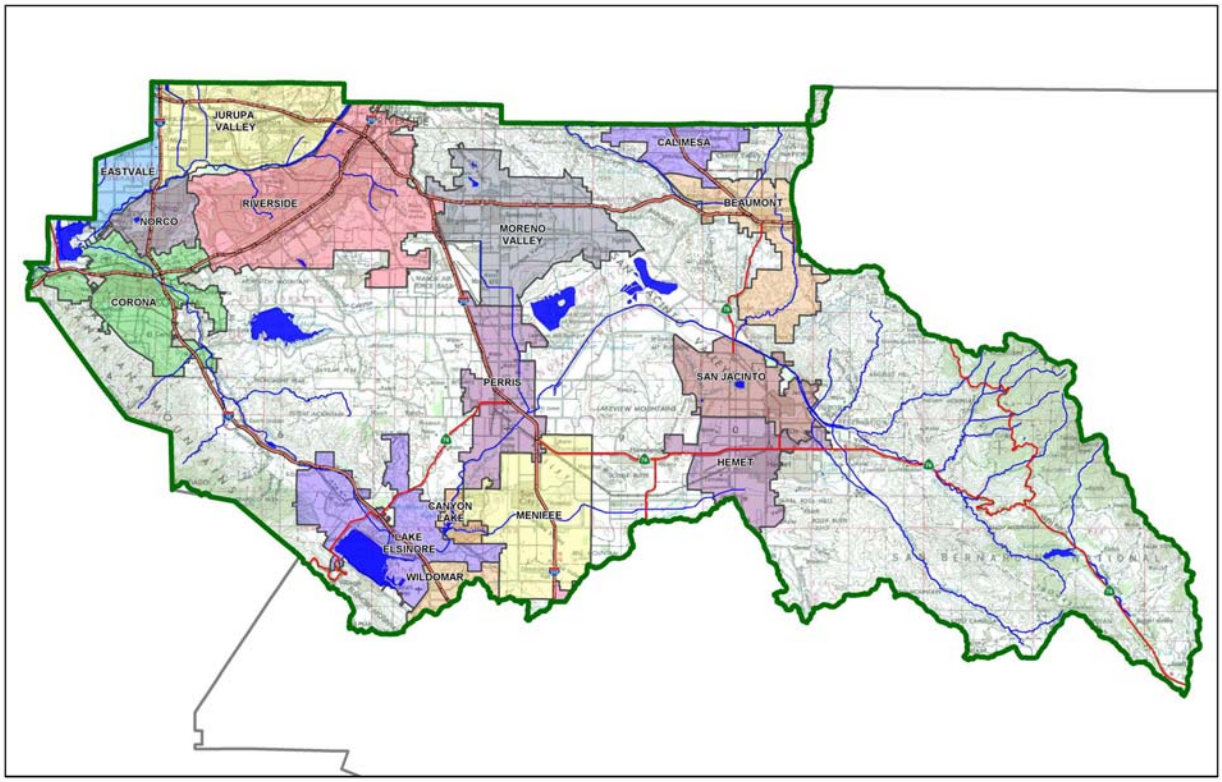
Project Specific Water Quality Management Plan

*A Template for Projects located within the **Santa Ana Watershed** Region of Riverside County*

Project Title: Tentative Tract 37392

Public Works No: PW17-0941

Design Review/Case No: P17-0929



Contact Information:

Prepared for: Marwan & Elizabeth Al Abbasi
764 W. Ramona Expressway, Suite C
Perris, CA 92571
951-776-9300

Prepared by: Gabel, Cook & Associates, Inc.
7177 Brockton Ave, Suite 339
Riverside, CA 92506
951-788-8092

☒ **Preliminary**
☐ **Final**

Original Date Prepared: October 2017

Revision Date(s):

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 Marwan & Elizabeth Al Abbasi by Gabel, Cook & Associates, Inc. for the Tentative Tract 37392 project.

This WQMP is intended to comply with the requirements of the City of Riverside for Tentative Tract 37392, Planning Case No. P17-xxxx, 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 the 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	Date
Marwan Al Abbasi_____ Owner's Printed Name	Owner's Title/Position

PREPARER'S CERTIFICATION

"The selection, sizing and design of stormwater treatment and other stormwater quality and quantity control measures in this plan meet the requirements of Regional Water Quality Control Board Order No. **R8-2010-0033** and any subsequent amendments thereto."

Preparer's Signature	Date
Craig Cook Preparer's Printed Name	Civil Engineer Preparer's Title/Position

Preparer's Licensure: RCE 23323

Table of Contents

Section A: Project and Site Information 5
A.1 Maps and Site Plans 6
A.2 Receiving Waters 7
A.3 Additional Permits/Approvals required for the Project: 7
Section B: Optimize Site Utilization (LID Principles) 8
Section C: Delineate Drainage Management Areas (DMAs) 9
Section D: Implement LID BMPs 10
D.1 Infiltration Applicability 10
D.2 Harvest and Use Assessment 10
D.3 Bioretention and Biotreatment Assessment 11
D.4 Feasibility Assessment Summaries 11
D.5 LID BMP Sizing 11
Section E: Alternative Compliance (LID Waiver Program) 13
E.1 Pollutants of Concern 13
Section F: Hydromodification 14
F.1 Hydrologic Conditions of Concern (HCOC) Analysis 14
F.2 HCOC Mitigation 16
Section G: Source Control BMPs 17
Section H: Construction Plan Checklist 18
Section I: Operation, Maintenance and Funding 18

List of Tables

Table A.1 Identification of Receiving Waters 7
Table A.2 Other Applicable Permits 7
Table C.1 DMA Classifications 9
Table C.2 Type 'A', Self-Treating Areas 9
Table C.3 Type 'B', Self-Retaining Areas 9
Table C.4 Type 'C', Areas that Drain to Self-Retaining Areas 9
Table C.5 Type 'D', Areas Draining to BMPs 9
Table D.1 Infiltration Feasibility 10
Table D.2 LID Prioritization Summary Matrix 11
Table D.3 DCV Calculations for LID BMPs 11
Table E.1 Potential Pollutants by Land Use Type 13
Table F.1 Hydrologic Conditions of Concern Summary 14
Table G.1 Permanent and Operational Source Control Measures 17
Table H.1 Construction Plan Cross-reference 18

List of Appendices

Appendix 1: Maps and Site Plans 19
Appendix 2: Construction Plans 20
Appendix 3: Soils Information 21
Appendix 4: Historical Site Conditions 22
Appendix 5: LID Infeasibility 23
Appendix 6: BMP Design Details 24
Appendix 7: Hydromodification 25
Appendix 8: Source Control 26
Appendix 9: O&M 27
Appendix 10: Educational Materials 30

Section A: Project and Site Information

Tentative Tract Map 37392 proposes to subdivide 16.79 vacant acres into 8 single family residential lots, located within the City's Residential Conservation (RC) Zone. The project proposes the 8 residential lots on either side of a north-south private street (AlAbbasi Way) that is an extension of Talcey Terrace. The site is characterized by a gentle rolling hill, running east to west, with a minor drainage running along the project's southerly boundary, and Talcey Terrace and a utility easement running along its northerly boundary. No off-site surface storm water runoff flows enter the project site.

This project proposes to develop graded pads on the 8 proposed lots. These graded lots will then be sold to individual buyers. These individual buyers will then develop their individual site, house and landscape plans, which will then be individually submitted to, and then reviewed by the City for permit issuances. This Water Quality Management Plan requires that each of these individual lot owners will be responsible to individually meet the City's Water Quality Management Plan requirements for the construction of their proposed homes, landscaping and hardscaping that lie within the "pad portions" of their individual lots. This WQMP will design a "Prototype" BMP for the "pad portions" of these 8 proposed lots by making an assumption concerning the impervious vs pervious surface conditions of these future developed lots. Since soil infiltration testing will not be completed on these 8 until the future owners are completing their development plans, the "Prototype" BMP with be a Bioretention Basin. Then in the future each individual lot owner will be responsible to design their own Structural BMP's to address the storm water runoff generated over their individual pad areas, or accept the prototype BMP established by the WQMP.

This Water Quality Management will also address the surface drainage runoff that is generated over the "street fronting" sloped portions of the proposed lot, the driveway portions of the proposed lots, and all areas within the proposed private street (see the WQMP Site Map in Appendix 1 to review the boundary of these areas). Surface drainage within these portions of the project lots (DMA1 and DMA2) will be directed into the private street, with the northerly portion of the project site being directed, within the private street, northerly into Talcey Terrace (DMA2), while the remainder of the project site is directed, within the private street, southerly into the minor drainage along the project's southerly boundary (DMA1).

The on-site storm water runoff flows and volumes, resulting from both the "Design Storm" rainfall event and the "Hydromodification" storm rainfall event, will be directed to the north and south ends of the project, within the private street, then collected by catch basin inlets with connecting storm drain pipes, and then conveyed into infiltration trenches. The infiltration trenches are sized to contain the capture flow rates and volumes generated by the design storm rainfall event and/or the flow rates and volumes necessary to meet the requirements of the hydromodication design criteria, which ever are greater. These storm volumes will then infiltrate into the existing soils within a 72 hour time period. Once the infiltrations trenches fill with these storm runoffs volumes, any continuing flows will bypass the infiltration trenches, and will then be directed into Talcey Terrace or the existing drainage course along the project's southerly boundary. In addition to storm water infiltration proposed by this design, another water conservation technique is proposed, through the planting of native and drought tolerant trees and large shrubs, within the proposed landscaped areas.

PROJECT INFORMATION	
Type of Project:	Single Family Residential Subdivision
Ward Area:	Ward 4, City of Riverside, County of Riverside, CA
Community Name:	Alessandro Heights, Overlook Parkway Area
Development Name:	Tentative Tract 37392
PROJECT LOCATION	
Latitude & Longitude (DMS): 33°55'10" N, 117°21'55" W	
Project Watershed and Sub-Watershed: Santa Ana; Santa Ana River, Reach 3/4	
APN(s): 243-210-037 & 041	
Map Book and Page No.: Portion of W ½, of the SW ¼, of Section 12, T. 3 S., R. 5 W., S.B.M.	
PROJECT CHARACTERISTICS	
Proposed or Potential Land Use(s)	Single Family Residential
Proposed or Potential SIC Code(s)	1521
Area of Impervious Project Footprint (SF)	34,358 SF
Total Area of proposed Impervious Surfaces within the Project Limits (SF)/or Replacement	34,358 SF
Does the project consist of offsite road improvements?	☒ Y ☐ N
Does the project propose to construct unpaved roads?	☐ Y ☒ N
Is the project part of a larger common plan of development (phased project)?	☐ Y ☒ N
EXISTING SITE CHARACTERISTICS	
Total area of existing Impervious Surfaces within the project limits (SF)	0 SF
Is the project located within any MSHCP Criteria Cell?	☐ Y ☒ N
If so, identify the Cell number:	N/A
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)	N/A
What is the Water Quality Design Storm Depth for the project?	0.54 in.

A.1 Maps and Site Plans

Appendix 1 includes a map of the local vicinity and existing site. In addition, WQMP Site Plan, located in Appendix 1, includes the following:

- Drainage Management Areas
- Proposed Structural BMPs
- Drainage Path
- Drainage Infrastructure, Inlets, Overflows
- Source Control BMPs
- Buildings, Roof Lines, Downspouts
- Impervious Surfaces
- Standard Labeling

A.2 Receiving Waters

In order of upstream to downstream, the receiving waters that the project site is tributary to are as follows. A map of the receiving waters is included in Appendix 1.

Table A.1 Identification of Receiving Waters

Receiving Waters	Hydrologic Unit	EPA Approved 303(d) List Impairments	Designated Beneficial Uses	Proximity to RARE Beneficial Use
Santa Ana River, Reach 4	801.21	Pathogens	GWR, REC1, REC2, WARM, WILD	N/A
Lake Evans	801.27	None	REC1, REC2, WARM, COLD, WILD	N/A
Tequesquite Arroyo (Sycamore Creek)	801.27	None	GWR, REC1, REC2, WARM, WILD, SPWN	N/A
Anza Park Drain	801.27	None	MUN, REC1, REC2, WARM, WILD, SPWN	N/A
Mockingbird Reservoir	801.26	None	AGR, REC1, REC2, WARM, WILD	N/A
Temescal Creek, Reach 1	801.25	None	REC1, REC2, WARM, WILD	N/A
Santa Ana River, Reach 3	801.21	Pathogens	AGR, GWR, REC1, REC2, WARM, WILD, RARE, SPWN	6.0 miles

A.3 Additional Permits/Approvals required for the Project:

Table A.2 Other Applicable Permits

Agency	Permit Required	
State Department of Fish and Game, 1602 Streambed Alteration Agreement	☐ Y	☒ N
State Water Resources Control Board, Clean Water Act (CWA) Section 401 Water Quality Cert.	☐ Y	☒ N
US Army Corps of Engineers, CWA Section 404 Permit	☐ Y	☒ N
US Fish and Wildlife, Endangered Species Act Section 7 Biological Opinion	☐ Y	☒ N
Statewide Construction General Permit Coverage	☒ Y	☐ N
Statewide Industrial General Permit Coverage	☐ Y	☒ N
Western Riverside MSHCP Consistency Approval (e.g., JPR, DBESP)	☐ Y	☒ N
Other *(please list in the space below as required)*		
City of Riverside Conditional Use Permit	☐ Y	☒ N
City of Riverside Design Review	☐ Y	☒ N
City of Riverside Building Permit	☐ Y	☒ N
City of Riverside Grading Permit	☒ Y	☐ N
City of Riverside Construction 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?

The site is characterized by a gentle rolling hill, running east to west, with a minor drainage running along the project's southerly boundary, and with Talcey Terrace and a utility easement running along its northerly boundary. No off-site surface storm water runoff flows enter the project site. Existing surface storm water runoff flows enter both Talcey Terrace and the drainage course along the project's southerly boundary. Surface drainage from the developed lots will be directed into the proposed private street (AlAbbasi Way), with a portion of those flows being directed, within the private street, northerly into Talcey Terrace, while the remainder of these flows are directed, within the private street, southerly into the drainage course along the project's southerly boundary.

Does the project identify and protect existing vegetation? If so, how? If not, why?

Yes, all ungraded portion of the 8 residential lots will be required to protect the existing vegetation. In addition, an open space easement will be reserved over the southern portion of the project, and will be maintained through the provisions of an Open Space Management Plan.

Does the project identify and preserve natural infiltration capacity? If so, how? If not, why?

Yes, the site proposed infiltration trenches to capture and infiltrated the storm water runoff volumes resulting from the site's design storm rainfall of 0.53 inches of rainfall, or the storm water volumes necessary to ensure that the storm water runoff, volumes, or time of concentrations are not increased by the development of the project, whichever is greater. In addition, all ungraded portions of the lots will be required to project the existing vegetation.

Does the project identify and minimize impervious area? If so, how? If not, why?

Yes, the site has been designed to include pervious areas to the maximum extent possible. In most cases, the proposed pad sizes on the lots are smaller than allowed by the City's Grading Ordinance. This results in an increase in the ungraded portion of the project. All ungraded portions of the lots will be required to project the existing vegetation. The private street has also been narrowed to the least width as required by the Planning, Public Works and Fire Departments.

Does the project identify and disperse runoff to adjacent pervious areas? If so, how? If not, why?

Yes, all runoff resulting from the site's design storm rainfall of 0.54" and resulting from the hydromodification requirements are directed into the infiltration trenches.

Section C: Delineate Drainage Management Areas (DMAs)

Table C.1 DMA Classifications

DMA Name or ID	Surface Type(s)	Area (Sq. Ft.)	DMA Type
DMA-1-A	A.C. PAVEMENT	8855	D
DMA-1-B	CONCRETE	6396	D
DMA-1-C	LANDSCAPING	41,216	D
DMA-2-A	A.C. PAVEMENT	5727	D
DMA-2-B	CONCRETE	13,224	D
DMA-2-C	LANDSCAPING	22,756	D
DMA-3-A	A.C. PAVEMENT	1141	A
DMA-3-B	CONCRETE	183	A
DMA-3-C	LANDSCAPING	23,011	A
DMA-4-D	ROOF	5000	D
DMA-4-B	CONCR/A.C. PAVEM'T	6650	D
DMA-4-C	LANDSCAPING	14,730	D

Table C.2 Type 'A', Self-Treating Areas

DMA Name or ID	**Area (Sq. Ft.)**	**Stabilization Type**	**Irrigation Type (if any)**
DMA 3-A	1,141	A.C. PAVEMENT	N.A.
DMA 3-B	183	CONCRETE	N.A.
DMA 3-C	23,011	LANDSCAPING	TO BE DETERMINED

Table C.3 Type 'B', Self-Retaining Areas

N/A

Table C.4 Type 'C', Areas that Drain to Self-Retaining Areas

N/A

Table C.5 Type 'D', Areas Draining to BMPs

DMA Name or ID	BMP Name or ID
DMA-1	Infiltration Trench 1
DMA-2	Infiltration Trench 2
DMA-4	Typical Lot Prototype Infiltration Trench 4

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: DMA-1		
…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 conditions apply*:*

☐ 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 (verified 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).

☐ None of the above.

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 the project, the following applies:

X 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.

☐ None of the above.

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	
DMA-1	☒	☐	☐	☐	☐
DMA-2	☒	☐	☐	☐	☐
DMA-4	☐	☐	☒	☐	☐

D.5 LID BMP Sizing

Table D.3 DCV Calculations for LID BMPs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Enter BMP Name / Identifier Here*		
	[A]		[B]	[C]	[A] x [C]	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
DMA-1-A	*8855*	*AC PAV'T*	*1.0*	*0.89*	*7881*			
DMA-1-B	*6396*	*CONCRETE*	*1.0*	*0.89*	*5692*			
DMA-1-C	*41,216*	*LANDSCAPE*	*0.10*	*0.11*	*4534*			
	$A_T = \Sigma[A]$				$\Sigma = [D]$	[E]	$[F] = \frac{[D]x[E]}{12}$	[G]
	56,467				18,107	0.54	817	2496

[B], [C] are obtained from Section 2.3.1 of the WQMP Guidance Document
[E] is obtained from Exhibit A of the WQMP Guidance Document
[G] is obtained from LID BMP design procedure sheet, placed in Appendix 6

Table D.4 DCV Calculations for LID BMPs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Enter BMP Name / Identifier Here*		
	[A]		[B]	[C]	[A] x [C]			
DMA-2-A	*5727*	*AC PAV'T*	*1.0*	*0.89*	*5096*	*Design Storm Depth (in)*	*Design Capture Volume,* V_{BMP} *(cubic feet)*	*Proposed Volume on Plans (cubic feet)*
DMA-2-B	*13,224*	*CONCRETE*	*1.0*	*0.89*	*10,245*			
DMA-1-C	*22,756*	*LANDSCAPE*	*0.10*	*0.11*	*2502*			
	$A_T = \Sigma[A]$				$\Sigma = [D]$	[E]	$[F] = \frac{[D]x[E]}{12}$	[G]
	41,707				17,843	0.54	827	2496

[B], [C] are obtained from Section 2.3.1 of the WQMP Guidance Document
[E] is obtained from Exhibit A of the WQMP Guidance Document
[G] is obtained from LID BMP design procedure sheet, placed in Appendix 6

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Enter BMP Name / Identifier Here*		
	[A]		[B]	[C]	[A] x [C]			
DMA-4-A	*5000*	*ROOF*	*1.0*	*0.89*	*5340*	*Design Storm Depth (in)*	*Design Capture Volume,* V_{BMP} *(cubic feet)*	*Proposed Volume on Plans (cubic feet)*
DMA-1-B	*6650*	*CONCRETE/A.C. PAVEMENT*	*1.0*	*0.89*	*4450*			
DMA-1-C	*14,730*	*LANDSCAPE*	*0.10*	*0.11*	*1202*			
	$A_T = \Sigma[A]$				$\Sigma = [D]$	[E]	$[F] = \frac{[D]x[E]}{12}$	[G]
	26,379				10,992	0.54	495	1664

[B], [C] are obtained from Section 2.3.1 of the WQMP Guidance Document
[E] is obtained from Exhibit A of the WQMP Guidance Document
[G] is obtained from LID BMP design procedure sheet, 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 confirmation of LID waiver approval by the Regional Board). For the 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 alternative compliance measures on the following pages are being implemented to ensure that any pollutant loads expected to be discharged by not incorporating LID BMPs, are fully mitigated.

E.1 Pollutants of Concern

Table E.1 Potential Pollutants by Land Use Type

Priority Development Project Categories and/or Project Features (check those that apply)	General Pollutant Categories							
	Bacterial Indicators	Metals	Nutrients	Pesticides	Toxic Organic Compounds	Sediments	Trash & Debris	Oil & Grease
☒ Detached Residential Development	P	N	P	P	N	P	P	P
☐ Attached Residential Development	P	N	P	P	N	P	P	P(2)
☐ Commercial/Industrial Development	P(3)	P	P(1)	P(1)	P(5)	P(1)	P	P
☐ Automotive Repair Shops	N	P	N	N	P(4, 5)	N	P	P
☐ Restaurants (>5,000 ft^2)	P	N	N	N	N	N	P	P
☒ Hillside Development (>5,000 ft^2)	P	N	P	P	N	P	P	P
☐ Parking Lots (>5,000 ft^2)	P(6)	P	P(1)	P(1)	P(4)	P(1)	P	P
☐ Retail Gasoline Outlets	N	P	N	N	P	N	P	P
Project Priority Pollutant(s) of Concern	☐	☐	☐	☐	☐	☐	☐	☐

P = Potential
N = Not Potential
(1) A potential Pollutant if non-native landscaping exists or is proposed onsite; otherwise not expected
(2) A potential Pollutant if the project includes uncovered parking areas; otherwise not expected
(3) A potential Pollutant is land use involving animal waste
(4) Specifically petroleum hydrocarbons
(5) Specifically solvents
(6) Bacterial indicators are routinely detected in pavement runoff

Section F: Hydromodification

F.1 Hydrologic Conditions of Concern (HCOC) Analysis

The project does create a Hydrologic Condition of Concern, meeting the criteria for HCOC Exemption as shown below:

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

Results included in Table F.1 below and hydrologic analysis included in Appendix 7.

Table F.1 Hydrologic Conditions of Concern Summary
DMA 1

	2 year – 24 hour		
	Pre-condition	**Post-condition**	**% Difference**
Time of Concentration	13Hr30Min	16Hr00Min	-16%
Flow (CFS)	0.042 CFS	0.042CFS	0%

Volume (Cubic Feet)	865 CF	258 CF	-70%

[1] Time of concentration is defined as the time after the beginning of the rainfall when all portions of the drainage basin are contributing to flow at the outlet.

Table F.2 Hydrologic Conditions of Concern Summary

DMA 2

	2 year – 24 hour		
	Pre-condition	**Post-condition**	**% Difference**
Time of Concentration	13Hr30Min	16Hr00Min	-16%
Flow (CFS)	0.042 CFS	0.042CFS	0%
Volume (Cubic Feet)	606 CF	295 CF	-51%

[1] Time of concentration is defined as the time after the beginning of the rainfall when all portions of the drainage basin are contributing to flow at the outlet.

Table F.3 Hydrologic Conditions of Concern Summary

	2 year – 24 hour		
	Pre-condition	**Post-condition**	**% Difference**
Time of Concentration	13Hr30Min	16Hr00Min	-16%
Flow (CFS)	0.020 CFS	0.020CFS	0%
Volume (Cubic Feet)	405 CF	169 CF	-58%

[1] Time of concentration is defined as the time after the beginning of the rainfall when all portions of the drainage basin are contributing to flow at the outlet

HCOC EXEMPTION 3: All downstream conveyance channels to an adequate sump (Prado Dam, 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

F.2 HCOC Mitigation

As an alternative to the HCOC Exemption Criteria above, HCOC criteria is considered mitigated if the project meets one of the following conditions, as indicated:

☐ a. Additional LID BMPS are implemented onsite or offsite to mitigate potential erosion or habitat impacts as a result of HCOCs. This can be conducted by an evaluation of site-specific conditions utilizing accepted professional methodologies published by entities such as the California Stormwater Quality Association (CASQA), the Southern California Coastal Water Research Project (SCCRWP), or other Co-Permittee approved methodologies for site-specific HCOC analysis.

☐ b. The project is developed consistent with an approved Watershed Action Plan that addresses HCOC in Receiving Waters.

☐ c. Mimicking the pre-development hydrograph with the post-development hydrograph, for a 2-year return frequency storm. Generally, the hydrologic conditions of concern are not significant, if the post-development hydrograph is no more than 10% greater than pre-development hydrograph. In cases where excess volume cannot be infiltrated or captured and reused, discharge from the site must be limited to a flow rate no greater than 110% of the pre-development 2-year peak flow.

☒ d. None of the above.

Section G: Source Control BMPs

The following table identifies the potential sources of runoff pollutants for this project and specifies how they are addressed through permanent controls and operational BMPs:

Table G.1 Permanent and Operational Source Control Measures

Potential Sources of Runoff pollutants	Permanent Structural Source Control BMPs	Operational Source Control BMPs
A. Onsite Storm Drain Inlets.	**Mark all inlets with the words "Only Rain Down the Storm Drain" or similar.**	**Maintain and periodically repaint or replace inlet markings** **Provide stormwater pollution information to new site owners.** **See applicable operational BMP's in Fact Sheet SC-44, "Drainage System Maintenance", in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com.** **Include the following in Project CC&R's : "Property owners 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. Landscape/ Outdoor	**State that final landscape plans will accomplish all of the following:** **Show self-retaining landscape areas, if any.** **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/Downloads/LandscapeGardenBrochure.pdf** **Provide IPM information to new owners, lessees and operators**

F. 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 wash water containing any cleaning agent or degreaser and discharge to the sanitary sewer not to a storm drain.**
G. Pools, spas, ponds, decorative fountains, and other water features.	**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/**

Section H: Construction Plan Checklist

Table H.1 Construction Plan Cross-reference

BMP No. or ID	BMP Identifier and Description	Plan Sheet Number(s)	Latitude / Longitude
DMA-1	INFILTRATION TRENCH NO. 1	CGP Sht 2	33°55'11" / 117°21'54"
DMA-2	INFILTRATION TRENCH NO. 2	CGP-Sht 2	33°55'07" / 117°21'52"
DMA-4	PROTOTYPE INFILTRATION TRENCH NO. 4	CGP-Sht 1	33°55'10" / 117°21'49"

Section I: Operation, Maintenance and Funding

Maintenance Mechanism: Will be provided on Final WQMP.

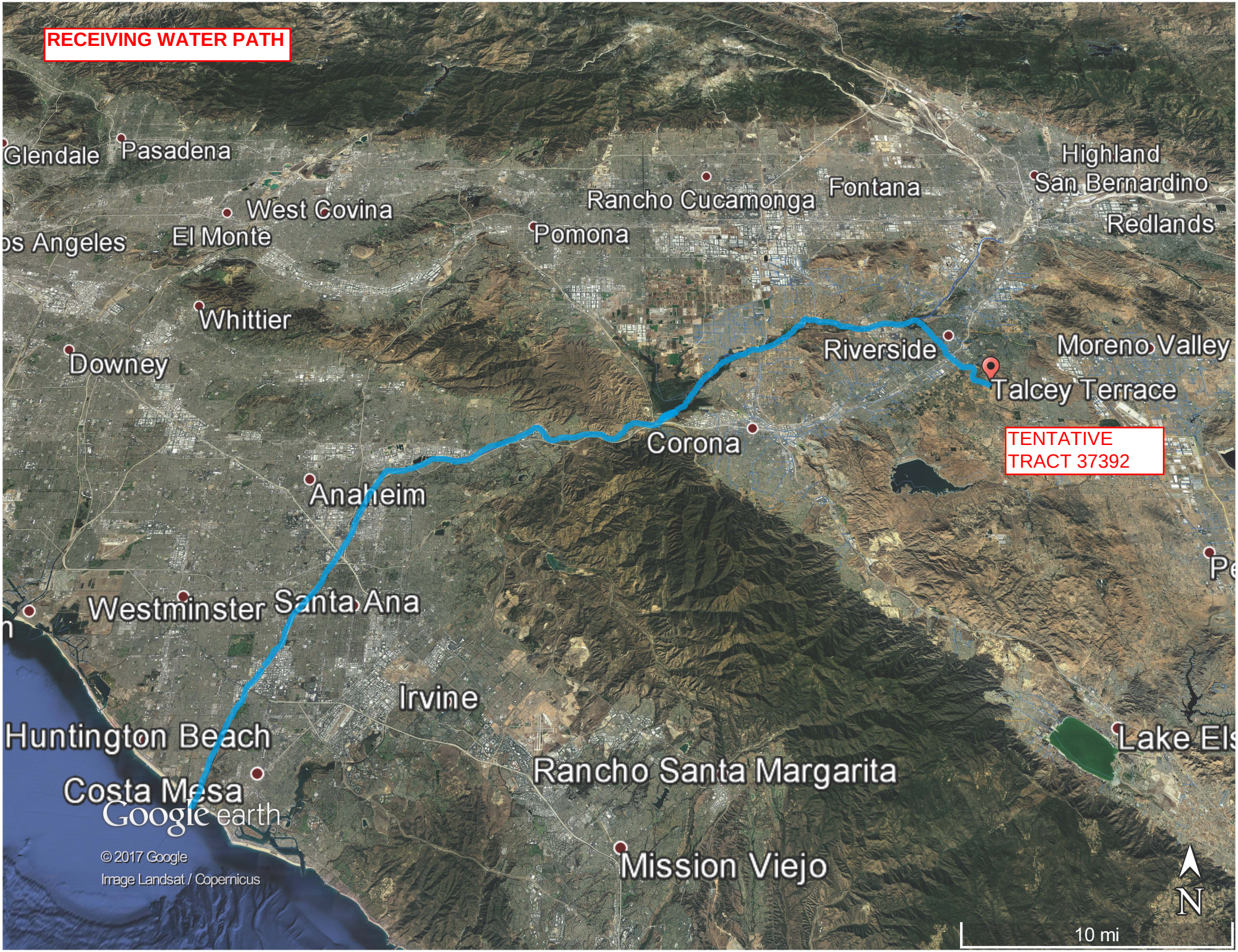
Will the proposed BMPs be maintained by a Home Owners' Association (HOA) or Property Owners Association (POA)?

☒ Y ☐ N

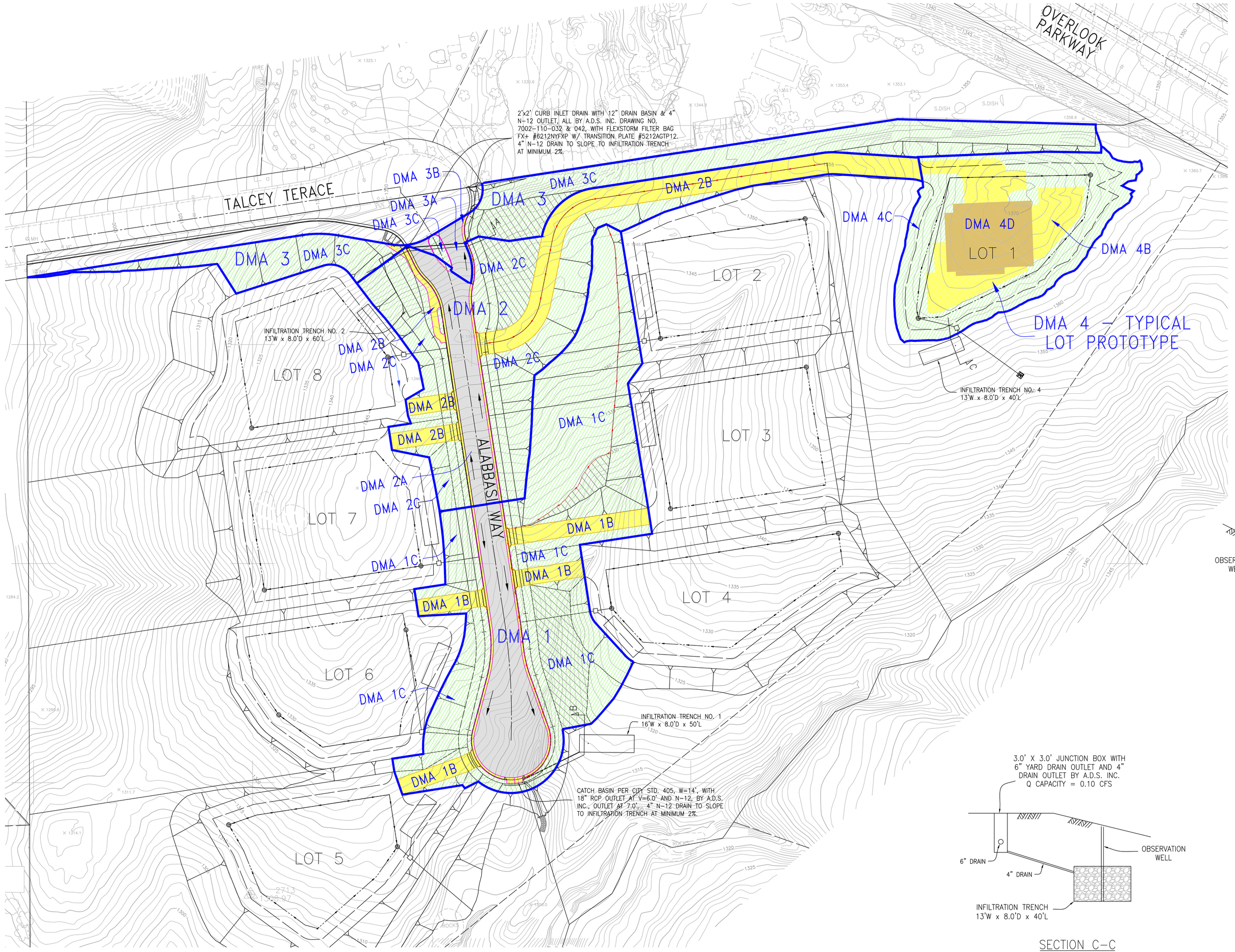
Operation and Maintenance Plan and Maintenance Mechanism is included in Appendix 9. Educational materials for those personnel that will be maintaining the proposed BMPs within this Project-Specific WQMP are included in Appendix 10.

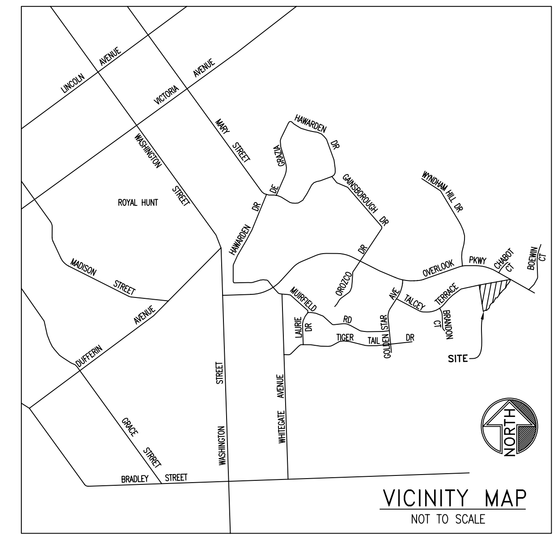
Appendix 1: Maps and Site Plans

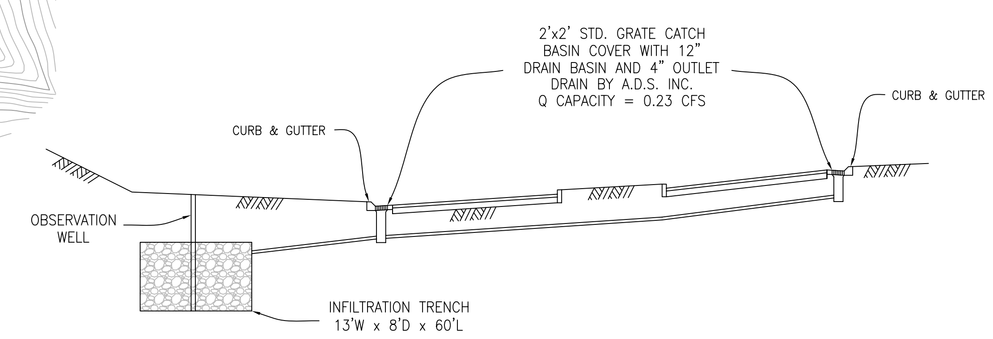
Location Map, WQMP Site Plan and Receiving Waters Map


RECEIVING WATER PATH
Glendale
Pasadena
West Covina
El Monte
os Angeles
Whittier
Downey
Rancho Cucamonga
Fontana
Pomona
Highland
San Bernardino
Redlands
Riverside
Moreno Valley
Talcey Terrace
TENTATIVE
TRACT 37392
Corona
Anaheim
Westminster
Santa Ana
Irvine
Huntington Beach
Costa Mesa
Rancho Santa Margarita
Mission Viejo
Lake El
Google earth
© 2017 Google
Image Landsat / Copernicus
N
10 mi

WQMP SITE MAP
TENTATIVE TRACT 37392
CITY OF RIVERSIDE
APRIL 2018

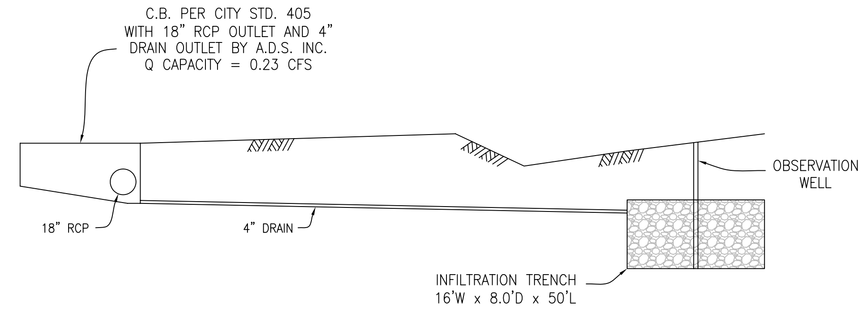






SECTION A–A

1"=10' HORIZ. SCALE
1"=10' VERT. SCALE



SECTION B–B

1"=10' HORIZ. SCALE
1"=10' VERT. SCALE

SECTION C–C

1"=10' HORIZ. SCALE
1"=10' VERT. SCALE

DMA DESIGNATION	DMA 1	DMA 2	DMA 3	DMA 4
AC PAV'T – A	8,855 SF	5,726 SF	1,141 SF	0 SF
CONCRETE CURBS, GUTTERS & CROSS GUTTERS – B	6,396 SF	13,224 SF	183 SF	6,650 SF
LANDSCAPING – C	41,216 SF	22,756 SF	23,011 SF	14,730 SF
ROOF – D	0 SF	0 SF	0 SF	5000 SF
TOTAL IMPERVIOUS	15,251 SF	18,951 SF	1324 SF	11,650 SF
TOTAL AREA	56,467 SF	41,707 SF	24,335 SF	26,379 SF
PERCENT IMPERVIOUS	27.0%	45.4%	5.4%	44.2%

TOTAL PROJECT AREA = 148,888 SF
TOTAL PROJECT IMPERVIOUS AREA = 47,146 SF
TOTAL PROJECT PERCENT IMPERVIOUS = 31.7%

LEGEND

- INDICATES AC PAVEMENT – A
- INDICATES CONCRETE CURBS, GUTTER & RIBBON GUTTERS – B
- INDICATES LANDSCAPING – C
- INDICATES ROOF – D
- INDICATES DMA BOUNDARY
- DRAINAGE FLOW PATH

NORTH

80' 40' 0 40' 80'

GABEL, COOK & ASSOCIATES INC.
CIVIL ENGINEERS · LAND SURVEYORS
LAND PLANNERS
7177 Brockton Ave., #339
Telephone (951) 788-8092

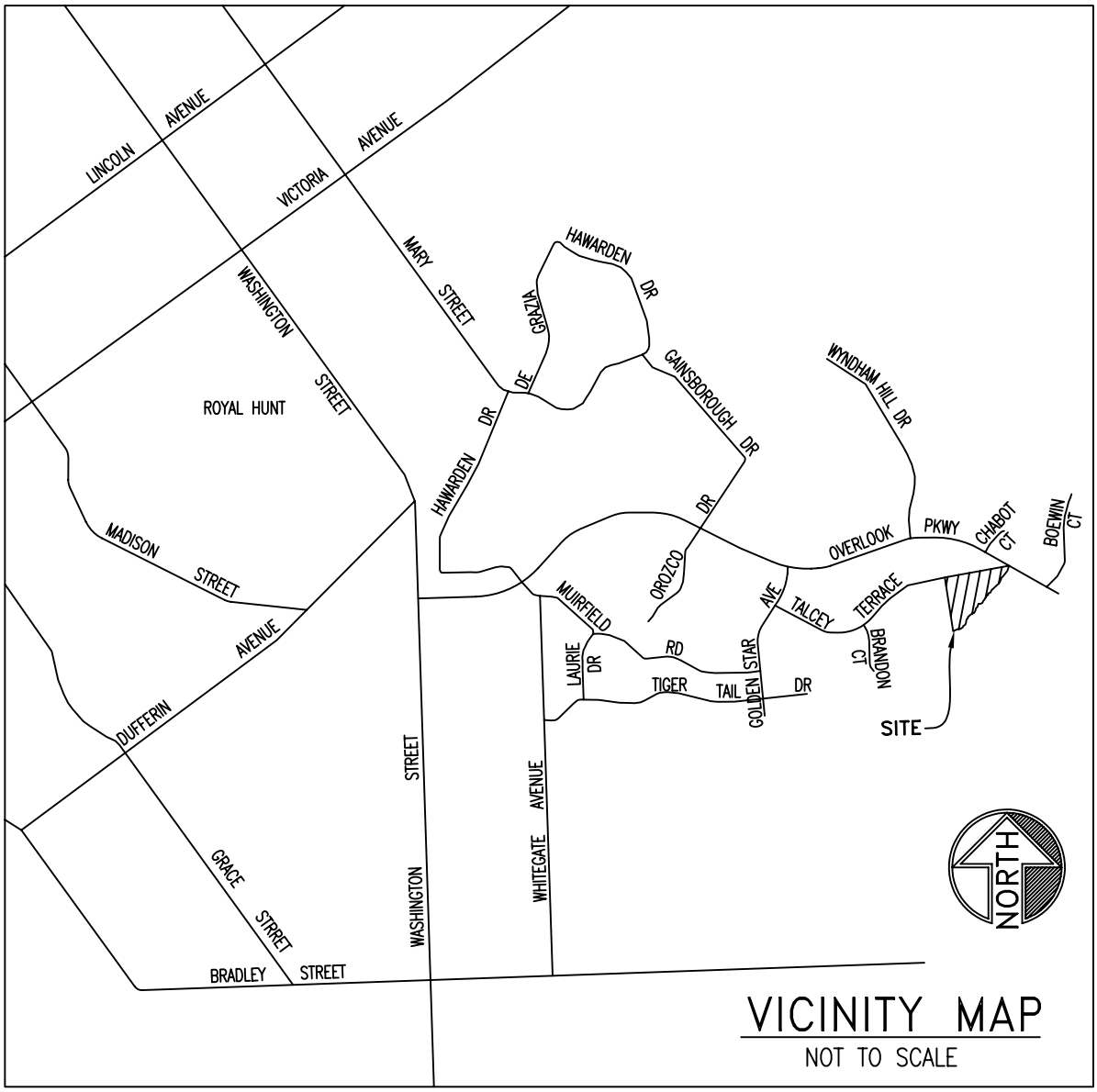
IN THE CITY OF RIVERSIDE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

WQMP SITE MAP

TENTATIVE TRACT 37392
ANP 243-210-037 & 041

SHEET 1 OF 1 SHEET

SCALE: 1"=40' | DATE: APRIL 2018 | FOR: MARWAN & ELIZABETH AL ABASSI | WO: 2165



VICINITY MAP

NOT TO SCALE

Appendix 2: Construction Plans

Grading and Drainage Plans

CONSTRUCTION NOTES

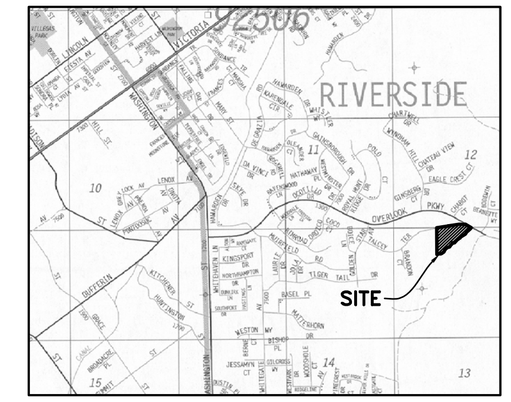
1. CONSTRUCT 6" DRAINLINE, MIN. SLOPE 0.50% AND MAINTAIN MIN. COVER OF 18".
2. CONSTRUCT AREA DRAIN INLET PER DETAIL ON SHEET 2.
3. CONSTRUCT YARD DRAIN THRU THE CURB OUTLET (BY CURB-O-LET OR APPROVED EQUAL) PER DETAIL ON SHEET 2.
4. CONSTRUCT 5' x 5' x 2.5' 1/4 TON RIP-RAP
5. CONSTRUCT 2'x2' STD. GRATE CATCH BASIN WITH 12" DRAIN BASIN AND WITH 4" N-12 OUTLET DRAIN, ALL BY A.D.S. INC.
6. CONSTRUCT CATCH BASIN, W=14', PER CITY STD. 405 WITH 18" RCP OUTLET (V-6.0') AND 4" N-12 OUTLET DRAIN, BY A.D.S. INC., (V-7.0').
7. CONSTRUCT INFILTRATION TRENCH, 13' W x 8.0' D x 60' L.
8. CONSTRUCT INFILTRATION TRENCH, 16' W x 8.0' D x 50' L.
9. CONSTRUCT 3' x 3' JUNCTION BOX.
10. CONSTRUCT INFILTRATION TRENC, 13' W x 8.0' D x 40' L.
11. CONSTRUCT 4" DRAINLINE, MIN. SLOPE 0.50% AND MAINTAIN MIN. COVER OF 18".

IMPROVEMENT PLANS NOTES:

STREET IMPROVEMENT PLANS FOR THIS TRACT WERE APPROVED BY CITY OF RIVERSIDE ON APRIL 12, 2005 AS R3830.
SEWER IMPROVEMENT PLANS FOR THIS TRACT WERE APPROVED BY CITY OF RIVERSIDE ON APRIL 4, 2005 AS S1874.
WATER IMPROVEMENT PLANS FOR THIS TRACT WERE APPROVED BY CITY OF RIVERSIDE ON APRIL 4, 2005 AS D5-704240.

NOTE

1. SEE SHEET 3 FOR CROSS SECTION



VICINITY MAP

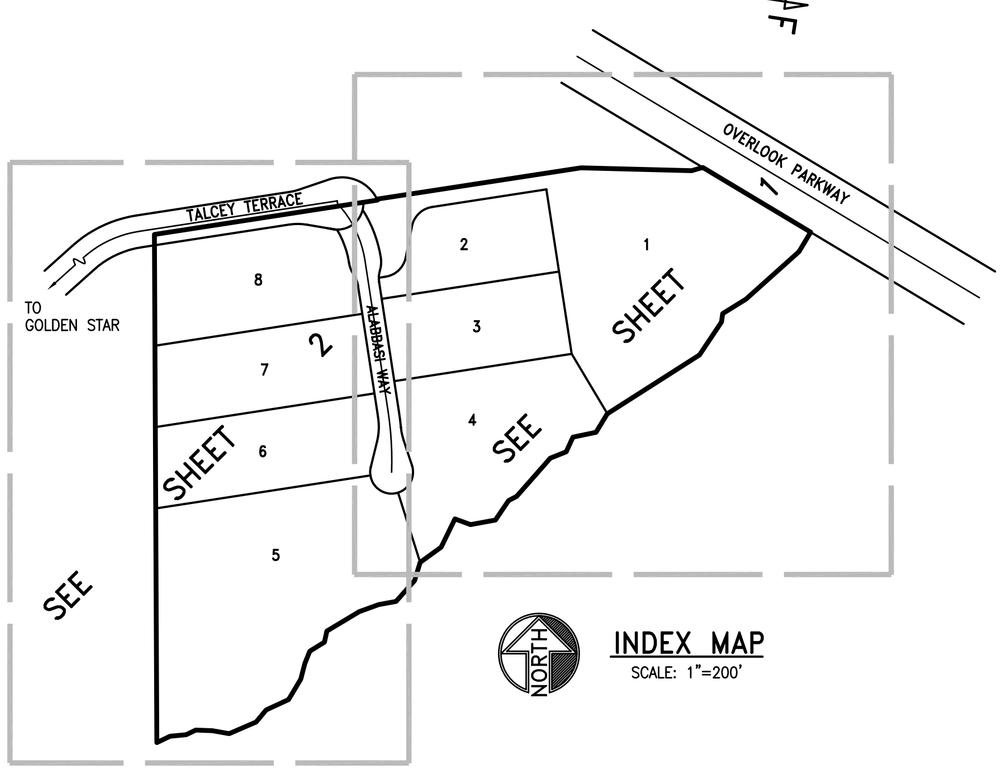
NOT TO SCALE

LEGEND

----------	EASEMENT LINE
————	PROPOSED PROPERTY LINE
----------	EXISTING PROPERTY LINE
—·—·—·—	CENTER LINE
————	RIGHT OF WAY
TC	TOP OF CURB
FF	FINISH FLOOR
(6.02)	EXISTING ELEVATION
6.02	PROPOSED ELEVATION
GB	GRADE BREAK
FL	FLOW LINE
FG	FINISHED GRADE
HP	HIGH POINT
TW	TOP OF WALL
TF	TOP OF FOOTING
TG	TOP OF GRATE
℄	CENTERLINE
LA	LANDSCAPED AREA
PL	PROPERTY LINE
R/W	RIGHT OF WAY
S/W	SIDEWALK
SP○	STAND PIPE

LINE TABLE

	BEARING	LENGTH
19	N54°04'17"E	48.39'
20	N25°58'39"E	58.47'
21	N69°51'42"W	31.04'
22	N79°24'53"E	47.05'
23	N34°14'25"E	43.84'
24	N62°16'43"E	17.01'
25	N41°21'57"E	94.82'
26	N68°26'25"E	31.87'
27	N24°35'00"E	30.18'
28	N78°12'17"E	43.93'
29	N31°14'59"E	40.39'
30	N57°27'13"E	203.87'
31	N33°48'12"E	73.76'
32	N07°26'56"E	15.79'
33	N58°08'31"E	51.25'
34	N48°13'01"E	132.39'
35	N30°50'27"E	42.15'



INDEX MAP

SCALE: 1"=200'

LOT NO.	LOT SIZE	LOT WIDTH @ SETBACK	LOT DEPTH	WHOLE LOT SLOPE ANAL.	GRADED PORTION SLOPE ANAL.	PAD SIZE	MAX. ALLOWABLE PAD SIZE
1	3.61 AC	136.62'	612.33'	15.43%	11.08%	21,925 SF	27,000 SF
2	1.01 AC	42.28'	334.30'	11.78%	11.99%	20,870 SF	27,000 SF
3	1.19 AC	155.00'	334.30'	14.76%	15.34%	21,000 SF	21,000 SF
4	2.04 AC	267.01'	334.39'	19.85%	13.59%	20,600 SF	27,000 SF
5	3.79 AC	120.73'	404.71'	20.06%	13.58%	18,650 SF	27,000 SF
6	1.43 AC	155.33'	413.08'	14.92%	13.71%	20,780 SF	27,000 SF
7	1.38 AC	150.00'	413.08'	17.66%	15.30%	21,000 SF	21,000 SF
8	1.54 AC	181.62'	390.82'	16.10%	16.43%	20,050 SF	21,000 SF

GABEL, COOK & ASSOCIATES INC.
CIVIL ENGINEERS · LAND SURVEYORS
LAND PLANNERS
7177 Brockton, Ave. Ste 339, Riverside, CA 92506
Telephone (951) 788-8092 Facsimile (951) 788-5184

IN THE CITY OF RIVERSIDE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

TRACT 37392
CONCEPTUAL GRADING PLAN

SHEET 1 OF 3 SHEET

SCALE: 1"=40' | DATE: APRIL 2018 | FOR: MARWAN & ELIZABETH ALABASSI | WO: 2165

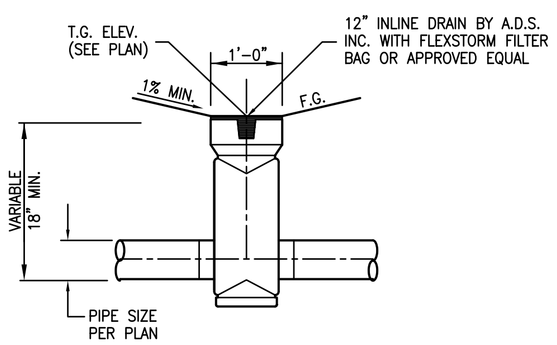
CONSTRUCTION NOTES

1. CONSTRUCT 6" DRAINLINE, MIN. SLOPE 0.50% AND MAINTAIN MIN. COVER OF 18".
2. CONSTRUCT AREA DRAIN INLET PER DETAIL ON SHEET 2.
3. CONSTRUCT YARD DRAIN THRU THE CURB OUTLET (BY CURB-O-LET OR APPROVED EQUAL) PER DETAIL ON SHEET 2.
4. CONSTRUCT 5' x 5' x 2.5' 1/4 TON RIP-RAP
5. CONSTRUCT 2'x2' STD. GRATE CATCH BASIN WITH 12" DRAIN BASIN AND WITH 4" N-12 OUTLET DRAIN, ALL BY A.D.S. INC.
6. CONSTRUCT CATCH BASIN, W=14', PER CITY STD. 405 WITH 18" RCP OUTLET (V-6.0') AND 4" N-12 OUTLET DRAIN, BY A.D.S. INC., (V-7.0').
7. CONSTRUCT INFILTRATION TRENCH, 13' W x 8.0' D x 60' L.
8. CONSTRUCT INFILTRATION TRENCH, 16' W x 8.0' D x 50' L.
9. CONSTRUCT 3' x 3' JUNCTION BOX.
10. CONSTRUCT INFILTRATION TRENCH, 13' W x 8.0' D x 40' L.
11. CONSTRUCT 4" DRAINLINE, MIN. SLOPE 0.50% AND MAINTAIN MIN. COVER OF 18".

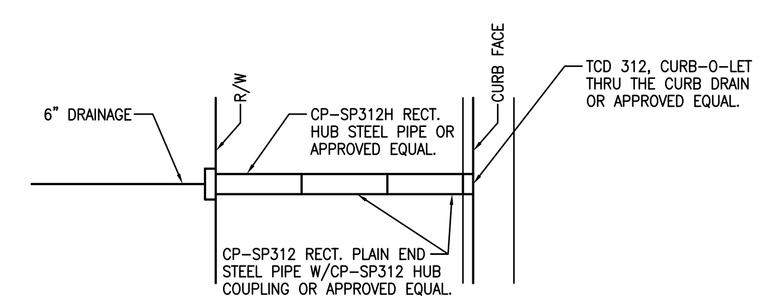
NOTE

1. SEE SHEET 3 FOR CROSS SECTION

LINE TABLE		
	BEARING	LENGTH
1	N64°25'14"E	27.42'
2	N84°41'25"E	30.17'
3	N63°49'14"E	19.72'
4	N87°46'41"W	31.10'
5	N80°04'58"W	31.76'
6	N66°42'30"E	54.73'
7	N39°39'18"E	29.13'
8	N65°14'42"E	46.15'
9	N30°38'52"E	44.33'
10	N14°45'24"E	30.25'
11	N21°51'55"E	24.71'
12	N58°24'58"E	31.97'
13	N12°15'58"E	21.10'
14	N59°04'42"E	70.42'
15	N70°05'57"E	38.67'
16	N79°33'07"E	32.70'
17	N41°42'57"E	51.80'
18	N17°03'09"E	35.67'
19	N54°04'17"E	48.39'
20	N25°58'39"E	58.47'
21	N69°51'42"W	31.04'



② AREA DRAIN INLET
NOT TO SCALE



③ YARD DRAIN CURB OUTLETS PER DETAIL ABOVE
NOT TO SCALE

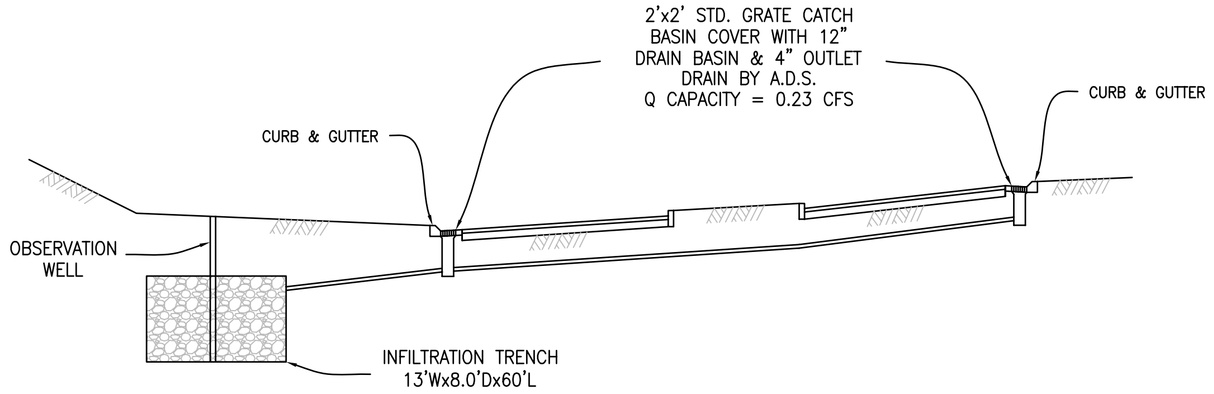
GABEL, COOK & ASSOCIATES INC.
CIVIL ENGINEERS · LAND SURVEYORS
LAND PLANNERS
7177 Brockton, Ave. Ste 339, Riverside, CA 92506
Telephone (951) 788-8092 Facsimile (951) 788-5184

IN THE CITY OF RIVERSIDE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

TRACT 37392
CONCEPTUAL GRADING PLAN

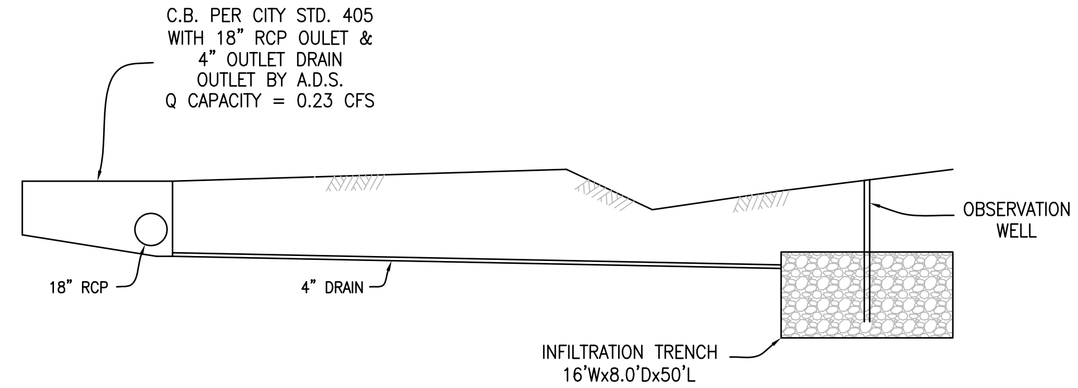
SHEET 2 OF 3 SHEET

SCALE: 1"=40'	DATE: APRIL 2018	FOR: MARWAN & ELIZABETH ALABASSI	WO: 2165



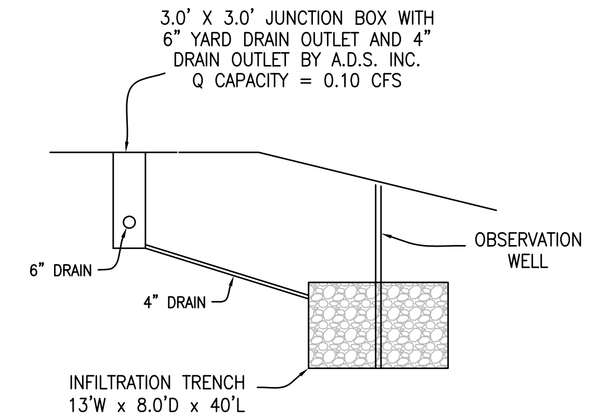
SECTION A–A

1"=10' HORIZ. SCALE
1"=10' VERT. SCALE



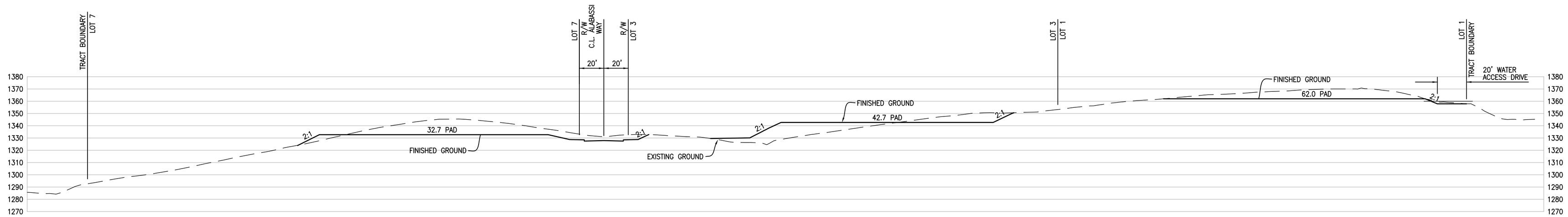
SECTION B–B

1"=10' HORIZ. SCALE
1"=10' VERT. SCALE



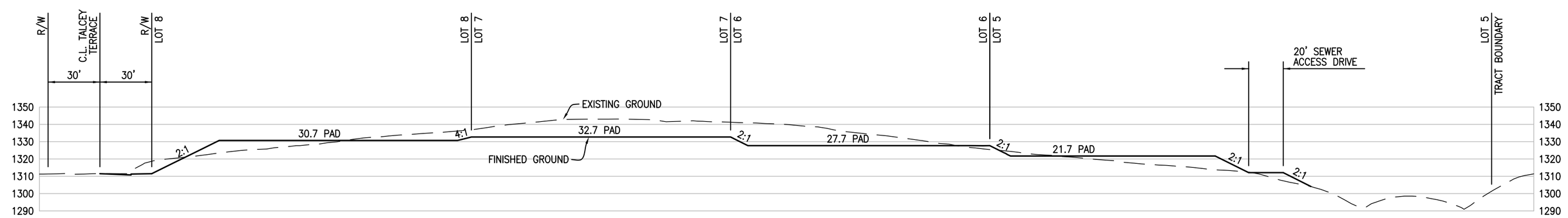
SECTION C–C

1"=10' HORIZ. SCALE
1"=10' VERT. SCALE



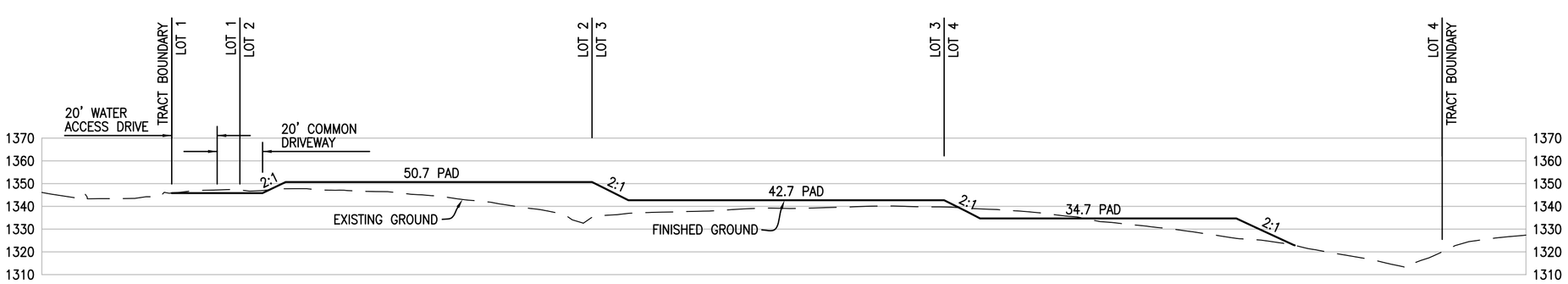
SECTION D–D

HORIZ. SCALE 1"=40'
VERT. SCALE 1"=40'



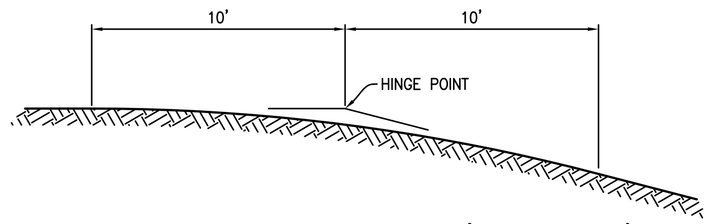
SECTION E–E

HORIZ. SCALE 1"=40'
VERT. SCALE 1"=40'



SECTION F–F

HORIZ. SCALE 1"=40'
VERT. SCALE 1"=40'



TYPICAL CONTOUR GRADING (T=10 FEET)

NOT TO SCALE

GABEL, COOK & ASSOCIATES INC.
CIVIL ENGINEERS · LAND SURVEYORS
LAND PLANNERS
7177 Brockton, Ave. Ste 339, Riverside, CA 92506
Telephone (951) 788–8092 Facsimile (951) 788–5184

IN THE CITY OF RIVERSIDE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

TRACT 37392 CONCEPTUAL GRADING PLAN

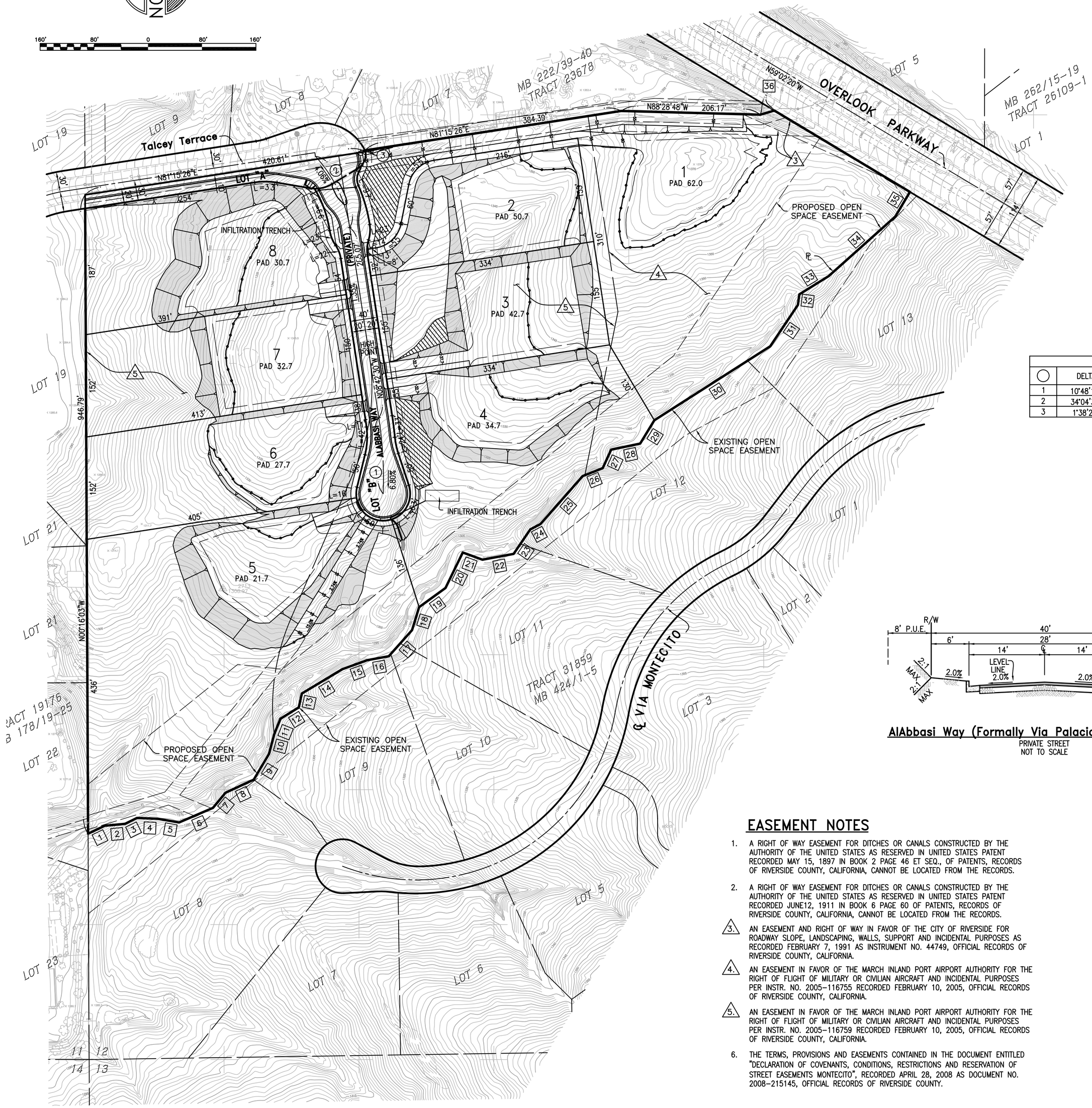
SHEET 3 OF 3 SHEET

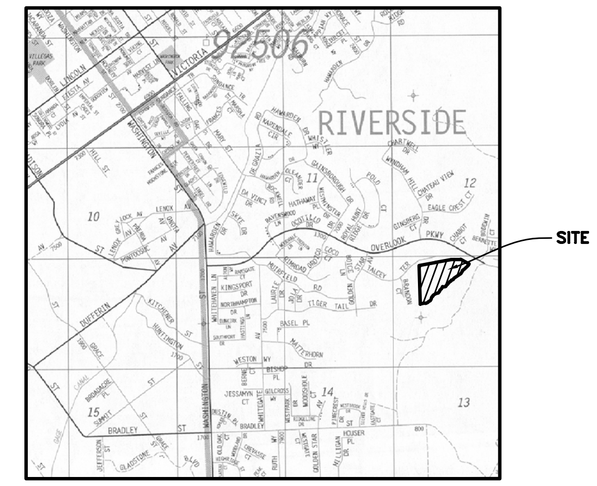
SCALE: AS SHOWN | DATE: APRIL 2018 | FOR: MARWAN & ELIZABETH ALABASSI | WO: 2165

TENTATIVE TRACT MAP NO. 37392

FORMALLY TENTATIVE TRACT MAP NO. 32042

REVISIONS:			TENTATIVE TRACT 32042 SCALE: AS NOTED
DATE	NO.	DESCRIPTION:	

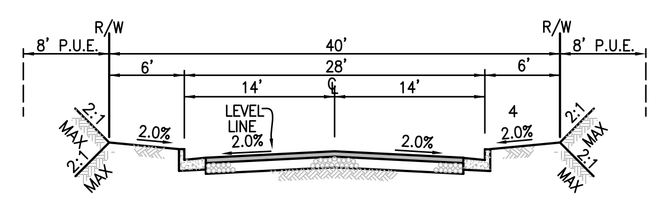




VICINITY MAP
NOT TO SCALE

CURVE TABLE				
◯	DELTA	R	L	T
1	10°48'18"	600.00'	113.15'	56.74'
2	34°04'36"	200.00'	118.95'	61.29'
3	1°38'21"	73.00'	2.09'	1.04'

LINE TABLE		
☐	BEARING	LENGTH
1	N64°25'14"E	27.42'
2	N84°41'25"E	30.17'
3	N63°49'14"E	19.72'
4	N87°46'41"W	31.10'
5	N80°04'58"W	31.76'
6	N66°42'30"E	54.73'
7	N39°39'18"E	29.13'
8	N65°14'42"E	46.15'
9	N30°38'52"E	44.33'
10	N14°45'24"E	30.25'
11	N21°51'55"E	24.71'
12	N58°24'58"E	31.97'
13	N12°15'58"E	21.10'
14	N59°04'42"E	70.42'
15	N70°05'57"E	38.67'
16	N79°33'07"E	32.70'
17	N41°42'57"E	51.80'
18	N17°03'09"E	35.67'
19	N54°04'17"E	48.39'
20	N25°58'39"E	58.47'
21	N69°51'42"W	31.04'
22	N79°24'53"E	47.05'
23	N34°14'25"E	43.84'
24	N62°16'43"E	17.01'
25	N41°21'57"E	94.82'
26	N68°26'25"E	31.87'
27	N24°35'00"E	30.18'
28	N78°12'17"E	43.93'
29	N31°14'59"E	40.39'
30	N57°27'13"E	203.87'
31	N33°48'12"E	73.76'
32	N07°26'56"E	15.79'
33	N58°08'31"E	51.25'
34	N48°13'01"E	132.39'
35	N30°50'27"E	42.15'
36	N73°38'18"E	21.77'



AlAbbasi Way (Formally Via Palacio) TYPICAL SECTION
PRIVATE STREET
NOT TO SCALE

APPLICANT, OWNER & DEVELOPER

MARWAN S. & ELIZABETH ALABBASI
764 W. RAMONA EXPRESSWAY, SUITE C
PERRIS, CA 92571
(951) 776-9300

ENGINEER

GABEL COOK & ASSOCIATES, INC.
7177 BROCKTON AVE., SUITE. 339
RIVERSIDE, CA 92506
(951) 788-8092

ASSESSOR'S PARCEL NUMBER:

243-210-037 & 041

LEGAL DESCRIPTION:

A PORTION OF THE W 1/2 OF THE SW 1/4 OF SECTION 12, T. 3 S., R. 5 W., S.B.M.

ACREAGE:

PROJECT SIZE	16.79 ACRES GROSS
PROPOSED STREET R/W	0.79 ACRES
NUMBER OF LOTS:	8 RESIDENTIAL
RESIDENTIAL LOT SIZE:	MINIMUM 1.01 ACRES NET MAXIMUM 3.78 ACRES NET
LOT DENSITY:	0.50 UNITS/ACRE

ZONING AND LAND USE:

EXISTING LAND USE:	VACANT
PROPOSED LAND USE:	RESIDENTIAL
EXISTING ZONING:	R-C
PROPOSED ZONING:	R-C

UTILITIES:

ELECTRIC:	CITY OF RIVERSIDE
GAS:	SOUTHERN CALIFORNIA GAS CO.
WATER:	CITY OF RIVERSIDE
SEWER:	CITY OF RIVERSIDE
TELEPHONE:	AT&T

SCHOOL DISTRICT:

RIVERSIDE UNIFIED SCHOOL DISTRICT

ENGINEER & REPRESENTATIVE:

GABEL COOK & ASSOCIATES, INC.
CIVIL ENGINEERS
7177 BROCKTON AVE., SUITE. 339
RIVERSIDE, CALIFORNIA 92506
(951) 788-8092

NOTES:

DRAINAGE:	DEVELOPMENT OF SITE WILL PERPETUATE EXISTING DRAINAGE PATTERNS.
GRADING:	GRADING WILL SUBSTANTIALLY CONFORM TO THAT SHOWN ON THE PROJECT CONCEPTUAL GRADING PLAN
CONTIGUOUS: OWNERSHIP	APN 243-400-007 IS OWNED AS CONTIGUOUS OWNERSHIP.
PREPARED:	APRIL 2018
FLOOD ZONE:	FLOOD INSURANCE MAP NUMBER 06065C0740G, AUGUST 28, 2008, ZONE X, AREA DETERMINED TO BE OUTSIDE 0.2% ANNUAL CHANCE FLOODPLAIN.
TOPO SOURCE:	TOPOGRAPHY IS BASED UPON AERIAL FLIGHT FLOWN 15 JULY 2003.

IMPROVEMENT PLANS:

STREET IMPROVEMENT PLANS FOR THIS TRACT WERE APPROVED BY CITY OF RIVERSIDE ON APRIL 12, 2005 AS R3830.
SEWER IMPROVEMENT PLANS FOR THIS TRACT WERE APPROVED BY CITY OF RIVERSIDE ON APRIL 4, 2005 AS S1874.
WATER IMPROVEMENT PLANS FOR THIS TRACT WERE APPROVED BY CITY OF RIVERSIDE ON APRIL 4, 2005 AS D5-704240.

EASEMENT NOTES

1. A RIGHT OF WAY EASEMENT FOR DITCHES OR CANALS CONSTRUCTED BY THE AUTHORITY OF THE UNITED STATES AS RESERVED IN UNITED STATES PATENT RECORDED MAY 15, 1897 IN BOOK 2 PAGE 46 ET SEQ., OF PATENTS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA, CANNOT BE LOCATED FROM THE RECORDS.
2. A RIGHT OF WAY EASEMENT FOR DITCHES OR CANALS CONSTRUCTED BY THE AUTHORITY OF THE UNITED STATES AS RESERVED IN UNITED STATES PATENT RECORDED JUNE12, 1911 IN BOOK 6 PAGE 60 OF PATENTS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA, CANNOT BE LOCATED FROM THE RECORDS.
3. AN EASEMENT AND RIGHT OF WAY IN FAVOR OF THE CITY OF RIVERSIDE FOR ROADWAY SLOPE, LANDSCAPING, WALLS, SUPPORT AND INCIDENTAL PURPOSES AS RECORDED FEBRUARY 7, 1991 AS INSTRUMENT NO. 44749, OFFICIAL RECORDS OF RIVERSIDE COUNTY, CALIFORNIA.
4. AN EASEMENT IN FAVOR OF THE MARCH INLAND PORT AIRPORT AUTHORITY FOR THE RIGHT OF FLIGHT OF MILITARY OR CIVILIAN AIRCRAFT AND INCIDENTAL PURPOSES PER INSTR. NO. 2005-116755 RECORDED FEBRUARY 10, 2005, OFFICIAL RECORDS OF RIVERSIDE COUNTY, CALIFORNIA.
5. AN EASEMENT IN FAVOR OF THE MARCH INLAND PORT AIRPORT AUTHORITY FOR THE RIGHT OF FLIGHT OF MILITARY OR CIVILIAN AIRCRAFT AND INCIDENTAL PURPOSES PER INSTR. NO. 2005-116759 RECORDED FEBRUARY 10, 2005, OFFICIAL RECORDS OF RIVERSIDE COUNTY, CALIFORNIA.
6. THE TERMS, PROVISIONS AND EASEMENTS CONTAINED IN THE DOCUMENT ENTITLED "DECLARATION OF COVENANTS, CONDITIONS, RESTRICTIONS AND RESERVATION OF STREET EASEMENTS MONTECITO", RECORDED APRIL 28, 2008 AS DOCUMENT NO. 2008-215145, OFFICIAL RECORDS OF RIVERSIDE COUNTY.

LOT NO.	LOT SIZE	LOT WIDTH @ SETBACK	LOT DEPTH	WHOLE LOT SLOPE ANAL.	GRADED PORTION SLOPE ANAL.	PAD SIZE	MAX. ALLOWABLE PAD SIZE
1	3.61 AC	136.62'	612.33'	15.43%	11.08%	21,925 SF	27,000 SF
2	1.01 AC	42.28'	334.30'	11.78%	11.99%	20,870 SF	27,000 SF
3	1.19 AC	155.00'	334.30'	14.76%	15.34%	21,000 SF	21,000 SF
4	2.04 AC	267.01'	334.39'	19.85%	13.59%	20,600 SF	27,000 SF
5	3.79 AC	120.73'	404.71'	20.06%	13.58%	18,650 SF	27,000 SF
6	1.43 AC	155.33'	413.08'	14.92%	13.71%	20,780 SF	27,000 SF
7	1.38 AC	150.00'	413.08'	17.66%	15.30%	21,000 SF	21,000 SF
8	1.54 AC	181.62'	390.82'	16.10%	16.43%	20,050 SF	21,000 SF

AVERAGE LOT SIZE IS 2.00 ACRES

GABEL, COOK & ASSOCIATES INC.
CIVIL ENGINEERS · LAND SURVEYORS
LAND PLANNERS
7177 Brockton, Ave. Ste 339, Riverside, CA 92506
Telephone (951) 788-8092 Facsimile (951) 788-5184

IN THE CITY OF RIVERSIDE, STATE OF CALIFORNIA

TENTATIVE TRACT MAP NO. 37392

BEING A DIVISION OF A PORTION OF THE W ½ OF THE SW ¼ OF SECTION 12, T. 3 S., R. 5 W., S.B.M.

SHEET 1 OF 1 SHEET

SCALE: AS-NOTED | DATE: APRIL 2018 | FOR: MARWAN & ELIZABETH ALABBASI | WO 2165

Appendix 3: Soils Information

Geotechnical Study and Other Infiltration Testing Data

SOIL
EXPLORATION
COMPANY, INC.

Soil Engineering, Environmental Engineering, Materials Testing, Geology

September 22, 2017

Project No. 17195-01

TO: Marwan and Elizabeth AlAbbasi
764 W. Ramona Expressway, Ste. C
Perris, CA 92571

SUBJECT: Infiltration Tests Report for WQMP Design, Tentative Trace 37392, Talcey Terrace (APN 243-210-037 and -041), City of Riverside, California

REFERENCE: Riverside County, Stormwater Quality Best Management Practice Design Handbook for Low Impact Development, Riverside County Flood Control and Water Conservation District, June 2014.

Introduction

Per your request, this report presents the results of infiltration tests and limitation of our work at the subject site (see Figure 1, Site Location Map). The tests were performed on September 19, 2017, at the proposed infiltration area (see Plate 1, Exploratory Trench and Infiltration Test Location Map).

Infiltration Tests (Percolation Test Procedure)

The procedure outlined in the above referenced Handbook was utilized for testing.

Two 8-inch diameter, 2-feet deep test holes (I-1 and I-2) were augered at the bottom of 4-feet deep trench excavations at suggested locations. The soil at the test locations was visually classified as bedrock. To mitigate any possible caving or sloughing of the test holes, a 6-inch diameter perforated pipe was placed in the holes. The bottom of the holes was covered with 2 inches of gravel.

The testing was conducted after presoaking with water. Two consecutive measurements showed that 6 inches of water seeped away in less than 25. The tests were therefore run for an additional one hour with measurements taken at 10 minute intervals. Water level was adjusted to 20 inches above the bottom of the test hole after each measurement. The drop that occurred during the final reading was used for design rate purposes.

Infiltration Tests/Tabulated Test Results

Test No.	Depth of Test (feet)	Earth Material	Infiltration Rate (in/hr)
I-1	6	Bedrock	1.84
I-2	6	Bedrock	1.72

We recommend that a suitable factor of safety should be applied to the rate in design of the system.

7535 Jurupa Ave., Unit C • Riverside, CA 92504 • Tel: (951) 688-7200 • Fax: (951) 688-7100
soilexploration@yahoo.com • www.soilexp.com

Limitation

Soil Exploration Co. has striven to perform our services within the limits prescribed by our client. No other representation, express or implied, and no warranty or guarantee is included or intended by virtue of the services performed or reports, opinion, documents or otherwise supplied.

Closure

Should you have any questions or concerns regarding this report, please do not hesitate to call this office. We appreciate this opportunity to be of service.

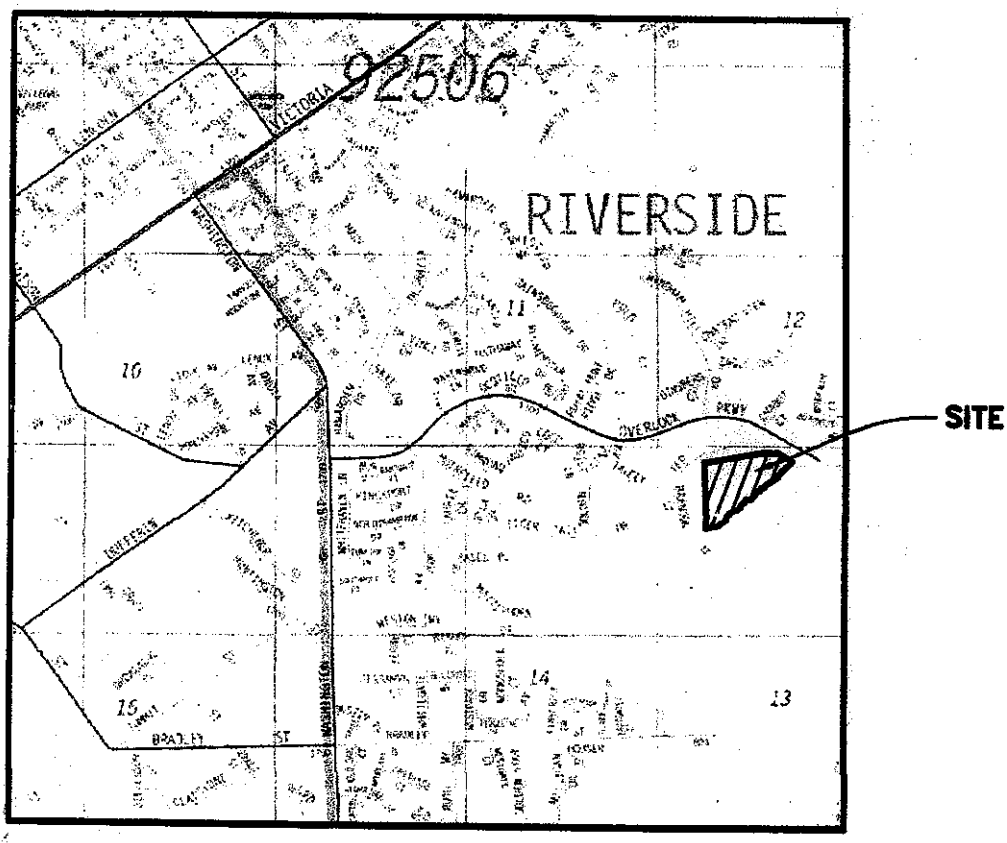
Very truly yours,
Soil Exploration Co., Inc.

REGISTERED PROFESSIONAL ENGINEER
GENE KINH-TOAN LUU
C 053417
Exp. 6/30/19
CIVIL
STATE OF CALIFORNIA

Gene K. Luu, PE 53417
Project Engineer

Distribution: [1] Addressee
[1] Gabel, Cook & Associates, Inc.

Attachment:	Figure 1	Site Location Map
	Figure 2	USGS Geologic Map
	Plate 1	Exploratory Trench & Infiltration Test Location Map
	Appendix A	Geotechnical Trench Log
	Appendix B	Infiltration Test Results Data Sheets



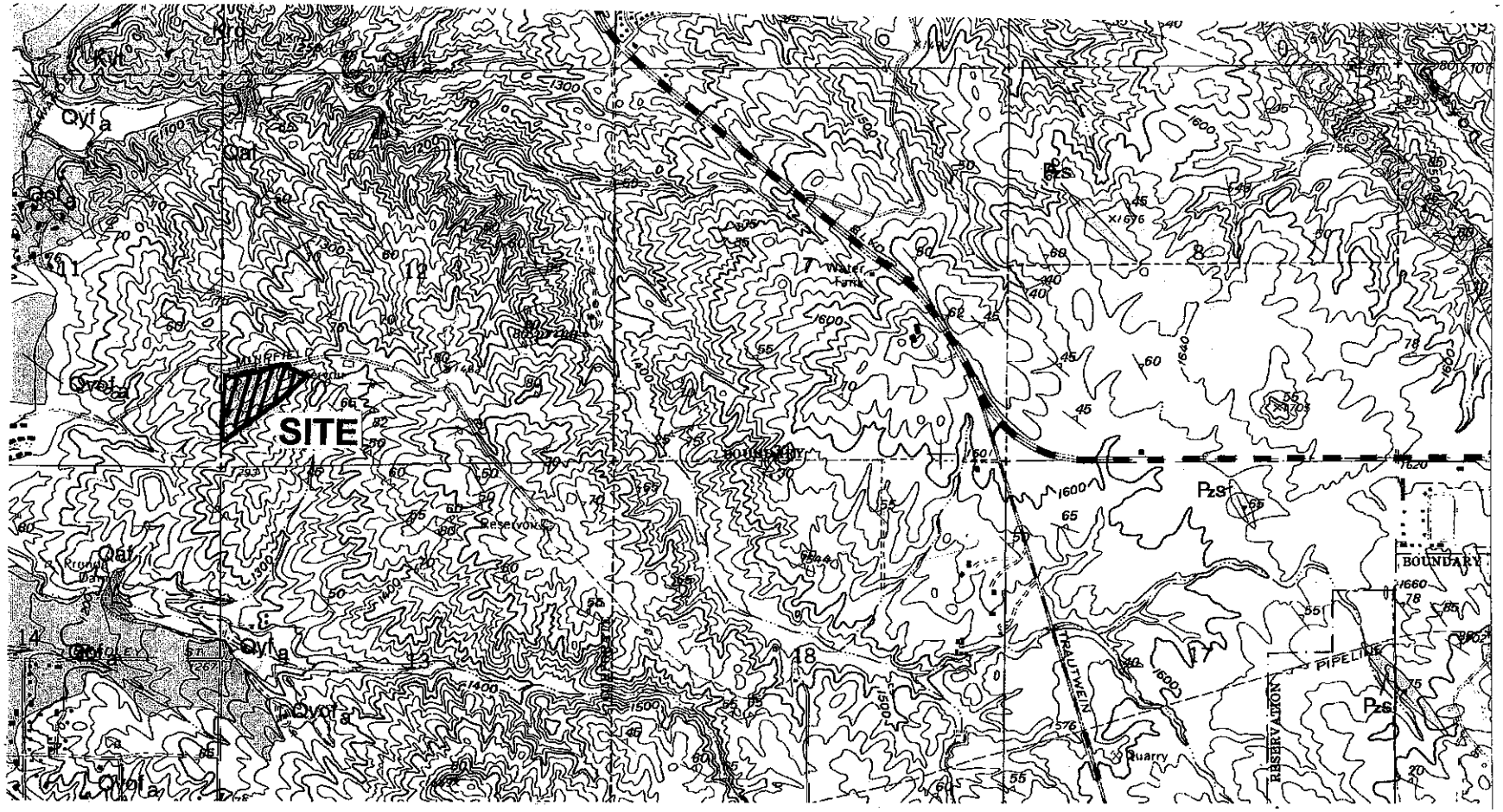
VICINITY MAP
NOT TO SCALE

NORTH

Base Map: Gabel, Cook & Associates, Inc., Riverside, California

SITE LOCATION MAP

Tentative Tract 37392
Talcey Terrace
City of Riverside, California



Base Map: USGS Geologic Map of the Riverside East 7.5' Quadrangle, Riverside County, California.

LEGEND:

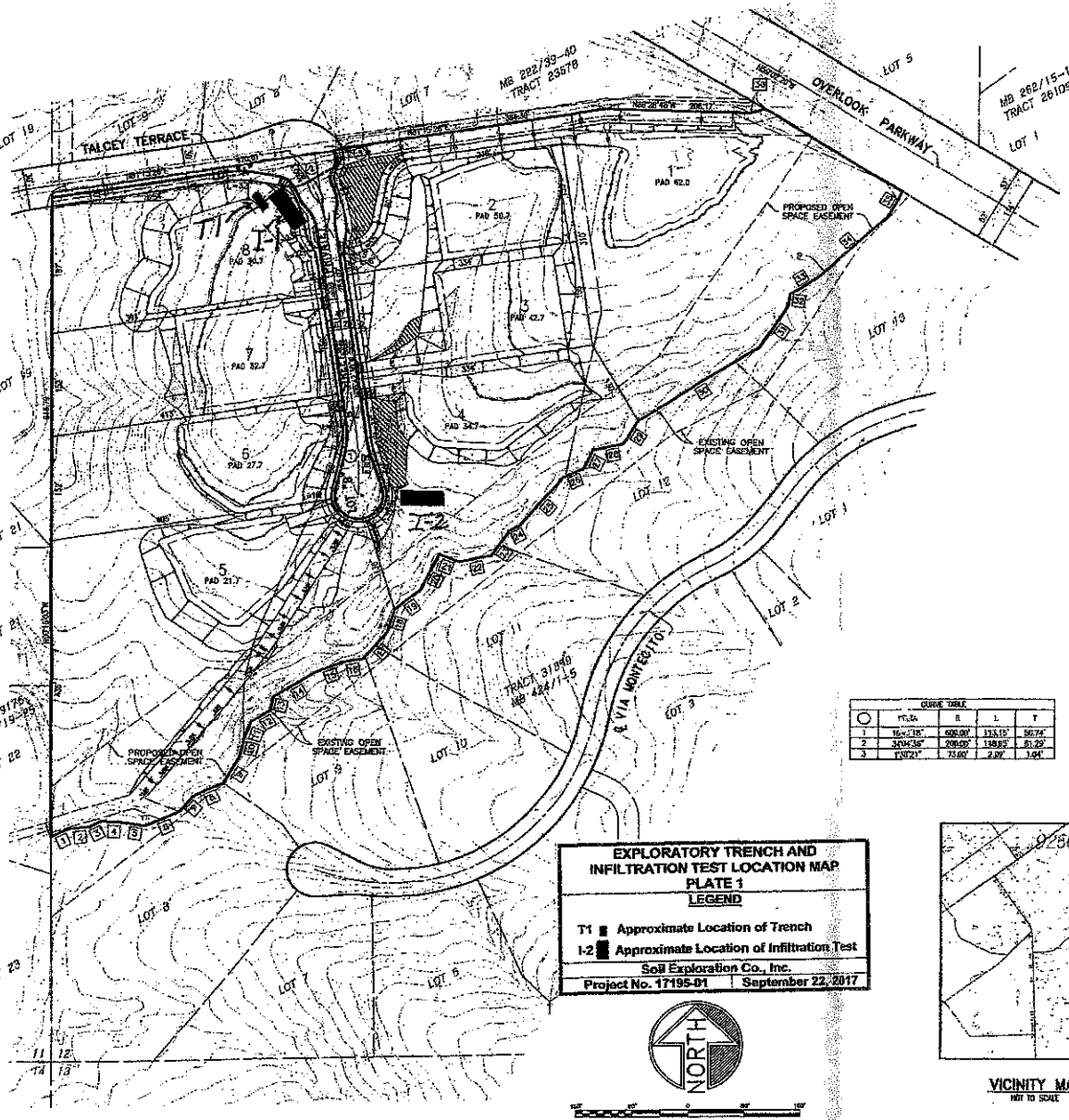
Kvt: Val Verde tonalite – Gray-weathering, relatively homogeneous, massive- to well- foliated, medium- to coarse-grained, hypautomorphic-granular biotite-hornblende tonalite.

TT 37392 **Talcey Terrace** **City of Riverside, California**	**Soil Exploration Co., Inc.** **Project No.: 17195-01** **Date: Sept. 22, 2017** **Figure: 2**

TENTATIVE TRACT MAP NO. 37392

FORMALLY TENTATIVE TRACT MAP NO. 32042

REVISIONS:			TENTATIVE TRACT 32
DATE	NO.	DESCRIPTION:	SCALE: AS NOTED



LOT NO.	LOT SIZE	WHOLE LOT SLOPE ANG.	GRADED PORTION SLOPE ANG.	END PAD SIZE
1	3.01 AC	15.43%	11.06%	21,925 SF
2	1.01 AC	11.26%	11.83%	20,670 SF
3	3.18 AC	14.76%	18.34%	21,000 SF
4	2.04 AC	16.95%	13.89%	20,600 SF
5	3.79 AC	20.06%	13.58%	18,650 SF
6	1.43 AC	14.92%	13.71%	20,750 SF
7	1.38 AC	17.26%	15.32%	21,000 SF
8	1.54 AC	18.10%	18.43%	20,000 SF

LINE TABLE

	BEARING	LENGTH
1	N64°25'14"E	27.42'
2	N84°41'25"E	39.17'
3	N63°49'14"E	19.72'
4	N07°46'41"W	31.10'
5	N83°04'56"W	31.76'
6	N66°42'30"E	54.73'
7	N39°39'18"E	29.13'
8	N65°14'42"E	46.15'
9	N30°38'52"E	44.33'
10	N14°45'24"E	30.25'
11	N21°51'55"E	24.71'
12	N58°24'58"E	31.07'
13	N12°15'56"E	21.10'
14	N69°04'42"E	70.42'
15	N70°05'57"E	38.67'
16	N76°33'07"E	32.70'
17	N41°42'57"E	51.80'
18	N17°03'09"E	35.87'
19	N54°04'17"E	45.30'
20	N23°56'39"E	56.47'
21	N69°51'42"E	31.04'
22	N78°34'53"E	47.05'
23	N34°14'26"E	43.64'
24	N62°16'43"E	17.01'
25	N41°21'57"E	94.82'
26	N88°28'28"E	31.87'
27	N24°35'00"E	30.18'
28	N78°12'17"E	43.93'
29	N31°14'59"E	40.30'
30	N67°27'13"E	203.87'
31	N33°48'12"E	73.76'
32	N07°26'50"E	15.79'
33	N56°08'31"E	51.25'
34	N48°13'01"E	132.38'
35	N30°50'27"E	42.15'
36	N73°38'16"E	21.77'

CURVE TABLE

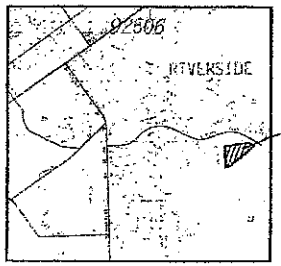
	Δ	R	L	T
1	16°47'18"	600.00'	175.15'	50.74'
2	34°04'36"	200.00'	118.93'	61.29'
3	1°01'21"	70.00'	2.09'	1.04'

EXPLORATORY TRENCH AND INFILTRATION TEST LOCATION MAP
PLATE 1
LEGEND

T1 ■ Approximate Location of Trench
I-2 ■ Approximate Location of Infiltration Test

Soil Exploration Co., Inc.
Project No. 17195-01 | September 22, 2017

NORTH



VICINITY MAP
NOT TO SCALE

APPLICANT, OWNER & DEVELOPER

MARWAN S. & ELIZABETH AL ABBASI
784 W. RAMONA EXPRESSWAY, SUITE C
PERRIS, CA 92571
(951) 776-9308

ENGINEER

GABEL, COOK & ASSOCIATES, INC.
7177 BROCKTON AVE., SUITE 339
RIVERSIDE, CA 92506
(951) 788-8092

ASSESSOR'S PARCEL NUMBER:

243-210-037 & 041

LEGAL DESCRIPTION:

A PORTION OF THE W 1/2 OF THE SW 1/4 OF SECTION 12, T. 3 S., R. 5 W., S.B.M.

ACREAGE:

PROJECT SIZE	16.79 ACRES GROSS
PROPOSED STREET R/W	0.79 ACRES
NUMBER OF LOTS:	8 RESIDENTIAL
RESIDENTIAL LOT SIZE:	MINIMUM 1.01 ACRES NET MAXIMUM 3.79 ACRES NET
LOT DENSITY:	0.50 UNITS/ACRE

ZONING AND LAND USE:

EXISTING LAND USE:	VACANT
PROPOSED LAND USE:	RESIDENTIAL
EXISTING ZONING:	R-C
PROPOSED ZONING:	R-C

UTILITIES:

ELECTRIC:	CITY OF RIVERSIDE
GAS:	SOUTHERN CALIFORNIA GAS CO.
WATER:	CITY OF RIVERSIDE
SEWER:	CITY OF RIVERSIDE
TELEPHONE:	AT&T

SCHOOL DISTRICT:

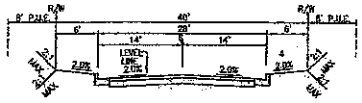
RIVERSIDE UNIFIED SCHOOL DISTRICT

ENGINEER & REPRESENTATIVE:

GABEL COOK & ASSOCIATES, INC.
CIVIL ENGINEERS
7177 BROCKTON AVE., SUITE 339
RIVERSIDE, CALIFORNIA 92506
(951) 788-8092

NOTES:

DRAINAGE:	DEVELOPMENT OF SITE WILL PERPETUATE EXISTING DRAINAGE PATTERNS.
GRADING:	GRADING WILL SUBSTANTIALLY CONFORM TO THAT SHOWN ON THE PROJECT CONCEPTUAL GRADING PLAN
CONTIGUOUS OWNERSHIP:	APN 243-400-007 IS OWNED AS CONTIGUOUS OWNERSHIP.
PREPARED:	AUGUST 2017
FLOOD ZONE:	FLOOD INSURANCE MAP NUMBER 06065C0740G, AUGUST 28, 2008, ZONE X, AREA DETERMINED TO BE OUTSIDE 0.2% ANNUAL CHANCE FLOODPLAIN.
TOPO SOURCE:	TOPOGRAPHY IS BASED UPON AERIAL FLIGHT FLOWN 15 JULY 2003.



STREET "B" TYPICAL SECTION
PRIVATE STREET
NOT TO SCALE

GABEL, COOK & ASSOCIATES INC.
CIVIL ENGINEERS · LAND SURVEYORS
LAND PLANNERS
7177 Brockton Ave. Ste 339, Riverside, CA 92506
Telephone (951) 788-8092 Facsimile (951) 788-5184

IN THE CITY OF RIVERSIDE, STATE OF CALIFORNIA

TENTATIVE TRACT MAP NO. 37392
BEING A DIVISION OF A PORTION OF THE W ½ OF THE SW ¼ OF SECTION 12, T. 3 S., R. 5 W., S.B.M.

SHEET 1 OF 1 SHEET

SCALE: AS-NOTED | DATE: AUGUST 2017 | FOR: MARWAN & ELIZABETH AL ABBASI | WO 2185

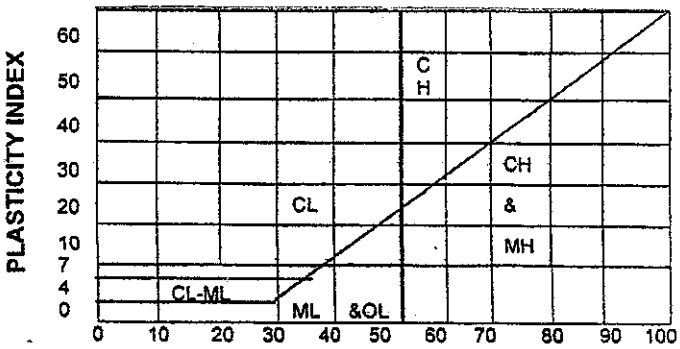
APPENDIX A

MAJOR DIVISIONS			SYMBOLS	TYPICAL NAMES
COARSE-GRAINED SOILS (More than ½ of soil < No. 200 sieve)	GRAVELS (More than ½ of coarse fraction > No. 4 sieve size)		GW	Well-graded gravels or gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels or gravel-sand mixtures, little or no fines
			GM	Silty gravels, gravel-sand-silt mixtures
			GC	Clayey gravels, gravel-sand-clay mixtures
	SANDS (More than ½ of coarse fraction < No. 4 sieve size)		SW	Well-graded sands or gravely sands, little or no fines
			SP	Poorly graded sands or gravelly sands, little or no fines
			SM	Silty sands, sand-salt mixtures
			SC	Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS (More than ½ of soil < No. 200 sieve)	SILTS & CLAYS LL < 50		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
			OL	Organic silts and organic silty clays of low plasticity.
	SILTS & CLAYS LL > 50		MH	Inorganic silts, caceous or diatonaceous fine sandy or silty soils, elastic silts
			CH	Inorganic clays of medium to high plasticity, organic silty clays, organic silts
			OH	Organic clays of medium to high plasticity, organic silty clays, organic silts
	HIGHLY ORGANIC SOILS		Pt	Peat and other highly organic soils

CLASSIFICATION CHART
(UNIFIED SOIL CLASSIFICATION SYSTEM)

CLASSIFICATION	RANGE OF GRAIN SIZES	
	U.S. Standard Sieve Size	Grain Size in Millimeters
BOULDER	ABOVE 12"	ABOVE 305
COBBLES	3" to 12"	305 to 76.2
GRAVEL	3" to No. 4	762 to 4.76
COARSE	3" TO ¾"	76.2 to 19.1
FINE	¾"to No. 4	19.1 to 4.76
SAND	No. 4 to 200	4.76 to 0.074
COARSE	No. 4 to 10	4.76 to 2.00
MEDIUM	No. 10 to 40	2.00 to 0.420
FINE	No. 40 to 200	0.420 to 0.074
SILT & CLAY	BELOW No. 200	BELOW 0.074

GRAIN SIZE CHART



PLASTICITY CHART

Ring Sample	Bag Sample	NR No Recovery	Classification in accordance with ASTM D2487 Description and visual observation in accordance with ASTM D2488 All Sieve Sizes shown are US Standard SPT Refusal is defined as one of the following: 10 blows for no apparent displacement 50 blows for less than 6 inches advancement 100 blows for 6 to 18 inches advancement
SPT Sample	= Seepage		

GEOTECHNICAL TRENCH LOG

Trench No. 1

Date: September 19, 2017
Project Name: TT 37392, Talcey Terrace, Riverside
Equipment Company: Can-Do Backhoe

Project No. 17195-01
Equipment Type: Case 580L with 24" bucket
Elevation: 1330±

DEPTH (feet)	EARTH MATERIAL	TYPE OF TEST	DRY DENSITY	MOISTURE (%)	SOIL CLASSIFICATION	Description Logged By GL Sampled By GL
1	Alluvium				SM	**SILTY SAND:** Light brown, fine to coarse grained, dry, medium dense
2	Bedrock				Kvt	**TONALITE:** Gray, fine to coarse grained, dense
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						TOTAL DEPTH = 15 FEET NO GROUNDWATER
15						NO CAVING TRENCH BACKFILLED

Soil Exploration Co., Inc.

APPENDIX B

Figure VII.18. Sample Test Data Form for Infiltration Test

Infiltration Test Data Sheet

Project:	MARWAN MASSAD	Project No:	17195-01	Date:	9-19-17
Test Hole No:	I 1	Tested By:	Eddie		
Depth of Test Hole, D_t=	60"	USCS Soil Classification:	bed rock		
Test Hole Dimensions (inches)			Length	Width	
Diameter (if round)=	8	Sides (if rectangular)=			

Sandy Soil Criteria Test*:

Trial No.	Start Time	Stop Time	Time Interval (min.)	Initial Depth to Water (in.)	Final Depth to Water (in.)	Change in Water Level (in.)	Greater than or Equal to 6"? (y/n)
1	12:03:43	12:28:43	25	56	46 1/8		y
2	12:31:05	12:56:05	25	11	46 7/8		y

*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak (fill) overnight. Obtain at least two measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25".

Trial No.	Start Time	Stop Time	Δt Time Interval (min.)	D_o Initial Depth to Water (in.)	D_f Final Depth to Water (in.)	ΔD Change in Water Level (in.)	Infiltration Rate (in./hr)
1	1:21:24	1:31:24	10	56	52 3/8		
2	1:41:50	1:51:50	10	56	52 5/8		
3	1:52:56	2:02:56	10	11	52 5/8		
4	2:04:51	2:14:51	10	11	52 7/8		
5	2:15:46	2:25:46	10	11	52 7/8		
6	2:27 —	2:37 —	10	11	52 7/8	3.125	1.84
7							
8							
9							
10							
11							
12							
13							
14							
15							

COMMENTS:

Infiltration Rate = $\frac{4 \times 60 \times 3.125}{10[4 + [20 + (20 - 3.125)]]} = 1.84$ in/hr

[illegible] TERRACE

Figure VII.18. Sample Test Data Form for Infiltration Test

Infiltration Test Data Sheet

Project:	MARWAN GLADDING	Project No:	17195-09	Date:	9-19-17
Test Hole No:	I 2	Tested By:	[illegible]		
Depth of Test Hole, D_T:	6'	USCS Soil Classification:	bed rock		
Test Hole Dimensions (inches)			Length	Width	
Diameter (if round)=	8	Sides (if rectangular)=			

Sandy Soil Criteria Test*

Trial No.	Start Time	Stop Time	Time Interval (min.)	Initial Depth to Water (in.)	Final Depth to Water (in.)	Change in Water Level (in.)	Greater than or Equal to 6"? (y/n)
1	12:42:33	1:07:35	25	130	123 3/4	6.25	Y
2	1:11:18	1:36:18	25	11	129	6	Y

*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak (fill) overnight. Obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25".

Trial No.	Start Time	Stop Time	Δt Time Interval (min.)	D_o Initial Depth to Water (in.)	D_f Final Depth to Water (in.)	ΔD Change in Water Level (in.)	Infiltration Rate (in./hr)
1	2:53:12	3:03:12	10	130	127		
2	3:04:31	3:14:31	10	11	127 1/16		
3	3:16:04	3:26:04	10	11	127 1/16		
4	3:29:32	3:39:32	10	11	127 1/16		
5	3:40:05	3:50:05	10	11	127 1/16		
6	3:51:55	4:01:55	10	11	127 1/16	2.9375	1.72
7							
8							
9							
10							
11							
12							
13							
14							
15							

COMMENTS:

Infiltration Rate = $\frac{4 \times 60 \times 2.9375}{10\{4+[20+(20-2.9375)]\}} = 1.72$ in/hr

Appendix 4: Historical Site Conditions

Phase I Environmental Site Assessment or Other Information on Past Site Use

Appendix 4: Historical Site Conditions

Phase I Environmental Site Assessment or Other Information on Past Site Use

N.A.

Appendix 5: LID Infeasibility

LID Technical Infeasibility Analysis

Appendix 5: LID Infeasibility

LID Technical Infeasibility Analysis

N.A.

Appendix 6: BMP Design Details

BMP Sizing, Design Details and other Supporting Documentation

Santa Ana Watershed - BMP Design Flow Rate, Q_{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: Gabel, Cook & Associates, Inc.

Date: 4/20/2018

Designed by: W. D. Gabel

Case No: PW17-0941

Company Project Number/Name: Tentative Tract 37392

BMP Identification

BMP NAME / ID: DMA 1 Infiltration Trench

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity: I = 0.20 in/hr

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMAS

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
DMA-1-A	*8855*	*Concrete or Asphalt*	*1*	*0.89*	*7898.7*			
DMA-1-B	*6396*	*Concrete or Asphalt*	*1*	*0.892*	*5705.2*			
DMA-2-C	*41,216*	*Ornamental Landscaping*	*0.1*	*0.110458*	*4552.6*			
	56467	***Total***			18156.5	0.20	*0.1*	*0.2*

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	Gabel, Cook & Associates, Inc.	Date	4/20/2018
Designed by	W. D. Gabel	Case No	PW17-0941
Company Project Number/Name	Tentative Tract 37392		

BMP Identification

BMP NAME / ID: DMA 1 Inflitraion Trench

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-1-A	*8855*	*Concrete or Asphalt*	*1*	*0.89*	*7898.7*			
DMA-1-B	*6396*	*Concrete or Asphalt*	*1*	*0.89*	*5705.2*			
DMA-1-C	*41,216*	*Ornamental Landscaping*	*0.1*	*0.11*	*4552.6*			
	56467		***Total***		**18156.5**	**0.54**	***817***	***2560***

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{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: Gabel, Cook & Associates, Inc. Date: 3/31/2018

Designed by: W. D. Gabel Case No: PW17-0941

Company Project Number/Name: Tentative Tract 37392

BMP Identification

BMP NAME / ID: DMA 2 Infiltration Trench

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

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 (use pull-down menu)	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
DMAs	*DMA-2-A*	*5727*	*Concrete or Asphalt*	*1*	*0.89*	*5108.5*			
	DMA-2-B	*13,224*	*Concrete or Asphalt*	*1*	*0.892*	*11795.8*			
	DMA-2-C	*22,756*	*Ornamental Landscaping*	*0.1*	*0.110458*	*2513.6*			
		41707	***Total***			**19417.9**	**0.20**	***0.1***	***0.2***

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	Gabel, Cook & Associates, Inc.	Date	3/31/2018
Designed by	W. D. Gabel	Case No	PW17-0941
Company Project Number/Name	Tentative Tract 37392		

BMP Identification

BMP NAME / ID: DMA 2 Infiltration Trench

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-2-A	*5757*	*Concrete or Asphalt*	*1*	*0.89*	*5135.2*			
DMA-2-B	*13,224*	*Concrete or Asphalt*	*1*	*0.89*	*11795.8*			
DMA-2-C	*22,756*	*Ornamental Landscaping*	*0.1*	*0.11*	*2513.6*			
	41737		***Total***		**19444.6**	**0.54**	***875***	***2496***

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{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	Gabel, Cook & Associates, Inc.	Date	4/20/2018
Designed by	W. D. Gabel	Case No	PW17-0941
Company Project Number/Name	Tentative Tract 37392		

BMP Identification

BMP NAME / ID: DMA 4 - Typical Lot Prototype BMP

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

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 (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
DMAs	*DMA-4-D*	*5000*	*Roofs*	*1*	*0.89*	*4460*			
	DMA-4-A	*6650*	*Concrete or Asphalt*	*1*	*0.892*	*5931.8*			
	DMA-4-C	*14,730*	*Ornamental Landscaping*	*0.1*	*0.11046*	*1627*			
		26380	***Total***			**12018.8**	**0.20**	***0.1***	***0.1***

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	Gabel, Cook & Associates, Inc.	Date	4/20/2018
Designed by	W. D. Gabel	Case No	PW17-0941
Company Project Number/Name	Tentative Tract 37392		

BMP Identification

BMP NAME / ID: DMA-4 - Typical Lot Prototype BMP

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

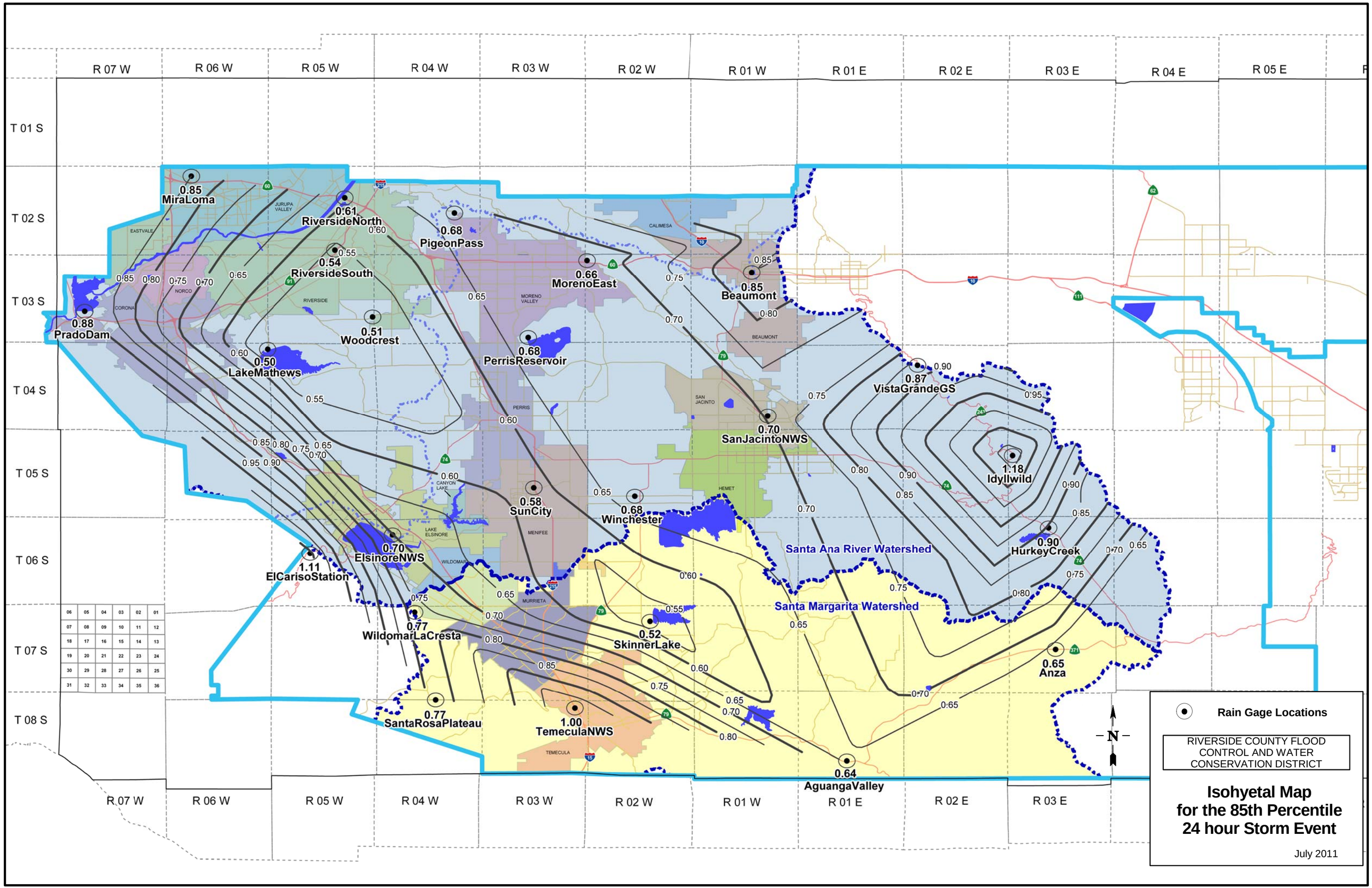
D_{85}= 0.54 inches

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-4-D	*5000*	*Roofs*	*1*	*0.89*	*4460*			
DMA-4-A	*6650*	*Concrete or Asphalt*	*1*	*0.89*	*5931.8*			
DMA-4-C	*14,730*	*Ornamental Landscaping*	*0.1*	*0.11*	*1627*			
	26380		***Total***		**12018.8**	**0.54**	***540.8***	***1664***

Notes:


R 07 W
R 06 W
R 05 W
R 04 W
R 03 W
R 02 W
R 01 W
R 01 E
R 02 E
R 03 E
R 04 E
R 05 E
T 01 S
T 02 S
T 03 S
T 04 S
T 05 S
T 06 S
T 07 S
T 08 S
0.85 MiraLoma
0.61 RiversideNorth
0.68 PigeonPass
0.54 RiversideSouth
0.66 MorenoEast
0.85 Beaumont
0.88 PradoDam
0.51 Woodcrest
0.50 LakeMathews
0.68 PerrisReservoir
0.87 VistaGrandeGS
0.70 SanJacintoNWS
1.18 Idyllwild
0.58 SunCity
0.68 Winchester
0.90 HurkeyCreek
0.70 ElsinoreNWS
1.11 ElCarisoStation
0.77 WildomarLaCresta
0.52 SkinnerLake
0.65 Anza
0.77 SantaRosaPlateau
1.00 TemeculaNWS
0.64 AguangaValley
Santa Ana River Watershed
Santa Margarita Watershed
EASTVALE
JURUPA VALLEY
CORONA
NORCO
RIVERSIDE
MORENO VALLEY
CALIMESA
BEAUMONT
SAN JACINTO
PERRIS
HEMET
CANYON LAKE
LAKE ELSINORE
WILDOMAR
MENIFEE
MURRIETA
TEMECULA
N
Rain Gage Locations
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
Isohyetal Map for the 85th Percentile 24 hour Storm Event
July 2011

Infiltration Trench - Design Procedure	BMP ID DMA1	Legend:	Required Entries / Calculated Cells
Company Name:	Gabel, Cook & Associates, Inc.	Date:	4/2/2018
Designed by:	W. D. Gabel	County/City Case No.:	PW17-0941

Design Volume

Enter the area tributary to this feature, Max = 10 acres	A_t= 1	acres
Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}= 802	ft^3

Calculate Maximium Depth of the Reservoir Layer

Enter Infiltration rate	I = 1.8	in/hr
Enter Factor of Safety, FS (unitless)	FS = 3	

Obtain from Table 1, Appendix A: "Infiltration Testing" of this BMP Handbook

n = 40 %

Calculate D_1.

$$D_1 = \frac{I\ (in/hr) \times 72\ hrs}{12\ (in/ft) \times (n/100) \times FS}$$

D_1 = 8.75 ft

Enter depth to historic high groundwater mark (measured from finished grade)	50	ft
Enter depth to top of bedrock or impermeable layer (measured from finished grade)	15	ft

D_2 is the smaller of:

Depth to groundwater - 11 ft; & Depth to impermeable layer - 6 ft D_2 = 9.0 ft

D_{MAX} is the smaller value of D_1 and D_2, must be less than or equal to 8 feet. D_{MAX} = 8.0 ft

Trench Sizing

Enter proposed reservoir layer depth D_R, must be $\leq D_{MAX}$ D_R = 8.00 ft

Calculate the design depth of water, d_W

Design $d_W = (D_R) \times (n/100)$ Design d_W= 3.20 ft

Minimum Surface Area, A_S

$$A_S = \frac{V_{BMP}}{d_W}$$

A_S = 251 ft^2

Proposed Design Surface Area A_D = 800 ft^2

Minimum Width = D_R + 1 foot pea gravel 9.00 ft

Sediment Control Provided? (Use pulldown) Yes

Geotechnical report attached? (Use pulldown) Yes

If the trench has been designed correctly, there should be no error messages on the spreadsheet.

Infiltration Trench - Design Procedure	BMP ID DMA 2	Legend:	Required Entries / Calculated Cells
Company Name:	Gabel, Cook & Associates, Inc.	Date:	4/20/2018
Designed by:	W. D. Gabel	County/City Case No.:	PW17-0941

Design Volume

Enter the area tributary to this feature, Max = 10 acres	A_t= 1	acres
Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}= 812	ft^3

Calculate Maximium Depth of the Reservoir Layer

Enter Infiltration rate	I = 1.8	in/hr
Enter Factor of Safety, FS (unitless)	FS = 3	

Obtain from Table 1, Appendix A: "Infiltration Testing" of this BMP Handbook

n = 40 %

Calculate D_1.

$$D_1 = \frac{I\ (in/hr) \times 72\ hrs}{12\ (in/ft) \times (n/100) \times FS}$$

D_1 = 9.20 ft

Enter depth to historic high groundwater mark (measured from finished grade)	50	ft
Enter depth to top of bedrock or impermeable layer (measured from finished grade)	15	ft

D_2 is the smaller of:

Depth to groundwater - 11 ft; & Depth to impermeable layer - 6 ft D_2 = 9.0 ft

D_{MAX} is the smaller value of D_1 and D_2, must be less than or equal to 8 feet. D_{MAX} = 8.0 ft

Trench Sizing

Enter proposed reservoir layer depth D_R, must be $\leq D_{MAX}$ D_R = 8.00 ft

Calculate the design depth of water, d_W

Design $d_W = (D_R) \times (n/100)$ Design d_W= 3.20 ft

Minimum Surface Area, A_S

$$A_S = \frac{V_{BMP}}{d_W}$$

A_S = 254 ft^2

Proposed Design Surface Area A_D = 780 ft^2

Minimum Width = D_R + 1 foot pea gravel 9.00 ft

Sediment Control Provided? (Use pulldown) Yes

Geotechnical report attached? (Use pulldown) Yes

If the trench has been designed correctly, there should be no error messages on the spreadsheet.

Infiltration Trench - Design Procedure	BMP ID DMA 4	Legend:	Required Entries / Calculated Cells
Company Name:	Gabel, Cook & Associates, Inc.	Date:	4/20/2018
Designed by:	W. D. Gabel	County/City Case No.:	PW17-0941

Design Volume

Enter the area tributary to this feature, Max = 10 acres	A_t=	1 acres
Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	541 ft^3

Calculate Maximium Depth of the Reservoir Layer

Enter Infiltration rate	I =	1.7 in/hr
Enter Factor of Safety, FS (unitless)	FS =	3
Obtain from Table 1, Appendix A: "Infiltration Testing" of this BMP Handbook		
	n =	40 %
Calculate D_1. $D_1 = \frac{I\ (in/hr) \times 72\ hrs}{12\ (in/ft) \times (n/100) \times FS}$	D_1 =	8.60 ft
Enter depth to historic high groundwater mark (measured from finished grade)		50 ft
Enter depth to top of bedrock or impermeable layer (measured from finished grade)		15 ft
D_2 is the smaller of: Depth to groundwater - 11 ft; & Depth to impermeable layer - 6 ft	D_2 =	9.0 ft
D_{MAX} is the smaller value of D_1 and D_2, must be less than or equal to 8 feet.	D_{MAX}=	8.0 ft

Trench Sizing

Enter proposed reservoir layer depth D_R, must be $\leq D_{MAX}$	D_R =	6.00 ft
Calculate the design depth of water, d_W		
Design $d_W = (D_R) \times (n/100)$	Design d_W=	2.40 ft
Minimum Surface Area, A_S $A_S = \frac{V_{BMP}}{d_W}$	A_S =	225 ft^2
Proposed Design Surface Area	A_D =	520 ft^2
Minimum Width = D_R + 1 foot pea gravel		7.00 ft
Sediment Control Provided? (Use pulldown)		Yes
Geotechnical report attached? (Use pulldown)		Yes

If the trench has been designed correctly, there should be no error messages on the spreadsheet.

Appendix 7: Hydromodification

Supporting Detail Relating to Hydrologic Conditions of Concern

```
        U n i t   H y d r o g r a p h   A n a l y s i s

        Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2008, Version 8.1
                Study date  08/27/17 File: DMA1UNDEV242.out

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
----------------------------------------------------------------------

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 5024

-------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format


-------------------------------------------------------------------
WO 2165
DMA1 UNDEVELOPED
INPUT = DMA1UNDEV.UM1
OUTPUT = DMA1UNDEV224.OUT
-------------------------------------------------------------------
Drainage Area =       1.30(Ac.)  =      0.002 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =       1.30(Ac.)  =      0.002 Sq. Mi.
Length along longest watercourse =     585.00(Ft.)
Length along longest watercourse measured to centroid =     292.50(Ft.)
Length along longest watercourse =      0.111 Mi.
Length along longest watercourse measured to centroid =      0.055 Mi.
Difference in elevation =      28.00(Ft.)
Slope along watercourse =    252.7179 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time =    0.036 Hr.
Lag time =     2.18 Min.
25% of lag time =     0.54 Min.
40% of lag time =     0.87 Min.
Unit time =    15.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]        Rainfall(In)[2]      Weighting[1*2]
        1.30             1.80                   2.34

100 YEAR Area rainfall data:


Area(Ac.)[1]        Rainfall(In)[2]      Weighting[1*2]
        1.30             4.50                   5.85

STORM EVENT (YEAR) =    2.00
Area Averaged 2-Year Rainfall =    1.800(In)
Area Averaged 100-Year Rainfall =    4.500(In)

Point rain (area averaged) =    1.800(In)
Areal adjustment factor =  100.00 %
Adjusted average point rain =    1.800(In)

Sub-Area Data:
Area(Ac.)          Runoff Index   Impervious %
     1.300            91.00          0.000
 Total Area Entered =      1.30(Ac.)


RI     RI    Infil. Rate Impervious   Adj. Infil. Rate  Area%      F
AMC2 AMC-1      (In/Hr)    (Dec.%)      (In/Hr)       (Dec.)     (In/Hr)
91.0  79.8       0.246     0.000         0.246        1.000       0.246
                                                    Sum (F) =    0.246
Area averaged mean soil loss (F) (In/Hr) =  0.246
Minimum soil loss rate ((In/Hr)) =  0.123
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.900
-------------------------------------------------------------------
```

Unit Hydrograph
FOOTHILL S-Curve

Unit Hydrograph Data

Unit	time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.250	688.118	80.646	1.057
2	0.500	1376.237	19.354	0.254
			Sum = 100.000	Sum= 1.310

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.25	0.20	0.014	(0.435)	0.013	0.001
2	0.50	0.30	0.022	(0.430)	0.019	0.002
3	0.75	0.30	0.022	(0.425)	0.019	0.002
4	1.00	0.40	0.029	(0.420)	0.026	0.003
5	1.25	0.30	0.022	(0.415)	0.019	0.002
6	1.50	0.30	0.022	(0.410)	0.019	0.002
7	1.75	0.30	0.022	(0.405)	0.019	0.002
8	2.00	0.40	0.029	(0.400)	0.026	0.003
9	2.25	0.40	0.029	(0.395)	0.026	0.003
10	2.50	0.40	0.029	(0.391)	0.026	0.003
11	2.75	0.50	0.036	(0.386)	0.032	0.004
12	3.00	0.50	0.036	(0.381)	0.032	0.004
13	3.25	0.50	0.036	(0.376)	0.032	0.004
14	3.50	0.50	0.036	(0.372)	0.032	0.004
15	3.75	0.50	0.036	(0.367)	0.032	0.004
16	4.00	0.60	0.043	(0.362)	0.039	0.004
17	4.25	0.60	0.043	(0.358)	0.039	0.004
18	4.50	0.70	0.050	(0.353)	0.045	0.005
19	4.75	0.70	0.050	(0.349)	0.045	0.005
20	5.00	0.80	0.058	(0.344)	0.052	0.006
21	5.25	0.60	0.043	(0.340)	0.039	0.004
22	5.50	0.70	0.050	(0.335)	0.045	0.005
23	5.75	0.80	0.058	(0.331)	0.052	0.006
24	6.00	0.80	0.058	(0.327)	0.052	0.006
25	6.25	0.90	0.065	(0.322)	0.058	0.006
26	6.50	0.90	0.065	(0.318)	0.058	0.006
27	6.75	1.00	0.072	(0.314)	0.065	0.007
28	7.00	1.00	0.072	(0.310)	0.065	0.007
29	7.25	1.00	0.072	(0.305)	0.065	0.007
30	7.50	1.10	0.079	(0.301)	0.071	0.008
31	7.75	1.20	0.086	(0.297)	0.078	0.009
32	8.00	1.30	0.094	(0.293)	0.084	0.009
33	8.25	1.50	0.108	(0.289)	0.097	0.011
34	8.50	1.50	0.108	(0.285)	0.097	0.011
35	8.75	1.60	0.115	(0.281)	0.104	0.012
36	9.00	1.70	0.122	(0.277)	0.110	0.012
37	9.25	1.90	0.137	(0.273)	0.123	0.014
38	9.50	2.00	0.144	(0.269)	0.130	0.014
39	9.75	2.10	0.151	(0.265)	0.136	0.015
40	10.00	2.20	0.158	(0.261)	0.143	0.016
41	10.25	1.50	0.108	(0.258)	0.097	0.011
42	10.50	1.50	0.108	(0.254)	0.097	0.011
43	10.75	2.00	0.144	(0.250)	0.130	0.014
44	11.00	2.00	0.144	(0.247)	0.130	0.014
45	11.25	1.90	0.137	(0.243)	0.123	0.014
46	11.50	1.90	0.137	(0.239)	0.123	0.014
47	11.75	1.70	0.122	(0.236)	0.110	0.012
48	12.00	1.80	0.130	(0.232)	0.117	0.013
49	12.25	2.50	0.180	(0.229)	0.162	0.018
50	12.50	2.60	0.187	(0.225)	0.168	0.019
51	12.75	2.80	0.202	(0.222)	0.181	0.020
52	13.00	2.90	0.209	(0.219)	0.188	0.021
53	13.25	3.40	0.245	0.215	(0.220)	0.029
54	13.50	3.40	0.245	0.212	(0.220)	0.033
55	13.75	2.30	0.166	(0.209)	0.149	0.017
56	14.00	2.30	0.166	(0.206)	0.149	0.017
57	14.25	2.70	0.194	(0.203)	0.175	0.019
58	14.50	2.60	0.187	(0.199)	0.168	0.019
59	14.75	2.60	0.187	(0.196)	0.168	0.019
60	15.00	2.50	0.180	(0.193)	0.162	0.018
61	15.25	2.40	0.173	(0.190)	0.156	0.017
62	15.50	2.30	0.166	(0.188)	0.149	0.017
63	15.75	1.90	0.137	(0.185)	0.123	0.014
64	16.00	1.90	0.137	(0.182)	0.123	0.014

65	16.25	0.40	0.029	(0.179)	0.026	0.003
66	16.50	0.40	0.029	(0.176)	0.026	0.003
67	16.75	0.30	0.022	(0.174)	0.019	0.002
68	17.00	0.30	0.022	(0.171)	0.019	0.002
69	17.25	0.50	0.036	(0.168)	0.032	0.004
70	17.50	0.50	0.036	(0.166)	0.032	0.004
71	17.75	0.50	0.036	(0.163)	0.032	0.004
72	18.00	0.40	0.029	(0.161)	0.026	0.003
73	18.25	0.40	0.029	(0.159)	0.026	0.003
74	18.50	0.40	0.029	(0.156)	0.026	0.003
75	18.75	0.30	0.022	(0.154)	0.019	0.002
76	19.00	0.20	0.014	(0.152)	0.013	0.001
77	19.25	0.30	0.022	(0.150)	0.019	0.002
78	19.50	0.40	0.029	(0.148)	0.026	0.003
79	19.75	0.30	0.022	(0.146)	0.019	0.002
80	20.00	0.20	0.014	(0.144)	0.013	0.001
81	20.25	0.30	0.022	(0.142)	0.019	0.002
82	20.50	0.30	0.022	(0.140)	0.019	0.002
83	20.75	0.30	0.022	(0.138)	0.019	0.002
84	21.00	0.20	0.014	(0.137)	0.013	0.001
85	21.25	0.30	0.022	(0.135)	0.019	0.002
86	21.50	0.20	0.014	(0.133)	0.013	0.001
87	21.75	0.30	0.022	(0.132)	0.019	0.002
88	22.00	0.20	0.014	(0.131)	0.013	0.001
89	22.25	0.30	0.022	(0.129)	0.019	0.002
90	22.50	0.20	0.014	(0.128)	0.013	0.001
91	22.75	0.20	0.014	(0.127)	0.013	0.001
92	23.00	0.20	0.014	(0.126)	0.013	0.001
93	23.25	0.20	0.014	(0.125)	0.013	0.001
94	23.50	0.20	0.014	(0.124)	0.013	0.001
95	23.75	0.20	0.014	(0.124)	0.013	0.001
96	24.00	0.20	0.014	(0.123)	0.013	0.001

(Loss Rate Not Used)

Sum = 100.0 Sum = 0.7

Flood volume = Effective rainfall 0.18(In)
times area 1.3(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)
Total soil loss = 1.62(In)
Total soil loss = 0.175(Ac.Ft)
Total rainfall = 1.80(In)
Flood volume = 865.0 Cubic Feet
Total soil loss = 7629.2 Cubic Feet

Peak flow rate of this hydrograph = 0.042(CFS) ← PEAK FLOW RATE

++

24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 15 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+15	0.0000	0.00	Q	|	|	|	|
0+30	0.0001	0.00	Q	|	|	|	|
0+45	0.0001	0.00	Q	|	|	|	|
1+ 0	0.0002	0.00	Q	|	|	|	|
1+15	0.0003	0.00	Q	|	|	|	|
1+30	0.0003	0.00	Q	|	|	|	|
1+45	0.0004	0.00	Q	|	|	|	|
2+ 0	0.0005	0.00	Q	|	|	|	|
2+15	0.0006	0.00	QV	|	|	|	|
2+30	0.0006	0.00	QV	|	|	|	|
2+45	0.0007	0.00	QV	|	|	|	|
3+ 0	0.0008	0.00	QV	|	|	|	|
3+15	0.0009	0.00	QV	|	|	|	|
3+30	0.0010	0.00	Q V	|	|	|	|
3+45	0.0011	0.00	Q V	|	|	|	|
4+ 0	0.0012	0.01	Q V	|	|	|	|
4+15	0.0013	0.01	Q V	|	|	|	|
4+30	0.0015	0.01	Q V	|	|	|	|
4+45	0.0016	0.01	Q V	|	|	|	|
5+ 0	0.0018	0.01	Q V	|	|	|	|
5+15	0.0019	0.01	Q V	|	|	|	|
5+30	0.0020	0.01	Q V	|	|	|	|
5+45	0.0022	0.01	Q V	|	|	|	|
6+ 0	0.0023	0.01	Q V	|	|	|	|
6+15	0.0025	0.01	Q V	|	|	|	|
6+30	0.0027	0.01	Q V	|	|	|	|
6+45	0.0029	0.01	Q V	|	|	|	|
7+ 0	0.0031	0.01	Q V	|	|	|	|
7+15	0.0033	0.01	Q V	|	|	|	|
7+30	0.0035	0.01	Q V	|	|	|	|

7+45	0.0037	0.01	Q	
8+ 0	0.0039	0.01	Q	
8+15	0.0042	0.01	Q	
8+30	0.0045	0.01	Q	
8+45	0.0048	0.01	Q	
9+ 0	0.0052	0.02	Q	
9+15	0.0055	0.02	Q	
9+30	0.0059	0.02	Q	
9+45	0.0063	0.02	Q	
10+ 0	0.0067	0.02	Q	
10+15	0.0071	0.02	Q	
10+30	0.0074	0.01	Q	
10+45	0.0077	0.02	Q	
11+ 0	0.0081	0.02	Q	
11+15	0.0085	0.02	Q	
11+30	0.0089	0.02	Q	
11+45	0.0092	0.02	Q	
12+ 0	0.0095	0.02	Q	
12+15	0.0100	0.02	Q	
12+30	0.0105	0.02	Q	
12+45	0.0110	0.03	Q	
13+ 0	0.0116	0.03	Q	
13+15	0.0124	0.04	Q	
13+30	0.0132	0.04	Q	
13+45	0.0138	0.03	Q	
14+ 0	0.0142	0.02	Q	
14+15	0.0147	0.02	Q	
14+30	0.0152	0.02	Q	
14+45	0.0157	0.02	Q	
15+ 0	0.0162	0.02	Q	
15+15	0.0167	0.02	Q	
15+30	0.0172	0.02	Q	
15+45	0.0175	0.02	Q	
16+ 0	0.0179	0.02	Q	
16+15	0.0180	0.01	Q	
16+30	0.0181	0.00	Q	
16+45	0.0182	0.00	Q	
17+ 0	0.0182	0.00	Q	
17+15	0.0183	0.00	Q	
17+30	0.0184	0.00	Q	
17+45	0.0185	0.00	Q	
18+ 0	0.0186	0.00	Q	
18+15	0.0187	0.00	Q	
18+30	0.0188	0.00	Q	
18+45	0.0188	0.00	Q	
19+ 0	0.0189	0.00	Q	
19+15	0.0189	0.00	Q	
19+30	0.0190	0.00	Q	
19+45	0.0191	0.00	Q	
20+ 0	0.0191	0.00	Q	
20+15	0.0192	0.00	Q	
20+30	0.0192	0.00	Q	
20+45	0.0193	0.00	Q	
21+ 0	0.0193	0.00	Q	
21+15	0.0194	0.00	Q	
21+30	0.0194	0.00	Q	
21+45	0.0195	0.00	Q	
22+ 0	0.0195	0.00	Q	
22+15	0.0196	0.00	Q	
22+30	0.0196	0.00	Q	
22+45	0.0197	0.00	Q	
23+ 0	0.0197	0.00	Q	
23+15	0.0197	0.00	Q	
23+30	0.0198	0.00	Q	
23+45	0.0198	0.00	Q	
24+ 0	0.0198	0.00	Q	
24+15	0.0199	0.00	Q	

```
        U n i t   H y d r o g r a p h   A n a l y s i s

        Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2008, Version 8.1
                Study date  08/27/17 File: DMA1DEV242.out

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
----------------------------------------------------------------------

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 5024

--------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format


--------------------------------------------------------------------
WO 2165
DMA1 DEVELOPED
INPUT = DMA1DEV.UM1
OUTPUT = DMA1DEV224.OUT
--------------------------------------------------------------------
Drainage Area =       1.30(Ac.)  =      0.002 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =       1.30(Ac.)  =      0.002 Sq. Mi.
Length along longest watercourse =     585.00(Ft.)
Length along longest watercourse measured to centroid =     292.50(Ft.)
Length along longest watercourse =      0.111 Mi.
Length along longest watercourse measured to centroid =      0.055 Mi.
Difference in elevation =      28.00(Ft.)
Slope along watercourse =    252.7179 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time =    0.018 Hr.
Lag time =     1.09 Min.
25% of lag time =     0.27 Min.
40% of lag time =     0.44 Min.
Unit time =    15.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]        Rainfall(In)[2]      Weighting[1*2]
        1.30             1.80                   2.34

100 YEAR Area rainfall data:


Area(Ac.)[1]        Rainfall(In)[2]      Weighting[1*2]
        1.30             4.50                   5.85

STORM EVENT (YEAR) =    2.00
Area Averaged 2-Year Rainfall =    1.800(In)
Area Averaged 100-Year Rainfall =    4.500(In)

Point rain (area averaged) =    1.800(In)
Areal adjustment factor =  100.00 %
Adjusted average point rain =    1.800(In)

Sub-Area Data:
Area(Ac.)          Runoff Index   Impervious %
     1.300            69.00          0.270
 Total Area Entered =      1.30(Ac.)


RI     RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-1     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)    (In/Hr)
69.0  49.8      0.574     0.270        0.434       1.000      0.434
                                                 Sum (F) =    0.434
Area averaged mean soil loss (F) (In/Hr) =  0.434
Minimum soil loss rate ((In/Hr)) =  0.217
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.680
--------------------------------------------------------------------
```

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %		Unit Hydrograph (CFS)
1	0.250	1376.237	100.000		1.310
			Sum = 100.000	Sum=	1.310

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.25	0.20	0.014	(0.767)	0.010	0.005
2	0.50	0.30	0.022	(0.758)	0.015	0.007
3	0.75	0.30	0.022	(0.749)	0.015	0.007
4	1.00	0.40	0.029	(0.741)	0.020	0.009
5	1.25	0.30	0.022	(0.732)	0.015	0.007
6	1.50	0.30	0.022	(0.723)	0.015	0.007
7	1.75	0.30	0.022	(0.715)	0.015	0.007
8	2.00	0.40	0.029	(0.706)	0.020	0.009
9	2.25	0.40	0.029	(0.698)	0.020	0.009
10	2.50	0.40	0.029	(0.689)	0.020	0.009
11	2.75	0.50	0.036	(0.681)	0.024	0.012
12	3.00	0.50	0.036	(0.672)	0.024	0.012
13	3.25	0.50	0.036	(0.664)	0.024	0.012
14	3.50	0.50	0.036	(0.656)	0.024	0.012
15	3.75	0.50	0.036	(0.647)	0.024	0.012
16	4.00	0.60	0.043	(0.639)	0.029	0.014
17	4.25	0.60	0.043	(0.631)	0.029	0.014
18	4.50	0.70	0.050	(0.623)	0.034	0.016
19	4.75	0.70	0.050	(0.615)	0.034	0.016
20	5.00	0.80	0.058	(0.607)	0.039	0.018
21	5.25	0.60	0.043	(0.599)	0.029	0.014
22	5.50	0.70	0.050	(0.592)	0.034	0.016
23	5.75	0.80	0.058	(0.584)	0.039	0.018
24	6.00	0.80	0.058	(0.576)	0.039	0.018
25	6.25	0.90	0.065	(0.568)	0.044	0.021
26	6.50	0.90	0.065	(0.561)	0.044	0.021
27	6.75	1.00	0.072	(0.553)	0.049	0.023
28	7.00	1.00	0.072	(0.546)	0.049	0.023
29	7.25	1.00	0.072	(0.538)	0.049	0.023
30	7.50	1.10	0.079	(0.531)	0.054	0.025
31	7.75	1.20	0.086	(0.524)	0.059	0.028
32	8.00	1.30	0.094	(0.517)	0.064	0.030
33	8.25	1.50	0.108	(0.509)	0.073	0.035
34	8.50	1.50	0.108	(0.502)	0.073	0.035
35	8.75	1.60	0.115	(0.495)	0.078	0.037
36	9.00	1.70	0.122	(0.488)	0.083	0.039
37	9.25	1.90	0.137	(0.481)	0.093	0.044
38	9.50	2.00	0.144	(0.475)	0.098	0.046
39	9.75	2.10	0.151	(0.468)	0.103	0.048
40	10.00	2.20	0.158	(0.461)	0.108	0.051
41	10.25	1.50	0.108	(0.454)	0.073	0.035
42	10.50	1.50	0.108	(0.448)	0.073	0.035
43	10.75	2.00	0.144	(0.441)	0.098	0.046
44	11.00	2.00	0.144	(0.435)	0.098	0.046
45	11.25	1.90	0.137	(0.428)	0.093	0.044
46	11.50	1.90	0.137	(0.422)	0.093	0.044
47	11.75	1.70	0.122	(0.416)	0.083	0.039
48	12.00	1.80	0.130	(0.410)	0.088	0.041
49	12.25	2.50	0.180	(0.404)	0.122	0.058
50	12.50	2.60	0.187	(0.398)	0.127	0.060
51	12.75	2.80	0.202	(0.392)	0.137	0.065
52	13.00	2.90	0.209	(0.386)	0.142	0.067
53	13.25	3.40	0.245	(0.380)	0.166	0.078
54	13.50	3.40	0.245	(0.374)	0.166	0.078
55	13.75	2.30	0.166	(0.368)	0.113	0.053
56	14.00	2.30	0.166	(0.363)	0.113	0.053
57	14.25	2.70	0.194	(0.357)	0.132	0.062
58	14.50	2.60	0.187	(0.352)	0.127	0.060
59	14.75	2.60	0.187	(0.346)	0.127	0.060
60	15.00	2.50	0.180	(0.341)	0.122	0.058
61	15.25	2.40	0.173	(0.336)	0.118	0.055
62	15.50	2.30	0.166	(0.331)	0.113	0.053
63	15.75	1.90	0.137	(0.326)	0.093	0.044
64	16.00	1.90	0.137	(0.321)	0.093	0.044
65	16.25	0.40	0.029	(0.316)	0.020	0.009

66	16.50	0.40	0.029	(0.311)	0.020	0.009
67	16.75	0.30	0.022	(0.306)	0.015	0.007
68	17.00	0.30	0.022	(0.302)	0.015	0.007
69	17.25	0.50	0.036	(0.297)	0.024	0.012
70	17.50	0.50	0.036	(0.293)	0.024	0.012
71	17.75	0.50	0.036	(0.288)	0.024	0.012
72	18.00	0.40	0.029	(0.284)	0.020	0.009
73	18.25	0.40	0.029	(0.280)	0.020	0.009
74	18.50	0.40	0.029	(0.276)	0.020	0.009
75	18.75	0.30	0.022	(0.272)	0.015	0.007
76	19.00	0.20	0.014	(0.268)	0.010	0.005
77	19.25	0.30	0.022	(0.264)	0.015	0.007
78	19.50	0.40	0.029	(0.260)	0.020	0.009
79	19.75	0.30	0.022	(0.257)	0.015	0.007
80	20.00	0.20	0.014	(0.253)	0.010	0.005
81	20.25	0.30	0.022	(0.250)	0.015	0.007
82	20.50	0.30	0.022	(0.247)	0.015	0.007
83	20.75	0.30	0.022	(0.244)	0.015	0.007
84	21.00	0.20	0.014	(0.241)	0.010	0.005
85	21.25	0.30	0.022	(0.238)	0.015	0.007
86	21.50	0.20	0.014	(0.235)	0.010	0.005
87	21.75	0.30	0.022	(0.233)	0.015	0.007
88	22.00	0.20	0.014	(0.230)	0.010	0.005
89	22.25	0.30	0.022	(0.228)	0.015	0.007
90	22.50	0.20	0.014	(0.226)	0.010	0.005
91	22.75	0.20	0.014	(0.224)	0.010	0.005
92	23.00	0.20	0.014	(0.222)	0.010	0.005
93	23.25	0.20	0.014	(0.221)	0.010	0.005
94	23.50	0.20	0.014	(0.219)	0.010	0.005
95	23.75	0.20	0.014	(0.218)	0.010	0.005
96	24.00	0.20	0.014	(0.217)	0.010	0.005

(Loss Rate Not Used)

Sum = 100.0 Sum = 2.3

Flood volume = Effective rainfall 0.58(In)
times area 1.3(Ac.)/[(In)/(Ft.)] = 0.1(Ac.Ft)
Total soil loss = 1.22(In)
Total soil loss = 0.133(Ac.Ft)
Total rainfall = 1.80(In)
Flood volume = 2718.1 Cubic Feet
Total soil loss = 5776.0 Cubic Feet

Peak flow rate of this hydrograph = 0.103(CFS)

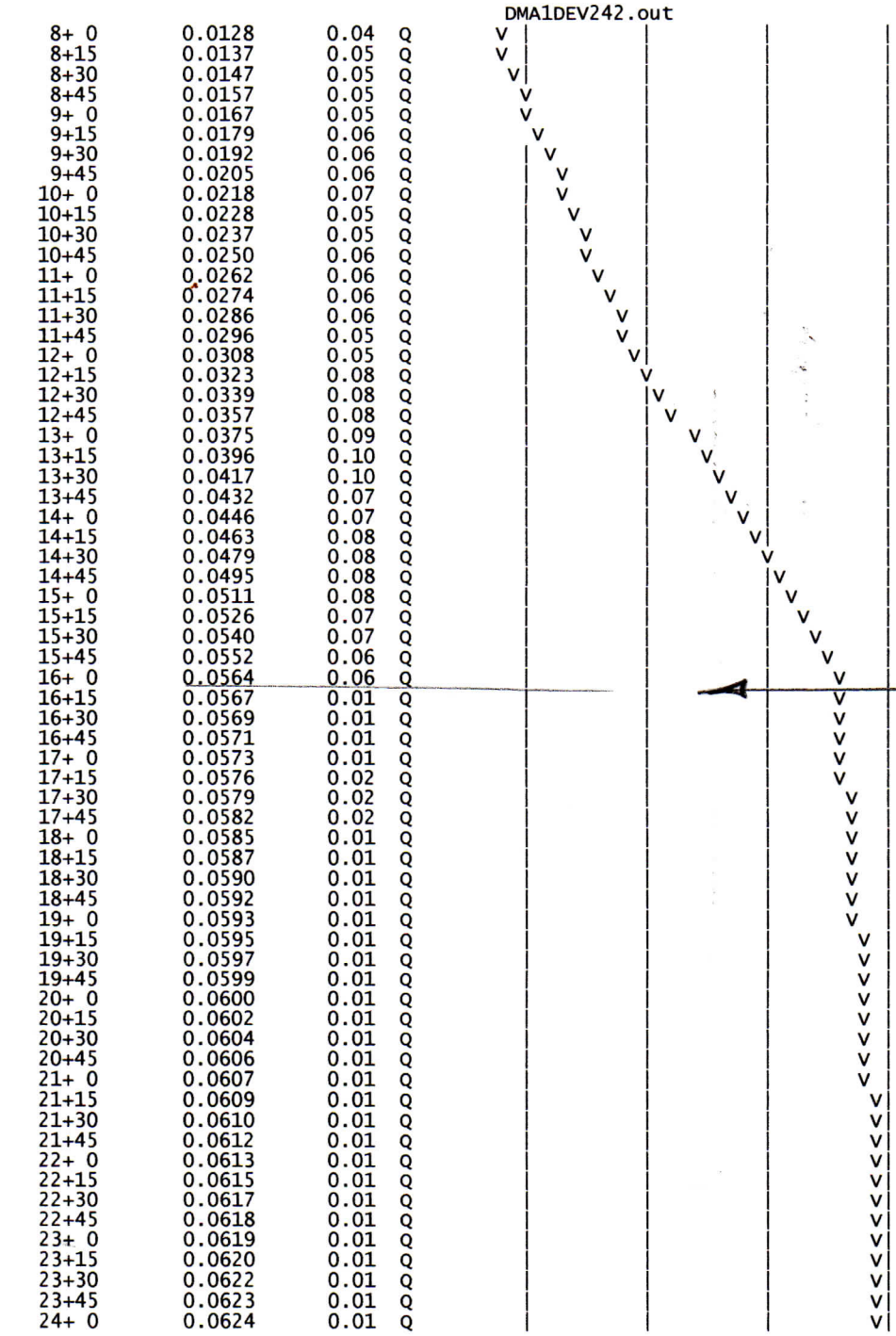
++

24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 15 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+15	0.0001	0.01	Q	|	|	|	|
0+30	0.0003	0.01	Q	|	|	|	|
0+45	0.0005	0.01	Q	|	|	|	|
1+ 0	0.0007	0.01	Q	|	|	|	|
1+15	0.0009	0.01	Q	|	|	|	|
1+30	0.0011	0.01	Q	|	|	|	|
1+45	0.0013	0.01	Q	|	|	|	|
2+ 0	0.0016	0.01	QV	|	|	|	|
2+15	0.0018	0.01	QV	|	|	|	|
2+30	0.0021	0.01	QV	|	|	|	|
2+45	0.0024	0.02	QV	|	|	|	|
3+ 0	0.0027	0.02	QV	|	|	|	|
3+15	0.0030	0.02	QV	|	|	|	|
3+30	0.0033	0.02	Q V	|	|	|	|
3+45	0.0036	0.02	Q V	|	|	|	|
4+ 0	0.0040	0.02	Q V	|	|	|	|
4+15	0.0044	0.02	Q V	|	|	|	|
4+30	0.0048	0.02	Q V	|	|	|	|
4+45	0.0052	0.02	Q V	|	|	|	|
5+ 0	0.0057	0.02	Q V	|	|	|	|
5+15	0.0061	0.02	Q V	|	|	|	|
5+30	0.0066	0.02	Q V	|	|	|	|
5+45	0.0071	0.02	Q V	|	|	|	|
6+ 0	0.0076	0.02	Q V	|	|	|	|
6+15	0.0081	0.03	Q V	|	|	|	|
6+30	0.0087	0.03	Q V	|	|	|	|
6+45	0.0093	0.03	Q V	|	|	|	|
7+ 0	0.0099	0.03	Q V	|	|	|	|
7+15	0.0105	0.03	Q V	|	|	|	|
7+30	0.0112	0.03	Q V	|	|	|	|
7+45	0.0120	0.04	Q V	|	|	|	|

8+ 0	0.0128	0.04	Q
8+15	0.0137	0.05	Q
8+30	0.0147	0.05	Q
8+45	0.0157	0.05	Q
9+ 0	0.0167	0.05	Q
9+15	0.0179	0.06	Q
9+30	0.0192	0.06	Q
9+45	0.0205	0.06	Q
10+ 0	0.0218	0.07	Q
10+15	0.0228	0.05	Q
10+30	0.0237	0.05	Q
10+45	0.0250	0.06	Q
11+ 0	0.0262	0.06	Q
11+15	0.0274	0.06	Q
11+30	0.0286	0.06	Q
11+45	0.0296	0.05	Q
12+ 0	0.0308	0.05	Q
12+15	0.0323	0.08	Q
12+30	0.0339	0.08	Q
12+45	0.0357	0.08	Q
13+ 0	0.0375	0.09	Q
13+15	0.0396	0.10	Q
13+30	0.0417	0.10	Q
13+45	0.0432	0.07	Q
14+ 0	0.0446	0.07	Q
14+15	0.0463	0.08	Q
14+30	0.0479	0.08	Q
14+45	0.0495	0.08	Q
15+ 0	0.0511	0.08	Q
15+15	0.0526	0.07	Q
15+30	0.0540	0.07	Q
15+45	0.0552	0.06	Q
16+ 0	0.0564	0.06	Q
16+15	0.0567	0.01	Q
16+30	0.0569	0.01	Q
16+45	0.0571	0.01	Q
17+ 0	0.0573	0.01	Q
17+15	0.0576	0.02	Q
17+30	0.0579	0.02	Q
17+45	0.0582	0.02	Q
18+ 0	0.0585	0.01	Q
18+15	0.0587	0.01	Q
18+30	0.0590	0.01	Q
18+45	0.0592	0.01	Q
19+ 0	0.0593	0.01	Q
19+15	0.0595	0.01	Q
19+30	0.0597	0.01	Q
19+45	0.0599	0.01	Q
20+ 0	0.0600	0.01	Q
20+15	0.0602	0.01	Q
20+30	0.0604	0.01	Q
20+45	0.0606	0.01	Q
21+ 0	0.0607	0.01	Q
21+15	0.0609	0.01	Q
21+30	0.0610	0.01	Q
21+45	0.0612	0.01	Q
22+ 0	0.0613	0.01	Q
22+15	0.0615	0.01	Q
22+30	0.0617	0.01	Q
22+45	0.0618	0.01	Q
23+ 0	0.0619	0.01	Q
23+15	0.0620	0.01	Q
23+30	0.0622	0.01	Q
23+45	0.0623	0.01	Q
24+ 0	0.0624	0.01	Q



$\Delta Q = 0.042$ cfs

$V_{REQ'D} = 0.565^{AF}$

$= 2460$ CF

```
        U n i t   H y d r o g r a p h   A n a l y s i s

        Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2008, Version 8.1
                Study date  08/27/17 File: DMA2UNDEV242.out

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
--------------------------------------------------------------------------

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 5024

-------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format


-------------------------------------------------------------------
WO 2165
DMA2 UNDEVELOPED
INPUT = DMA2UNDEV.UM1
OUTPUT = DMA2UNDEV224.OUT
-------------------------------------------------------------------
Drainage Area =       0.91(Ac.)  =      0.001 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =       0.91(Ac.)  =      0.001 Sq. Mi.
Length along longest watercourse =     500.00(Ft.)
Length along longest watercourse measured to centroid =     250.00(Ft.)
Length along longest watercourse =      0.095 Mi.
Length along longest watercourse measured to centroid =      0.047 Mi.
Difference in elevation =      41.00(Ft.)
Slope along watercourse =    432.9600 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time =    0.029 Hr.
Lag time =     1.75 Min.
25% of lag time =     0.44 Min.
40% of lag time =     0.70 Min.
Unit time =    15.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
        0.91            1.80                    1.64

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
        0.91            4.50                    4.09

STORM EVENT (YEAR) =    2.00
Area Averaged 2-Year Rainfall =    1.800(In)
Area Averaged 100-Year Rainfall =    4.500(In)

Point rain (area averaged) =    1.800(In)
Areal adjustment factor =  100.00 %
Adjusted average point rain =    1.800(In)

Sub-Area Data:
Area(Ac.)         Runoff Index   Impervious %
     0.910           91.00          0.000
 Total Area Entered =      0.91(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-1     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)    (In/Hr)
91.0  79.8      0.246     0.000        0.246       1.000      0.246
                                                 Sum (F) =    0.246
Area averaged mean soil loss (F) (In/Hr) =  0.246
Minimum soil loss rate ((In/Hr)) =  0.123
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.900
-------------------------------------------------------------------
```

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.250	858.833	100.000	0.917
			Sum = 100.000 Sum=	0.917

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.25	0.20	0.014	(0.435)	0.013	0.001
2	0.50	0.30	0.022	(0.430)	0.019	0.002
3	0.75	0.30	0.022	(0.425)	0.019	0.002
4	1.00	0.40	0.029	(0.420)	0.026	0.003
5	1.25	0.30	0.022	(0.415)	0.019	0.002
6	1.50	0.30	0.022	(0.410)	0.019	0.002
7	1.75	0.30	0.022	(0.405)	0.019	0.002
8	2.00	0.40	0.029	(0.400)	0.026	0.003
9	2.25	0.40	0.029	(0.395)	0.026	0.003
10	2.50	0.40	0.029	(0.391)	0.026	0.003
11	2.75	0.50	0.036	(0.386)	0.032	0.004
12	3.00	0.50	0.036	(0.381)	0.032	0.004
13	3.25	0.50	0.036	(0.376)	0.032	0.004
14	3.50	0.50	0.036	(0.372)	0.032	0.004
15	3.75	0.50	0.036	(0.367)	0.032	0.004
16	4.00	0.60	0.043	(0.362)	0.039	0.004
17	4.25	0.60	0.043	(0.358)	0.039	0.004
18	4.50	0.70	0.050	(0.353)	0.045	0.005
19	4.75	0.70	0.050	(0.349)	0.045	0.005
20	5.00	0.80	0.058	(0.344)	0.052	0.006
21	5.25	0.60	0.043	(0.340)	0.039	0.004
22	5.50	0.70	0.050	(0.335)	0.045	0.005
23	5.75	0.80	0.058	(0.331)	0.052	0.006
24	6.00	0.80	0.058	(0.327)	0.052	0.006
25	6.25	0.90	0.065	(0.322)	0.058	0.006
26	6.50	0.90	0.065	(0.318)	0.058	0.006
27	6.75	1.00	0.072	(0.314)	0.065	0.007
28	7.00	1.00	0.072	(0.310)	0.065	0.007
29	7.25	1.00	0.072	(0.305)	0.065	0.007
30	7.50	1.10	0.079	(0.301)	0.071	0.008
31	7.75	1.20	0.086	(0.297)	0.078	0.009
32	8.00	1.30	0.094	(0.293)	0.084	0.009
33	8.25	1.50	0.108	(0.289)	0.097	0.011
34	8.50	1.50	0.108	(0.285)	0.097	0.011
35	8.75	1.60	0.115	(0.281)	0.104	0.012
36	9.00	1.70	0.122	(0.277)	0.110	0.012
37	9.25	1.90	0.137	(0.273)	0.123	0.014
38	9.50	2.00	0.144	(0.269)	0.130	0.014
39	9.75	2.10	0.151	(0.265)	0.136	0.015
40	10.00	2.20	0.158	(0.261)	0.143	0.016
41	10.25	1.50	0.108	(0.258)	0.097	0.011
42	10.50	1.50	0.108	(0.254)	0.097	0.011
43	10.75	2.00	0.144	(0.250)	0.130	0.014
44	11.00	2.00	0.144	(0.247)	0.130	0.014
45	11.25	1.90	0.137	(0.243)	0.123	0.014
46	11.50	1.90	0.137	(0.239)	0.123	0.014
47	11.75	1.70	0.122	(0.236)	0.110	0.012
48	12.00	1.80	0.130	(0.232)	0.117	0.013
49	12.25	2.50	0.180	(0.229)	0.162	0.018
50	12.50	2.60	0.187	(0.225)	0.168	0.019
51	12.75	2.80	0.202	(0.222)	0.181	0.020
52	13.00	2.90	0.209	(0.219)	0.188	0.021
53	13.25	3.40	0.245	0.215	(0.220)	0.029
54	13.50	3.40	0.245	0.212	(0.220)	0.033
55	13.75	2.30	0.166	(0.209)	0.149	0.017
56	14.00	2.30	0.166	(0.206)	0.149	0.017
57	14.25	2.70	0.194	(0.203)	0.175	0.019
58	14.50	2.60	0.187	(0.199)	0.168	0.019
59	14.75	2.60	0.187	(0.196)	0.168	0.019
60	15.00	2.50	0.180	(0.193)	0.162	0.018
61	15.25	2.40	0.173	(0.190)	0.156	0.017
62	15.50	2.30	0.166	(0.188)	0.149	0.017
63	15.75	1.90	0.137	(0.185)	0.123	0.014
64	16.00	1.90	0.137	(0.182)	0.123	0.014
65	16.25	0.40	0.029	(0.179)	0.026	0.003

66	16.50	0.40	0.029	(0.176)	0.026	0.003
67	16.75	0.30	0.022	(0.174)	0.019	0.002
68	17.00	0.30	0.022	(0.171)	0.019	0.002
69	17.25	0.50	0.036	(0.168)	0.032	0.004
70	17.50	0.50	0.036	(0.166)	0.032	0.004
71	17.75	0.50	0.036	(0.163)	0.032	0.004
72	18.00	0.40	0.029	(0.161)	0.026	0.003
73	18.25	0.40	0.029	(0.159)	0.026	0.003
74	18.50	0.40	0.029	(0.156)	0.026	0.003
75	18.75	0.30	0.022	(0.154)	0.019	0.002
76	19.00	0.20	0.014	(0.152)	0.013	0.001
77	19.25	0.30	0.022	(0.150)	0.019	0.002
78	19.50	0.40	0.029	(0.148)	0.026	0.003
79	19.75	0.30	0.022	(0.146)	0.019	0.002
80	20.00	0.20	0.014	(0.144)	0.013	0.001
81	20.25	0.30	0.022	(0.142)	0.019	0.002
82	20.50	0.30	0.022	(0.140)	0.019	0.002
83	20.75	0.30	0.022	(0.138)	0.019	0.002
84	21.00	0.20	0.014	(0.137)	0.013	0.001
85	21.25	0.30	0.022	(0.135)	0.019	0.002
86	21.50	0.20	0.014	(0.133)	0.013	0.001
87	21.75	0.30	0.022	(0.132)	0.019	0.002
88	22.00	0.20	0.014	(0.131)	0.013	0.001
89	22.25	0.30	0.022	(0.129)	0.019	0.002
90	22.50	0.20	0.014	(0.128)	0.013	0.001
91	22.75	0.20	0.014	(0.127)	0.013	0.001
92	23.00	0.20	0.014	(0.126)	0.013	0.001
93	23.25	0.20	0.014	(0.125)	0.013	0.001
94	23.50	0.20	0.014	(0.124)	0.013	0.001
95	23.75	0.20	0.014	(0.124)	0.013	0.001
96	24.00	0.20	0.014	(0.123)	0.013	0.001

(Loss Rate Not Used)

Sum = 100.0 Sum = 0.7

Flood volume = Effective rainfall 0.18(In)
times area 0.9(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)
Total soil loss = 1.62(In)
Total soil loss = 0.123(Ac.Ft)
Total rainfall = 1.80(In)
Flood volume = 605.5 Cubic Feet
Total soil loss = 5340.4 Cubic Feet

Peak flow rate of this hydrograph = 0.030(CFS) ← PEAK FLOW RATE

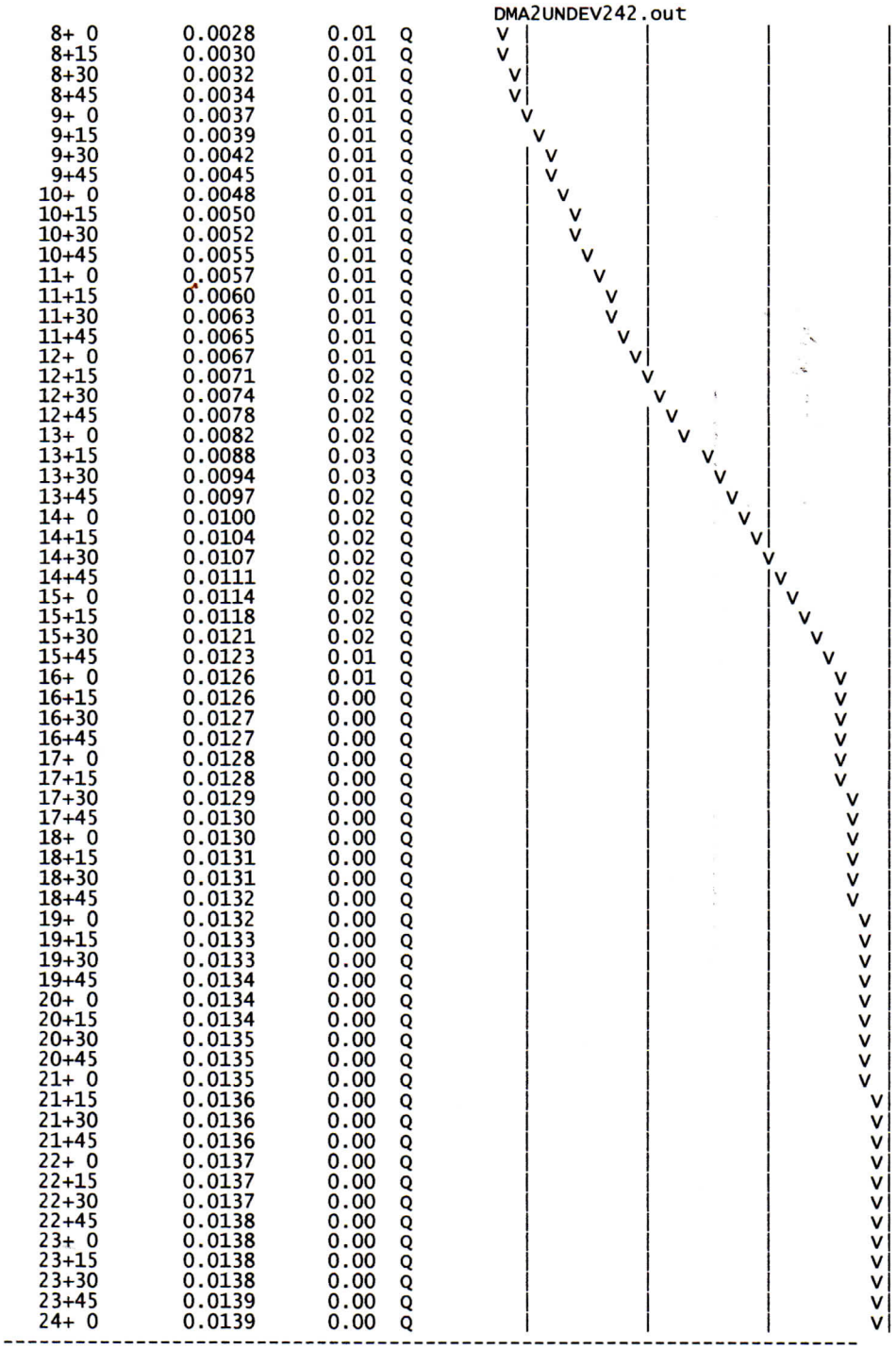
++

24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 15 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+15	0.0000	0.00	Q	|	|	|	|
0+30	0.0001	0.00	Q	|	|	|	|
0+45	0.0001	0.00	Q	|	|	|	|
1+ 0	0.0002	0.00	Q	|	|	|	|
1+15	0.0002	0.00	Q	|	|	|	|
1+30	0.0002	0.00	Q	|	|	|	|
1+45	0.0003	0.00	Q	|	|	|	|
2+ 0	0.0003	0.00	Q	|	|	|	|
2+15	0.0004	0.00	QV	|	|	|	|
2+30	0.0005	0.00	QV	|	|	|	|
2+45	0.0005	0.00	QV	|	|	|	|
3+ 0	0.0006	0.00	QV	|	|	|	|
3+15	0.0007	0.00	QV	|	|	|	|
3+30	0.0007	0.00	Q V	|	|	|	|
3+45	0.0008	0.00	Q V	|	|	|	|
4+ 0	0.0009	0.00	Q V	|	|	|	|
4+15	0.0010	0.00	Q V	|	|	|	|
4+30	0.0011	0.00	Q V	|	|	|	|
4+45	0.0011	0.00	Q V	|	|	|	|
5+ 0	0.0013	0.01	Q V	|	|	|	|
5+15	0.0013	0.00	Q V	|	|	|	|
5+30	0.0014	0.00	Q V	|	|	|	|
5+45	0.0015	0.01	Q V	|	|	|	|
6+ 0	0.0017	0.01	Q V	|	|	|	|
6+15	0.0018	0.01	Q V	|	|	|	|
6+30	0.0019	0.01	Q V	|	|	|	|
6+45	0.0020	0.01	Q V	|	|	|	|
7+ 0	0.0022	0.01	Q V	|	|	|	|
7+15	0.0023	0.01	Q V	|	|	|	|
7+30	0.0025	0.01	Q V	|	|	|	|
7+45	0.0026	0.01	Q V	|	|	|	|

8+ 0	0.0028	0.01	Q
8+15	0.0030	0.01	Q
8+30	0.0032	0.01	Q
8+45	0.0034	0.01	Q
9+ 0	0.0037	0.01	Q
9+15	0.0039	0.01	Q
9+30	0.0042	0.01	Q
9+45	0.0045	0.01	Q
10+ 0	0.0048	0.01	Q
10+15	0.0050	0.01	Q
10+30	0.0052	0.01	Q
10+45	0.0055	0.01	Q
11+ 0	0.0057	0.01	Q
11+15	0.0060	0.01	Q
11+30	0.0063	0.01	Q
11+45	0.0065	0.01	Q
12+ 0	0.0067	0.01	Q
12+15	0.0071	0.02	Q
12+30	0.0074	0.02	Q
12+45	0.0078	0.02	Q
13+ 0	0.0082	0.02	Q
13+15	0.0088	0.03	Q
13+30	0.0094	0.03	Q
13+45	0.0097	0.02	Q
14+ 0	0.0100	0.02	Q
14+15	0.0104	0.02	Q
14+30	0.0107	0.02	Q
14+45	0.0111	0.02	Q
15+ 0	0.0114	0.02	Q
15+15	0.0118	0.02	Q
15+30	0.0121	0.02	Q
15+45	0.0123	0.01	Q
16+ 0	0.0126	0.01	Q
16+15	0.0126	0.00	Q
16+30	0.0127	0.00	Q
16+45	0.0127	0.00	Q
17+ 0	0.0128	0.00	Q
17+15	0.0128	0.00	Q
17+30	0.0129	0.00	Q
17+45	0.0130	0.00	Q
18+ 0	0.0130	0.00	Q
18+15	0.0131	0.00	Q
18+30	0.0131	0.00	Q
18+45	0.0132	0.00	Q
19+ 0	0.0132	0.00	Q
19+15	0.0133	0.00	Q
19+30	0.0133	0.00	Q
19+45	0.0134	0.00	Q
20+ 0	0.0134	0.00	Q
20+15	0.0134	0.00	Q
20+30	0.0135	0.00	Q
20+45	0.0135	0.00	Q
21+ 0	0.0135	0.00	Q
21+15	0.0136	0.00	Q
21+30	0.0136	0.00	Q
21+45	0.0136	0.00	Q
22+ 0	0.0137	0.00	Q
22+15	0.0137	0.00	Q
22+30	0.0137	0.00	Q
22+45	0.0138	0.00	Q
23+ 0	0.0138	0.00	Q
23+15	0.0138	0.00	Q
23+30	0.0138	0.00	Q
23+45	0.0139	0.00	Q
24+ 0	0.0139	0.00	Q



```
        U n i t   H y d r o g r a p h   A n a l y s i s

        Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2008, Version 8.1
                Study date  08/27/17 File: DMA2DEV242.out

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
--------------------------------------------------------------------------

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 5024

------------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



------------------------------------------------------------------------
WO 2165
DMA2 DEVELOPED
INPUT = DMA2DEV.UM1
OUTPUT = DMA2DEV224.OUT
-----------------------------------------------------------------------
Drainage Area =       0.91(Ac.)  =      0.001 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =       0.91(Ac.)  =      0.001 Sq. Mi.
Length along longest watercourse =     500.00(Ft.)
Length along longest watercourse measured to centroid =     250.00(Ft.)
Length along longest watercourse =      0.095 Mi.
Length along longest watercourse measured to centroid =      0.047 Mi.
Difference in elevation =      41.00(Ft.)
Slope along watercourse =    432.9600 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time =    0.015 Hr.
Lag time =     0.87 Min.
25% of lag time =     0.22 Min.
40% of lag time =     0.35 Min.
Unit time =    15.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]        Rainfall(In)[2]      Weighting[1*2]
        0.91            1.80                    1.64

100 YEAR Area rainfall data:


Area(Ac.)[1]        Rainfall(In)[2]      Weighting[1*2]
        0.91            4.50                    4.09

STORM EVENT (YEAR) =    2.00
Area Averaged 2-Year Rainfall =    1.800(In)
Area Averaged 100-Year Rainfall =    4.500(In)

Point rain (area averaged) =    1.800(In)
Areal adjustment factor =  100.00 %
Adjusted average point rain =    1.800(In)

Sub-Area Data:
Area(Ac.)          Runoff Index   Impervious %
     0.910           69.00          0.440
 Total Area Entered =      0.91(Ac.)


RI     RI    Infil. Rate Impervious   Adj. Infil. Rate  Area%      F
AMC2 AMC-1      (In/Hr)    (Dec.%)      (In/Hr)       (Dec.)    (In/Hr)
69.0  49.8       0.574     0.440        0.347         1.000      0.347
                                                    Sum (F) =    0.347
Area averaged mean soil loss (F) (In/Hr) =  0.347
Minimum soil loss rate ((In/Hr)) =  0.173
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.550
------------------------------------------------------------------------
```

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.250	1717.665	100.000	0.917
			Sum = 100.000	Sum= 0.917

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.25	0.20	0.014	(0.612)	0.008	0.006
2	0.50	0.30	0.022	(0.605)	0.012	0.010
3	0.75	0.30	0.022	(0.598)	0.012	0.010
4	1.00	0.40	0.029	(0.591)	0.016	0.013
5	1.25	0.30	0.022	(0.584)	0.012	0.010
6	1.50	0.30	0.022	(0.577)	0.012	0.010
7	1.75	0.30	0.022	(0.570)	0.012	0.010
8	2.00	0.40	0.029	(0.563)	0.016	0.013
9	2.25	0.40	0.029	(0.557)	0.016	0.013
10	2.50	0.40	0.029	(0.550)	0.016	0.013
11	2.75	0.50	0.036	(0.543)	0.020	0.016
12	3.00	0.50	0.036	(0.536)	0.020	0.016
13	3.25	0.50	0.036	(0.530)	0.020	0.016
14	3.50	0.50	0.036	(0.523)	0.020	0.016
15	3.75	0.50	0.036	(0.517)	0.020	0.016
16	4.00	0.60	0.043	(0.510)	0.024	0.019
17	4.25	0.60	0.043	(0.504)	0.024	0.019
18	4.50	0.70	0.050	(0.497)	0.028	0.023
19	4.75	0.70	0.050	(0.491)	0.028	0.023
20	5.00	0.80	0.058	(0.484)	0.032	0.026
21	5.25	0.60	0.043	(0.478)	0.024	0.019
22	5.50	0.70	0.050	(0.472)	0.028	0.023
23	5.75	0.80	0.058	(0.466)	0.032	0.026
24	6.00	0.80	0.058	(0.460)	0.032	0.026
25	6.25	0.90	0.065	(0.454)	0.036	0.029
26	6.50	0.90	0.065	(0.447)	0.036	0.029
27	6.75	1.00	0.072	(0.441)	0.040	0.032
28	7.00	1.00	0.072	(0.436)	0.040	0.032
29	7.25	1.00	0.072	(0.430)	0.040	0.032
30	7.50	1.10	0.079	(0.424)	0.044	0.036
31	7.75	1.20	0.086	(0.418)	0.048	0.039
32	8.00	1.30	0.094	(0.412)	0.051	0.042
33	8.25	1.50	0.108	(0.406)	0.059	0.049
34	8.50	1.50	0.108	(0.401)	0.059	0.049
35	8.75	1.60	0.115	(0.395)	0.063	0.052
36	9.00	1.70	0.122	(0.390)	0.067	0.055
37	9.25	1.90	0.137	(0.384)	0.075	0.062
38	9.50	2.00	0.144	(0.379)	0.079	0.065
39	9.75	2.10	0.151	(0.373)	0.083	0.068
40	10.00	2.20	0.158	(0.368)	0.087	0.071
41	10.25	1.50	0.108	(0.363)	0.059	0.049
42	10.50	1.50	0.108	(0.357)	0.059	0.049
43	10.75	2.00	0.144	(0.352)	0.079	0.065
44	11.00	2.00	0.144	(0.347)	0.079	0.065
45	11.25	1.90	0.137	(0.342)	0.075	0.062
46	11.50	1.90	0.137	(0.337)	0.075	0.062
47	11.75	1.70	0.122	(0.332)	0.067	0.055
48	12.00	1.80	0.130	(0.327)	0.071	0.058
49	12.25	2.50	0.180	(0.322)	0.099	0.081
50	12.50	2.60	0.187	(0.317)	0.103	0.084
51	12.75	2.80	0.202	(0.312)	0.111	0.091
52	13.00	2.90	0.209	(0.308)	0.115	0.094
53	13.25	3.40	0.245	(0.303)	0.135	0.110
54	13.50	3.40	0.245	(0.298)	0.135	0.110
55	13.75	2.30	0.166	(0.294)	0.091	0.075
56	14.00	2.30	0.166	(0.289)	0.091	0.075
57	14.25	2.70	0.194	(0.285)	0.107	0.087
58	14.50	2.60	0.187	(0.281)	0.103	0.084
59	14.75	2.60	0.187	(0.276)	0.103	0.084
60	15.00	2.50	0.180	(0.272)	0.099	0.081
61	15.25	2.40	0.173	(0.268)	0.095	0.078
62	15.50	2.30	0.166	(0.264)	0.091	0.075
63	15.75	1.90	0.137	(0.260)	0.075	0.062
64	16.00	1.90	0.137	(0.256)	0.075	0.062
65	16.25	0.40	0.029	(0.252)	0.016	0.013

66	16.50	0.40	0.029	(0.248)	0.016	0.013
67	16.75	0.30	0.022	(0.244)	0.012	0.010
68	17.00	0.30	0.022	(0.241)	0.012	0.010
69	17.25	0.50	0.036	(0.237)	0.020	0.016
70	17.50	0.50	0.036	(0.233)	0.020	0.016
71	17.75	0.50	0.036	(0.230)	0.020	0.016
72	18.00	0.40	0.029	(0.227)	0.016	0.013
73	18.25	0.40	0.029	(0.223)	0.016	0.013
74	18.50	0.40	0.029	(0.220)	0.016	0.013
75	18.75	0.30	0.022	(0.217)	0.012	0.010
76	19.00	0.20	0.014	(0.214)	0.008	0.006
77	19.25	0.30	0.022	(0.211)	0.012	0.010
78	19.50	0.40	0.029	(0.208)	0.016	0.013
79	19.75	0.30	0.022	(0.205)	0.012	0.010
80	20.00	0.20	0.014	(0.202)	0.008	0.006
81	20.25	0.30	0.022	(0.200)	0.012	0.010
82	20.50	0.30	0.022	(0.197)	0.012	0.010
83	20.75	0.30	0.022	(0.194)	0.012	0.010
84	21.00	0.20	0.014	(0.192)	0.008	0.006
85	21.25	0.30	0.022	(0.190)	0.012	0.010
86	21.50	0.20	0.014	(0.188)	0.008	0.006
87	21.75	0.30	0.022	(0.186)	0.012	0.010
88	22.00	0.20	0.014	(0.184)	0.008	0.006
89	22.25	0.30	0.022	(0.182)	0.012	0.010
90	22.50	0.20	0.014	(0.180)	0.008	0.006
91	22.75	0.20	0.014	(0.179)	0.008	0.006
92	23.00	0.20	0.014	(0.177)	0.008	0.006
93	23.25	0.20	0.014	(0.176)	0.008	0.006
94	23.50	0.20	0.014	(0.175)	0.008	0.006
95	23.75	0.20	0.014	(0.174)	0.008	0.006
96	24.00	0.20	0.014	(0.173)	0.008	0.006

(Loss Rate Not Used)

Sum = 100.0 Sum = 3.2

Flood volume = Effective rainfall 0.81(In)
times area 0.9(Ac.)/[(In)/(Ft.)] = 0.1(Ac.Ft)
Total soil loss = 0.99(In)
Total soil loss = 0.075(Ac.Ft)
Total rainfall = 1.80(In)
Flood volume = 2675.7 Cubic Feet
Total soil loss = 3270.3 Cubic Feet

Peak flow rate of this hydrograph = 0.101(CFS)

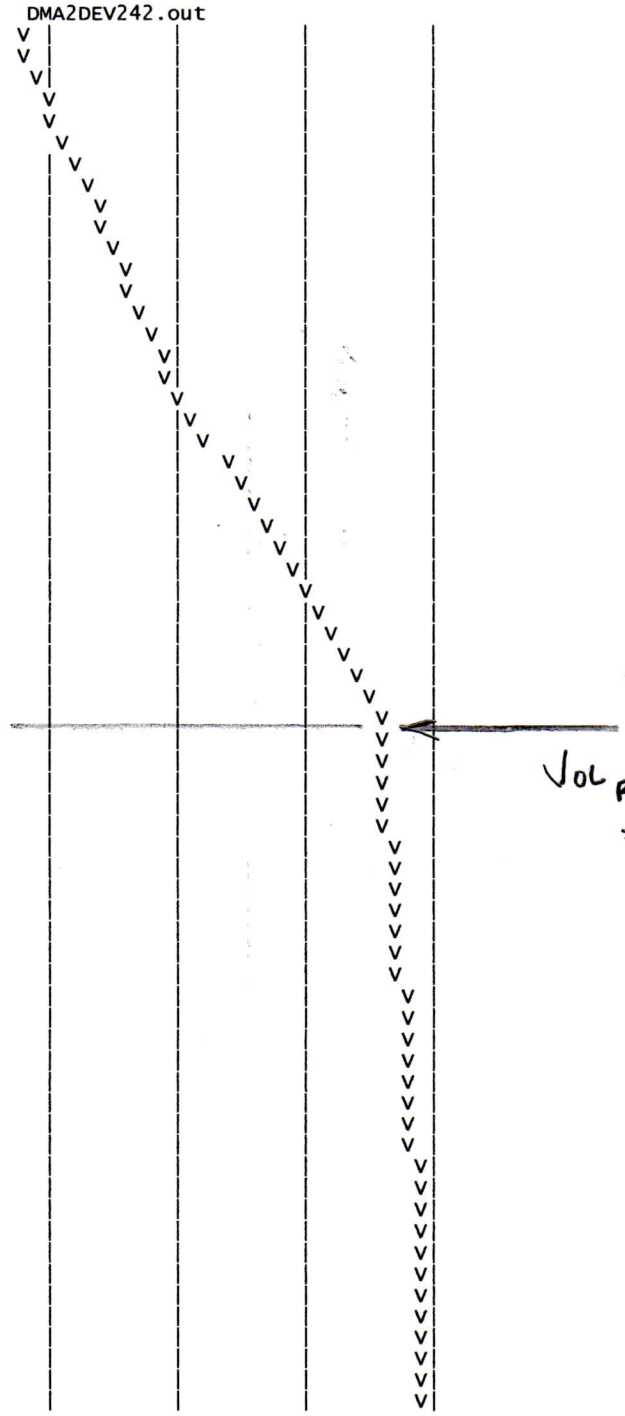
++

24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 15 Minute intervals ((CFS))

```
Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
-------------------------------------------------------------------------
  0+15       0.0001      0.01  Q         |         |         |         |
  0+30       0.0003      0.01  Q         |         |         |         |
  0+45       0.0005      0.01  Q         |         |         |         |
  1+ 0       0.0007      0.01  Q         |         |         |         |
  1+15       0.0009      0.01  Q         |         |         |         |
  1+30       0.0011      0.01  Q         |         |         |         |
  1+45       0.0013      0.01  Q         |         |         |         |
  2+ 0       0.0015      0.01  Q         |         |         |         |
  2+15       0.0018      0.01  QV        |         |         |         |
  2+30       0.0020      0.01  QV        |         |         |         |
  2+45       0.0023      0.01  QV        |         |         |         |
  3+ 0       0.0026      0.01  QV        |         |         |         |
  3+15       0.0029      0.01  QV        |         |         |         |
  3+30       0.0033      0.01  Q V       |         |         |         |
  3+45       0.0036      0.01  Q V       |         |         |         |
  4+ 0       0.0039      0.02  Q V       |         |         |         |
  4+15       0.0043      0.02  Q V       |         |         |         |
  4+30       0.0047      0.02  Q  V      |         |         |         |
  4+45       0.0052      0.02  Q  V      |         |         |         |
  5+ 0       0.0057      0.02  Q  V      |         |         |         |
  5+15       0.0060      0.02  Q  V      |         |         |         |
  5+30       0.0064      0.02  Q   V     |         |         |         |
  5+45       0.0069      0.02  Q   V     |         |         |         |
  6+ 0       0.0074      0.02  Q   V     |         |         |         |
  6+15       0.0080      0.03  Q    V    |         |         |         |
  6+30       0.0085      0.03  Q    V    |         |         |         |
  6+45       0.0092      0.03  Q    V    |         |         |         |
  7+ 0       0.0098      0.03  Q     V   |         |         |         |
  7+15       0.0104      0.03  Q     V   |         |         |         |
  7+30       0.0111      0.03  Q      V  |         |         |         |
  7+45       0.0118      0.04  Q      V  |         |         |         |
```

8+ 0	0.0126	0.04	Q
8+15	0.0135	0.04	Q
8+30	0.0144	0.04	Q
8+45	0.0154	0.05	Q
9+ 0	0.0165	0.05	Q
9+15	0.0176	0.06	Q
9+30	0.0189	0.06	Q
9+45	0.0201	0.06	Q
10+ 0	0.0215	0.07	Q
10+15	0.0224	0.04	Q
10+30	0.0233	0.04	Q
10+45	0.0246	0.06	Q
11+ 0	0.0258	0.06	Q
11+15	0.0270	0.06	Q
11+30	0.0281	0.06	Q
11+45	0.0292	0.05	Q
12+ 0	0.0303	0.05	Q
12+15	0.0318	0.07	Q
12+30	0.0334	0.08	Q
12+45	0.0351	0.08	Q
13+ 0	0.0369	0.09	Q
13+15	0.0390	0.10	Q
13+30	0.0411	0.10	Q
13+45	0.0425	0.07	Q
14+ 0	0.0439	0.07	Q
14+15	0.0456	0.08	Q
14+30	0.0472	0.08	Q
14+45	0.0488	0.08	Q
15+ 0	0.0503	0.07	Q
15+15	0.0518	0.07	Q
15+30	0.0532	0.07	Q
15+45	0.0544	0.06	Q
16+ 0	0.0555	0.06	Q
16+15	0.0558	0.01	Q
16+30	0.0560	0.01	Q
16+45	0.0562	0.01	Q
17+ 0	0.0564	0.01	Q
17+15	0.0567	0.01	Q
17+30	0.0570	0.01	Q
17+45	0.0573	0.01	Q
18+ 0	0.0576	0.01	Q
18+15	0.0578	0.01	Q
18+30	0.0580	0.01	Q
18+45	0.0582	0.01	Q
19+ 0	0.0584	0.01	Q
19+15	0.0585	0.01	Q
19+30	0.0588	0.01	Q
19+45	0.0590	0.01	Q
20+ 0	0.0591	0.01	Q
20+15	0.0593	0.01	Q
20+30	0.0595	0.01	Q
20+45	0.0596	0.01	Q
21+ 0	0.0598	0.01	Q
21+15	0.0600	0.01	Q
21+30	0.0601	0.01	Q
21+45	0.0603	0.01	Q
22+ 0	0.0604	0.01	Q
22+15	0.0606	0.01	Q
22+30	0.0607	0.01	Q
22+45	0.0608	0.01	Q
23+ 0	0.0609	0.01	Q
23+15	0.0611	0.01	Q
23+30	0.0612	0.01	Q
23+45	0.0613	0.01	Q
24+ 0	0.0614	0.01	Q



$\partial Q = 0.030$ cfs

$Vol_{REQ'D} = 0.0546$ AF

$= 2380$ CF

```
        U n i t   H y d r o g r a p h   A n a l y s i s

        Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2008, Version 8.1
                Study date  03/30/18 File: DMA4UNDEV242.out

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
--------------------------------------------------------------------------

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 5024

-------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



-------------------------------------------------------------------
WO 2165
DMA4 UNDEVELOPED
INPUT = DMA4UNDEV.UM1
OUTPUT = DMA4UNDEV224.OUT
-------------------------------------------------------------------
Drainage Area =       0.61(Ac.)  =      0.001 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =       0.61(Ac.)  =      0.001 Sq. Mi.
Length along longest watercourse =     150.00(Ft.)
Length along longest watercourse measured to centroid =     149.99(Ft.)
Length along longest watercourse =      0.028 Mi.
Length along longest watercourse measured to centroid =      0.028 Mi.
Difference in elevation =      12.00(Ft.)
Slope along watercourse =    422.4000 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time =    0.015 Hr.
Lag time =     0.91 Min.
25% of lag time =     0.23 Min.
40% of lag time =     0.37 Min.
Unit time =    15.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]        Rainfall(In)[2]      Weighting[1*2]
        0.61             1.80                    1.10

100 YEAR Area rainfall data:


Area(Ac.)[1]        Rainfall(In)[2]      Weighting[1*2]
        0.61             4.50                    2.75

STORM EVENT (YEAR) =    2.00
Area Averaged 2-Year Rainfall =    1.800(In)
Area Averaged 100-Year Rainfall =    4.500(In)

Point rain (area averaged) =    1.800(In)
Areal adjustment factor =  100.00 %
Adjusted average point rain =    1.800(In)

Sub-Area Data:
Area(Ac.)          Runoff Index   Impervious %
     0.610            91.00          0.000
 Total Area Entered =      0.61(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-1     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)    (In/Hr)
91.0  79.8      0.246     0.000        0.246       1.000      0.246
                                                  Sum (F) =   0.246
Area averaged mean soil loss (F) (In/Hr) =  0.246
Minimum soil loss rate ((In/Hr)) =  0.123
```

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.250	1640.131	100.000	0.615
		Sum = 100.000	Sum= 0.615

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1 0.25	0.20	0.014	(0.435)	0.013	0.001
2 0.50	0.30	0.022	(0.430)	0.019	0.002
3 0.75	0.30	0.022	(0.425)	0.019	0.002
4 1.00	0.40	0.029	(0.420)	0.026	0.003
5 1.25	0.30	0.022	(0.415)	0.019	0.002
6 1.50	0.30	0.022	(0.410)	0.019	0.002
7 1.75	0.30	0.022	(0.405)	0.019	0.002
8 2.00	0.40	0.029	(0.400)	0.026	0.003
9 2.25	0.40	0.029	(0.395)	0.026	0.003
10 2.50	0.40	0.029	(0.391)	0.026	0.003
11 2.75	0.50	0.036	(0.386)	0.032	0.004
12 3.00	0.50	0.036	(0.381)	0.032	0.004
13 3.25	0.50	0.036	(0.376)	0.032	0.004
14 3.50	0.50	0.036	(0.372)	0.032	0.004
15 3.75	0.50	0.036	(0.367)	0.032	0.004
16 4.00	0.60	0.043	(0.362)	0.039	0.004
17 4.25	0.60	0.043	(0.358)	0.039	0.004
18 4.50	0.70	0.050	(0.353)	0.045	0.005
19 4.75	0.70	0.050	(0.349)	0.045	0.005
20 5.00	0.80	0.058	(0.344)	0.052	0.006
21 5.25	0.60	0.043	(0.340)	0.039	0.004
22 5.50	0.70	0.050	(0.335)	0.045	0.005
23 5.75	0.80	0.058	(0.331)	0.052	0.006
24 6.00	0.80	0.058	(0.327)	0.052	0.006
25 6.25	0.90	0.065	(0.322)	0.058	0.006
26 6.50	0.90	0.065	(0.318)	0.058	0.006
27 6.75	1.00	0.072	(0.314)	0.065	0.007
28 7.00	1.00	0.072	(0.310)	0.065	0.007
29 7.25	1.00	0.072	(0.305)	0.065	0.007
30 7.50	1.10	0.079	(0.301)	0.071	0.008
31 7.75	1.20	0.086	(0.297)	0.078	0.009
32 8.00	1.30	0.094	(0.293)	0.084	0.009
33 8.25	1.50	0.108	(0.289)	0.097	0.011
34 8.50	1.50	0.108	(0.285)	0.097	0.011
35 8.75	1.60	0.115	(0.281)	0.104	0.012
36 9.00	1.70	0.122	(0.277)	0.110	0.012
37 9.25	1.90	0.137	(0.273)	0.123	0.014
38 9.50	2.00	0.144	(0.269)	0.130	0.014
39 9.75	2.10	0.151	(0.265)	0.136	0.015
40 10.00	2.20	0.158	(0.261)	0.143	0.016
41 10.25	1.50	0.108	(0.258)	0.097	0.011
42 10.50	1.50	0.108	(0.254)	0.097	0.011
43 10.75	2.00	0.144	(0.250)	0.130	0.014
44 11.00	2.00	0.144	(0.247)	0.130	0.014
45 11.25	1.90	0.137	(0.243)	0.123	0.014
46 11.50	1.90	0.137	(0.239)	0.123	0.014
47 11.75	1.70	0.122	(0.236)	0.110	0.012
48 12.00	1.80	0.130	(0.232)	0.117	0.013
49 12.25	2.50	0.180	(0.229)	0.162	0.018
50 12.50	2.60	0.187	(0.225)	0.168	0.019
51 12.75	2.80	0.202	(0.222)	0.181	0.020
52 13.00	2.90	0.209	(0.219)	0.188	0.021
53 13.25	3.40	0.245	0.215	(0.220)	0.029
54 13.50	3.40	0.245	0.212	(0.220)	0.033
55 13.75	2.30	0.166	(0.209)	0.149	0.017
56 14.00	2.30	0.166	(0.206)	0.149	0.017
57 14.25	2.70	0.194	(0.203)	0.175	0.019

58	14.50	2.60	0.187	(0.199)	0.168	0.019
59	14.75	2.60	0.187	(0.196)	0.168	0.019
60	15.00	2.50	0.180	(0.193)	0.162	0.018
61	15.25	2.40	0.173	(0.190)	0.156	0.017
62	15.50	2.30	0.166	(0.188)	0.149	0.017
63	15.75	1.90	0.137	(0.185)	0.123	0.014
64	16.00	1.90	0.137	(0.182)	0.123	0.014
65	16.25	0.40	0.029	(0.179)	0.026	0.003
66	16.50	0.40	0.029	(0.176)	0.026	0.003
67	16.75	0.30	0.022	(0.174)	0.019	0.002
68	17.00	0.30	0.022	(0.171)	0.019	0.002
69	17.25	0.50	0.036	(0.168)	0.032	0.004
70	17.50	0.50	0.036	(0.166)	0.032	0.004
71	17.75	0.50	0.036	(0.163)	0.032	0.004
72	18.00	0.40	0.029	(0.161)	0.026	0.003
73	18.25	0.40	0.029	(0.159)	0.026	0.003
74	18.50	0.40	0.029	(0.156)	0.026	0.003
75	18.75	0.30	0.022	(0.154)	0.019	0.002
76	19.00	0.20	0.014	(0.152)	0.013	0.001
77	19.25	0.30	0.022	(0.150)	0.019	0.002
78	19.50	0.40	0.029	(0.148)	0.026	0.003
79	19.75	0.30	0.022	(0.146)	0.019	0.002
80	20.00	0.20	0.014	(0.144)	0.013	0.001
81	20.25	0.30	0.022	(0.142)	0.019	0.002
82	20.50	0.30	0.022	(0.140)	0.019	0.002
83	20.75	0.30	0.022	(0.138)	0.019	0.002
84	21.00	0.20	0.014	(0.137)	0.013	0.001
85	21.25	0.30	0.022	(0.135)	0.019	0.002
86	21.50	0.20	0.014	(0.133)	0.013	0.001
87	21.75	0.30	0.022	(0.132)	0.019	0.002
88	22.00	0.20	0.014	(0.131)	0.013	0.001
89	22.25	0.30	0.022	(0.129)	0.019	0.002
90	22.50	0.20	0.014	(0.128)	0.013	0.001
91	22.75	0.20	0.014	(0.127)	0.013	0.001
92	23.00	0.20	0.014	(0.126)	0.013	0.001
93	23.25	0.20	0.014	(0.125)	0.013	0.001
94	23.50	0.20	0.014	(0.124)	0.013	0.001
95	23.75	0.20	0.014	(0.124)	0.013	0.001
96	24.00	0.20	0.014	(0.123)	0.013	0.001

(Loss Rate Not Used)

Sum = 100.0 Sum = 0.7

Flood volume = Effective rainfall 0.18(In)
times area 0.6(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)
Total soil loss = 1.62(In)
Total soil loss = 0.082(Ac.Ft)
Total rainfall = 1.80(In)
Flood volume = 405.9 Cubic Feet
Total soil loss = 3579.9 Cubic Feet

Peak flow rate of this hydrograph = 0.020(CFS) ← PEAK FLOW RATE

++

24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 15 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+15	0.0000	0.00	Q	|	|	|	|
0+30	0.0000	0.00	Q	|	|	|	|
0+45	0.0001	0.00	Q	|	|	|	|
1+ 0	0.0001	0.00	Q	|	|	|	|
1+15	0.0001	0.00	Q	|	|	|	|
1+30	0.0002	0.00	Q	|	|	|	|
1+45	0.0002	0.00	Q	|	|	|	|
2+ 0	0.0002	0.00	Q	|	|	|	|
2+15	0.0003	0.00	QV	|	|	|	|
2+30	0.0003	0.00	QV	|	|	|	|
2+45	0.0003	0.00	QV	|	|	|	|
3+ 0	0.0004	0.00	QV	|	|	|	|
3+15	0.0004	0.00	QV	|	|	|	|
3+30	0.0005	0.00	Q V	|	|	|	|
3+45	0.0005	0.00	Q V	|	|	|	|
4+ 0	0.0006	0.00	Q V	|	|	|	|
4+15	0.0006	0.00	Q V	|	|	|	|
4+30	0.0007	0.00	Q V	|	|	|	|
4+45	0.0008	0.00	Q V	|	|	|	|

5+ 0	0.0008	0.00	Q	V
5+15	0.0009	0.00	Q	V
5+30	0.0010	0.00	Q	V
5+45	0.0010	0.00	Q	V
6+ 0	0.0011	0.00	Q	V
6+15	0.0012	0.00	Q	V
6+30	0.0013	0.00	Q	V
6+45	0.0014	0.00	Q	V
7+ 0	0.0015	0.00	Q	V
7+15	0.0015	0.00	Q	V
7+30	0.0016	0.00	Q	V
7+45	0.0018	0.01	Q	V
8+ 0	0.0019	0.01	Q	V
8+15	0.0020	0.01	Q	V
8+30	0.0022	0.01	Q	V
8+45	0.0023	0.01	Q	V
9+ 0	0.0025	0.01	Q	V
9+15	0.0026	0.01	Q	V
9+30	0.0028	0.01	Q	V
9+45	0.0030	0.01	Q	V
10+ 0	0.0032	0.01	Q	V
10+15	0.0033	0.01	Q	V
10+30	0.0035	0.01	Q	V
10+45	0.0037	0.01	Q	V
11+ 0	0.0038	0.01	Q	V
11+15	0.0040	0.01	Q	V
11+30	0.0042	0.01	Q	V
11+45	0.0043	0.01	Q	V
12+ 0	0.0045	0.01	Q	V
12+15	0.0047	0.01	Q	V
12+30	0.0050	0.01	Q	V
12+45	0.0052	0.01	Q	V
13+ 0	0.0055	0.01	Q	V
13+15	0.0059	0.02	Q	V
13+30	0.0063	0.02	Q	V
13+45	0.0065	0.01	Q	V
14+ 0	0.0067	0.01	Q	V
14+15	0.0070	0.01	Q	V
14+30	0.0072	0.01	Q	V
14+45	0.0074	0.01	Q	V
15+ 0	0.0077	0.01	Q	V
15+15	0.0079	0.01	Q	V
15+30	0.0081	0.01	Q	V
15+45	0.0083	0.01	Q	V
16+ 0	0.0084	0.01	Q	V
16+15	0.0085	0.00	Q	V
16+30	0.0085	0.00	Q	V
16+45	0.0085	0.00	Q	V
17+ 0	0.0086	0.00	Q	V
17+15	0.0086	0.00	Q	V
17+30	0.0087	0.00	Q	V
17+45	0.0087	0.00	Q	V
18+ 0	0.0087	0.00	Q	V
18+15	0.0088	0.00	Q	V
18+30	0.0088	0.00	Q	V
18+45	0.0088	0.00	Q	V
19+ 0	0.0089	0.00	Q	V
19+15	0.0089	0.00	Q	V
19+30	0.0089	0.00	Q	V
19+45	0.0090	0.00	Q	V
20+ 0	0.0090	0.00	Q	V
20+15	0.0090	0.00	Q	V
20+30	0.0090	0.00	Q	V
20+45	0.0091	0.00	Q	V
21+ 0	0.0091	0.00	Q	V
21+15	0.0091	0.00	Q	V
21+30	0.0091	0.00	Q	V
21+45	0.0091	0.00	Q	V
22+ 0	0.0092	0.00	Q	V
22+15	0.0092	0.00	Q	V
22+30	0.0092	0.00	Q	V
22+45	0.0092	0.00	Q	V
23+ 0	0.0092	0.00	Q	V
23+15	0.0093	0.00	Q	V
23+30	0.0093	0.00	Q	V
23+45	0.0093	0.00	Q	V
24+ 0	0.0093	0.00	Q	V

```
        U n i t   H y d r o g r a p h   A n a l y s i s

        Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2008, Version 8.1
                Study date  03/30/18 File: DMA4DEV242.out

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
--------------------------------------------------------------------------

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 5024

-------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format


-------------------------------------------------------------------
WO 2165
DMA4 DEVELOPED
INPUT = DMA4DEV.UM1
OUTPUT = DMA4DEV224.OUT
-------------------------------------------------------------------
Drainage Area =       0.61(Ac.)  =      0.001 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =       0.61(Ac.)  =      0.001 Sq. Mi.
Length along longest watercourse =     175.00(Ft.)
Length along longest watercourse measured to centroid =     150.00(Ft.)
Length along longest watercourse =      0.033 Mi.
Length along longest watercourse measured to centroid =      0.028 Mi.
Difference in elevation =       2.00(Ft.)
Slope along watercourse =     60.3429 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time =    0.023 Hr.
Lag time =     1.40 Min.
25% of lag time =     0.35 Min.
40% of lag time =     0.56 Min.
Unit time =    15.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]        Rainfall(In)[2]      Weighting[1*2]
        0.61             1.80                    1.10

100 YEAR Area rainfall data:


Area(Ac.)[1]        Rainfall(In)[2]      Weighting[1*2]
        0.61             4.50                    2.75

STORM EVENT (YEAR) =    2.00
Area Averaged 2-Year Rainfall =    1.800(In)
Area Averaged 100-Year Rainfall =    4.500(In)

Point rain (area averaged) =    1.800(In)
Areal adjustment factor =  100.00 %
Adjusted average point rain =    1.800(In)

Sub-Area Data:
Area(Ac.)          Runoff Index   Impervious %
     0.610            69.00          0.440
 Total Area Entered =      0.61(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%      F
AMC2 AMC-1     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)    (In/Hr)
69.0  49.8      0.574     0.440        0.347       1.000      0.347
                                                  Sum (F) =    0.347
Area averaged mean soil loss (F) (In/Hr) =  0.347
Minimum soil loss rate ((In/Hr)) =  0.173
```

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.548

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %		Unit Hydrograph (CFS)
1	0.250	1068.708	100.000		0.615
			Sum = 100.000	Sum=	0.615

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1 0.25	0.20	0.014	(0.612)	0.008	0.007
2 0.50	0.30	0.022	(0.605)	0.012	0.010
3 0.75	0.30	0.022	(0.598)	0.012	0.010
4 1.00	0.40	0.029	(0.591)	0.016	0.013
5 1.25	0.30	0.022	(0.584)	0.012	0.010
6 1.50	0.30	0.022	(0.577)	0.012	0.010
7 1.75	0.30	0.022	(0.570)	0.012	0.010
8 2.00	0.40	0.029	(0.563)	0.016	0.013
9 2.25	0.40	0.029	(0.557)	0.016	0.013
10 2.50	0.40	0.029	(0.550)	0.016	0.013
11 2.75	0.50	0.036	(0.543)	0.020	0.016
12 3.00	0.50	0.036	(0.536)	0.020	0.016
13 3.25	0.50	0.036	(0.530)	0.020	0.016
14 3.50	0.50	0.036	(0.523)	0.020	0.016
15 3.75	0.50	0.036	(0.517)	0.020	0.016
16 4.00	0.60	0.043	(0.510)	0.024	0.020
17 4.25	0.60	0.043	(0.504)	0.024	0.020
18 4.50	0.70	0.050	(0.497)	0.028	0.023
19 4.75	0.70	0.050	(0.491)	0.028	0.023
20 5.00	0.80	0.058	(0.484)	0.032	0.026
21 5.25	0.60	0.043	(0.478)	0.024	0.020
22 5.50	0.70	0.050	(0.472)	0.028	0.023
23 5.75	0.80	0.058	(0.466)	0.032	0.026
24 6.00	0.80	0.058	(0.460)	0.032	0.026
25 6.25	0.90	0.065	(0.454)	0.036	0.029
26 6.50	0.90	0.065	(0.447)	0.036	0.029
27 6.75	1.00	0.072	(0.441)	0.039	0.033
28 7.00	1.00	0.072	(0.436)	0.039	0.033
29 7.25	1.00	0.072	(0.430)	0.039	0.033
30 7.50	1.10	0.079	(0.424)	0.043	0.036
31 7.75	1.20	0.086	(0.418)	0.047	0.039
32 8.00	1.30	0.094	(0.412)	0.051	0.042
33 8.25	1.50	0.108	(0.406)	0.059	0.049
34 8.50	1.50	0.108	(0.401)	0.059	0.049
35 8.75	1.60	0.115	(0.395)	0.063	0.052
36 9.00	1.70	0.122	(0.390)	0.067	0.055
37 9.25	1.90	0.137	(0.384)	0.075	0.062
38 9.50	2.00	0.144	(0.379)	0.079	0.065
39 9.75	2.10	0.151	(0.373)	0.083	0.068
40 10.00	2.20	0.158	(0.368)	0.087	0.072
41 10.25	1.50	0.108	(0.363)	0.059	0.049
42 10.50	1.50	0.108	(0.357)	0.059	0.049
43 10.75	2.00	0.144	(0.352)	0.079	0.065
44 11.00	2.00	0.144	(0.347)	0.079	0.065
45 11.25	1.90	0.137	(0.342)	0.075	0.062
46 11.50	1.90	0.137	(0.337)	0.075	0.062
47 11.75	1.70	0.122	(0.332)	0.067	0.055
48 12.00	1.80	0.130	(0.327)	0.071	0.059
49 12.25	2.50	0.180	(0.322)	0.099	0.081
50 12.50	2.60	0.187	(0.317)	0.103	0.085
51 12.75	2.80	0.202	(0.312)	0.110	0.091
52 13.00	2.90	0.209	(0.308)	0.114	0.094
53 13.25	3.40	0.245	(0.303)	0.134	0.111
54 13.50	3.40	0.245	(0.298)	0.134	0.111
55 13.75	2.30	0.166	(0.294)	0.091	0.075
56 14.00	2.30	0.166	(0.289)	0.091	0.075
57 14.25	2.70	0.194	(0.285)	0.107	0.088

58	14.50	2.60	0.187	(0.281)	0.103	0.085
59	14.75	2.60	0.187	(0.276)	0.103	0.085
60	15.00	2.50	0.180	(0.272)	0.099	0.081
61	15.25	2.40	0.173	(0.268)	0.095	0.078
62	15.50	2.30	0.166	(0.264)	0.091	0.075
63	15.75	1.90	0.137	(0.260)	0.075	0.062
64	16.00	1.90	0.137	(0.256)	0.075	0.062
65	16.25	0.40	0.029	(0.252)	0.016	0.013
66	16.50	0.40	0.029	(0.248)	0.016	0.013
67	16.75	0.30	0.022	(0.244)	0.012	0.010
68	17.00	0.30	0.022	(0.241)	0.012	0.010
69	17.25	0.50	0.036	(0.237)	0.020	0.016
70	17.50	0.50	0.036	(0.233)	0.020	0.016
71	17.75	0.50	0.036	(0.230)	0.020	0.016
72	18.00	0.40	0.029	(0.227)	0.016	0.013
73	18.25	0.40	0.029	(0.223)	0.016	0.013
74	18.50	0.40	0.029	(0.220)	0.016	0.013
75	18.75	0.30	0.022	(0.217)	0.012	0.010
76	19.00	0.20	0.014	(0.214)	0.008	0.007
77	19.25	0.30	0.022	(0.211)	0.012	0.010
78	19.50	0.40	0.029	(0.208)	0.016	0.013
79	19.75	0.30	0.022	(0.205)	0.012	0.010
80	20.00	0.20	0.014	(0.202)	0.008	0.007
81	20.25	0.30	0.022	(0.200)	0.012	0.010
82	20.50	0.30	0.022	(0.197)	0.012	0.010
83	20.75	0.30	0.022	(0.194)	0.012	0.010
84	21.00	0.20	0.014	(0.192)	0.008	0.007
85	21.25	0.30	0.022	(0.190)	0.012	0.010
86	21.50	0.20	0.014	(0.188)	0.008	0.007
87	21.75	0.30	0.022	(0.186)	0.012	0.010
88	22.00	0.20	0.014	(0.184)	0.008	0.007
89	22.25	0.30	0.022	(0.182)	0.012	0.010
90	22.50	0.20	0.014	(0.180)	0.008	0.007
91	22.75	0.20	0.014	(0.179)	0.008	0.007
92	23.00	0.20	0.014	(0.177)	0.008	0.007
93	23.25	0.20	0.014	(0.176)	0.008	0.007
94	23.50	0.20	0.014	(0.175)	0.008	0.007
95	23.75	0.20	0.014	(0.174)	0.008	0.007
96	24.00	0.20	0.014	(0.173)	0.008	0.007

(Loss Rate Not Used)

Sum = 100.0 Sum = 3.3

Flood volume = Effective rainfall 0.81(In)
times area 0.6(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)
Total soil loss = 0.99(In)
Total soil loss = 0.050(Ac.Ft)
Total rainfall = 1.80(In)
Flood volume = 1801.6 Cubic Feet
Total soil loss = 2184.2 Cubic Feet

Peak flow rate of this hydrograph = 0.068(CFS)

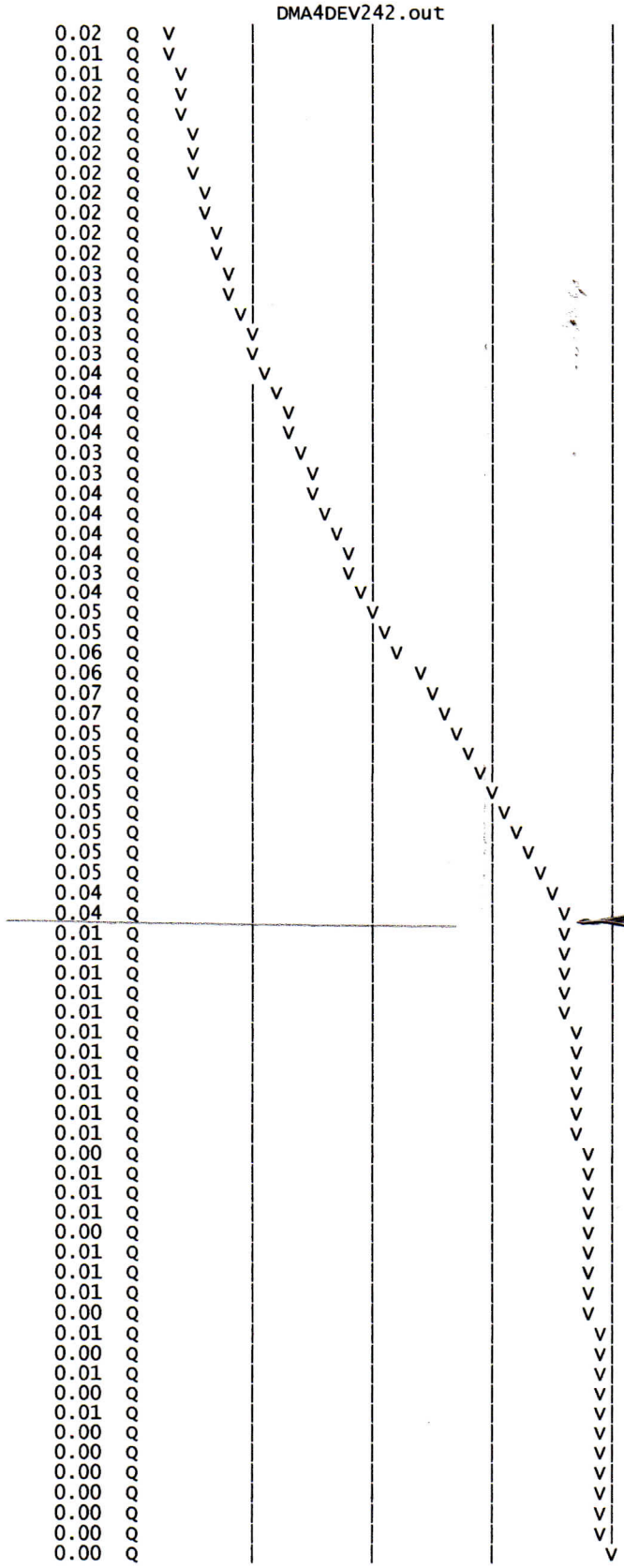
++

24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 15 Minute intervals ((CFS))

```
Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
-------------------------------------------------------------------------
  0+15       0.0001       0.00  Q         |         |         |         |
  0+30       0.0002       0.01  Q         |         |         |         |
  0+45       0.0003       0.01  Q         |         |         |         |
  1+ 0       0.0005       0.01  Q         |         |         |         |
  1+15       0.0006       0.01  Q         |         |         |         |
  1+30       0.0007       0.01  Q         |         |         |         |
  1+45       0.0009       0.01  Q         |         |         |         |
  2+ 0       0.0010       0.01  Q         |         |         |         |
  2+15       0.0012       0.01  QV        |         |         |         |
  2+30       0.0014       0.01  QV        |         |         |         |
  2+45       0.0016       0.01  QV        |         |         |         |
  3+ 0       0.0018       0.01  QV        |         |         |         |
  3+15       0.0020       0.01  QV        |         |         |         |
  3+30       0.0022       0.01  Q V       |         |         |         |
  3+45       0.0024       0.01  Q V       |         |         |         |
  4+ 0       0.0026       0.01  Q V       |         |         |         |
  4+15       0.0029       0.01  Q V       |         |         |         |
  4+30       0.0032       0.01  Q  V      |         |         |         |
  4+45       0.0035       0.01  Q  V      |         |         |         |
```

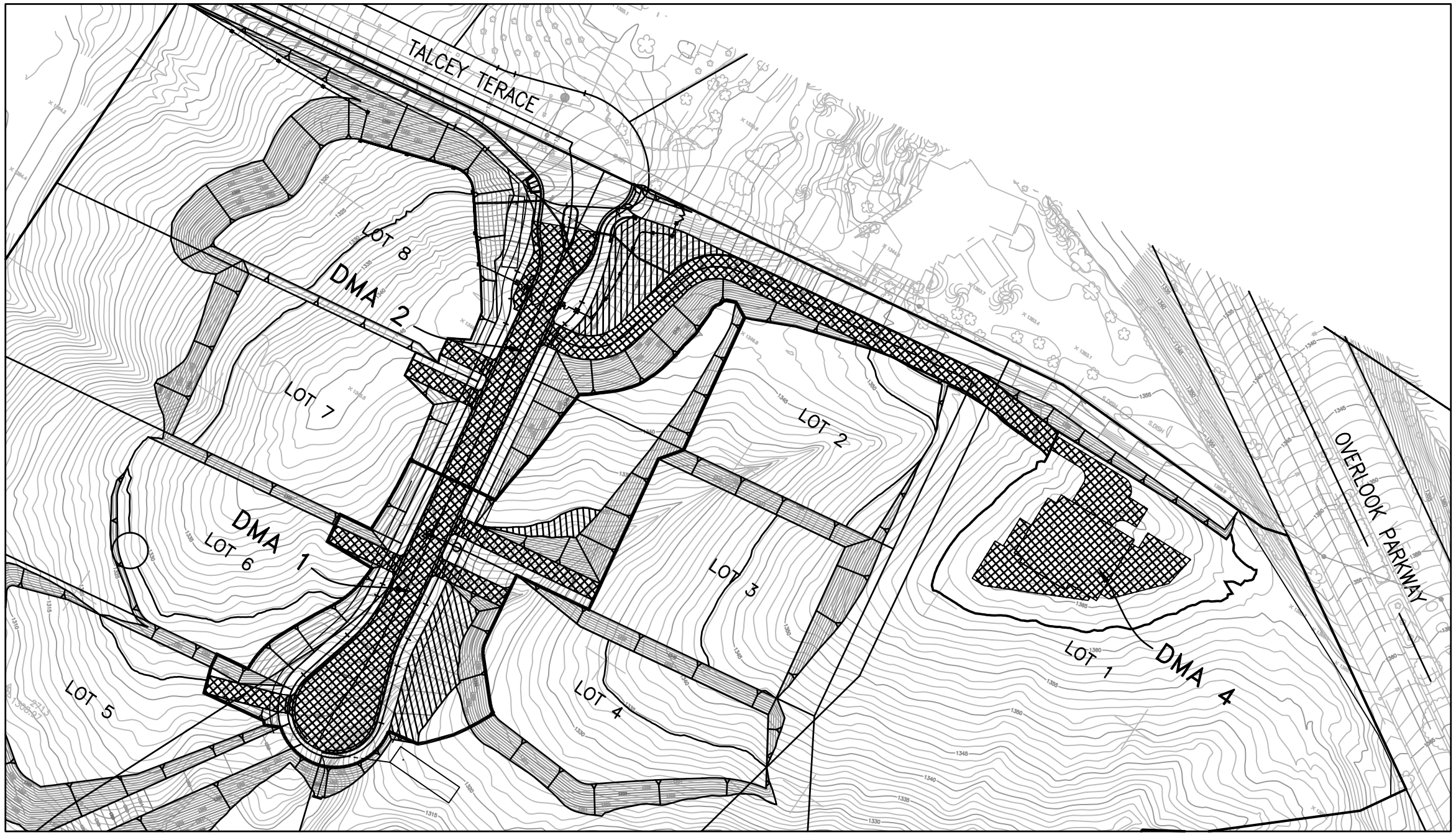
5+ 0	0.0038	0.02	Q
5+15	0.0041	0.01	Q
5+30	0.0043	0.01	Q
5+45	0.0047	0.02	Q
6+ 0	0.0050	0.02	Q
6+15	0.0054	0.02	Q
6+30	0.0057	0.02	Q
6+45	0.0062	0.02	Q
7+ 0	0.0066	0.02	Q
7+15	0.0070	0.02	Q
7+30	0.0074	0.02	Q
7+45	0.0079	0.02	Q
8+ 0	0.0085	0.03	Q
8+15	0.0091	0.03	Q
8+30	0.0097	0.03	Q
8+45	0.0104	0.03	Q
9+ 0	0.0111	0.03	Q
9+15	0.0119	0.04	Q
9+30	0.0127	0.04	Q
9+45	0.0136	0.04	Q
10+ 0	0.0145	0.04	Q
10+15	0.0151	0.03	Q
10+30	0.0157	0.03	Q
10+45	0.0165	0.04	Q
11+ 0	0.0174	0.04	Q
11+15	0.0182	0.04	Q
11+30	0.0189	0.04	Q
11+45	0.0196	0.03	Q
12+ 0	0.0204	0.04	Q
12+15	0.0214	0.05	Q
12+30	0.0225	0.05	Q
12+45	0.0237	0.06	Q
13+ 0	0.0249	0.06	Q
13+15	0.0263	0.07	Q
13+30	0.0277	0.07	Q
13+45	0.0286	0.05	Q
14+ 0	0.0296	0.05	Q
14+15	0.0307	0.05	Q
14+30	0.0318	0.05	Q
14+45	0.0328	0.05	Q
15+ 0	0.0339	0.05	Q
15+15	0.0349	0.05	Q
15+30	0.0358	0.05	Q
15+45	0.0366	0.04	Q
16+ 0	0.0374	0.04	Q
16+15	0.0376	0.01	Q
16+30	0.0377	0.01	Q
16+45	0.0378	0.01	Q
17+ 0	0.0380	0.01	Q
17+15	0.0382	0.01	Q
17+30	0.0384	0.01	Q
17+45	0.0386	0.01	Q
18+ 0	0.0388	0.01	Q
18+15	0.0389	0.01	Q
18+30	0.0391	0.01	Q
18+45	0.0392	0.01	Q
19+ 0	0.0393	0.00	Q
19+15	0.0394	0.01	Q
19+30	0.0396	0.01	Q
19+45	0.0397	0.01	Q
20+ 0	0.0398	0.00	Q
20+15	0.0399	0.01	Q
20+30	0.0400	0.01	Q
20+45	0.0402	0.01	Q
21+ 0	0.0402	0.00	Q
21+15	0.0404	0.01	Q
21+30	0.0404	0.00	Q
21+45	0.0406	0.01	Q
22+ 0	0.0407	0.00	Q
22+15	0.0408	0.01	Q
22+30	0.0409	0.00	Q
22+45	0.0409	0.00	Q
23+ 0	0.0410	0.00	Q
23+15	0.0411	0.00	Q
23+30	0.0412	0.00	Q
23+45	0.0413	0.00	Q
24+ 0	0.0414	0.00	Q



@ Q = 0.02 cfs

$V_{Req'd}$ = 0.0375 AF

= 1636 CF



DMA 1
IMPERVIOUS AREA = 15,251 SF
TOTAL AREA = 56,467 SF
PERCENT IMPERVIOUS = 27.0%

DMA 2
IMPERVIOUS AREA = 17,783 SF
TOTAL AREA = 39,989 SF
PERCENT IMPERVIOUS = 43.1%

DMA 4
IMPERVIOUS AREA = 11,650 SF
TOTAL AREA = 26,379 SF
PERCENT IMPERVIOUS = 44.2%

NORTH

200' 100' 0 100' 200'

EXHIBIT SHOWING POST-DEVELOPMENT SITE IMPERVIOUS AREA WITHIN PROJECT DMA'S

IMPERVIOUS AREA

PERVIOUS AREA

PROJECT DRAINAGE MANAGEMENT AREA BOUNDARY

DMA DRAINAGE FLOW PATH

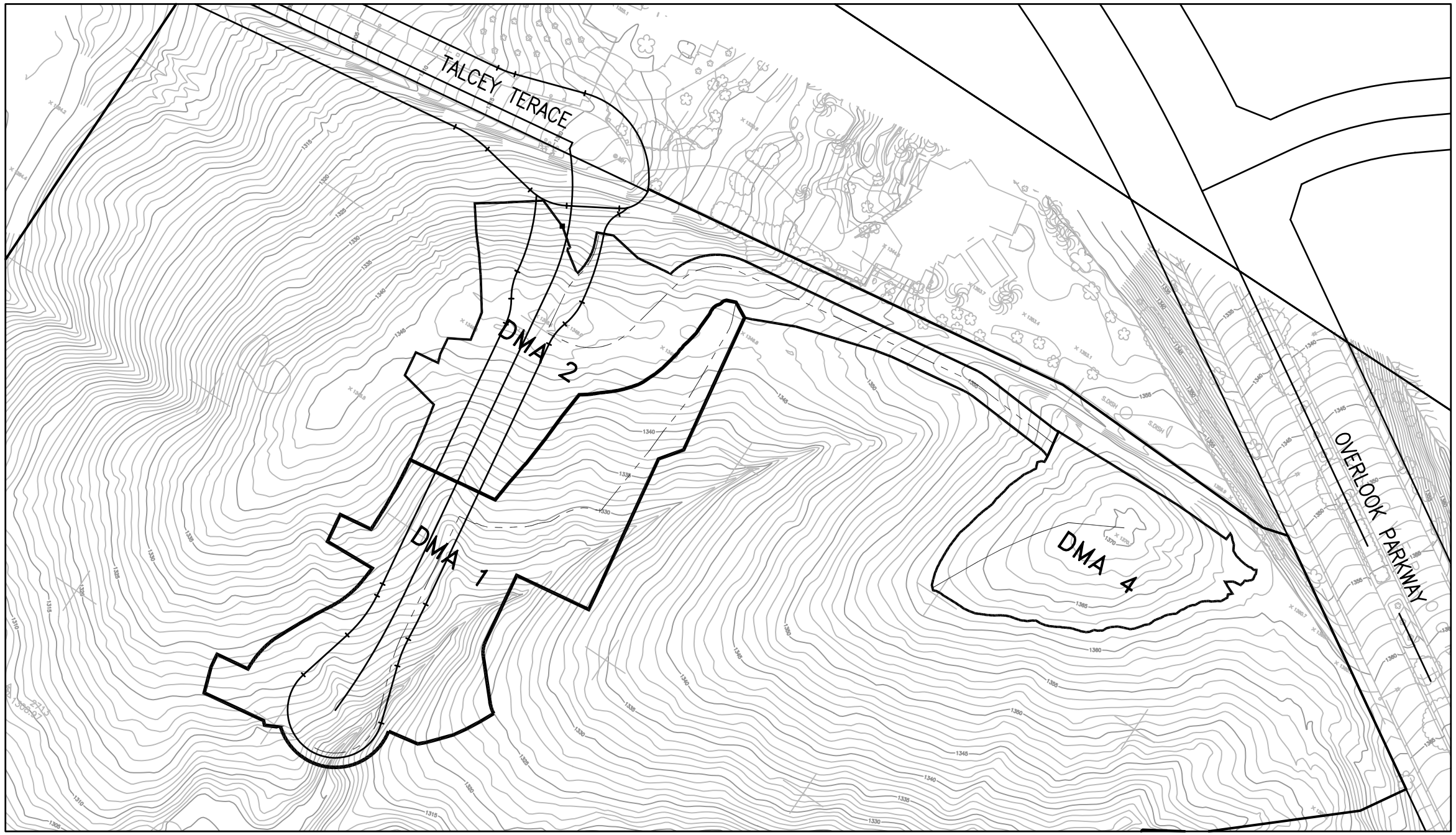
GABEL, COOK & ASSOCIATES INC.
CIVIL ENGINEERS · LAND SURVEYORS
LAND PLANNERS
7177 Brockton Ave., #339
Telephone (951) 788-8092

IN THE CITY OF RIVERSIDE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

TENTATIVE TRACT 37392

1 OF 1 SHEET

DATE: APRIL 2018 | FOR: MARWAN & ELIZABETH ALABBASI | WO: 2165



DMA 1
IMPERVIOUS AREA = 0 SF
TOTAL AREA = 56,467 SF
PERCENT IMPERVIOUS = 0%

DMA 2
IMPERVIOUS AREA = 0 SF
TOTAL AREA = 39,989 SF
PERCENT IMPERVIOUS = 0%

DMA 4
IMPERVIOUS AREA = 0 SF
TOTAL AREA = 26,379 SF
PERCENT IMPERVIOUS = 0%

NORTH

200' 100' 0 100' 200'

EXHIBIT SHOWING PRE-DEVELOPMENT SITE IMPERVIOUS AREA WITHIN PROJECT DMA'S

IMPERVIOUS AREA

PERVIOUS AREA

PROJECT DRAINAGE MANAGEMENT AREA BOUNDARY

DMA DRAINAGE FLOW PATH

GABEL, COOK & ASSOCIATES INC.
CIVIL ENGINEERS · LAND SURVEYORS
LAND PLANNERS
7177 Brockton Ave., #339
Telephone (951) 788-8092

IN THE CITY OF RIVERSIDE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

TENTATIVE TRACT 37392

1 OF 1 SHEET

NOVEMBER 2017 | FOR: MARWAN & ELIZABETH ALABBASI | WO: 2165

Appendix 8: Source Control

Pollutant Sources/Source Control Checklist

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

How to use this worksheet (also see instructions in Section G of the WQMP Template):

1. Review Column 1 and identify which of these potential sources of stormwater pollutants apply to your site. Check each box that applies.
2. Review Column 2 and incorporate all of the corresponding applicable BMPs in your WQMP Exhibit.
3. Review Columns 3 and 4 and incorporate all of the corresponding applicable permanent controls and operational BMPs in your WQMP. Use the format shown in Table G.1on page 23 of this WQMP Template. Describe your specific BMPs in an accompanying narrative, and explain any special conditions or situations that required omitting BMPs or substituting alternative BMPs for those shown here.

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ A. **On-site storm drain inlets**	❑ **Locations of inlets.**	❑ **Mark all inlets with the words "Only Rain Down the Storm Drain" or similar. Catch Basin Markers may be available from the Riverside County Flood Control and Water Conservation District, call 951.955.1200 to verify.**	❑ **Maintain and periodically repaint or replace inlet markings.** ❑ **Provide stormwater pollution prevention information to new site owners, lessees, or operators.** ❑ **See applicable operational BMPs in Fact Sheet SC-44, "Drainage System Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com** ❑ **Include the following in lease agreements: "Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains."**
❑ B. **Interior floor drains and elevator shaft sump pumps**		❑ **State that interior floor drains and elevator shaft sump pumps will be plumbed to sanitary sewer.**	❑ **Inspect and maintain drains to prevent blockages and overflow.**
❑ C. **Interior parking garages**		❑ **State that parking garage floor drains will be plumbed to the sanitary sewer.**	❑ **Inspect and maintain drains to prevent blockages and overflow.**

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ D1. **Need for future indoor & structural pest control**		❑ **Note building design features that discourage entry of pests.**	❑ **Provide Integrated Pest Management information to owners, lessees, and operators.**
❑ D2. **Landscape/ Outdoor Pesticide Use**	❑ **Show locations of native trees or areas of shrubs and ground cover to be undisturbed and retained.** ❑ **Show self-retaining landscape areas, if any.** ❑ **Show stormwater treatment and hydrograph modification management BMPs. (See instructions in Chapter 3, Step 5 and guidance in Chapter 5.)**	**State that final landscape plans will accomplish all of the following.** ❑ **Preserve existing native trees, shrubs, and ground cover to the maximum extent possible.** ❑ **Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution.** ❑ **Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions.** ❑ **Consider using pest-resistant plants, especially adjacent to hardscape.** **To insure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.**	❑ **Maintain landscaping using minimum or no pesticides.** ❑ **See applicable operational BMPs in "What you should know for…..Landscape and Gardening"** at http://rcflood.org/stormwater/**Error! Hyperlink reference not valid.** ❑ **Provide IPM information to new owners, lessees and operators.**

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ E. **Pools, spas, ponds, decorative fountains, and other water features.**	❑ **Show location of water feature and a sanitary sewer cleanout in an accessible area within 10 feet. (Exception: Public pools must be plumbed according to County Department of Environmental Health Guidelines.)**	**If the Co-Permittee requires pools to be plumbed to the sanitary sewer, place a note on the plans and state in the narrative that this connection will be made according to local requirements.**	❑ **See applicable operational BMPs in** "Guidelines for Maintaining Your Swimming Pool, Jacuzzi and Garden Fountain" at http://rcflood.org/stormwater/
❑ F. **Food service**	❑ **For restaurants, grocery stores, and other food service operations, show location (indoors or in a covered area outdoors) of a floor sink or other area for cleaning floor mats, containers, and equipment.** ❑ **On the drawing, show a note that this drain will be connected to a grease interceptor before discharging to the sanitary sewer.**	❑ **Describe the location and features of the designated cleaning area.** ❑ **Describe the items to be cleaned in this facility and how it has been sized to insure that the largest items can be accommodated.**	❑ **See the brochure, "**The Food Service Industry Best Management Practices for: Restaurants, Grocery Stores, Delicatessens and Bakeries" at http://rcflood.org/stormwater/ **Provide this brochure to new site owners, lessees, and operators.**
❑ G. **Refuse areas**	❑ **Show where site refuse and recycled materials will be handled and stored for pickup. See local municipal requirements for sizes and other details of refuse areas.** ❑ **If dumpsters or other receptacles are outdoors, show how the designated area will be covered, graded, and paved to prevent run-on and show locations of berms to prevent runoff from the area.** ❑ **Any drains from dumpsters, compactors, and tallow bin areas shall be connected to a grease removal device before discharge to sanitary sewer.**	❑ **State how site refuse will be handled and provide supporting detail to what is shown on plans.** ❑ **State that signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar.**	❑ **State how the following will be implemented:** **Provide adequate number of receptacles. Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered. Prohibit/prevent dumping of liquid or hazardous wastes. Post "no hazardous materials" signs. Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available on-site. See Fact Sheet SC-34, "Waste Handling and Disposal" in the CASQA Stormwater Quality Handbooks at** www.cabmphandbooks.com

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ H. **Industrial processes.**	❑ **Show process area.**	❑ **If industrial processes are to be located on site, state: "All process activities to be performed indoors. No processes to drain to exterior or to storm drain system."**	❑ **See Fact Sheet SC-10, "Non-Stormwater Discharges" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com** See the brochure "Industrial & Commercial Facilities Best Management Practices for: Industrial, Commercial Facilities" at http://rcflood.org/stormwater/

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ I. **Outdoor storage of equipment or materials. (See rows J and K for source control measures for vehicle cleaning, repair, and maintenance.)**	❑ **Show any outdoor storage areas, including how materials will be covered. Show how areas will be graded and bermed to prevent run-on or run-off from area.** ❑ **Storage of non-hazardous liquids shall be covered by a roof and/or drain to the sanitary sewer system, and be contained by berms, dikes, liners, or vaults.** ❑ **Storage of hazardous materials and wastes must be in compliance with the local hazardous materials ordinance and a Hazardous Materials Management Plan for the site.**	**Include a detailed description of materials to be stored, storage areas, and structural features to prevent pollutants from entering storm drains.** **Where appropriate, reference documentation of compliance with the requirements of Hazardous Materials Programs for:** ▪ **Hazardous Waste Generation** ▪ **Hazardous Materials Release Response and Inventory** ▪ **California Accidental Release (CalARP)** ▪ **Aboveground Storage Tank** ▪ **Uniform Fire Code Article 80 Section 103(b) & (c) 1991** ▪ **Underground Storage Tank** **www.cchealth.org/groups/hazmat/**	❑ **See the Fact Sheets SC-31, "Outdoor Liquid Container Storage" and SC-33, "Outdoor Storage of Raw Materials " in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ J. **Vehicle and Equipment Cleaning**	❑ **Show on drawings as appropriate:** **(1) Commercial/industrial facilities having vehicle/equipment cleaning needs shall either provide a covered, bermed area for washing activities or discourage vehicle/equipment washing by removing hose bibs and installing signs prohibiting such uses.** **(2) Multi-dwelling complexes shall have a paved, bermed, and covered car wash area (unless car washing is prohibited on-site and hoses are provided with an automatic shut-off to discourage such use).** **(3) Washing areas for cars, vehicles, and equipment shall be paved, designed to prevent run-on to or runoff from the area, and plumbed to drain to the sanitary sewer.** **(4) Commercial car wash facilities shall be designed such that no runoff from the facility is discharged to the storm drain system. Wastewater from the facility shall discharge to the sanitary sewer, or a wastewater reclamation system shall be installed.**	❑ **If a car wash area is not provided, describe any measures taken to discourage on-site car washing and explain how these will be enforced.**	**Describe operational measures to implement the following (if applicable):** ❑ **Washwater from vehicle and equipment washing operations shall not be discharged to the storm drain system.** Refer to "Outdoor Cleaning Activities and Professional Mobile Service Providers" for many of the Potential Sources of Runoff Pollutants categories below. Brochure can be found at http://rcflood.org/stormwater/ ❑ **Car dealerships and similar may rinse cars with water only.**

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ K. **Vehicle/Equipment Repair and Maintenance**	❑ **Accommodate all vehicle equipment repair and maintenance indoors. Or designate an outdoor work area and design the area to prevent run-on and runoff of stormwater.** ❑ **Show secondary containment for exterior work areas where motor oil, brake fluid, gasoline, diesel fuel, radiator fluid, acid-containing batteries or other hazardous materials or hazardous wastes are used or stored. Drains shall not be installed within the secondary containment areas.** ❑ **Add a note on the plans that states either (1) there are no floor drains, or (2) floor drains are connected to wastewater pretreatment systems prior to discharge to the sanitary sewer and an industrial waste discharge permit will be obtained.**	❑ **State that no vehicle repair or maintenance will be done outdoors, or else describe the required features of the outdoor work area.** ❑ **State that there are no floor drains or if there are floor drains, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements.** ❑ **State that there are no tanks, containers or sinks to be used for parts cleaning or rinsing or, if there are, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements.**	**In the Stormwater Control Plan, note that all of the following restrictions apply to use the site:** ❑ **No person shall dispose of, nor permit the disposal, directly or indirectly of vehicle fluids, hazardous materials, or rinsewater from parts cleaning into storm drains.** ❑ **No vehicle fluid removal shall be performed outside a building, nor on asphalt or ground surfaces, whether inside or outside a building, except in such a manner as to ensure that any spilled fluid will be in an area of secondary containment. Leaking vehicle fluids shall be contained or drained from the vehicle immediately.** ❑ **No person shall leave unattended drip parts or other open containers containing vehicle fluid, unless such containers are in use or in an area of secondary containment.** Refer to "Automotive Maintenance & Car Care Best Management Practices for Auto Body Shops, Auto Repair Shops, Car Dealerships, Gas Stations and Fleet Service Operations". Brochure can be found at http://rcflood.org/stormwater/ Refer to Outdoor Cleaning Activities and Professional Mobile Service Providers for many of the Potential Sources of Runoff Pollutants categories below. Brochure can be found at http://rcflood.org/stormwater/

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ L. **Fuel Dispensing Areas**	❑ **Fueling areas[6] shall have impermeable floors (i.e., portland cement concrete or equivalent smooth impervious surface) that are: a) graded at the minimum slope necessary to prevent ponding; and b) separated from the rest of the site by a grade break that prevents run-on of stormwater to the maximum extent practicable.** ❑ **Fueling areas shall be covered by a canopy that extends a minimum of ten feet in each direction from each pump. [Alternative: The fueling area must be covered and the cover's minimum dimensions must be equal to or greater than the area within the grade break or fuel dispensing area[1].] The canopy [or cover] shall not drain onto the fueling area.**		❑ **The property owner shall dry sweep the fueling area routinely.** ❑ **See the Fact Sheet SD-30 , "Fueling Areas" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**

[6] **The fueling area shall be defined as the area extending a minimum of 6.5 feet from the corner of each fuel dispenser or the length at which the hose and nozzle assembly may be operated plus a minimum of one foot, whichever is greater.**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ M. **Loading Docks**	❑ **Show a preliminary design for the loading dock area, including roofing and drainage. Loading docks shall be covered and/or graded to minimize run-on to and runoff from the loading area. Roof downspouts shall be positioned to direct stormwater away from the loading area. Water from loading dock areas shall be drained to the sanitary sewer, or diverted and collected for ultimate discharge to the sanitary sewer.** ❑ **Loading dock areas draining directly to the sanitary sewer shall be equipped with a spill control valve or equivalent device, which shall be kept closed during periods of operation.** ❑ **Provide a roof overhang over the loading area or install door skirts (cowling) at each bay that enclose the end of the trailer.**		❑ **Move loaded and unloaded items indoors as soon as possible.** ❑ **See Fact Sheet SC-30, "Outdoor Loading and Unloading," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ N. **Fire Sprinkler Test Water**		❑ **Provide a means to drain fire sprinkler test water to the sanitary sewer.**	❑ **See the note in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**
O. **Miscellaneous Drain or Wash Water or Other Sources** ❑ **Boiler drain lines** ❑ **Condensate drain lines** ❑ **Rooftop equipment** ❑ **Drainage sumps** ❑ **Roofing, gutters, and trim.** ❑ **Other sources**		❑ **Boiler drain lines shall be directly or indirectly connected to the sanitary sewer system and may not discharge to the storm drain system.** ❑ **Condensate drain lines may discharge to landscaped areas if the flow is small enough that runoff will not occur. Condensate drain lines may not discharge to the storm drain system.** ❑ **Rooftop equipment with potential to produce pollutants shall be roofed and/or have secondary containment.** ❑ **Any drainage sumps on-site shall feature a sediment sump to reduce the quantity of sediment in pumped water.** ❑ **Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff.** **Include controls for other sources as specified by local reviewer.**	

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ P. **Plazas, sidewalks, and parking lots.**			❑ **Sweep plazas, sidewalks, and parking lots regularly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into the storm drain system. Collect washwater containing any cleaning agent or degreaser and discharge to the sanitary sewer not to a storm drain.**

Appendix 9: O&M

Operation and Maintenance Plan and Documentation of Finance, Maintenance and Recording Mechanisms

"OPERATION AND MAINTENANCE PLAN WILL BE PROVIDED WITH FINAL WQMP"

Appendix 10: Educational Materials

BMP Fact Sheets, Maintenance Guidelines and Other End-User BMP Information

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.

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.

Why is stormwater runoff a problem?

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.

After the Storm

For more information contact:

or visit
www.epa.gov/npdes/stormwater
www.epa.gov/nps

A Citizen's Guide to Understanding Stormwater

EPA United States Environmental Protection Agency

EPA 833-B-03-002

January 2003

Internet Address (URL) • HTTP://www.epa.gov
Recycled/Recyclable • Printed With Vegetable Oil Based Inks on 100% Postconsumer, Process Chlorine Free Recycled Paper

Stormwater Pollution Solutions

Residential

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.

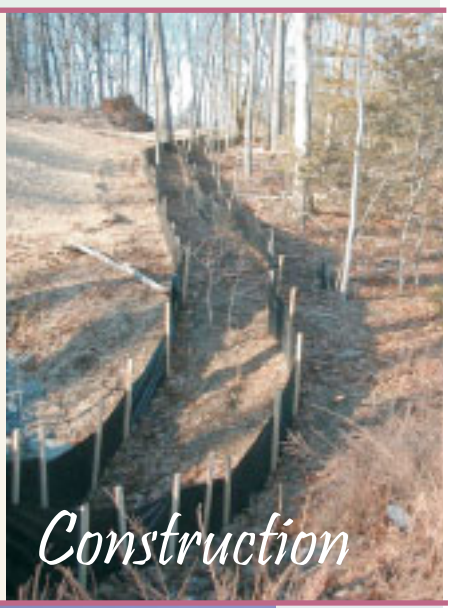
Commercial

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.



Construction

Agriculture

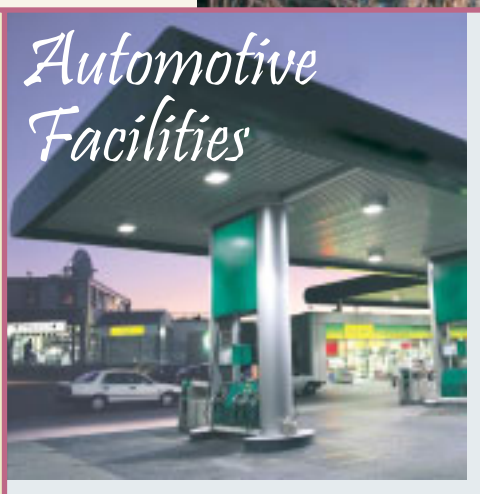
Lack of vegetation on streambanks can lead to erosion. Overgrazed pastures can also contribute excessive amounts of sediment to local waterbodies. Excess fertilizers and pesticides can poison aquatic animals and lead to destructive algae blooms. Livestock in streams can contaminate waterways with bacteria, 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.

Forestry

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.



Automotive Facilities

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.

RIVERSIDE COUNTY
ANIMAL SERVICES LOCATIONS:

www.rcdas.org

BLYTHE
16450 West Hobson Way
Blythe, CA 92225
760-921-7857

COACHELLA VALLEY ANIMAL CAMPUS
72-050 Petland Place
Thousand Palms, CA 92276
760-343-3644

RIVERSIDE COUNTY ANIMAL SERVICES
6851 Van Buren Blvd.
Riverside, CA 92509
951-688-4340

OTHER ANIMAL SHELTERS:

ANIMAL CARE CENTER OF INDIO
45-355 Van Buren
Indio, CA 92201
760-391-4138

ANIMAL FRIENDS OF THE VALLEYS
29001 Bastron Avenue
Lake Elsinore, CA 92530
951-674-0618
(Serving incorporated Temecula, Wildomar, Lake Elsinore, Murrieta and Canyon Lake)

MARY S. ROBERTS PET ADOPTION CENTER
6185 Industrial Avenue
Riverside, CA 92504
951-688-4340

RAMONA HUMANE SOCIETY
690 Humane Way
San Jacinto 92586
951-654-8002
(Serving Sun City, Menifee, Romoland and Homeland)

Looking to adopt a pet?
This website is linked to many animal shelters.
www.petfinder.com

To report illegal storm drain disposal, call
1-800-506-2555

Or visit our website at www.rcflood.org

E-mail fcnpdes@rcflood.org

What's the Scoop?

Tips for a Healthy Pet and a Healthier Environment

CREATE A HEALTHY ENVIRONMENT in and around your home by following these simple pet practices. Your pet, family and neighbors will appreciate their clean comfortable surroundings.

HOUSEHOLD PETS

We all love our pets, but pet waste is a subject everyone likes to avoid. Pet waste left on trails, sidewalks, streets and grassy areas can be washed into the nearest waterway when it rains. Even if you can't see streams or lakes near you, rainfall (stormwater) or sprinkler runoff can wash pet waste into the storm drains that carry runoff to the nearest streams or lakes untreated. The risk of stormwater contamination increases if pet waste is allowed to accumulate in outdoor animal pen areas or left on sidewalks, streets or driveways.

Pet waste contains nutrients and bacteria. Nutrients can promote the growth of algae in streams and lakes. Algae can cause fish kills and other environmental damage if it is fed too many nutrients. Pet Waste also contains e. Coli and fecal bacteria, which can cause disease in other animals and humans that come in contact with it when swimming or splashing in streams and lakes. Dogs also carry salmonella and giardia, which can make people sick.

Pet waste that is not picked up and properly disposed can also increase vector problems. Flies and other insects are not only attracted to and feed on pet waste, but can also be infected with diseases and spread those diseases to humans and other animals.

WHAT CAN YOU DO?

- **SCOOP** up pet waste and flush it down the toilet or place in trash can.
- **NEVER DUMP** pet waste into a storm drain or catch basin.
- **USE** the complimentary bags or mutt mitts offered in dispensers at local parks.
- **CARRY EXTRA BAGS** when walking your dog and make them available to other pet owners who are without.
- **TEACH CHILDREN** how to properly clean up after a pet.
- **TELL FRIENDS AND NEIGHBORS** about the ill effects of animal waste on the environment. Encourage them to clean up after pets.

Call 1-800-506-2555 TOLL FREE to report illegal dumping to the storm drain, find the dates and times of local Household Hazardous Waste Collection Events, obtain additional information on stormwater problems and solutions, request presentations about stormwater pollution in your child's classroom, or learn about free grasscycling and composting workshops.

SCOOP THE POOP

Many communities have "Scoop the Poop" laws that govern pet waste cleanup. Some of these laws specifically require anyone who walks an animal off their property to carry a bag, shovel, or scooper. Any waste left by the animal must be cleaned up immediately. CALL YOUR LOCAL CODE ENFORCEMENT OFFICE to find out more about pet waste regulations.

OTHER WAYS TO PROTECT YOUR PETS AND THE ENVIRONMENT

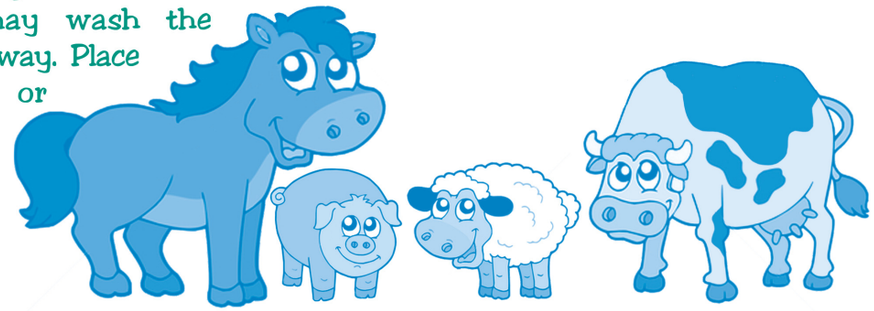
Pets are only one of many sources that contribute to water pollution. However, these other sources of water pollution cannot only harm the environment but also harm your pet. Improperly used or stored lawn fertilizers, pesticides, soaps, grease and vehicle fluids cannot only be washed into local streams and lakes, these chemicals can also harm your pet if they ingest or touch these chemicals. Call 1-800-506-2555 for information regarding how to properly dispose of household hazardous wastes such as these. You can also keep your pets and our environment healthy by properly maintaining your vehicles, and limiting use of pesticides and fertilizers to only the amount that is absolutely needed.

Make sure to not only protect your pets, but to also protect your neighbors pets. NEVER HOSE VEHICLE FLUIDS into the street or gutter. USE ABSORBENT MATERIALS such as cat litter to clean-up spills. SWEEP UP used absorbent materials and place it in the trash.

HORSES AND LIVESTOCK

Fortunate enough to own a horse or livestock? You, too, can play a part in protecting and cleaning up our water resources. The following are a few simple Best Management Practices (BMPs) specifically designed for horses and livestock.

- STORE your manure properly. Do not store unprotected piles of manure in places where stormwater runoff may wash the manure away. Place a cover or tarp over the pile to keep rainwater out.



- BUILD a manure storage facility to protect your pets, property and the environment. These structures usually consist of a concrete pad to protect groundwater and a short wall on one or two sides to make manure handling easier.
- READ the Only Rain Down the Storm Drain brochure titled "Tips for Horse Care" for additional guidance and recommendations. This brochure should be available from your local city office or for download at www.rcflood.org/stormwater.
- KEEP animals out of streams - Horses and livestock can deficate in streams causing stormwater pollution. Livestock and horses in streams can also disturb sensitive habitat and vegetation, causing additional environmental damage. Keep livestock and horses away from streams and use designated stream crossings whenever possible.
- MATERIAL STORAGE SAFETY TIPS Many of the chemicals found in barns require careful handling and proper disposal. When using these chemicals, be certain to follow these common sense guidelines:
  - Buy only what you need.
  - Treat spills of hoof oils like a fuel spill. Use kitty litter to soak up the oil and dispose of it in a tightly sealed plastic bag.
  - Store pesticides in a locked, dry, well-ventilated area.
  - Protect stored fertilizer and pesticides from rain and surface water.

RESOURCE CONSERVATION DISTRICTS CAN HELP

Call 1-800-506-2555 for assistance with locating a local conservation district that can help you properly manage your manure, re-establish healthy pastures, control weeds, or identify appropriate grasses for your soils.

Thank you for doing your part to protect your watershed, the environment, your pets and your community!

Drain Inserts

MP-52

Description

Drain inserts are manufactured filters or fabric placed in a drop inlet to remove sediment and debris. There are a multitude of inserts of various shapes and configurations, typically falling into one of three different groups: socks, boxes, and trays. The sock consists of a fabric, usually constructed of polypropylene. The fabric may be attached to a frame or the grate of the inlet holds the sock. Socks are meant for vertical (drop) inlets. Boxes are constructed of plastic or wire mesh. Typically a polypropylene "bag" is placed in the wire mesh box. The bag takes the form of the box. Most box products are one box; that is, the setting area and filtration through media occur in the same box. Some products consist of one or more trays or mesh grates. The trays may hold different types of media. Filtration media vary by manufacturer. Types include polypropylene, porous polymer, treated cellulose, and activated carbon.

California Experience

The number of installations is unknown but likely exceeds a thousand. Some users have reported that these systems require considerable maintenance to prevent plugging and bypass.

Advantages

- Does not require additional space as inserts as the drain inlets are already a component of the standard drainage systems.
- Easy access for inspection and maintenance.
- As there is no standing water, there is little concern for mosquito breeding.
- A relatively inexpensive retrofit option.

Limitations

Performance is likely significantly less than treatment systems that are located at the end of the drainage system such as ponds and vaults. Usually not suitable for large areas or areas with trash or leaves than can plug the insert.

Design and Sizing Guidelines

Refer to manufacturer's guidelines. Drain inserts come any many configurations but can be placed into three general groups: socks, boxes, and trays. The sock consists of a fabric, usually constructed of polypropylene. The fabric may be attached to a frame or the grate of the inlet holds the sock. Socks are meant for vertical (drop) inlets. Boxes are constructed of plastic or wire mesh. Typically a polypropylene "bag" is placed in the wire mesh box. The bag takes the form of the box. Most box products are

Design Considerations

- Use with other BMPs
- Fit and Seal Capacity within Inlet

Targeted Constituents

- ☑ Sediment
- ☑ Nutrients
- ☑ Trash
- ☑ Metals
- Bacteria
- ☑ Oil and Grease
- ☑ Organics

Removal Effectiveness

See New Development and Redevelopment Handbook-Section 5.

one box; that is, the setting area and filtration through media occurs in the same box. One manufacturer has a double-box. Stormwater enters the first box where setting occurs. The stormwater flows into the second box where the filter media is located. Some products consist of one or more trays or mesh grates. The trays can hold different types of media. Filtration media vary with the manufacturer: types include polypropylene, porous polymer, treated cellulose, and activated carbon.

Construction/Inspection Considerations

Be certain that installation is done in a manner that makes certain that the stormwater enters the unit and does not leak around the perimeter. Leakage between the frame of the insert and the frame of the drain inlet can easily occur with vertical (drop) inlets.

Performance

Few products have performance data collected under field conditions.

Siting Criteria

It is recommended that inserts be used only for retrofit situations or as pretreatment where other treatment BMPs presented in this section area used.

Additional Design Guidelines

Follow guidelines provided by individual manufacturers.

Maintenance

Likely require frequent maintenance, on the order of several times per year.

Cost

- The initial cost of individual inserts ranges from less than $100 to about $2,000. The cost of using multiple units in curb inlet drains varies with the size of the inlet.
- The low cost of inserts may tend to favor the use of these systems over other, more effective treatment BMPs. However, the low cost of each unit may be offset by the number of units that are required, more frequent maintenance, and the shorter structural life (and therefore replacement).

References and Sources of Additional Information

Hrachovec, R., and G. Minton, 2001, Field testing of a sock-type catch basin insert, Planet CPR, Seattle, Washington

Interagency Catch Basin Insert Committee, Evaluation of Commercially-Available Catch Basin Inserts for the Treatment of Stormwater Runoff from Developed Sites, 1995

Larry Walker Associates, June 1998, NDMP Inlet/In-Line Control Measure Study Report

Manufacturers literature

Santa Monica (City), Santa Monica Bay Municipal Stormwater/Urban Runoff Project - Evaluation of Potential Catch basin Retrofits, Woodward Clyde, September 24, 1998

Woodward Clyde, June 11, 1996, Parking Lot Monitoring Report, Santa Clara Valley Nonpoint Source Pollution Control Program.

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.

...ONLY RAIN... DOWN THE 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.

Non-Stormwater Discharges SC-10

Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Description

Non-stormwater discharges are those flows that do not consist entirely of stormwater. Some non-stormwater discharges do not include pollutants and may be discharged to the storm drain. These include uncontaminated groundwater and natural springs. There are also some non-stormwater discharges that typically do not contain pollutants and may be discharged to the storm drain with conditions. These include car washing, air conditioner condensate, etc. However there are certain non-stormwater discharges that pose environmental concern. These discharges may originate from illegal dumping or from internal floor drains, appliances, industrial processes, sinks, and toilets that are connected to the nearby storm drainage system. These discharges (which may include: process waste waters, cooling waters, wash waters, and sanitary wastewater) can carry substances such as paint, oil, fuel and other automotive fluids, chemicals and other pollutants into storm drains. They can generally be detected through a combination of detection and elimination. The ultimate goal is to effectively eliminate non-stormwater discharges to the stormwater drainage system through implementation of measures to detect, correct, and enforce against illicit connections and illegal discharges of pollutants on streets and into the storm drain system and creeks.

Targeted Constituents

Sediment	
Nutrients	✓
Trash	
Metals	✓
Bacteria	✓
Oil and Grease	✓
Organics	✓

Approach

Initially the industry must make an assessment of non-stormwater discharges to determine which types must be eliminated or addressed through BMPs. The focus of the following approach is in the elimination of non-stormwater discharges.

CASQA
California Stormwater Quality Association

Pollution Prevention

- Ensure that used oil, used antifreeze, and hazardous chemical recycling programs are being implemented. Encourage litter control.

Suggested Protocols

Recommended Complaint Investigation Equipment

- Field Screening Analysis
  - pH paper or meter
  - Commercial stormwater pollutant screening kit that can detect for reactive phosphorus, nitrate nitrogen, ammonium nitrogen, specific conductance, and turbidity
  - Sample jars
  - Sample collection pole
  - A tool to remove access hole covers
- Laboratory Analysis
  - Sample cooler
  - Ice
  - Sample jars and labels
  - Chain of custody forms
- Documentation
  - Camera
  - Notebook
  - Pens
  - Notice of Violation forms
  - Educational materials

General

- Develop clear protocols and lines of communication for effectively prohibiting non-stormwater discharges, especially those that are not classified as hazardous. These are often not responded to as effectively as they need to be.
- Stencil or demarcate storm drains, where applicable, to prevent illegal disposal of pollutants. Storm drain inlets should have messages such as "Dump No Waste Drains to Stream" stenciled or demarcated next to them to warn against ignorant or intentional dumping of pollutants into the storm drainage system.

- See SC44 Stormwater Drainage System Maintenance for additional information.

Illicit Connections

- Locate discharges from the industrial storm drainage system to the municipal storm drain system through review of "as-built" piping schematics.
- Isolate problem areas and plug illicit discharge points.
- Locate and evaluate all discharges to the industrial storm drain system.

Visual Inspection and Inventory

- Inventory and inspect each discharge point during dry weather.
- Keep in mind that drainage from a storm event can continue for a day or two following the end of a storm and groundwater may infiltrate the underground stormwater collection system. Also, non-stormwater discharges are often intermittent and may require periodic inspections.

Review Infield Piping

- A review of the "as-built" piping schematic is a way to determine if there are any connections to the stormwater collection system.
- Inspect the path of floor drains in older buildings.

Smoke Testing

- Smoke testing of wastewater and stormwater collection systems is used to detect connections between the two systems.
- During dry weather the stormwater collection system is filled with smoke and then traced to sources. The appearance of smoke at the base of a toilet indicates that there may be a connection between the sanitary and the stormwater system.

Dye Testing

- A dye test can be performed by simply releasing a dye into either your sanitary or process wastewater system and examining the discharge points from the stormwater collection system for discoloration.

TV Inspection of Drainage System

- TV Cameras can be employed to visually identify illicit connections to the industrial storm drainage system.

Illegal Dumping

- Regularly inspect and clean up hot spots and other storm drainage areas where illegal dumping and disposal occurs.
- On paved surfaces, clean up spills with as little water as possible. Use a rag for small spills, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be sent to a certified laundry (rags) or disposed of as hazardous waste.

- Never hose down or bury dry material spills. Sweep up the material and dispose of properly.
- Use adsorbent materials on small spills rather than hosing down the spill. Remove the adsorbent materials promptly and dispose of properly.
- For larger spills, a private spill cleanup company or Hazmat team may be necessary.

Once a site has been cleaned:

- Post "No Dumping" signs with a phone number for reporting dumping and disposal.
- Landscaping and beautification efforts of hot spots may also discourage future dumping, as well as provide open space and increase property values.
- Lighting or barriers may also be needed to discourage future dumping.
- See fact sheet SC11 Spill Prevention, Control, and Cleanup.

Inspection

- Regularly inspect and clean up hot spots and other storm drainage areas where illegal dumping and disposal occurs.
- Conduct field investigations of the industrial storm drain system for potential sources of non-stormwater discharges.
- Pro-actively conduct investigations of high priority areas. Based on historical data, prioritize specific geographic areas and/or incident type for pro-active investigations.

Reporting

- A database is useful for defining and tracking the magnitude and location of the problem.
- Report prohibited non-stormwater discharges observed during the course of normal daily activities so they can be investigated, contained, and cleaned up or eliminated.
- Document that non-stormwater discharges have been eliminated by recording tests performed, methods used, dates of testing, and any on-site drainage points observed.
- Document and report annually the results of the program.
- Maintain documentation of illicit connection and illegal dumping incidents, including significant conditionally exempt discharges that are not properly managed.

Training

- Training of technical staff in identifying and documenting illegal dumping incidents is required.
- Consider posting the quick reference table near storm drains to reinforce training.
- Train employees to identify non-stormwater discharges and report discharges to the appropriate departments.

- Educate employees about spill prevention and cleanup.
- Well-trained employees can reduce human errors that lead to accidental releases or spills. The employee should have the tools and knowledge to immediately begin cleaning up a spill should one occur. Employees should be familiar with the Spill Prevention Control and Countermeasure Plan.
- Determine and implement appropriate outreach efforts to reduce non-permissible non-stormwater discharges.
- Conduct spill response drills annually (if no events occurred to evaluate your plan) in cooperation with other industries.
- When a responsible party is identified, educate the party on the impacts of his or her actions.

Spill Response and Prevention

- See SC11 Spill Prevention Control and Cleanup.

Other Considerations

- Many facilities do not have accurate, up-to-date schematic drawings.

Requirements

Costs (including capital and operation & maintenance)

- The primary cost is for staff time and depends on how aggressively a program is implemented.
- Cost for containment and disposal is borne by the discharger.
- Illicit connections can be difficult to locate especially if there is groundwater infiltration.
- Indoor floor drains may require re-plumbing if cross-connections to storm drains are detected.

Maintenance (including administrative and staffing)

- Illegal dumping and illicit connection violations requires technical staff to detect and investigate them.

Supplemental Information

Further Detail of the BMP

Illegal Dumping

- Substances illegally dumped on streets and into the storm drain systems and creeks include paints, used oil and other automotive fluids, construction debris, chemicals, fresh concrete, leaves, grass clippings, and pet wastes. All of these wastes cause stormwater and receiving water quality problems as well as clog the storm drain system itself.
- Establish a system for tracking incidents. The system should be designed to identify the following:
  - Illegal dumping hot spots

- Types and quantities (in some cases) of wastes
- Patterns in time of occurrence (time of day/night, month, or year)
- Mode of dumping (abandoned containers, "midnight dumping" from moving vehicles, direct dumping of materials, accidents/spills)
- Responsible parties

One of the keys to success of reducing or eliminating illegal dumping is increasing the number of people at the facility who are aware of the problem and who have the tools to at least identify the incident, if not correct it. Therefore, train field staff to recognize and report the incidents.

What constitutes a "non-stormwater" discharge?

- Non-stormwater discharges to the stormwater collection system may include any water used directly in the manufacturing process (process wastewater), air conditioning condensate and coolant, non-contact cooling water, cooling equipment condensate, outdoor secondary containment water, vehicle and equipment wash water, sink and drinking fountain wastewater, sanitary wastes, or other wastewaters.

Permit Requirements

- Facilities subject to stormwater permit requirements must include a certification that the stormwater collection system has been tested or evaluated for the presence of non-stormwater discharges. The State's General Industrial Stormwater Permit requires that non-stormwater discharges be eliminated prior to implementation of the facility's SWPPP.

Performance Evaluation

- Review annually internal investigation results; assess whether goals were met and what changes or improvements are necessary.
- Obtain feedback from personnel assigned to respond to, or inspect for, illicit connections and illegal dumping incidents.

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

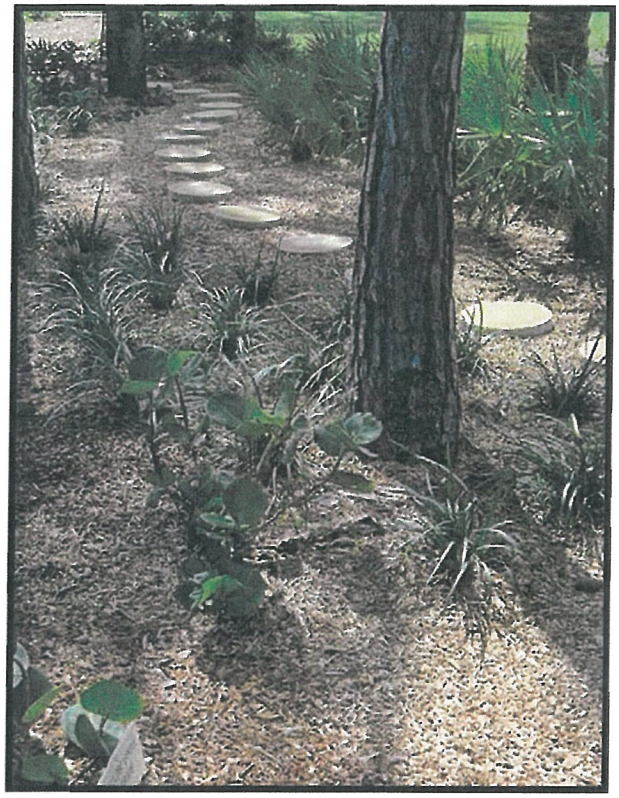
Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Storm Water Managers Resource Center http://www.stormwatercenter.net/

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.

SD-10 Site Design & Landscape Planning

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.

SD-10 Site Design & Landscape Planning

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

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.

- Design timing and application methods of irrigation water to minimize the runoff of excess irrigation water into the storm water drainage system.
- Group plants with similar water requirements in order to reduce excess irrigation runoff and promote surface filtration. Choose plants with low irrigation requirements (for example, native or drought tolerant species). Consider design features such as:
  - Using mulches (such as wood chips or bar) in planter areas without ground cover to minimize sediment in runoff
  - Installing appropriate plant materials for the location, in accordance with amount of sunlight and climate, and use native plant materials where possible and/or as recommended by the landscape architect
  - Leaving a vegetative barrier along the property boundary and interior watercourses, to act as a pollutant filter, where appropriate and feasible
  - Choosing plants that minimize or eliminate the use of fertilizer or pesticides to sustain growth
- Employ other comparable, equally effective methods to reduce irrigation water runoff.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of " redevelopment" must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under "designing new installations" above should be followed.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

Storm Drain Signage SD-13

Design Objectives

- Maximize Infiltration
- Provide Retention
- Slow Runoff
- Minimize Impervious Land Coverage
- ☑ Prohibit Dumping of Improper Materials
- Contain Pollutants
- Collect and Convey

Description

Waste materials dumped into storm drain inlets can have severe impacts on receiving and ground waters. Posting notices regarding discharge prohibitions at storm drain inlets can prevent waste dumping. Storm drain signs and stencils are highly visible source controls that are typically placed directly adjacent to storm drain inlets.

Approach

The stencil or affixed sign contains a brief statement that prohibits dumping of improper materials into the urban runoff conveyance system. Storm drain messages have become a popular method of alerting the public about the effects of and the prohibitions against waste disposal.

Suitable Applications

Stencils and signs alert the public to the destination of pollutants discharged to the storm drain. Signs are appropriate in residential, commercial, and industrial areas, as well as any other area where contributions or dumping to storm drains is likely.

Design Considerations

Storm drain message markers or placards are recommended at all storm drain inlets within the boundary of a development project. The marker should be placed in clear sight facing toward anyone approaching the inlet from either side. All storm drain inlet locations should be identified on the development site map.

Designing New Installations

The following methods should be considered for inclusion in the project design and show on project plans:

- Provide stenciling or labeling of all storm drain inlets and catch basins, constructed or modified, within the project area with prohibitive language. Examples include "NO DUMPING

– DRAINS TO OCEAN" and/or other graphical icons to discourage illegal dumping.

- Post signs with prohibitive language and/or graphical icons, which prohibit illegal dumping at public access points along channels and creeks within the project area.

Note - Some local agencies have approved specific signage and/or storm drain message placards for use. Consult local agency stormwater staff to determine specific requirements for placard types and methods of application.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. If the project meets the definition of "redevelopment", then the requirements stated under " designing new installations" above should be included in all project design plans.

Additional Information

Maintenance Considerations

- Legibility of markers and signs should be maintained. If required by the agency with jurisdiction over the project, the owner/operator or homeowner's association should enter into a maintenance agreement with the agency or record a deed restriction upon the property title to maintain the legibility of placards or signs.

Placement

- Signage on top of curbs tends to weather and fade.

- Signage on face of curbs tends to be worn by contact with vehicle tires and sweeper brooms.

Supplemental Information

Examples

- Most MS4 programs have storm drain signage programs. Some MS4 programs will provide stencils, or arrange for volunteers to stencil storm drains as part of their outreach program.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

Appendix E

Mitigation Monitoring and Reporting Program

MITIGATION MONITORING AND REPORTING PROGRAM

The Final Initial Study-Mitigated Negative Declaration identifies the mitigation measures that will be implemented to reduce the impacts associated with the Alabbasi Compound Project. The California Environmental Quality Act (CEQA) was amended in 1989 to add Section 21081.6, which requires a public agency to adopt a monitoring and reporting program for assessing and ensuring compliance with any required mitigation measures applied to proposed development. As stated in Section 21081.6 of the Public Resources Code:

> *... the public agency shall adopt a reporting or monitoring program for the changes made to the project or conditions of project approval, adopted in order to mitigate or avoid significant effects on the environment.*

Section 21081.6 also provides general guidelines for implementing mitigation monitoring programs and indicates that specific reporting and/or monitoring requirements, to be enforced during project implementation, shall be defined as part of adopting a mitigated negative declaration.

The mitigation monitoring table lists those mitigation measures included as conditions of approval for the project. To ensure that the mitigation measures are properly implemented, a monitoring program has been devised which identifies the timing and responsibility for monitoring each measure. The City of Riverside as the lead agency will be primarily responsible for monitoring and reporting the implementation of the mitigation measures.

Alabbasi Compound Initial Study-Mitigated Negative Declaration Mitigation Monitoring and Reporting Plan						
Mitigation Measure		**Responsible Monitoring Party**	**Monitoring Action**	**Implementation Schedule**	**Verification of Completion**	
					Check Box	**Date**
Biological Resources						
BIO-1	**Mitigation Measure BIO-1:** A qualified biologist will conduct a pre-construction presence/absence survey for burrowing owls within 30 days prior to site disturbance. If burrowing owls are detected onsite and may be affected by the project, avoidance measures shall be developed in compliance with the MSHCP and subject to the approval of the Western Riverside Regional Conservation Authority and wildlife agencies.	Community & Economic Development Department, Planning Division; Public Works Department	Perform survey not more than 30 days in advance of construction.	Not more than 30 days in advance of ground disturbing activities. Applicant to provide a report of other evidence of completion to the City of Riverside Planning Division prior to issuance of a Grading Permit.		
BIO-2	**Mitigation Measure BIO-2**: As feasible, vegetation clearing should be conducted outside of the nesting season, which is generally identified as February 1 through September 15. If avoidance of the nesting season is not feasible, then a qualified biologist shall conduct a nesting bird survey within three days prior to any disturbance of the site, including disking and grading. If active nests are identified, the biologist shall establish suitable buffers around the nests based on his/her judgement, and the buffer areas shall be avoided until the nests are no longer occupied and the juvenile birds can survive independently from the nests.	Community & Economic Development Department, Planning Division; Public Works Department	Perform survey not more than 3 days in advance of construction.	Not more than 3 days in advance of ground disturbing activities. Applicant to provide a report of other evidence of completion to the City of Riverside Planning Division.		
Cultural Resources						

Alabbasi Compound Initial Study-Mitigated Negative Declaration Mitigation Monitoring and Reporting Plan						
Mitigation Measure		Responsible Monitoring Party	Monitoring Action	Implementation Schedule	Verification of Completion	
					Check Box	Date
CUL-1	**Mitigation Measure CUL-1 Changes to Project**: Prior to Grading Permit issuance, if there are any changes to Project site design and/or proposed grades, the Applicant and the City shall contact interested tribes to provide an electronic copy of the revised plans for review. Additional consultation shall occur between the City and interested tribes to discuss any proposed changes and review any new impacts and/or potential avoidance/preservation of the cultural resources on the Project site. The City and the Applicant shall make all attempts to avoid and/or preserve in place as many cultural and paleontological resources as possible that are located on the Project site if the site design and/or proposed grades should be revised.	Community & Economic Development Department, Planning Division	Verification of implementation in the field prior to grading and construction. Consultation logs showing Applicant's effort to contact consulting tribes and the outcome of any such consultation.	Prior to site disturbance and grading if the project site design and/or proposed grades change from what has been approved.		
CUL-2	**Mitigation Measure CUL-2: Archaeological Monitoring:** At least 30 days prior to application for a grading permit and before any grading, excavation and/or ground disturbing activities on the site take place, the Project Applicant shall retain a Secretary of the Interior's Standards-qualified Project Archaeologist to manage the monitoring of all ground-disturbing activities in an effort to identify any unknown archaeological resources.	Community & Economic Development Department, Planning Division; Public Works Department; Project Biologist; Qualified Archaeological	Archaeological Monitoring Plan. Evidence that a qualified Archaeological Monitor has been retained by Applicant shall be provided to the city (i.e., signed contract). Removal and Relocation Plan.	At least 30 days prior to application for a grading permit.		

Alabbasi Compound Initial Study-Mitigated Negative Declaration Mitigation Monitoring and Reporting Plan						
Mitigation Measure		Responsible Monitoring Party	Monitoring Action	Implementation Schedule	Verification of Completion	
					Check Box	Date
	1. The Project Archaeologist, in consultation with consulting tribe(s), the Developer and the City, shall develop an Archaeological Monitoring Plan to 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: a. Project grading and development scheduling; b. The development of a rotating or simultaneous schedule in coordination with the Developer and the Project Archaeologist for designated Native American Tribal Monitors from the Consulting Tribe(s) during grading, excavation and ground disturbing activities on the site: including the scheduling, safety requirements, duties, scope of work, and Native American Tribal Monitors' authority to stop and redirect grading activities in coordination with all Project archaeologists; c. Plan for the controlled grading within 50 feet of the boundaries of identified resources. Grading within 50-feet of these sites shall be conducted using	Monitor				

Alabbasi Compound Initial Study-Mitigated Negative Declaration Mitigation Monitoring and Reporting Plan						
Mitigation Measure		Responsible Monitoring Party	Monitoring Action	Implementation Schedule	Verification of Completion	
					Check Box	Date
	controlled grading techniques. Large indiscriminate grading equipment shall not be used, and the controlled grading technique shall be reviewed by the Project Archaeologist, in consultation with the Consulting Tribe(s), the Developer, and the City. The Project Archaeologist and Native American Tribal Monitors shall ensure that the grading efforts in these areas are conducted in a manner that allows for the identification of subsurface cultural resources. Any resources observed shall be addressed in accordance with **MM-CUL-3** below; d. The determination by the Project Archaeologist, Project Biologist, Developer, City and Consulting Tribe(s) as to the scope, methods and suitable relocation site(s) for CA-RIV-33-003483. This Removal and Relocation Plan shall be reviewed and approved by City Staff prior to commencement of work. Relocation shall be mutually agreed upon and completed to the satisfaction of all parties prior to commencement of mass grading. The relocated features will be placed in an area that will be					

Alabbasi Compound Initial Study-Mitigated Negative Declaration Mitigation Monitoring and Reporting Plan						
Mitigation Measure		Responsible Monitoring Party	Monitoring Action	Implementation Schedule	Verification of Completion	
					Check Box	Date
	preserved in perpetuity, so that no future disturbances will occur; and e. The protocols and stipulations that the Developer, City, Tribe(s) and Project archaeologist will follow in the event of inadvertent cultural resources discoveries, including any newly discovered cultural resource deposits that shall be subject to a cultural resources evaluation.					
CUL-3	**Mitigation Measure CUL-3: Treatment and Disposition of Cultural Resources:** In the event that Native American cultural resources are inadvertently discovered during the course of grading for this Project, the following procedures will be carried out for treatment and disposition of the discoveries: 1. **Temporary Curation and Storage:** During the course of construction, all discovered resources shall be temporarily curated in a secure location onsite or at the offices of the Project Archaeologist. The removal of any artifacts from the Project site will need to be thoroughly inventoried with tribal monitor oversite of the process; and	Community & Economic Development Department, Planning Division; Public Works Department; Qualified Archaeological Monitor; Applicant; Consulting Tribes	Report documenting discovery and disposition of any discovered Native American cultural resources. If resources are discovered and curated, a copy of the curation agreement shall be provided to the City. Completed Phase IV Monitoring Report.	As needed during construction. Phase IV Monitoring Report shall be submitted and accepted prior to final inspection of rough grading.		

Alabbasi Compound Initial Study-Mitigated Negative Declaration Mitigation Monitoring and Reporting Plan						
Mitigation Measure		Responsible Monitoring Party	Monitoring Action	Implementation Schedule	Verification of Completion	
					Check Box	Date
	2. **Treatment and Final Disposition:** The landowner(s) shall relinquish ownership of all cultural resources, including sacred items, burial goods, and all archaeological artifacts and non-human remains as part of the required mitigation for impacts to cultural resources. The Applicant shall relinquish the artifacts through one or more of the following methods and provide the City of Riverside Community & Economic Development Department with evidence of same: a. Accommodate the process for onsite reburial of the discovered items with the consulting Native American tribes or bands. This shall include measures and provisions to protect the future reburial area from any future impacts. Reburial shall not occur until all cataloguing and basic recordation have been completed; b. A curation agreement with an appropriate qualified repository within Riverside County that meets federal standards per 36 CFR Part 79 and therefore would be professionally curated and made available to other archaeologists/researchers for further					

Alabbasi Compound Initial Study-Mitigated Negative Declaration Mitigation Monitoring and Reporting Plan						
Mitigation Measure		Responsible Monitoring Party	Monitoring Action	Implementation Schedule	Verification of Completion	
					Check Box	Date
	study. The collections and associated records shall be transferred, including title, to an appropriate curation facility within Riverside County, to be accompanied by payment of the fees necessary for permanent curation: c. If more than one Native American tribe or band is involved with the Project and cannot come to a consensus as to the disposition of cultural materials, they shall be curated at the Western Science Center by default; and d. At the completion of grading, excavation and ground disturbing activities on the site, a Phase IV Monitoring Report shall be submitted to the City documenting monitoring activities conducted by the Project Archaeologist and Native Tribal Monitors within 60 days of completion of grading. This report shall document the impacts to the known resources on the property; describe how each mitigation measure was fulfilled; document the type of cultural resources recovered and the disposition of such resources; provide evidence of the required cultural sensitivity training for the construction staff held during the					

Alabbasi Compound Initial Study-Mitigated Negative Declaration Mitigation Monitoring and Reporting Plan						
Mitigation Measure		Responsible Monitoring Party	Monitoring Action	Implementation Schedule	Verification of Completion	
					Check Box	Date
	required pre-grade meeting; and, in a confidential appendix, include the daily/weekly monitoring notes from the archaeologist. All reports produced will be submitted to the City of Riverside, Eastern Information Center and interested tribes.					