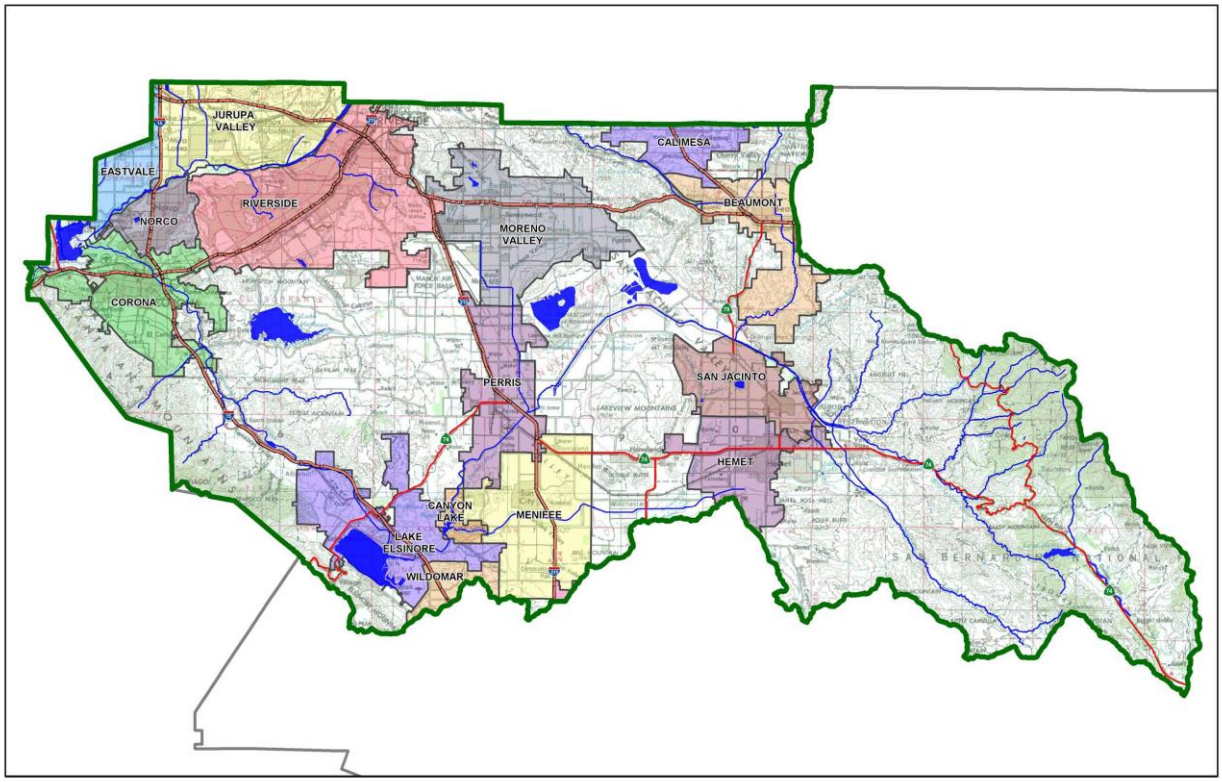
Project Specific Water Quality Management Plan

*For Projects located within the **Santa Ana Watershed** Region of Riverside County*

Project Title: ***Stratford Ranch***

Development No: ***TTM 36647***

Design Review/Case No: ***16-05216***



☒ **Preliminary**
☐ **Final**

Original Date Prepared: *May 2015*

Revision Date(s): June 22, 2018

Prepared for Compliance with
Regional Board Order No. **R8-2010-0033**

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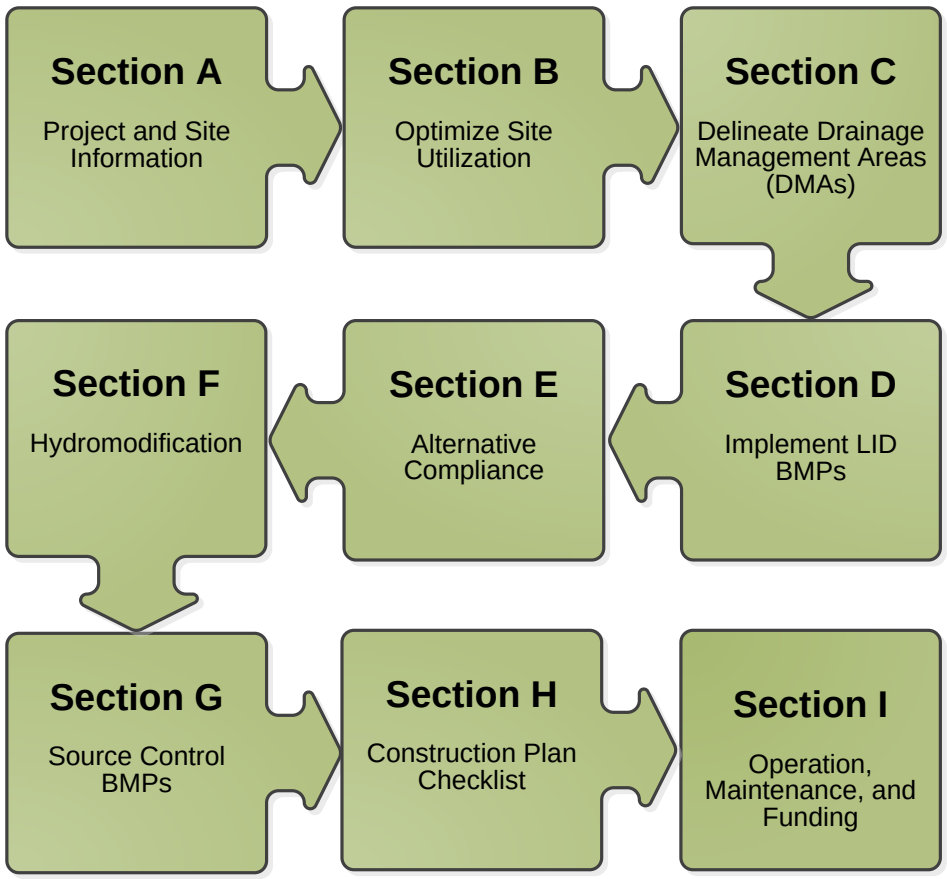
A Brief Introduction

This Project-Specific WQMP Template for the **Santa Ana Region** has been prepared to help guide you in documenting compliance for your project. Because this document has been designed to specifically document compliance, you will need to utilize the WQMP Guidance Document as your "how-to" manual to help guide you through this process. Both the Template and Guidance Document go hand-in-hand, and will help facilitate a well prepared Project-Specific WQMP. Below is a flowchart for the layout of this Template that will provide the steps required to document compliance.



OWNER'S CERTIFICATION

This Project-Specific Water Quality Management Plan (WQMP) has been prepared for *Mission Pacific Land Company* by *Albert A. Webb Associates* for the *Stratford Ranch* project.

This WQMP is intended to comply with the requirements of the *City of Perris* for *Water Quality Ordinance 1194* 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 Perris Water Quality Ordinance 1194.*

"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
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	June 22, 2018 Date
Sarah Kowalski, PE Preparer's Printed Name	*Senior Engineer* Preparer's Title/Position

Preparer's Licensure:

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Section A: Project and Site Information

PROJECT INFORMATION	
Type of Project:	*Residential*
Planning Area:	*Perris Valley Commerce Center (PVCC) Specific Plan Area*
Community Name:	*Perris Valley*
Development Name:	
PROJECT LOCATION	
Latitude & Longitude (DMS): *33° 51' 11.58"N, 117° 13' 07.88"W*	
Project Watershed and Sub-Watershed: *Lake Elsinore, San Jacinto River (Reach 3)*	
APN(s): *302-150-009, 010, 011, 012, 013, 014, 015, 016, 017, 018, and 019 and 302-140-007 and 008*	
Map Book and Page No.: *2010 Thomas Guide, Page 747, Grid H7.*	
PROJECT CHARACTERISTICS	
Proposed or Potential Land Use(s)	*Residential*
Proposed or Potential SIC Code(s) ***1521*** *(General Contractors-Single-Family Houses)*	*1521*
Total area of project site (SF)	*2,238,745 SF (51.4 AC)*
Area of Impervious Project Footprint (SF)	*476,323 SF (10.9 AC)*
Total Area of proposed Impervious Surfaces within the Project Limits (SF)/or Replacement	*518,815 SF (11.9 AC)*
Does the project consist of offsite road improvements?	☒ Y ☐ N
Does the project propose to construct unpaved roads?	☐ Y ☒ N
Is the project part of a larger common plan of development (phased project)?	☐ Y ☒ N
EXISTING SITE CHARACTERISTICS	
Total area of existing Impervious Surfaces within the project limits (SF)	*0*
Is the project located within any MSHCP Criteria Cell?	☐ Y ☒ N
If so, identify the Cell number:	*N/A*
Are there any natural hydrologic features on the project site?	☐ Y ☒ N
Is a Geotechnical Report attached? *Only NRCS Soil Map*	☒ Y ☐ N
If no Geotech. Report, list the NRCS soils type(s) present on the site (A, B, C and/or D)	
What is the Water Quality Design Storm Depth for the project?	*0.66*

A.1 Maps and Site Plans

When completing your Project-Specific WQMP, include a map of the local vicinity and existing site. In addition, include all grading, drainage, landscape/plant palette and other pertinent construction plans in Appendix 2. At a **minimum**, your WQMP Site Plan should include the following:

- Drainage Management Areas
- Proposed Structural BMPs
- Drainage Path
- Drainage Infrastructure, Inlets, Overflows
- Source Control BMPs
- Buildings, Roof Lines, Downspouts
- Impervious Surfaces
- Standard Labeling

Use your discretion on whether or not you may need to create multiple sheets or can appropriately accommodate these features on one or two sheets. Keep in mind that the Co-Permittee plan reviewer must be able to easily analyze your project utilizing this template and its associated site plans and maps.

Project Description

This project proposes to build 90 single family residential units on approximately 22.6 acres of currently vacant land. The site is located north of Ramona Expressway and west of Evans Road. TTM 36648 is located to the north of the property, and the Perris Valley Storm Drain (PVSD) Channel forms the western boundary.

Historically the site was used for agriculture. Presently, it is vacant with little or no vegetation. The site is relatively flat and the predominant soil classification group is "C". According to the soils report, perched ground water conditions were encountered at depths as shallow as 11.5 feet below grade.

The proposed project site DMA 1 can be divided into 2 watersheds, west and east. Both watersheds are comprised of residential lots and streets. Each lot disperses roof runoff to lot specific drainage swales. These swales allow for infiltration to the maximum extent practicable. As shown in the BMP Site Plan Exhibit details, a depression of 4-6" will be incorporated into the precise grade of each lot to allow for further infiltration of this roof run-off prior to discharging to the street. Underdrains then direct each lot's flow to the street via private drains through curb. The storm drain runoffs from both watersheds are collected by proposed onsite storm drain systems and then discharged into open space Lot "B", a proposed bioretention basin for water quality mitigation. The treated flows then are outlet into the existing PVSD Channel.

The proposed project site DMA 2 includes a detention basin that is proposed on the remainder lot between Ramona Expressway and the tract boundary of TTM 36647. This DMA is classified as self-retaining, and it will retain all run-on flows within the detention basin.

A.2 Identify Receiving Waters

Using Table A.1 below, list in order of upstream to downstream, the receiving waters that the project site is tributary to. Continue to fill each row with the Receiving Water's 303(d) listed impairments (if any), designated beneficial uses, and proximity, if any, to a RARE beneficial use. Include a map of the receiving waters in Appendix 1.

Table A.1 Identification of Receiving Waters

Receiving Waters	EPA Approved 303(d) List Impairments	Designated Beneficial Uses	Proximity to RARE Beneficial Use
Perris Valley Storm Drain (channel)	*None*	*None*	*Not a water body classified as RARE*
San Jacinto River (Reach 3) (HU# 802.11)	*None*	*Intermittent: MUN, AGR, GWR, REC1, REC2, WARM, WILD*	*Not a water body classified as RARE*
Canyon Lake (HU# 802.11, 802.12)	*Nutrients, Pathogens*	*MUN, AGR, GWR, REC1, REC2, WARM, WILD*	*Not a water body classified as RARE*
Lake Elsinore (HU# 802.31)	*PCBs, (Organic Compound), Nutrients, Organic Enrichment (Low DO), Sediment Toxicity, Unknown Toxicity*	*REC1, REC2, WARM, WILD,*	*Not a water body classified as RARE*

A.3 Additional Permits/Approvals required for the Project:

Table A.2 Other Applicable Permits

Agency	Permit Required	
State Department of Fish and Game, 1602 Streambed Alteration Agreement	☐ Y	☒ N
State Water Resources Control Board, Clean Water Act (CWA) Section 401 Water Quality Cert.	☐ Y	☒ N
US Army Corps of Engineers, CWA Section 404 Permit	☐ Y	☒ N
US Fish and Wildlife, Endangered Species Act Section 7 Biological Opinion	☐ Y	☒ N
Statewide Construction General Permit Coverage ***(2009-0009-DWQ as amended by 2010-0014-DWQ)***	☒ Y	☐ N
Statewide Industrial General Permit Coverage	☒ Y	☐ N
Western Riverside MSHCP Consistency Approval (e.g., JPR, DBESP)	☐ Y	☒ N
City of Perris Grading Permit	☒ Y	☐ N
City of Perris Building Permit	☒ Y	☐ N
Riverside County Flood Control Encroachment Permit	☒ Y	☐ N

If yes is answered to any of the questions above, the Co-Permittee may require proof of approval/coverage from those agencies as applicable including documentation of any associated requirements that may affect this Project-Specific WQMP.

Section B: Optimize Site Utilization (LID Principles)

Review of the information collected in Section 'A' will aid in identifying the principal constraints on site design and selection of LID BMPs as well as opportunities to reduce imperviousness and incorporate LID Principles into the site and landscape design. For example, **constraints** might include impermeable soils, high groundwater, groundwater pollution or contaminated soils, steep slopes, geotechnical instability, high-intensity land use, heavy pedestrian or vehicular traffic, utility locations or safety concerns. **Opportunities** might include existing natural areas, low areas, oddly configured or otherwise unbuildable parcels, easements and landscape amenities including open space and buffers (which can double as locations for bioretention BMPs), and differences in elevation (which can provide hydraulic head). Prepare a brief narrative for each of the site optimization strategies described below. This narrative will help you as you proceed with your LID design and explain your design decisions to others.

The 2010 Santa Ana MS4 Permit further requires that LID Retention BMPs (Infiltration Only or Harvest and Use) be used unless it can be shown that those BMPs are infeasible. Therefore, it is important that your narrative identify and justify if there are any constraints that would prevent the use of those categories of LID BMPs. Similarly, you should also note opportunities that exist which will be utilized during project design. Upon completion of identifying Constraints and Opportunities, include these on your WQMP Site plan in Appendix 1.

Site Optimization

The following questions are based upon Section 3.2 of the WQMP Guidance Document. Review of the WQMP Guidance Document will help you determine how best to optimize your site and subsequently identify opportunities and/or constraints, and document compliance.

Did you identify and preserve existing drainage patterns? If so, how? If not, why?

The site has historically been used for agriculture. It is highly disturbed through plowing and is currently vacant with little or no vegetation. Drainage patterns are to the south. The project site design will continue these existing drainage patterns and direct runoff to the south through on-site storm drain systems and through a water quality bioretention basin before discharging into the Perris Valley Storm Drain (Channel).

Did you identify and protect existing vegetation? If so, how? If not, why?

Presently, dense vegetation or areas of well-established trees do not exist. The majority of the project area is plowed in rows and lies fallow with no vegetation. (See Aerial Map in Appendix 1 for reference.)

Did you identify and preserve natural infiltration capacity? If so, how? If not, why?

Yes. Per the Geotechnical Report by Advanced Geotechnical Solutions, Inc., dated October 14, 2013 (see Appendix 3), infiltration rates range from 0.07 to 0.12 inches per hour. These infiltration rates are below the minimum infiltration rate threshold of 1.6 inches per hour required for infiltration BMPs, as established by the Santa Ana WQMP Guidance Document. As such, the natural infiltration capacity of the onsite soil is considered low. Although infiltration capacity of the site is relatively low, existing infiltration capacity will be utilized/preserved to the maximum extent practicable (MEP) by use of a bioretention basin.

Did you identify and minimize impervious area? If so, how? If not, why?

Yes. Approximately 10% of the project site will be set aside for use as landscaping and bioretention water quality basin. Road widths are kept to minimum per city requirements.

Did you identify and disperse runoff to adjacent pervious areas? If so, how? If not, why?

Yes. Roof runoff as well as pavement runoff will be directed to inlets and conveyed to a water quality bioretention basin via an onsite storm drain system. Additionally, as shown in the BMP Site Plan Exhibit details, a depression of 4-6" will be incorporated into the precise grade of each lot to allow for further infiltration of this roof run-off prior to discharging to the street

Section C: Delineate Drainage Management Areas (DMAs)

Utilizing the procedure in Section 3.3 of the WQMP Guidance Document which discusses the methods of delineating and mapping your project site into individual DMAs, complete Table C.1 below to appropriately categorize the types of classification (e.g., Type A, Type B, etc.) per DMA for your project site. Upon completion of this table, this information will then be used to populate and tabulate the corresponding tables for their respective DMA classifications.

Table C.1 DMA Classifications

DMA Name or ID	Surface Type(s)[1]	Area (Sq. Ft.)	DMA Type
DMA 1 - Lots	*Roofs*	*263,420*	*D*
DMA 1 - Lots	*Ornamental Landscaping*	*395,130*	*D*
DMA 1 - Hardscape	*Asphalt or Concrete*	*255,396*	*D*
DMA 1 - Landscape	*Ornamental Landscaping*	*73,235*	*D*
DMA 2	*Natural (C Soil)*	*1,229,592*	*B*
DMA 3	*Natural (C Soil)*	*0.0*	*C*

[1] *Reference Table 2-1 in the WQMP Guidance Document to populate this column*

Table C.2 Type 'A', Self-Treating Areas

DMA Name or ID	Area (Sq. Ft.)	Stabilization Type	Irrigation Type (if any)

Table C.3 Type 'B', Self-Retaining Areas

Self-Retaining Area				**Type 'C' DMAs that are draining to the Self-Retaining Area**		
DMA Name / ID	Post-project surface type	Area (square feet) [A]	Storm Depth (inches) [B]	DMA Name / ID	[C] from Table C.4 = [C]	Required Retention Depth (inches) [D]
DMA 2	*Natural (C Soil)*	*1,229,592*	*0.66*	*DMA 3*	*0.0*	*0.66*

$$[D] = [B] + \frac{[B] \cdot [C]}{[A]}$$

Table C.4 Type 'C', Areas that Drain to Self-Retaining Areas

DMA					**Receiving Self-Retaining DMA**		
DMA Name / ID	Area (square feet) [A]	Post-project surface type	Runoff factor [B]	Product [C] = [A] x [B]	DMA Name / ID	Area (square feet) [D]	Ratio [C]/[D]
DMA 3	*0.0*	*Natural (C Soil)*	*0.3*	*0.0*	*DMA 2*	*1,229,592*	*0.0*

Table C.5 Type 'D', Areas Draining to BMPs

DMA Name or ID	BMP Name or ID
DMA 1 - Lots	*WQ1 – Bioretention Basin*
DMA 1 - Lots	*WQ1 – Bioretention Basin*
DMA 1 - Hardscape	*WQ1 – Bioretention Basin*
DMA 1 - Landscape	*WQ1 – Bioretention Basin*

Note: More than one drainage management area can drain to a single LID BMP, however, one drainage management area may not drain to more than one BMP.

Section D: Implement LID BMPs

D.1 Infiltration Applicability

Is there an approved downstream 'Highest and Best Use' for storm water runoff (see discussion in Chapter 2.4.4 of the WQMP Guidance Document for further details)? ☐ Y ☒ N

If yes has been checked, Infiltration BMPs shall not be used for the site. If no, continue working through this section to implement your LID BMPs. It is recommended that you contact your Co-Permittee to verify whether or not your project discharges to an approved downstream 'Highest and Best Use' feature.

Geotechnical Report

A Geotechnical Report or Phase I Environmental Site Assessment may be required by the Copermittee to confirm present and past site characteristics that may affect the use of Infiltration BMPs. In addition, the Co-Permittee, at their discretion, may not require a geotechnical report for small projects as described in Chapter 2 of the WQMP Guidance Document. If a geotechnical report has been prepared, include it in Appendix 3. In addition, if a Phase I Environmental Site Assessment has been prepared, include it in Appendix 4.

Is this project classified as a small project consistent with the requirements of Chapter 2 of the WQMP Guidance Document? ☐ Y ☒ N

Infiltration Feasibility

Table D.1 below is meant to provide a simple means of assessing which DMAs on your site support Infiltration BMPs and is discussed in the WQMP Guidance Document in Chapter 2.4.5. Check the appropriate box for each question and then list affected DMAs as applicable. If additional space is needed, add a row below the corresponding answer.

Table D.1 Infiltration Feasibility

Does the project site…	YES	NO
…have any DMAs with a seasonal high groundwater mark shallower than 10 feet?		
If Yes, list affected DMAs:		*X*
…have any DMAs located within 100 feet of a water supply well?		
If Yes, list affected DMAs:		*X*
…have any areas identified by the geotechnical report as posing a public safety risk where infiltration of stormwater could have a negative impact?		
If Yes, list affected DMAs:		*X*
…have measured in-situ infiltration rates of less than 1.6 inches / hour?		
If Yes, list affected DMAs: *DMA 1*	*X*	
…have significant cut and/or fill conditions that would preclude in-situ testing of infiltration rates at the final infiltration surface?		
If Yes, list affected DMAs:		*X*
…geotechnical report identifies other site-specific factors that would preclude effective and safe infiltration?		
Describe here:		*X*

If you answered "Yes" to any of the questions above for any DMA, Infiltration BMPs should not be used for those DMAs and you should proceed to the assessment for Harvest and Use below.

D.2 Harvest and Use Assessment

Please check what applies*:*

- ☐ Downstream water rights may be impacted by Harvest and Use as approved by the Regional Board (verify with the Copermittee).
- ☐ The Design Capture Volume will be addressed using Infiltration Only BMPs. In such a case, Harvest and Use BMPs are still encouraged, but it would not be required if the Design Capture Volume will be infiltrated or evapotranspired.

If any of the above boxes have been checked, Harvest and Use BMPs need not be assessed for the site. If neither of the above criteria applies, follow the steps below to assess the feasibility of irrigation use, toilet use and other non-potable uses (e.g., industrial use).

Irrigation Use Feasibility

Complete the following steps to determine the feasibility of harvesting stormwater runoff for Irrigation Use BMPs on your site:

Step 1: Identify the total area of irrigated landscape on the site, and the type of landscaping used.

Total Area of Irrigated Landscape: *10.8 acres*

Type of Landscaping (Conservation Design or Active Turf): *Conservation Design*

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for irrigation use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: 11.9 acres

Step 3: Cross reference the Design Storm depth for the project site (see Exhibit A of the WQMP Guidance Document) with the left column of Table 2-3 in Chapter 2 to determine the minimum area of Effective Irrigated Area per Tributary Impervious Area (EIATIA).

Enter your EIATIA factor: *1.05*

Step 4: Multiply the unit value obtained from Step 3 by the total of impervious areas from Step 2 to develop the minimum irrigated area that would be required.

Minimum required irrigated area: *12.5 acres*

Step 5: Determine if harvesting stormwater runoff for irrigation use is feasible for the project by comparing the total area of irrigated landscape (Step 1) to the minimum required irrigated area (Step 4).

Minimum required irrigated area (Step 4)	Available Irrigated Landscape (Step 1)
12.5 acres	*10.8 acres*

Toilet Use Feasibility

Complete the following steps to determine the feasibility of harvesting stormwater runoff for toilet flushing uses on your site:

Step 1: Identify the projected total number of daily toilet users during the wet season, and account for any periodic shut downs or other lapses in occupancy:

Projected Number of Daily Toilet Users: 360

Project Type: Single Family Residential

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for toilet use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: 11.9 acres

Step 3: Enter the Design Storm depth for the project site (see Exhibit A) into the left column of Table 2-1 in Chapter 2 to determine the minimum number or toilet users per tributary impervious acre (TUTIA).

Enter your TUTIA factor: 108

Step 4: Multiply the unit value obtained from Step 3 by the total of impervious areas from Step 2 to develop the minimum number of toilet users that would be required.

Minimum number of toilet users: 1,285

Step 5: Determine if harvesting stormwater runoff for toilet flushing use is feasible for the project by comparing the Number of Daily Toilet Users (Step 1) to the minimum required number of toilet users (Step 4).

Minimum required Toilet Users (Step 4)	**Projected number of toilet users (Step 1)**
1,285	*360*

Other Non-Potable Use Feasibility

Are there other non-potable uses for stormwater runoff on the site (e.g. industrial use)? See Chapter 2 of the Guidance for further information. If yes, describe below. If no, write N/A.

None

Step 1: Identify the projected average daily non-potable demand, in gallons per day, during the wet season and accounting for any periodic shut downs or other lapses in occupancy or operation.

Average Daily Demand: N/A

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for the identified non-potable use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: N/A

Step 3: Enter the Design Storm depth for the project site (see Exhibit A) into the left column of Table 2-3 in Chapter 2 to determine the minimum demand for non-potable uses per tributary impervious acre.

Enter the factor from Table 2-3: N/A

Step 4: Multiply the unit value obtained from Step 4 by the total of impervious areas from Step 3 to develop the minimum number of gallons per day of non-potable use that would be required.

Minimum required use: N/A

Step 5: Determine if harvesting stormwater runoff for other non-potable use is feasible for the project by comparing the Number of Daily Toilet Users (Step 1) to the minimum required number of toilet users (Step 4).

Minimum required non-potable use (Step 4)	**Projected average daily use (Step 1)**
N/A	*N/A*

If Irrigation, Toilet and Other Use feasibility anticipated demands are less than the applicable minimum values, Harvest and Use BMPs are not required and you should proceed to utilize LID Bioretention and Biotreatment, unless a site-specific analysis has been completed that demonstrates technical infeasibility as noted in D.3 below.

D.3 Bioretention and Biotreatment Assessment

Other LID Bioretention and Biotreatment BMPs as described in Chapter 2.4.7 of the WQMP Guidance Document are feasible on nearly all development sites with sufficient advance planning.

Select one of the following:

☒ LID Bioretention/Biotreatment BMPs will be used for some or all DMAs of the project as noted below in Section D.4 (note the requirements of Section 3.4.2 in the WQMP Guidance Document).

☐ A site-specific analysis demonstrating the technical infeasibility of all LID BMPs has been performed and is included in Appendix 5. If you plan to submit an analysis demonstrating the technical infeasibility of LID BMPs, request a pre-submittal meeting with the Copermittee to discuss this option. Proceed to Section E to document your alternative compliance measures.

D.4 Feasibility Assessment Summaries

From the Infiltration, Harvest and Use, Bioretention and Biotreatment Sections above, complete Table D.2 below to summarize which LID BMPs are technically feasible, and which are not, based upon the established hierarchy.

Table D.2 LID Prioritization Summary Matrix

DMA Name/ID	LID BMP Hierarchy				No LID (Alternative Compliance)
	1. Infiltration	2. Harvest and use	3. Bioretention	4. Biotreatment	
DMA 1 – Lots	☐	☐	☒	☐	☐
DMA 1 - Lots	☐	☐	☒	☐	☐
DMA 1 – Hardscape	☐	☐	☒	☐	☐
DMA 1 - Landscape	☐	☐	☒	☐	☐

For those DMAs where LID BMPs are not feasible, provide a brief narrative below summarizing why they are not feasible, include your technical infeasibility criteria in Appendix 5, and proceed to Section E below to document Alternative Compliance measures for those DMAs. Recall that each proposed DMA must pass through the LID BMP hierarchy before alternative compliance measures may be considered.

LID BMPs are feasible for all DMAs. LID Bioretention BMPs will be used for all the DMAs of the project.

D.5 LID BMP Sizing

Each LID BMP must be designed to ensure that the Design Capture Volume will be addressed by the selected BMPs. First**,** calculate the Design Capture Volume for each LID BMP using the V_{BMP} worksheet in Appendix F of the LID BMP Design Handbook. Second**,** design the LID BMP to meet the required V_{BMP} using a method approved by the Copermittee. Utilize the worksheets found in the LID BMP Design Handbook or consult with your Copermittee to assist you in correctly sizing your LID BMPs. Complete Table D.3 below to document the Design Capture Volume and the Proposed Volume for each LID BMP. Provide the completed design procedure sheets for each LID BMP in Appendix 6. You may add additional rows to the table below as needed.

Table D.3 DCV Calculations for LID BMPs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*WQ1 - Bioretention Basin*		
	[A]		[B]	[C]	[A] x [C]			
DMA 1 - Lots	*263,420*	*Roofs*	*1*	*0.89*	*234970.6*	*Design Storm Depth (in)*	*Design Capture Volume,* V_{BMP} *(cubic feet)*	*Proposed Volume on Plans (cubic feet)*
DMA 1 - Lots	*395,130*	*Ornamental Landscaping*	*0.1*	*0.11*	*43645.3*			
DMA 1 - Hardscape	*255,396*	*Concrete or Asphalt*	*1*	*0.89*	*227813.2*			
DMA 1 - Landscape	*73,235*	*Ornamental Landscaping*	*0.1*	*0.11*	*8089.4*			
	987181				*514518.5*	*0.66*	*28298.5*	***39555***

[B], [C] is obtained as described in Section 2.3.1 of the WQMP Guidance Document

[E] is obtained from Exhibit A in the WQMP Guidance Document

[G] is obtained from a design procedure sheet, such as in LID BMP Design Handbook and placed in Appendix 6

Section E: Alternative Compliance (LID Waiver Program)

LID BMPs are expected to be feasible on virtually all projects. Where LID BMPs have been demonstrated to be infeasible as documented in Section D, other Treatment Control BMPs must be used (subject to LID waiver approval by the Copermittee). Check one of the following Boxes:

☒ LID Principles and LID BMPs have been incorporated into the site design to fully address all Drainage Management Areas. No alternative compliance measures are required for this project and thus this Section is not required to be completed.

- *Or* -

☐ The following Drainage Management Areas are unable to be addressed using LID BMPs. A site-specific analysis demonstrating technical infeasibility of LID BMPs has been approved by the Co-Permittee and included in Appendix 5. Additionally, no downstream regional and/or sub-regional LID BMPs exist or are available for use by the project. The following alternative compliance measures on the following pages are being implemented to ensure that any pollutant loads expected to be discharged by not incorporating LID BMPs, are fully mitigated.

Not Applicable.

E.1 Identify Pollutants of Concern

Utilizing Table A.1 from Section A above which noted your project's receiving waters and their associated EPA approved 303(d) listed impairments, cross reference this information with that of your selected Priority Development Project Category in Table E.1 below. If the identified General Pollutant Categories are the same as those listed for your receiving waters, then these will be your Pollutants of Concern and the appropriate box or boxes will be checked on the last row. The purpose of this is to document compliance and to help you appropriately plan for mitigating your Pollutants of Concern in lieu of implementing LID BMPs.

Table E.1 Potential Pollutants by Land Use Type

Priority Development Project Categories and/or Project Features (check those that apply)	General Pollutant Categories								
	Bacterial Indicators	Metals	Nutrients	Pesticides	Toxic Organic Compounds	Sediments	Trash & Debris	Oil & Grease	Oxygen Demanding Substances
☐ Detached Residential Development	P	N	P	P	N	P	P	P	P
☐ Attached Residential Development	P	N	P	P	N	P	P	P[(2)]	P[(1)]
☐ Commercial/Industrial Development	P[(3)]	P	P[(1)]	P[(1)]	P[(5)]	P[(1)]	P	P	P[(1)]
☐ Automotive Repair Shops	N	P	N	N	P[(4, 5)]	N	P	P	N
☐ Restaurants (>5,000 ft^2)	P	N	N	N	N	N	P	P	P
☐ Hillside Development (>5,000 ft^2)	P	N	P	P	N	P	P	P	P
☐ Parking Lots (>5,000 ft^2)	P[(6)]	P	P[(1)]	P[(1)]	P[(4)]	P[(1)]	P	P	P[(1)]
☐ Retail Gasoline Outlets	N	P	N	N	P	N	P	P	N
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

Although Lake Elsinore is impaired by nutrients, organic compounds, and oxygen demanding substances and Canyon Lake is impaired by nutrients and pathogens, it is unlikely that a significant amount of nutrients and oxygen demanding substances will enter the sand filter basins from the hardscape and roof areas. Therefore, the sand filter basins should not require 36" of sand media to reach a medium level of effectiveness.

E.2 Stormwater Credits

Projects that cannot implement LID BMPs but nevertheless implement smart growth principles are potentially eligible for Stormwater Credits. Utilize Table 3-8 within the WQMP Guidance Document to identify your Project Category and its associated Water Quality Credit. If not applicable, write N/A.

Table E.2 Water Quality Credits

Qualifying Project Categories	Credit Percentage[2]
N/A	
Total Credit Percentage[1]	

[1] *Cannot Exceed 50%*
[2] *Obtain corresponding data from Table 3-8 in the WQMP Guidance Document*

E.3 Sizing Criteria

After you appropriately considered Stormwater Credits for your project, utilize Table E.3 below to appropriately size them to the DCV, or Design Flow Rate, as applicable. Please reference Chapter 3.5.2 of the WQMP Guidance Document for further information.

Table E.3 Treatment Control BMP Sizing

DMA Type/ID	**DMA Area (square feet)**	**Post-Project Surface Type**	**Effective Impervious Fraction, I_f**	**DMA Runoff Factor**	**DMA Area x Runoff Factor**		***Enter BMP Name / Identifier Here***		
	[A]		[B]	[C]	[A] x [C]				
						Design Storm Depth (in)	*Minimum Design Capture Volume or Design Flow Rate (cubic feet or cfs)*	*Total Storm Water Credit % Reduction*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
	$A_T = \Sigma[A]$				$\Sigma = [D]$	[E]	$[F] = \frac{[D]x[E]}{[G]}$	[F] X (1-[H])	[I]

[B], [C] is obtained as described in Section 2.3.1 from the WQMP Guidance Document
[E] is obtained from Exhibit A in the WQMP Guidance Document
[G] is for Flow-Based Treatment Control BMPs [G] = 43,560, for Volume-Based Control Treatment BMPs, [G] = 12
[H] is from the Total Credit Percentage as Calculated from Table E.2 above
[I] as obtained from a design procedure sheet from the BMP manufacturer and should be included in Appendix 6

E.4 Treatment Control BMP Selection

Treatment Control BMPs typically provide proprietary treatment mechanisms to treat potential pollutants in runoff, but do not sustain significant biological processes. Treatment Control BMPs must have a removal efficiency of a medium or high effectiveness as quantified below:

- **High**: equal to or greater than 80% removal efficiency
- **Medium**: between 40% and 80% removal efficiency

Such removal efficiency documentation (e.g., studies, reports, etc.) as further discussed in Chapter 3.5.2 of the WQMP Guidance Document, must be included in Appendix 6. In addition, ensure that proposed Treatment Control BMPs are properly identified on the WQMP Site Plan in Appendix 1.

Table E.4 Treatment Control BMP Selection

Selected Treatment Control BMP Name or ID[1]	Priority Pollutant(s) of Concern to Mitigate[2]	Removal Efficiency Percentage[3]

[1] *Treatment Control BMPs must not be constructed within Receiving Waters. In addition, a proposed Treatment Control BMP may be listed more than once if they possess more than one qualifying pollutant removal efficiency.*
[2] *Cross Reference Table E.1 above to populate this column.*
[3] *As documented in a Co-Permittee Approved Study and provided in Appendix 6.*

Section F: Hydromodification

F.1 Hydrologic Conditions of Concern (HCOC) Analysis

Once you have determined that the LID design is adequate to address water quality requirements, you will need to assess if the proposed LID Design may still create a HCOC. Review Chapters 2 and 3 (including Figure 3-7) of the WQMP Guidance Document to determine if your project must mitigate for Hydromodification impacts. If your project meets one of the following criteria which will be indicated by the check boxes below, you do not need to address Hydromodification at this time. However, if the project does not qualify for Exemptions 1, 2 or 3, then additional measures must be added to the design to comply with HCOC criteria. This is discussed in further detail below in Section F.2.

HCOC EXEMPTION 1: The Priority Development Project disturbs less than one acre. The Copermittee has the discretion to require a Project-Specific WQMP to address HCOCs on projects less than one acre on a case by case basis. The disturbed area calculation should include all disturbances associated with larger common plans of development.

Does the project qualify for this HCOC Exemption? ☐ Y ☒ N

If Yes, HCOC criteria do not apply.

HCOC EXEMPTION 2: The volume and time of concentration[1] of storm water runoff for the post-development condition is not significantly different from the pre-development condition for a 2-year return frequency storm (a difference of 5% or less is considered insignificant) using one of the following methods to calculate:

- Riverside County Hydrology Manual
- Technical Release 55 (TR-55): Urban Hydrology for Small Watersheds (NRCS 1986), or derivatives thereof, such as the Santa Barbara Urban Hydrograph Method
- Other methods acceptable to the Co-Permittee

Does the project qualify for this HCOC Exemption? ☐ Y ☒ N

If Yes, report results in Table F.1 below and provide your substantiated hydrologic analysis in *Appendix 7.*

Table F.1 Hydrologic Conditions of Concern Summary

	2 year – 24 hour		
	Pre-condition	**Post-condition**	**% Difference**
Time of Concentration	INSERT VALUE	INSERT VALUE	INSERT VALUE
Volume (Cubic Feet)	INSERT VALUE	INSERT VALUE	INSERT VALUE

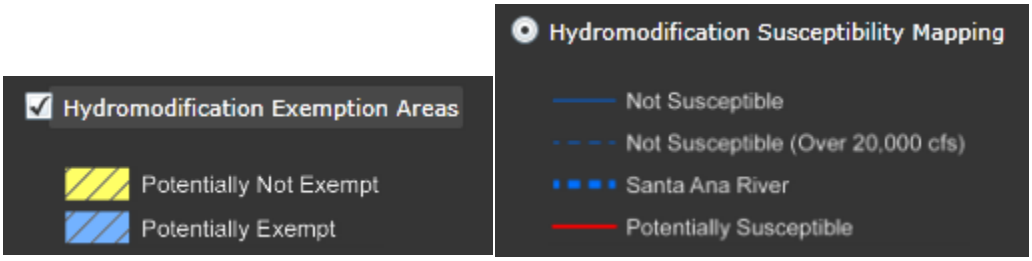
[1] Time of concentration is defined as the time after the beginning of the rainfall when all portions of the drainage basin are contributing to flow at the outlet.

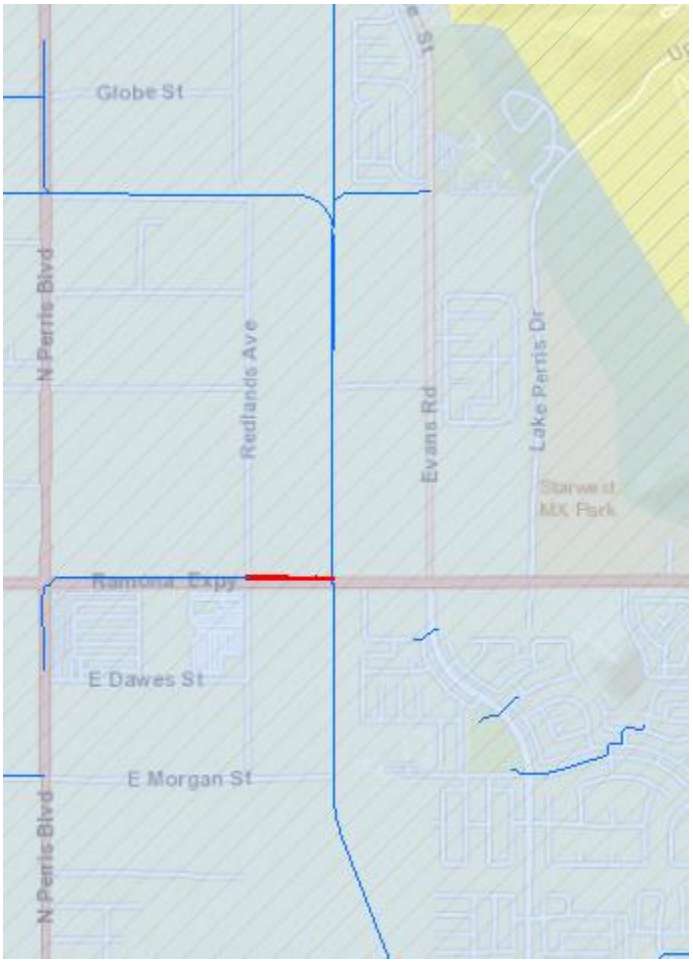
HCOC EXEMPTION 3: All downstream conveyance channels to an adequate sump (for example, Prado Dam, Lake Elsinore, Canyon Lake, Santa Ana River, or other lake, reservoir or naturally erosion resistant feature) that will receive runoff from the project are engineered and regularly maintained to ensure design flow capacity; no sensitive stream habitat areas will be adversely affected; or are not identified on the Co-Permittees Hydromodification Sensitivity Maps.

Does the project qualify for this HCOC Exemption? ☒ Y ☐ N

If Yes, HCOC criteria do not apply and note below which adequate sump applies to this HCOC qualifier:

The project area is identified as <u>not susceptible</u> on the Co-Permittees Hydromodification Sensitivity Map, approved April 20, 2017.





F.2 HCOC Mitigation

If none of the above HCOC Exemption Criteria are applicable, HCOC criteria is considered mitigated if they meet one of the following conditions:

a. Additional LID BMPS are implemented onsite or offsite to mitigate potential erosion or habitat impacts as a result of HCOCs. This can be conducted by an evaluation of site-specific conditions utilizing accepted professional methodologies published by entities such as the California Stormwater Quality Association (CASQA), the Southern California Coastal Water Research Project (SCCRWP), or other Co-Permittee approved methodologies for site-specific HCOC analysis.

b. The project is developed consistent with an approved Watershed Action Plan that addresses HCOC in Receiving Waters.

c. Mimicking the pre-development hydrograph with the post-development hydrograph, for a 2-year return frequency storm. Generally, the hydrologic conditions of concern are not significant, if the post-development hydrograph is no more than 10% greater than pre-development hydrograph. In cases where excess volume cannot be infiltrated or captured and reused, discharge from the site must be limited to a flow rate no greater than 110% of the pre-development 2-year peak flow.

Be sure to include all pertinent documentation used in your analysis of the items a, b or c in Appendix 7.

Section G: Source Control BMPs

Source control BMPs include permanent, structural features that may be required in your project plans — such as roofs over and berms around trash and recycling areas — and Operational BMPs, such as regular sweeping and "housekeeping", that must be implemented by the site's occupant or user. The MEP standard typically requires both types of BMPs. In general, Operational BMPs cannot be substituted for a feasible and effective permanent BMP. Using the Pollutant Sources/Source Control Checklist in Appendix 8, review the following procedure to specify Source Control BMPs for your site:

1. ***Identify Pollutant Sources*:** Review Column 1 in the Pollutant Sources/Source Control Checklist. Check off the potential sources of Pollutants that apply to your site.

2. ***Note Locations on Project-Specific WQMP Exhibit*:** Note the corresponding requirements listed in Column 2 of the Pollutant Sources/Source Control Checklist. Show the location of each Pollutant source and each permanent Source Control BMP in your Project-Specific WQMP Exhibit located in Appendix 1.

3. ***Prepare a Table and Narrative*:** Check off the corresponding requirements listed in Column 3 in the Pollutant Sources/Source Control Checklist. In the left column of Table G.1 below, list each potential source of runoff Pollutants on your site (from those that you checked in the Pollutant Sources/Source Control Checklist). In the middle column, list the corresponding permanent, Structural Source Control BMPs (from Columns 2 and 3 of the Pollutant Sources/Source Control Checklist) used to prevent Pollutants from entering runoff. **Add additional narrative** in this column that explains any special features, materials or methods of construction that will be used to implement these permanent, Structural Source Control BMPs.

4. ***Identify Operational Source Control BMPs:*** To complete your table, refer once again to the Pollutant Sources/Source Control Checklist. List in the right column of your table the Operational BMPs that should be implemented as long as the anticipated activities continue at the site. Copermittee stormwater ordinances require that applicable Source Control BMPs be implemented; the same BMPs may also be required as a condition of a use permit or other revocable Discretionary Approval for use of the site.

Table G.1 Permanent and Operational Source Control Measures

Potential Sources of Runoff pollutants	Permanent Structural Source Control BMPs	Operational Source Control BMPs
On-site storm drain catch basins and grated inlets. Locations are shown on the PWQMP Exhibit in Appendix 1.	*On-site storm drain signage will utilize language, "No Dumping Drains to River", or equally approved text that is consistent with the City of Perris' requirements. Landscape area drains surrounded by vegetation will not be signed. The signs will be located at storm drain inlets in impervious areas and will be either stenciled or placarded.* *See CASQA SD-13 BMP Fact Sheet in Appendix 10 for additional information*	*Inspect the signage once per year.* *Repair or replace when the signage becomes unreadable.* *The original owner or developer will be responsible for the first stenciling of the storm drain system. Thereafter when the property is sold, the new owner will assume the responsibility for inspection, maintenance, and funding.*

Potential Sources of Runoff pollutants	Permanent Structural Source Control BMPs	Operational Source Control BMPs
	On-site drainage facility inspection and maintenance. *On-site drainage structures, including all storm drain clean outs, area drains, inlets, catch basins, inlet & outlet structures, forbays, & water treatment control basins shall be inspected and maintained on a regular basis to insure their operational adequacy.* *See CASQA SC-44 BMP Fact Sheet in Appendix 10 for additional information.*	*Inspect at a minimum, once before the onset of the rainy season (Oct 1 to May 1), once during the rainy season, and once after the rainy season.* *Maintenance should include removal of trash, debris, & sediment and the repair of any deficiencies or damage that may impact water quality.* *The property owner will assume the responsibility for all on-site drainage facility inspection, maintenance, and funding.*
Landscape Design, Maintenance, and Pesticide Use.	*Irrigation systems and landscape design should follow as a guide the specifications and recommendations of the Water Conservation Act of 2006, AB1881 (Laird) and conform to the standards and requirements of the City of Perris' landscape requirements.* *Irrigation systems shall employ control systems and be designed to conserve water.* *The landscape design shall incorporate native and drought tolerant vegetation with low irrigation requirements.* *See CASQA SD-10 and SD-12 BMP Fact Sheets in and other landscape literature in Appendix 10 for additional information.*	*Performed during design phase.*
	Irrigation and landscape maintenance should be performed on a regular basis throughout the year. *See CASQA SC-41 BMP Fact Sheets in Appendix 10 for additional information.*	*Inspect landscape areas twice annually (before and after the rainy season) and the irrigation system quarterly for proper functioning.* *Maintenance should be performed every 2 weeks or as needed.* *Landscape maintenance should include mowing, weeding, trimming, removal of trash & debris, repair of erosion, re-vegetation, and removal of cut & dead vegetation.* *Irrigation maintenance should include the repair of leaky or broken sprinkler heads, the maintaining of timing apparatus accuracy, and the maintaining of shut off valves in good working order,*

Potential Sources of Runoff pollutants	Permanent Structural Source Control BMPs	Operational Source Control BMPs
	Pesticide usage should be at a necessary minimum and be consistent with the instructions contained on product labels and with the regulations administered by the State Department of Pesticide Regulation. *Pesticides should be used at an absolute minimum or not at all in the retention/infiltration basin. If used, it should not be applied in close proximity to the rainy season.*	

See additional information on Source Control BMPs and their operation and maintenance in Appendix 8 and Appendix 9.

Section H: Construction Plan Checklist

Populate Table H.1 below to assist the plan checker in an expeditious review of your project. The first two columns will contain information that was prepared in previous steps, while the last column will be populated with the corresponding plan sheets. This table is to be completed with the submittal of your final Project-Specific WQMP.

Table H.1 Construction Plan Cross-reference

BMP No. or ID	BMP Identifier and Description	Corresponding Plan Sheet(s)
WQ1	*WQ1 – Bioretention Basin*	*TTM 36647 Conceptual Grading Plan*

Note that the updated table — or Construction Plan WQMP Checklist — is **only a reference tool** to facilitate an easy comparison of the construction plans to your Project-Specific WQMP. Co-Permittee staff can advise you regarding the process required to propose changes to the approved Project-Specific WQMP.

To be completed at the time of the Final WQMP.

Section I: Operation, Maintenance and Funding

This Section will be completed and addressed at the time of the final WQMP submittal.

The Copermittee will periodically verify that Stormwater BMPs on your site are maintained and continue to operate as designed. To make this possible, your Copermittee will require that you include in Appendix 9 of this Project-Specific WQMP:

1. A means to finance and implement facility maintenance in perpetuity, including replacement cost.
2. Acceptance of responsibility for maintenance from the time the BMPs are constructed until responsibility for operation and maintenance is legally transferred. A warranty covering a period following construction may also be required.
3. An outline of general maintenance requirements for the Stormwater BMPs you have selected.
4. Figures delineating and designating pervious and impervious areas, location, and type of Stormwater BMP, and tables of pervious and impervious areas served by each facility. Geo-locating the BMPs using a coordinate system of latitude and longitude is recommended to help facilitate a future statewide database system.
5. A separate list and location of self-retaining areas or areas addressed by LID Principles that do not require specialized O&M or inspections but will require typical landscape maintenance as noted in Chapter 5, pages 85-86, in the WQMP Guidance. Include a brief description of typical landscape maintenance for these areas.

Your local Co-Permittee will also require that you prepare and submit a detailed Stormwater BMP Operation and Maintenance Plan that sets forth a maintenance schedule for each of the Stormwater BMPs built on your site. An agreement assigning responsibility for maintenance and providing for inspections and certification may also be required.

Details of these requirements and instructions for preparing a Stormwater BMP Operation and Maintenance Plan are in Chapter 5 of the WQMP Guidance Document.

Maintenance Mechanism: *WQMP Covenent and Agreement*

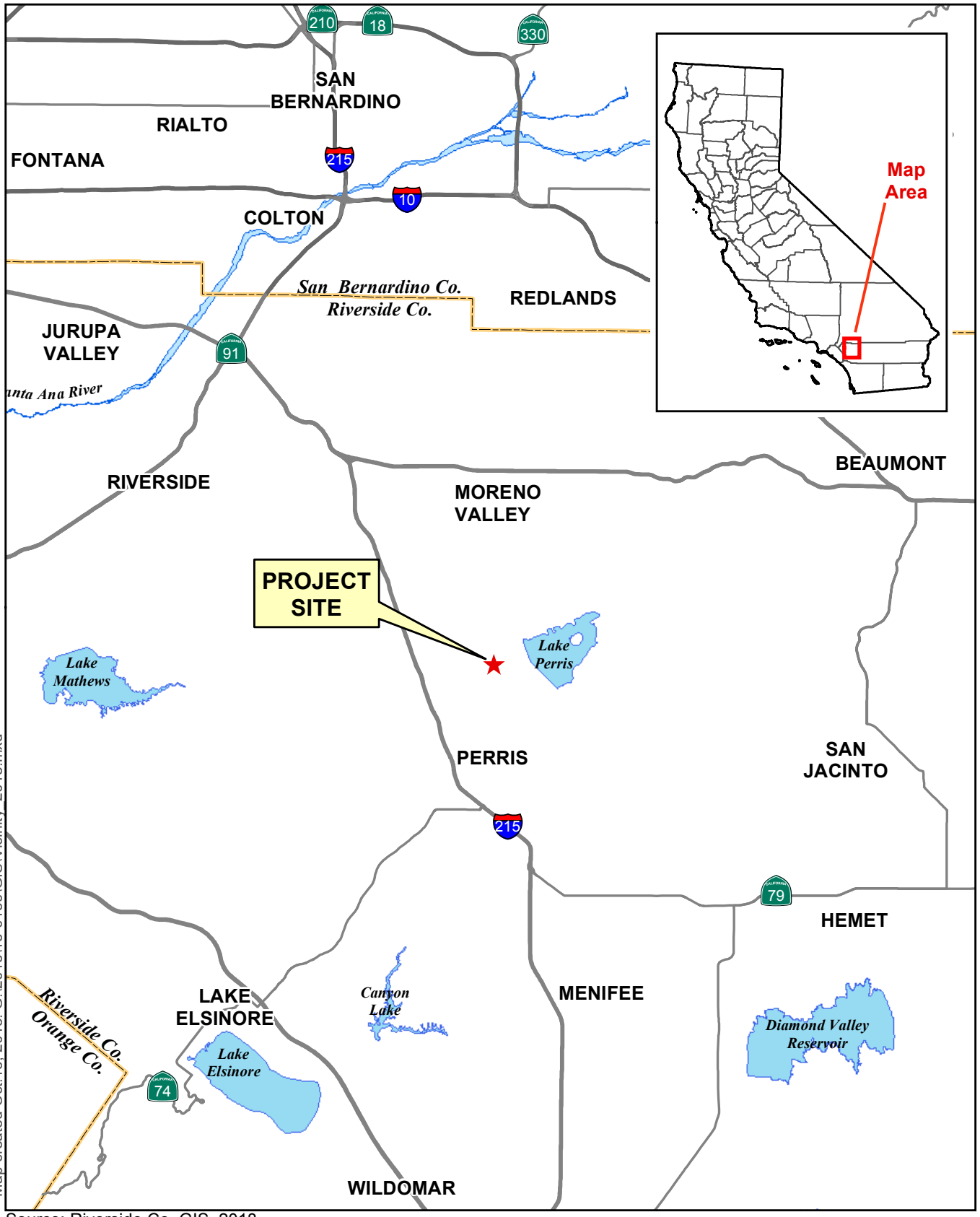
Will the proposed BMPs be maintained by a Home Owners' Association (HOA) or Property Owners Association (POA)?

☐ Y ☒ N

Include your Operation and Maintenance Plan and Maintenance Mechanism in Appendix 9. Additionally, include all pertinent forms of educational materials for those personnel that will be maintaining the proposed BMPs within this Project-Specific WQMP in Appendix 10.

Appendix 1: Maps and Site Plans

Location Map, WQMP Site Plan and Receiving Waters Map



Map created Oct.13, 2015. G:\2013\13-0159\GIS\Vicinity_2018.mxd

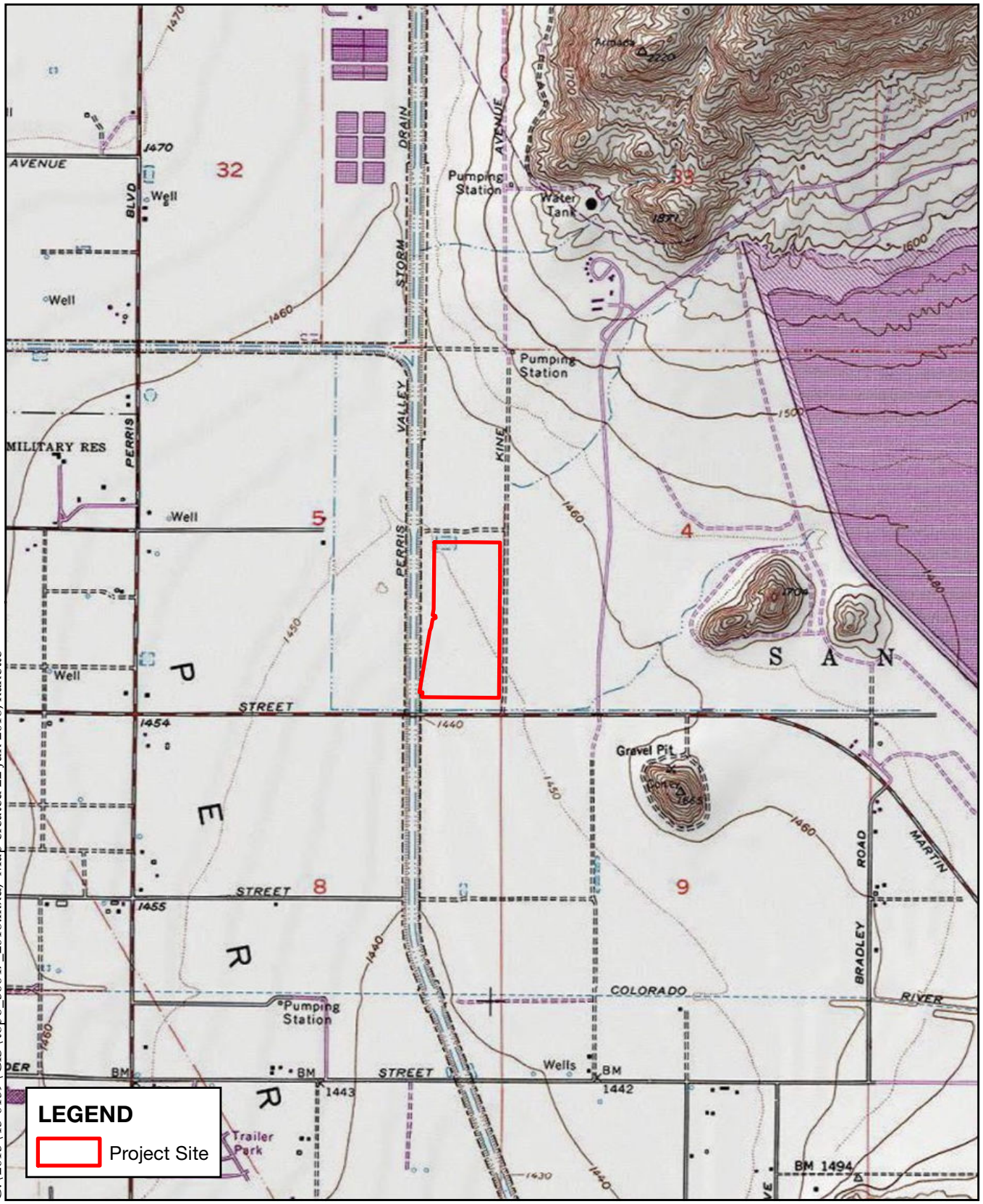
Source: Riverside Co. GIS, 2018

0 2 4 6 Miles

Figure 1 – Vicinity Map

TR 36647

ALBERT A. WEBB ASSOCIATES



G:\2013\13-0159\GIS\topo_36647_2018.mxd; Map created 22 Jun 2018; nanette

Sources: ESRI / USGS 7.5min Quad
DRG: PERRIS

Figure 2 – Topographic Map
TR 36647

0 1,000 2,000 3,000 Feet

ALBERT A. WEBB ASSOCIATES

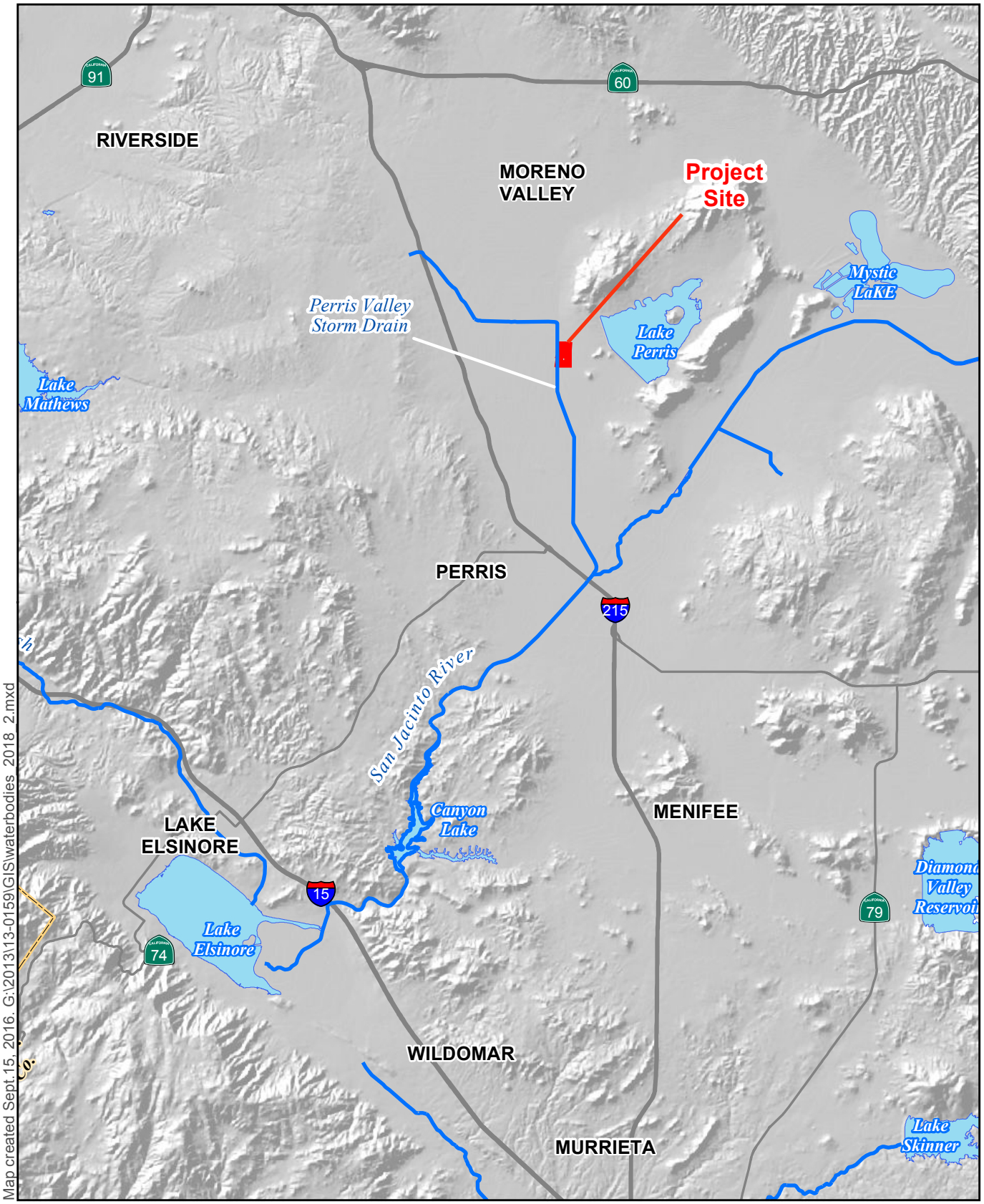
G:\2013\13-0159\GIS\aerial_36647_2018.mxd; Map created 22 Jun 2018

Sources: Riverside Co. GIS, 2018;
USDA NAIP, 2016.

0 250 500 750 1,000 Feet

Figure 3 – Aerial Photograph
TR 36647

ALBERT A. WEBB ASSOCIATES



Map created Sept.15, 2016. G:\2013\13-0159\GIS\waterbodies_2018_2.mxd

Sources: USGS DLG; USGS 30m DEM

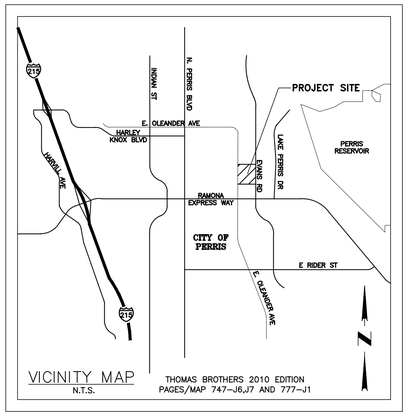
0 2 4 6 Miles

Figure 4 – Receiving Waterbodies

TR 36647

ALBERT A. WEBB ASSOCIATES

TENTATIVE TRACT MAP No. 36647
POST-CONSTRUCTION BMP SITE PLAN

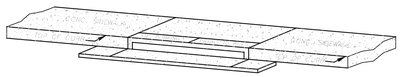


LEGEND

- WQ BIORETENTION BASIN
- DETENTION BASIN
- RESIDENTIAL LOTS
- PUBLIC LANDSCAPE AREA
- SD — STORM DRAIN LINE
- DIRECTION OF FLOW

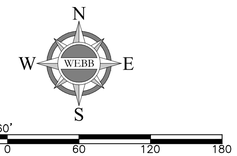
GENERAL NOTES

1. ALL PROPOSED STORM DRAIN CURB OPENING CATCH BASINS AND DROP INLETS SHALL BE STENCILED PER CITY OF PERRIS REQUIREMENTS AND DETAIL ON THIS SHEET (SEE CASQA SD-13 IN APPENDIX 9 OF PWQMP DOCUMENT).
2. ALL RUN-OFF SHALL BE DISCHARGED DIRECTLY INTO THE PROPOSED ON-SITE STORM DRAIN SYSTEM AND TREATED BY THE PROPOSED BIORETENTION BASIN BEFORE DISCHARGING INTO THE OFF-SITE MS4 STORM DRAIN FACILITIES (PERRIS VALLEY STORM DRAIN).



1. STENCILS TO HAVE 2" LETTERS AS FOLLOWS: *"NO DUMPING DRAINS TO RIVER"*
2. PLACE BOTH STENCILS CENTERED WITHIN THE CATCHBASIN OPENING AND WITHIN THE TOP OF THE CURB.
3. SPRAY BOTH STENCILS WITH WHITE PAINT.
4. REMOVE STENCILS WHEN PAINT IS DRY

CATCH BASIN STENCILING DETAIL
NTS

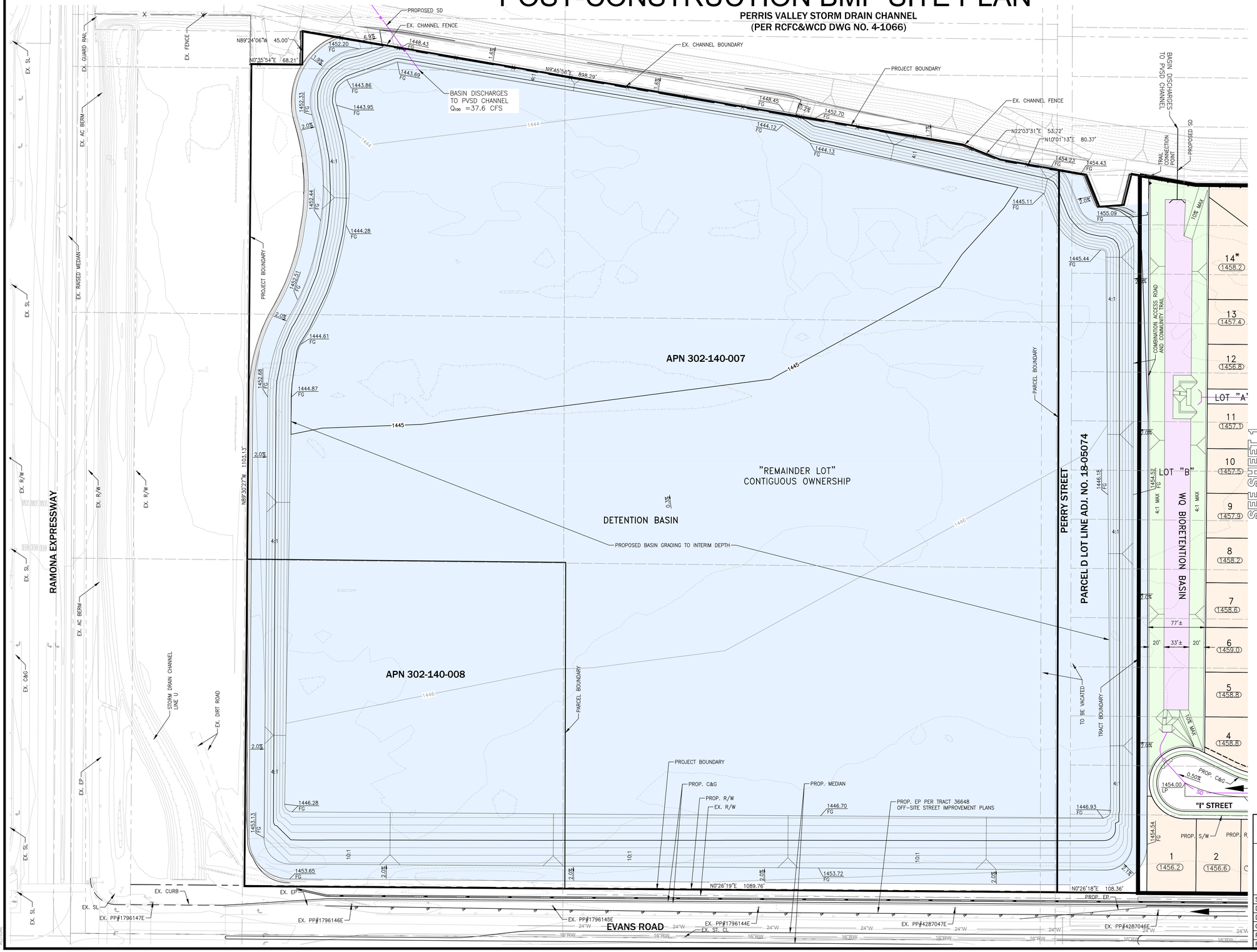


TTM 36647

DPR 16-05216
CITY OF PERRIS, CALIFORNIA
POST-CONSTRUCTION BMP SITE PLAN

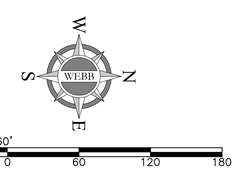
SCALE:	1" = 60'	ALBERT A. WEBB ASSOCIATES	W.O. 13-0159
DATE:	6/22/2018	ENGINEERING CONSULTANTS 3788 McCRAY STREET RIVERSIDE CA. 92506 PH. (951) 686-1070 FAX (951) 788-1256	SHEET 1
DESIGNED:	ABE		OF 3 SHEETS
CHECKED:	SKK		DWG. NO.
PLN CK REF:			
F.B.			

TENTATIVE TRACT MAP No. 36647
POST-CONSTRUCTION BMP SITE PLAN



LEGEND

- WQ BIORETENTION BASIN
- DETENTION BASIN
- RESIDENTIAL LOTS
- PUBLIC LANDSCAPE AREA
- SD — STORM DRAIN LINE
- DIRECTION OF FLOW



TTM 36647

DPR 16-05216
CITY OF PERRIS, CALIFORNIA
POST-CONSTRUCTION BMP SITE PLAN

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DATE:	6/22/2018	SHEET	2
DESIGNED:	ABE	OF	3 SHEETS
CHECKED:	SKK	DWG. NO.	
PLN CK REF:			
F.B.			

ALBERT A. WEBB ASSOCIATES
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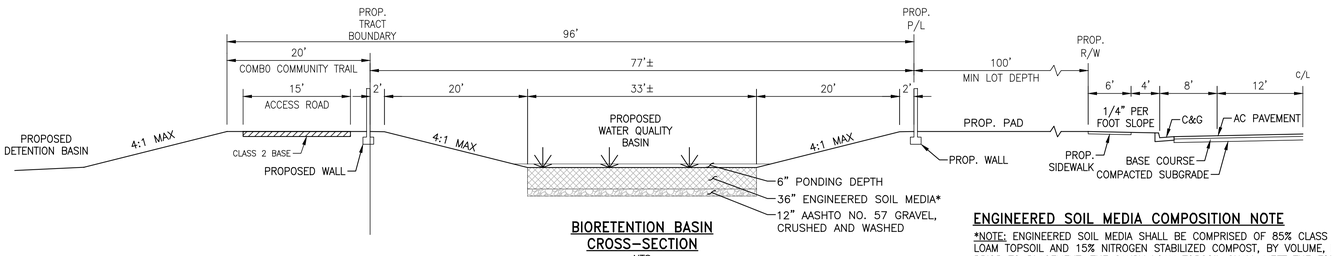
3788 McCRAY STREET
RIVERSIDE, CA. 92506
PH. (951) 686-1070
FAX (951) 788-1256

TENTATIVE TRACT MAP No. 36647
POST-CONSTRUCTION BMP SITE PLAN

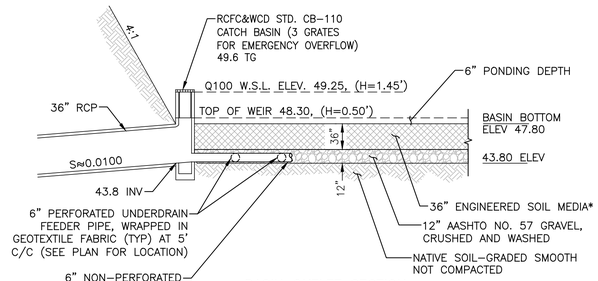
SUMMARY TABLE						
BMP ID	TRIBUTARY AREA (AC)	DESIGN BASIS	BOTTOM AREA (SF)		BASIN VOLUME (CF)	
			REQUIRED	PROVIDED	REQUIRED	PROVIDED
WQ 1 – BIORETENTION	22.6	VOLUME	15910	21975	28299	21975



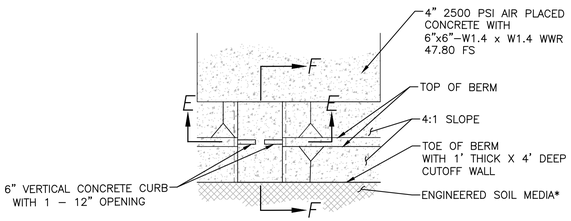
BIORETENTION BASIN CROSS–SECTION
NTS

ENGINEERED SOIL MEDIA COMPOSITION NOTE

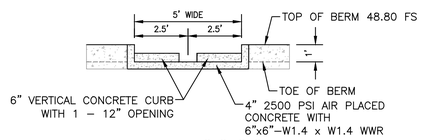
*NOTE: ENGINEERED SOIL MEDIA SHALL BE COMPRISED OF 85% CLASS "A" SANDY LOAM TOPSOIL AND 15% NITROGEN STABILIZED COMPOST, BY VOLUME, DRUM MIXED PRIOR TO PLACEMENT. THE SANDY LOAM TOPSOIL SHALL MEET THE FOLLOWING RANGE REQUIREMENTS: 70–80% SAND, 15–20% SILT, AND 5–10% CLAY.



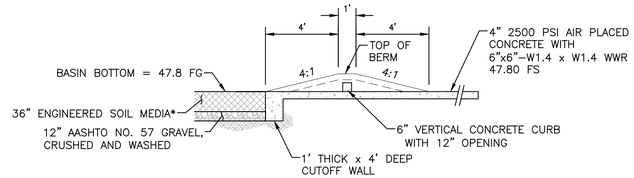
BASIN OUTLET SECTION
PVSD CHANNEL
NTS



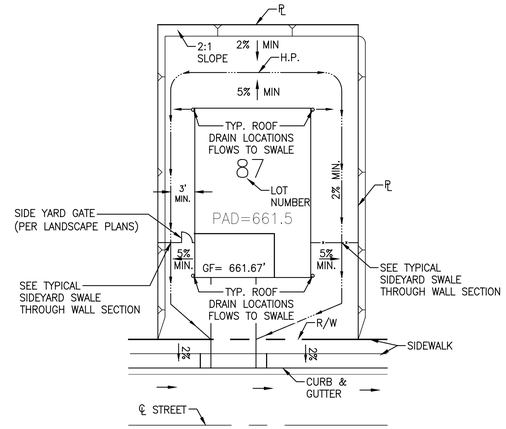
BASIN INLET SECTION
"A" STREET
NTS



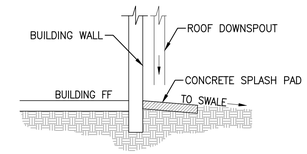
SECTION "E"–"E"
NTS



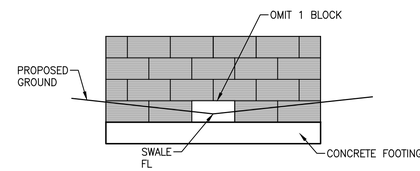
SECTION "F"–"F"
NTS



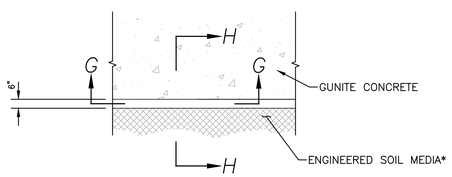
TYPICAL LOT
NTS



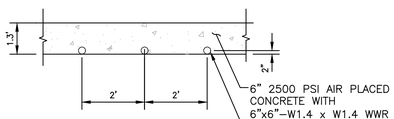
CONCEPTUAL ROOF DRAIN DETAIL
NTS



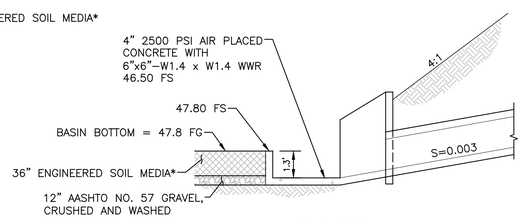
TYPICAL SIDEYARD SWALE THROUGH WALL SECTION
NTS



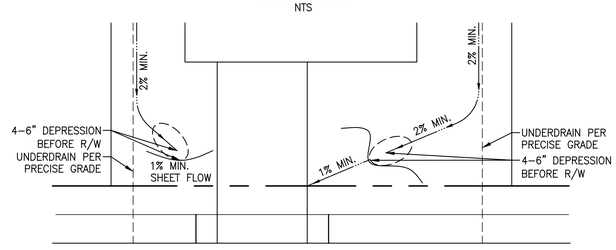
BASIN INLET SECTION
"I" STREET
NTS



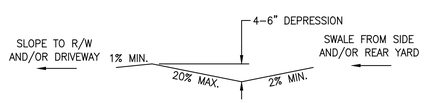
SECTION "G"–"G"
NTS



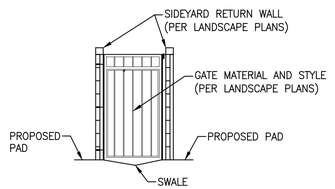
SECTION "H"–"H"
NTS



TYPICAL SWALE DEPRESSION BEFORE R/W DETAIL
NTS



TYPICAL SWALE DEPRESSION SECTION
NTS



TYPICAL SIDEYARD SWALE UNDER GATE
NTS

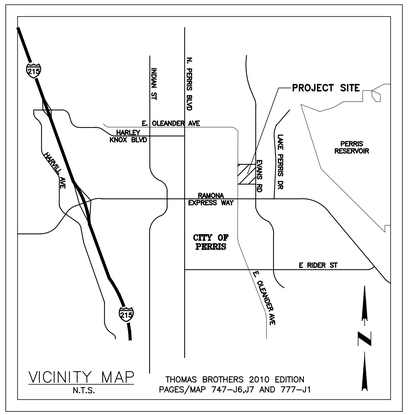
TTM 36647

DPR 16-05216
CITY OF PERRIS, CALIFORNIA
POST-CONSTRUCTION BMP SITE PLAN
DETAIL SHEET

SCALE:	NTS	W.O.	13–0159
DATE:	6/22/2018	SHEET	3
DESIGNED:	ABE	OF	3 SHEETS
CHECKED:	SKK		
PLN CK REF:		DWG. NO.	
F.B.			

ALBERT A. WEBB ASSOCIATES
ENGINEERING CONSULTANTS
3788 McCRAY STREET
RIVERSIDE CA. 92506
PH. (951) 686–1070
FAX (951) 788–1256

TENTATIVE TRACT MAP No. 36647
DRAINAGE MANAGEMENT AREA MAP

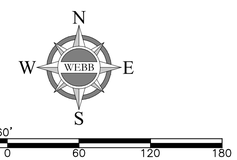


LEGEND

- POST-CONSTRUCTION BIORETENTION BASIN 0.5 ACRES
- POST-CONSTRUCTION DETENTION BASIN DMA 2 28.2 ACRES
- DMA 1 RESIDENTIAL LOTS 15.1 ACRES
- DMA 1 CONCRETE AND/OR ASPHALT 5.9 ACRES
- DMA 1 PUBLIC LANDSCAPE AREA 1.7 ACRES
- SD — STORM DRAIN LINE
- DIRECTION OF FLOW

GENERAL NOTES

1. ALL PROPOSED STORM DRAIN CURB OPENING CATCH BASINS AND DROP INLETS SHALL BE STENCILED PER CITY OF PERRIS REQUIREMENTS AND DETAIL ON THIS SHEET (SEE CASQA SD-13 IN APPENDIX 9 OF PWQMP DOCUMENT).
2. ALL RUN-OFF SHALL BE DISCHARGED DIRECTLY INTO THE PROPOSED ON-SITE STORM DRAIN SYSTEM AND TREATED BY THE PROPOSED BIORETENTION BASIN BEFORE DISCHARGING INTO THE OFF-SITE MS4 STORM DRAIN FACILITIES (PERRIS VALLEY STORM DRAIN).

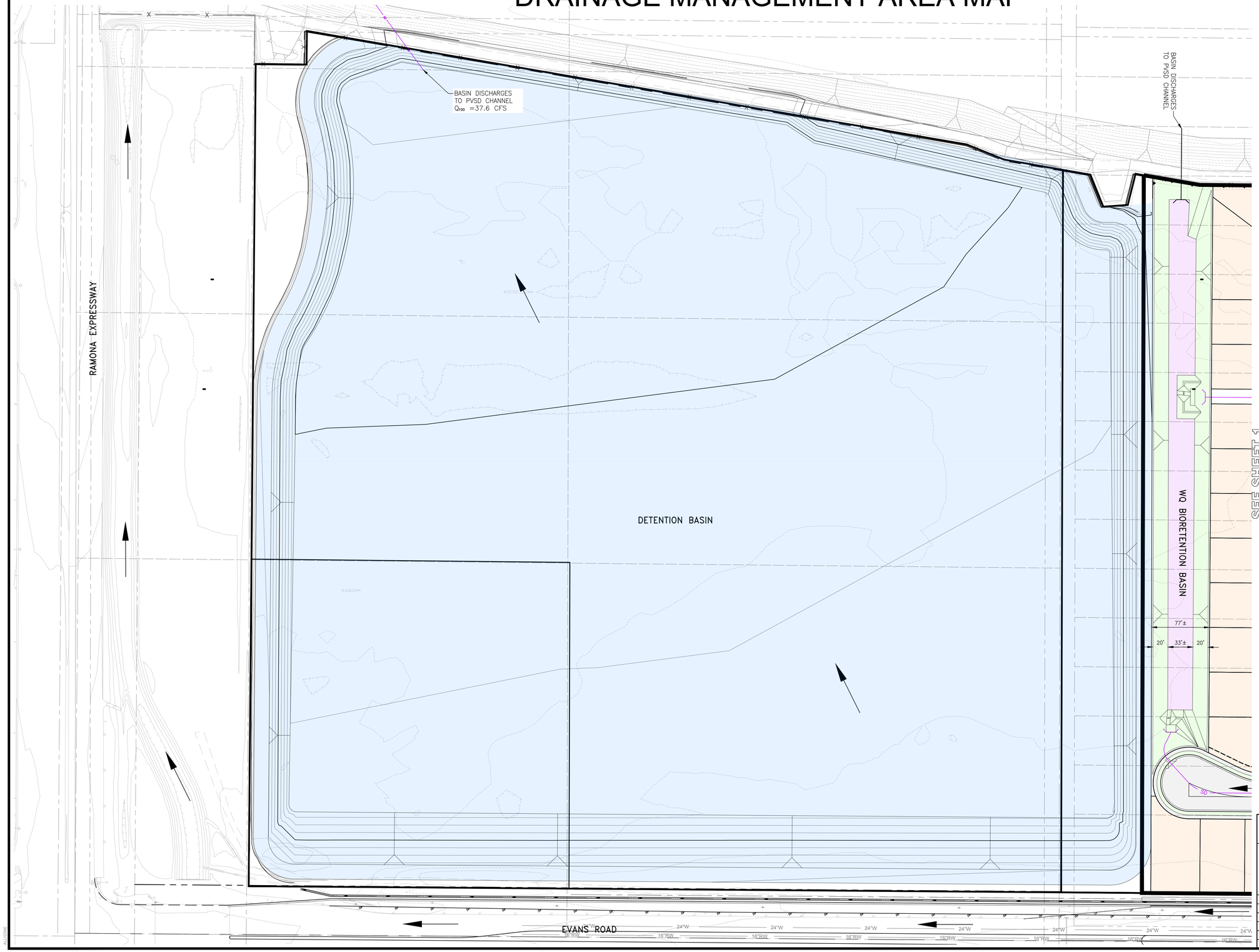


TTM 36647

DPR 16-05216
CITY OF PERRIS, CALIFORNIA
DRAINAGE MANAGEMENT AREA MAP

SCALE: 1" = 60'	ALBERT A. WEBB ASSOCIATES	ENGINEERING CONSULTANTS 3788 McCRAY STREET RIVERSIDE CA. 92506 PH. (951) 686-1070 FAX (951) 788-1256	W.O. 13-0159
DATE: 6/22/2018			SHEET 1
DESIGNED: ABE			OF 3 SHEETS
CHECKED: SKK			
PLN CK REF:			DWG. NO.
F.B.			

TENTATIVE TRACT MAP No. 36647
DRAINAGE MANAGEMENT AREA MAP



LEGEND

- POST-CONSTRUCTION BIORETENTION BASIN 0.5 ACRES
- POST-CONSTRUCTION DETENTION BASIN DMA 2 28.2 ACRES
- DMA 1 RESIDENTIAL LOTS 15.1 ACRES
- DMA 1 CONCRETE AND/OR ASPHALT 5.9 ACRES
- DMA 1 PUBLIC LANDSCAPE AREA 1.7 ACRES
- SD — STORM DRAIN LINE
- DIRECTION OF FLOW

W E S N

WEBB

1" = 60'

60 30 0 60 120 180

TTM 36647

DPR 16-05216
CITY OF PERRIS, CALIFORNIA
DRAINAGE MANAGEMENT AREA MAP

SCALE:	1" = 60'	W.O.	13-0159
DATE:	6/22/2018	SHEET	2
DESIGNED:	ABE	OF	3 SHEETS
CHECKED:	SKK		
PLN CK REF:		DWG. NO.	
F.B.			

ALBERT A. WEBB ASSOCIATES
ENGINEERING CONSULTANTS
3788 McCRAY STREET
RIVERSIDE CA. 92506
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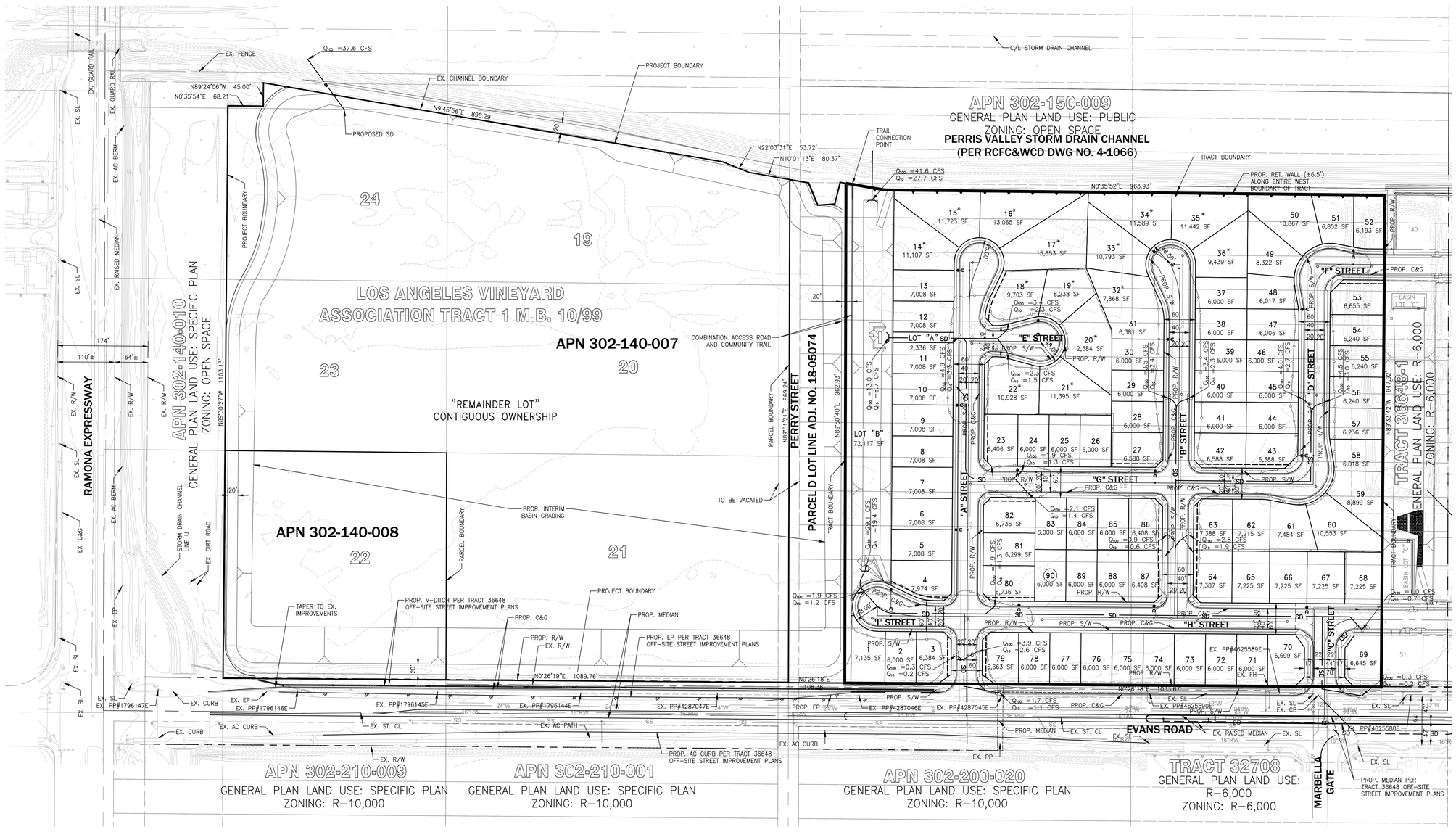
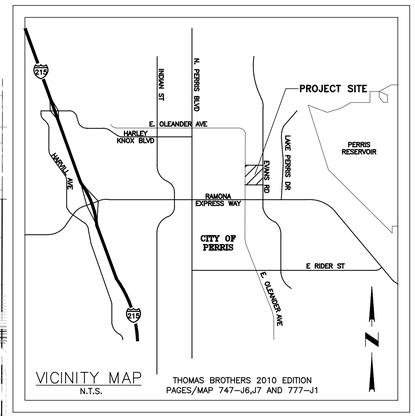
Appendix 2: Construction Plans

Conceptual Grading and Post construction BMP Plan

TENTATIVE TRACT MAP No. 36647





LEGEND

CB	CATCH BASIN
C&G	CURB AND GUTTER
C/L	CENTERLINE
EX	EXISTING
GB	GRADE BREAK
HP	HIGH POINT
LP	LOW POINT
FS	FINISH SURFACE
PROP	PROPOSED
P/L	PROPERTY LINE
R/W	RIGHT OF WAY
SD	STORM DRAIN LINE
SF	SQUARE FEET
SL	STREET LIGHT
ST	STREET
S/W	SIDEWALK
SWR	SEWER LINE
WTR	WATER LINE

LINETYPE LEGEND

- TRACT BOUNDARY
- PROPERTY LINE
- RIGHT OF WAY
- CENTERLINE
- PROPOSED EASEMENT LINE
- CURB
- GUTTER
- SIDEWALK
- EDGE OF PAVEMENT
- SEWER LINE
- WATER LINE
- STORM DRAIN LINE
- RETAINING WALL
- 100YR (INTERIM) WATER SURFACE ELEVATION
- PARCEL BOUNDARY
- PROJECT BOUNDARY

NOTES

1. 2010 THOMAS BROS. MAP BOOK: PAGE 747, GRID J7 & PAGE 777, GRID J1
2. THIS MAP DOES NOT INCLUDE THE ENTIRE CONTIGUOUS OWNERSHIP OF THE LAND DIVIDER.
3. EASEMENTS OF RECORD ARE SHOWN.
4. THERE ARE NO EXISTING WELLS ON THE PROPERTY.
5. ALL SLOPES ARE 2:1 RATIO, UNLESS OTHERWISE NOTED.
6. NO SUBSURFACE SEPTIC SEWAGE DISPOSAL IS INTENDED.
7. THERE WILL NOT BE ANY FLAMMABLE/COMBUSTIBLE LIQUIDS OR WASTE OIL ABOVE OR BELOW GROUND.
8. LAND IS SUBJECT TO HIGH LIQUEFACTION.
9. LAND IS NOT WITHIN A SPECIAL STUDIES ZONE.
10. LAND IS SUBJECT TO OVERFLOW, INUNDATION OR FLOOD HAZARD.
11. FLOOD ZONE A, AREA OF HIGH FLOODING PER FEMA PANEL 06065C1430G. FLOOD PLAIN SHOWN IS THE CURRENT CONDITION, PRIOR TO THE PERRIS VALLEY STORM DRAIN CHANNEL IMPROVEMENT.
12. NO EXISTING STRUCTURES OR DWELLINGS ON SITE.
13. THERE ARE NO OPEN CHANNELS ON SITE.
14. EXISTING POWER POLES ARE TO REMAIN IN PLACE.
15. PERRY STREET BETWEEN THE PVSD CHANNEL AND EVANS ROAD SHALL BE VACATED UPON RECORDATION OF THE TRACT MAP.
16. THE BASIS OF BEARINGS FOR THIS SURVEY IS THE CALIFORNIA STATE PLAN COORDINATE SYSTEM, CCS83, ZONE 6, BASED LOCALLY ON CONTROL STATIONS "MLFP", "PPBF", NAD 83(NSRS2011).
17. THIS SITE IS BASED ON NAVD 88.

N
W E
S
WEBB

1" = 100'
100 50 0 100 200 300

CITY CASE No. 16-05216

OWNER/DEVELOPER

STRATFORD RANCH INVESTORS, LLC
4100 NEWPORT PLACE DR. SUITE 400
NEWPORT BEACH, CA 92660
PH: (949) 333-6752
ATTN: JASON KELLER

ENGINEER

ALBERT A. WEBB ASSOCIATES
3788 McCRAY STREET
RIVERSIDE, CA 92506
ATTN: SARAH KOWALSKI
TEL: (951) 686-1070
FAX: (951) 788-1256

SOILS ENGINEER

ADVANCED GEOTECHNICAL SOLUTIONS, INC.
25109 JEFFERSON AVENUE, SUITE 220
MURRIETA, CA 92562
ATTN: JEFFREY A. CHANEY
TEL: (619) 708-1649

TOPOGRAPHY SOURCE

TOPOGRAPHY FLOWN BY:
INLAND AERIAL SURVEYS, INC.
COMPILED FROM AERIAL PHOTOGRAPHY DATED: 6/26/2017 AND 10/23/2017

LEGAL DESCRIPTION

"TTM 36647"
PARCEL C OF LOT LINE ADJUSTMENT NO. 18-05074
REC. __/__/____, INST.#_____ O.R.

"REMAINDER LOT"
PARCEL D OF LOT LINE ADJUSTMENT NO. 18-05074
REC. __/__/____, INST.#_____ O.R.

PARCEL 1: (APN: 302-140-007)
LOTS 18, 19, 20, 21, 23, 24 AND THE EASTERLY 69.7 FEET OF LOT 25 OF LOS ANGELES VINEYARD ASSOCIATION TRACT 1, AS SHOWN BY MAP ON FILE IN BOOK 10 PAGE 99 OF MAPS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA;
EXCEPTING THEREFROM THAT PORTION CONVEYED TO THE RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT BY DEED RECORDED APRIL 8, 1955 IN BOOK 1720 PAGE 226 OF OFFICIAL RECORDS OF RIVERSIDE COUNTY, CALIFORNIA;
ALSO EXCEPTING THEREFROM THAT PORTION CONVEYED TO THE COUNTY OF RIVERSIDE BY DEED RECORDED FEBRUARY 11, 1959 AS INSTRUMENT NO. 11951 OF OFFICIAL RECORDS OF RIVERSIDE COUNTY, CALIFORNIA;
ALSO EXCEPTING THEREFROM THAT PORTION CONVEYED TO THE STATE OF CALIFORNIA BY DEEDS RECORDED NOVEMBER 18, 1969 AS INSTRUMENT NO. 118288 OF OFFICIAL RECORDS OF RIVERSIDE COUNTY, CALIFORNIA.
ALSO EXCEPTING THEREFROM THOSE PORTION OF LOTS 18, 19, 24 AND 25 CONVEYED TO THE RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT BY DEED RECORDED MAY 24, 2017 AS INSTRUMENT NO. 2017-0208311 OF OFFICIAL RECORDS OF RIVERSIDE COUNTY, CALIFORNIA.
ALSO EXCEPTING THEREFROM THOSE PORTION OF LOT 18 CONVEYED TO THE RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT BY DEED RECORDED MAY 24, 2017 AS INSTRUMENT NO. 2017-0208318 OF OFFICIAL RECORDS OF RIVERSIDE COUNTY, CALIFORNIA.
PARCEL 2: (APN: 302-140-008)
LOT 22 OF LOS ANGELES VINEYARD ASSOCIATION TRACT 1, AS SHOWN BY MAP ON FILE IN BOOK 10 PAGE 99 OF MAPS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA;
EXCEPTING THEREFROM THAT PORTION CONVEYED TO THE COUNTY OF RIVERSIDE BY DEED RECORDED SEPTEMBER 19, 1958 IN BOOK 2335 PAGE 23 OF OFFICIAL RECORDS OF RIVERSIDE COUNTY, CALIFORNIA;
ALSO EXCEPTING THEREFROM THAT PORTION CONVEYED TO THE STATE OF CALIFORNIA BY DEED RECORDED JULY 14, 1970 AS INSTRUMENT NO. 67199 OF OFFICIAL RECORDS OF RIVERSIDE COUNTY, CALIFORNIA.
PARCEL 3: (APN'S: 302-150-009-0, 302-150-013-3 AND 302-150-014-4)
PARCEL E OF LOT 4, PARCELS E OF LOT 5, PARCELS A, C, D AND E OF LOT 6, PARCELS A, B, C AND D OF LOT 7, PARCELS D, E AND F OF LOT 8, PARCELS A, B, C, D AND E OF LOT 9, PARCELS C, D AND E OF LOT 10 AND PARCEL E OF LOT 11, ALL IN UNIT 1 OF LA VINA LAND COMPANY TRACT, UNITS 1 AND 2 AS SHOWN BY MAP ON FILE IN BOOK 14 PAGES 19 AND 20 OF MAPS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA;
EXCEPTING FROM PARCEL E OF LOT 4 AND PARCEL E OF LOT 10 THOSE PORTIONS DESCRIBED IN PARCEL 4 AS CONVEYED TO THE RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT BY DEED RECORDED APRIL 8, 1955 IN BOOK 1720 PAGE 226 OF OFFICIAL RECORDS OF RIVERSIDE COUNTY, CALIFORNIA.
ALSO EXCEPTING THEREFROM THOSE PORTION OF PARCEL E OF LOT 4, PARCEL C OF LOT 10, PARCEL E OF LOT 11 CONVEYED TO THE RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT BY DEED RECORDED MAY 24, 2017 AS INSTRUMENT NO. 20170208312 OF OFFICIAL RECORDS OF RIVERSIDE COUNTY, CALIFORNIA.
ALSO EXCEPTING THEREFROM THOSE PORTION OF C OF LOT 10 CONVEYED TO THE RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT BY DEED RECORDED MAY 24, 2017 AS INSTRUMENT NO. 2017-0208312 OF OFFICIAL RECORDS OF RIVERSIDE COUNTY, CALIFORNIA.
PARCEL 4: (APN'S: 302-150-015-5 AND 302-150-016-6)
PARCELS A AND B, LOT 8 OF UNIT 1, IN LA VINA LAND COMPANY TRACT, UNITS 1 AND 2 AS SHOWN BY MAP ON FILE IN BOOK 14 PAGES 19 AND 20 OF MAPS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA.
PARCEL 5: (APN: 302-150-017-7)
PARCEL C, LOT 8, UNIT NO. 1, OF LA VINA LAND TRACT AS SHOWN BY MAP ON FILE IN BOOK 14 PAGES 19 AND 20 OF MAPS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA.

ASSESSOR'S PARCEL NO.

TTM 36647
302-150-010, 302-150-011, 302-150-012, 302-150-018, 302-150-019;
AND PORTIONS OF APNS: 302-150-009, 302-150-013, 302-150-014, 302-150-015, 302-150-016, 302-150-017

"REMAINDER LOT"
302-140-007, 302-140-008
AND PORTIONS OF APNS: 302-150-009, 302-150-013, 302-150-014, 302-150-015, 302-150-016, 302-150-017

NOTE

ALL HOMES ARE SUBJECT TO CITY OF PERRIS AUTOMATIC FIRE SPRINKLER REQUIREMENTS. PER CITY OF PERRIS FIRE SECTION 6.A.2.d.i. LOTS WITH AN * SHALL BE SUBJECT TO NFPA SECTION 13-D REQUIREMENTS, AND THE SPRINKLER SYSTEM SHALL INCLUDE FULL PROTECTION OF THE ATTIC SPACES(S).

UTILITIES

WATER	EASTERN MUNICIPAL WATER DISTRICT
SEWER	EASTERN MUNICIPAL WATER DISTRICT
ELECTRIC	SOUTHERN CALIFORNIA EDISON COMPANY
GAS	SOUTHERN CALIFORNIA GAS COMPANY
TELEPHONE	SBC
TELEVISION	INDIVIDUAL RECEPTION/CABLE

SCHOOL DISTRICT

VAL VERDE UNIFIED SCHOOL DISTRICT

EARTHWORK

RAW
CUT: 223,410 CY
FILL: 147,670 CY

LAND USE

EXISTING LAND USE: SPECIFIC PLAN
PROPOSED LAND USE: R-6,000
EXISTING ZONING: R-10,000
PROPOSED ZONING: R-6,000

ACREAGE

TTM 36647
24.12 AC. GROSS
22.60 AC. NET
DENSITY: 4.0 DU/AC

"REMAINDER LOT"
30.70 AC. GROSS
28.94 AC. NET

GRAND TOTAL
54.82 AC. GROSS
51.54 AC. NET

TENTATIVE MAP

TRACT 36647

COMPREHENSIVE SITE PLAN

SCALE: 1" = 100'	ALBERT A. WEBB ASSOCIATES	ENGINEERING CONSULTANTS 3788 McCRAY STREET RIVERSIDE CA. 92506 PH. (951) 686-1070 FAX (951) 788-1256	W.O. 13-0159
DATE: 6/22/2018			SHEET 1
DESIGNED: CCK			OF 4 SHEETS
CHECKED: SKK			
PLN CK REF:			DWG. NO.
F.B.			

ALL ISSUES

R:\2013\13-0159\Drawings\Entitlement\13-0159 C-TTM-36647.dwg 6/22/2018 5:25:13 PM

TENTATIVE TRACT MAP No. 36647
CONCEPTUAL GRADING

LOT #	LOT SIZE (SF)	USEABLE AREA	LOT WIDTH	LOT DEPTH	STREET FRONTAGE	LOT #	LOT SIZE (SF)	USEABLE AREA	LOT WIDTH	LOT DEPTH	STREET FRONTAGE
1	7135	7135	65.6'	100.0'	72.5'	47	6006	6006	60.0'	99.4'	60.0'
2	6000	6000	60.0'	100.0'	60.0'	48	6017	6017	62.7'	90.2'	63.4'
3	6384	5872	67.2'	100.0'	52.2'	49	8322	8322	60.4'	90.2'	45.2'
4	7974	7195	73.9'	116.8'	62.0'	50	10867	10867	60.3'	98.5'	45.2'
5	7008	7008	60.0'	116.8'	60.0'	51	6852	6852	64.6'	98.5'	60.8'
6	7008	7008	60.0'	116.8'	60.0'	52	6193	6078	60.0'	100.6'	60.3'
7	7008	7008	60.0'	116.8'	60.0'	53	6655	6447	65.0'	104.0'	40.0'
8	7008	7008	60.0'	116.8'	60.0'	54	6240	6240	60.0'	104.0'	60.0'
9	7008	7008	60.0'	116.8'	60.0'	55	6240	6240	60.0'	104.0'	60.0'
10	7008	7008	60.0'	116.8'	60.0'	56	6240	6240	60.0'	104.0'	60.0'
11	7008	7008	60.0'	116.8'	60.0'	57	6236	6238	60.0'	103.4'	60.0'
12	7008	7008	60.0'	116.8'	60.0'	58	6018	6018	62.0'	94.1'	62.7'
13	7008	7008	60.0'	116.8'	60.0'	59	8899	8899	60.6'	94.1'	44.8'
14	11107	11107	61.7'	116.8'	45.7'	60	10553	10162	59.6'	95.3'	44.8'
15	11723	11723	69.3'	90.1'	45.2'	61	7484	7089	75.3'	95.3'	71.2'
16	13065	13065	70.8'	90.1'	45.2'	62	7215	6963	72.3'	98.4'	72.3'
17	15653	15653	60.0'	161.1'	45.2'	63	7388	6601	75.0'	100.0'	60.0'
18	9703	8808	61.1'	90.8'	50.0'	64	7387	6768	75.0'	100.0'	60.0'
19	8238	7893	69.5'	90.8'	45.2'	65	7225	7225	72.3'	100.0'	72.3'
20	12384	12166	109.7'	95.2'	65.1'	66	7225	7225	72.2'	100.0'	72.2'
21	11395	11035	69.3'	92.9'	45.2'	67	7225	7225	72.2'	100.0'	72.2'
22	10928	10220	105.4'	92.9'	81.5'	68	7225	7008	72.3'	100.0'	72.3'
23	6406	5786	65.2'	100.0'	50.2'	69	6645	6645	70.3'	100.0'	46.3'
24	6000	6000	60.0'	100.0'	60.0'	70	6699	6699	70.9'	100.0'	46.9'
25	6000	6000	60.0'	100.0'	60.0'	71	6000	6000	60.0'	100.0'	60.0'
26	6000	5991	60.0'	100.0'	60.0'	72	6000	6000	60.0'	100.0'	60.0'
27	6588	5782	65.0'	100.0'	50.0'	73	6000	6000	60.0'	100.0'	60.0'
28	6000	5867	60.0'	100.0'	60.0'	74	6000	6000	60.0'	100.0'	60.0'
29	6000	6000	60.0'	100.0'	60.0'	75	6000	6000	60.0'	100.0'	60.0'
30	6000	6000	60.0'	100.0'	60.0'	76	6000	6000	60.0'	100.0'	60.0'
31	6381	6351	60.0'	100.0'	60.2'	77	6000	6000	60.0'	100.0'	60.0'
32	7868	7868	62.2'	115.1'	66.0'	78	6000	6000	60.0'	100.0'	60.0'
33	10793	10793	66.0'	121.9'	55.7'	79	6663	6151	70.0'	100.0'	55.0'
34	11589	11589	69.4'	90.0'	45.2'	80	6736	6006	70.0'	100.0'	55.0'
35	11442	11442	69.5'	90.0'	45.2'	81	6299	6002	60.0'	100.0'	60.0'
36	9439	9639	74.1'	100.0'	55.6'	82	6736	6006	70.0'	100.1'	55.0'
37	6000	6000	60.0'	100.0'	60.0'	83	6000	6000	60.0'	100.0'	60.0'
38	6000	6000	60.0'	100.0'	60.0'	84	6000	6000	60.0'	100.0'	60.0'
39	6000	6000	60.0'	100.0'	60.0'	85	6000	6000	60.0'	100.0'	60.0'
40	6000	6000	60.0'	100.0'	60.0'	86	6408	5842	65.1'	100.0'	50.1'
41	6000	6000	60.0'	100.0'	60.0'	87	6408	5968	65.1'	100.0'	50.2'
42	6588	5968	65.0'	100.0'	50.0'	88	6000	6000	60.0'	100.0'	60.0'
43	6388	5838	65.0'	100.0'	40.0'	89	6000	6000	60.0'	100.0'	60.0'
44	6000	6000	60.0'	100.0'	60.0'	90	6000	6000	60.0'	100.0'	60.0'
45	6000	6000	60.0'	100.0'	60.0'	LOT "A"	2336	2336	20.0'	116.8'	20.0'
46	6000	6000	60.0'	100.0'	60.0'	LOT "B"	72117	72117	761.8'	100.0'	–

TOTAL LOT AREA (TTM 36647): 721,261 SQ. FT. (16.56 AC. NET)
TOTAL AREA (TTM 36647): 984,309 SQ. FT. (22.60 AC. NET)
"REMAINDER LOT" AREA: 1,260,724 SQ. FT. (28.94 AC. NET)
GRAND TOTAL AREA: 2,245,033 SQ. FT. (51.54 AC. NET)

N
W WEBB E
S

1" = 60'
60 30 0 60 120 180

CITY CASE No. 16-05216

LEGEND

C&G	CURB AND GUTTER
S/W	SIDEWALK
SWR	SEWER
WTR	WATER
SD	STORM DRAIN

TENTATIVE MAP
TRACT 36647
CONCEPTUAL GRADING PLAN AND LOT MATRIX

SCALE:	1" = 60'	ALBERT A. WEBB ASSOCIATES	W.O. 13-0159
DATE:	6/22/2018	ENGINEERING CONSULTANTS 3788 McCRAY STREET RIVERSIDE CA. 92506 PH. (951) 686-1070 FAX (951) 788-1256	SHEET 2
DESIGNED:	CCK		OF 4 SHEETS
CHECKED:	SKK		DWG. NO.
PLN CK REF:			
F.B.			

TENTATIVE TRACT MAP No. 36647
CONCEPTUAL GRADING

PERRIS VALLEY STORM DRAIN CHANNEL
(PER RCFC&WCD DWG NO. 4-1066)

APN 302-150-009
GENERAL PLAN LAND USE: PUBLIC
ZONING: OPEN SPACE

APN 302-140-010
GENERAL PLAN LAND USE: SPECIFIC PLAN
ZONING: OPEN SPACE

APN 302-140-007

APN 302-140-008

LOS ANGELES VINEYARD
ASSOCIATION TRACT 1 M.B. 10/99

"REMAINDER LOT"
CONTIGUOUS OWNERSHIP

PARCEL D LOT LINE ADJ. NO. 18-05074

RAMONA EXPRESSWAY

PERRY STREET

EVANS ROAD

"I" STREET

LOT "B"

LOT "I"

TO BE VACATED

TRACT BOUNDARY

PROJECT BOUNDARY

PARCEL BOUNDARY

EX. CHANNEL BOUNDARY

EX. CHANNEL FENCE

PROPOSED SD

PROPOSED BASIN GRADING TO INTERIM DEPTH

COMBINATION ACCESS ROAD AND COMMUNITY TRAIL

TRAIL CONNECTION POINT

STORM DRAIN CHANNEL LINE U

EX. DIRT ROAD

EX. RAISED MEDIAN

EX. GUARD RAIL

EX. AC BERM

EX. FENCE

EX. SL

EX. R/W

EX. C&G

EX. EP

EX. CURB

PROP. C&G

PROP. R/W

PROP. MEDIAN

PROP. S/W

PROP. EP

PROP. EP PER TRACT 36648
OFF-SITE STREET IMPROVEMENT PLANS

SEE SHEET 2

F 4

G 4

LEGEND

C&G	CURB AND GUTTER
S/W	SIDEWALK
SWR	SEWER
WTR	WATER
SD	STORM DRAIN

1" = 60'

CITY CASE No. 16-05216

TENTATIVE MAP

TRACT 36647

CONCEPTUAL GRADING PLAN

SCALE:	1" = 60'
DATE:	6/22/2018
DESIGNED:	CCK
CHECKED:	SKK
PLN CK REF:	
F.B.	

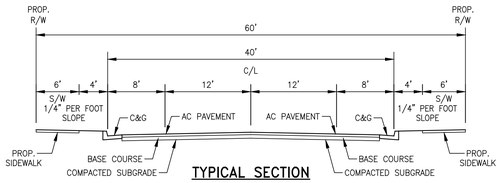
ALBERT A. WEBB ASSOCIATES
ENGINEERING CONSULTANTS
3788 McCRAY STREET
RIVERSIDE CA. 92506
PH. (951) 686-1070
FAX (951) 788-1256

W.O.	13-0159
SHEET	3
OF	4 SHEETS
DWG. NO.	

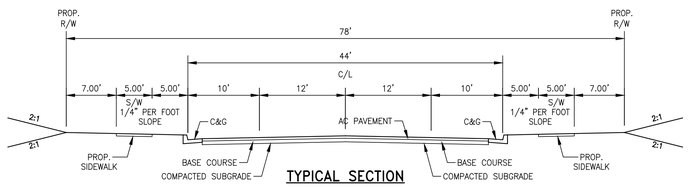
TENTATIVE TRACT MAP No. 36647
STREET AND GRADING SECTIONS

NOTE
PROPOSED ROADWAYS SHALL BE DESIGNED, CONSTRUCTED, AND MAINTAINED TO SUPPORT A TOTAL WEIGHT OF 68,000 LBS.

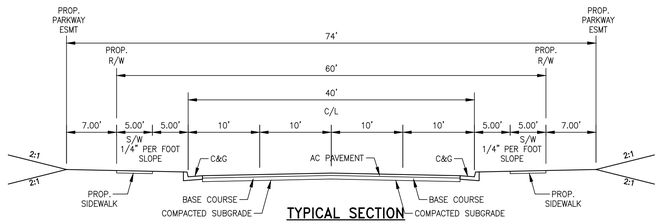
NOTE
ALL STREET CUL–DE–SACS TO BE CONSTRUCTED PER COUNTY OF RIVERSIDE STANDARD 800, ALL OFFSET CUL–DE–SACS TO BE CONSTRUCTED PER COUNTY OF RIVERSIDE STANDARD 800(A), AND ALL STREET KNUCKLES TO BE CONSTRUCTED PER COUNTY OF RIVERSIDE STANDARD 801.



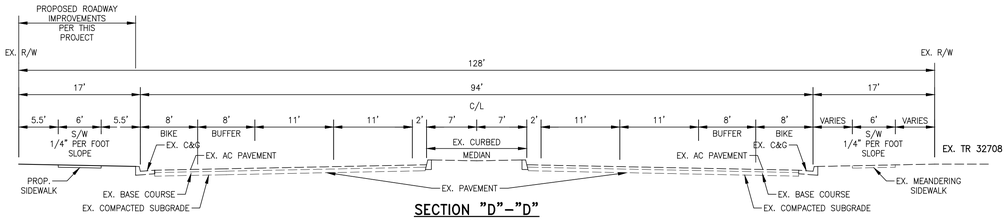
TYPICAL SECTION
STD. NO. 105
LOCAL STREET
"A" STREET, "B" STREET, "D"–"I" STREET
NTS



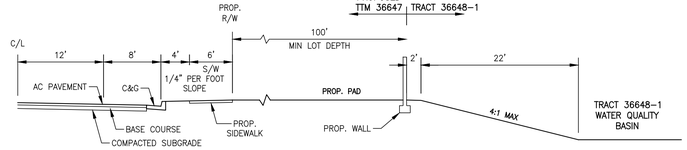
TYPICAL SECTION
STD. NO. 103
MODIFIED
"C" STREET, ENTRANCE
NTS



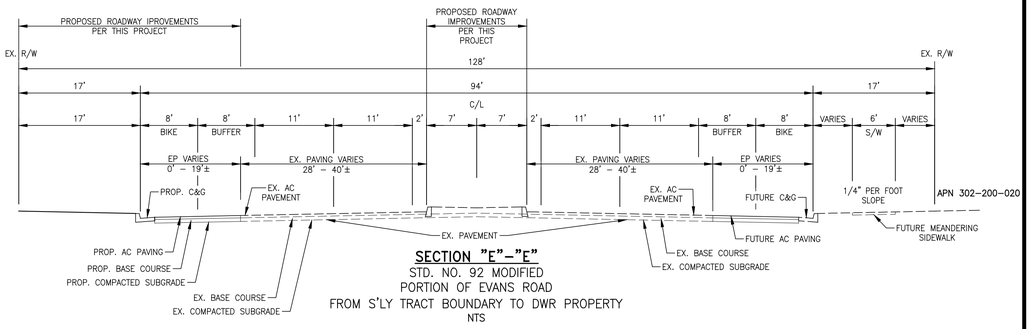
TYPICAL SECTION
STD. NO. 103
MODIFIED
"A" STREET, ENTRANCE
NTS



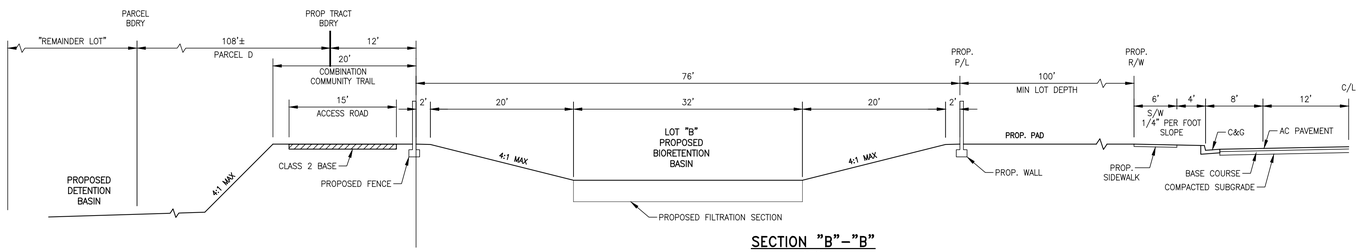
SECTION "D"–"D"
STD. NO. 92 MODIFIED
PORTION OF EVANS ROAD
ALONG PROJECT FRONTAGE
NTS



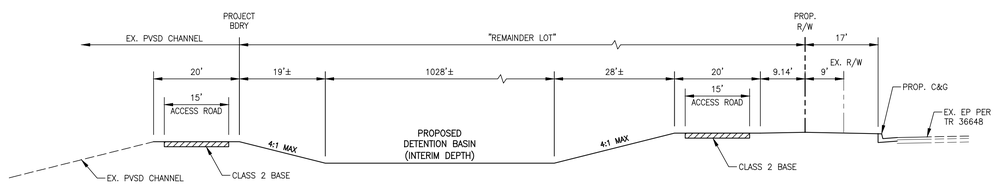
SECTION "A"–"A"
NTS



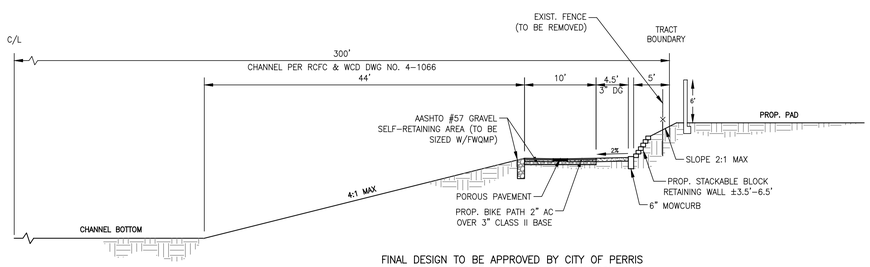
SECTION "E"–"E"
STD. NO. 92 MODIFIED
PORTION OF EVANS ROAD
FROM S'LY TRACT BOUNDARY TO DWR PROPERTY
NTS



SECTION "B"–"B"
NTS

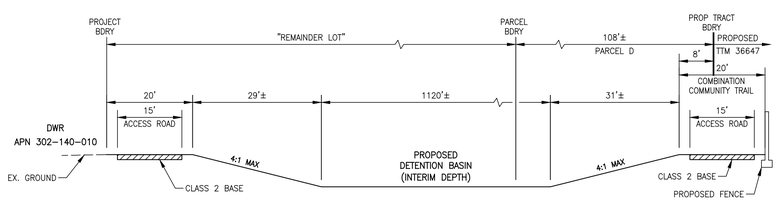


SECTION "F"–"F"
NTS



FINAL DESIGN TO BE APPROVED BY CITY OF PERRIS AND RIVERSIDE COUNTY FLOOD CONTROL

SECTION "C"–"C"
NTS



SECTION "G"–"G"
NTS

CITY CASE No. 16–05216

TENTATIVE MAP
TRACT 36647
STREET AND GRADING SECTIONS

SCALE: NTS	ALBERT A. WEBB ASSOCIATES	ENGINEERING CONSULTANTS 3788 McCRAY STREET RIVERSIDE CA. 92506 PH. (951) 686–1070 FAX (951) 788–1256	W.O. 13–0159
DATE: 6/22/2018			SHEET 4
DESIGNED: CCK			OF 4 SHEETS
CHECKED: SKK			
PLN CK REF:			DWG. NO.
F.B.			

ALLSONE

R:\2013\13-0159\Drawings\Entitlement\13-0159 C-TTM-36647.dwg 6/22/2018 5:25:31 PM

Appendix 3: Soils Information

Geotechnical Study and Other Infiltration Testing Data

INFILTRATION TEST RESULTS INCLUDED IN THIS PRELIMINARY WQMP

COMPLETE GETOTECHNICAL REPORT TO BE PROVIDED WITH FINAL WQMP

ADVANCED GEOTECHNICAL SOLUTIONS, INC.
25109 Jefferson Avenue, Suite 200
Murrieta, California 92562
Telephone: (619) 708-1649 Fax: (714) 409-3287

Stratford Ranch Investors, LLC
3649 Mission Inn Avenue
Murrieta, CA 92562

October 14, 2013
P/W 1204-05
Report 1204-05-B-3

Attention: **Mr. John Abel**

Subject: Infiltration Test Results and Recommendations Regarding Hydrologic Conditions, Stratford Ranch Project TTM 36647 & 36648, City of Perris, California

Reference: *Updated Preliminary Geotechnical Investigation for the Stratford Ranch Project, City of Perris, California, prepared by Advanced Geotechnical Solutions, Inc. (AGS) dated May 29, 2012 (P/W 1205-05)*

Preliminary Geotechnical Investigation Proposed 450-Acre Development, Located north of Ramona Expressway Between Redlands Avenue and Lake Perris Drive, In the City of Perris, Riverside, California, prepared by Lawson and Associates Geotechnical Consulting, Inc. (LGC), dated July 29, 2004 (Project No. 032338-10)

Gentlemen,

Pursuant to your request, Advanced Geotechnical Solutions, Inc. (AGS) has prepared this letter summarizing our recent infiltration testing and addressing the anticipated hydrologic conditions which will be encountered at the Stratford Ranch project, TTM 36647 and 36648, located in the City of Perris, California. In this letter AGS presents a summary of results from our recent infiltration testing program and a discussion of geologic/geotechnical issues associated with the disposal of storm water onsite.

In conformance with our proposal, AGS has conducted infiltration testing at the approximate locations depicted on the enclosed plan prepared by Webb Associates (Exhibit 1).

1.0 TEST METHODS AND METHODOLOGY

Six infiltration locations were investigated by AGS as part of our initial phase of infiltration testing. As part of this work infiltration rates and their associated soil profile characteristics in the area of the tests were determined at each of the requested locations. At each test location a Double Ring Infiltrometer (DRI) test was conducted in general conformance to the Riverside County –Low Impact Development BMP Design Handbook (rev 9/2011). Tests were conducted at 2 to 3 feet below the existing surface. At the conclusion of the infiltration testing a test pit was excavated at each test location with a rubber tired backhoe (JD 310SC) to depths of 10 feet to provide a soil profile in the area. Logs of these test pits are summarized in Table 1.0 The approximate location of these test-pit locations are shown on attached Plates 1 and 2.
Infiltration test results are summarized in Table 1.0. A summary of the geologic conditions and recommended Hydrologic Soil Group per USDA are also included in Table 1.0.

Table 1.0
Summary of Infiltration Test Results

Test Number	Test Type	Basin #	Infiltration Rate (inches/hour)	USDA Soil Type (Hydrologic Soil Group)	Soil Profile at Test Location
DRT-1	DRI	1	0.13	D	0-5 ft Alluvium 5-10 ft Very Old Fan Deposit
DRT-2	DRI	1	0.14	D	0-4 ft Alluvium 4-10 ft Very Old Fan Deposit
DRT-3	DRI	2	0.07	D	0-3.5 ft Alluvium 3.5-10 ft Very Old Fan Deposit
DRT-4	DRI	2	0.12	D	0-4.5 ft Alluvium 4.5-10 ft Very Old Fan Deposit
DRT-5	DRI	3	0.08	D	0-2 ft Alluvium 2-10 ft Very Old Fan Deposit
DRT-6	DRI	3	0.10	D	0-3.5 ft Alluvium 3.5-10 ft Very Old Fan Deposit

2.0 SITE GEOLOGIC CONDITIONS & RECOMMENDED DESIGN INFILTRATION RATES

Across the majority of the site the upper few feet of the alluvium consists of silty sands to sandy silts. These upper soils appear to be relatively porous and will generally have low to very low infiltration rates. The underlying less porous older alluvium will have very low infiltration rates.

2.1. Alluvium

The upper soils have been classified as Modern Alluvium and consist of silty sands, clayey silts and silty clays. These light brown to tan soils are typically dry to damp, loose to moderately dense to soft/firm. During this investigation the alluvium was observed to be two (2) to five (5) feet thick. These soils are considered to be Group D (Hydrologic Soil Group) with infiltration rates of 0.07 to 0.14 inches per hour.

2.2. Very Old Fan Deposits (Map Symbol Qvof)

Soils underlying the Modern Alluvium have been classified as Very Old Fan Deposits. The differentiation is based upon the color and density changes observed. This unit is composed of fine grained silty sands to sandy silts with silty clay layers and is typically tan to red brown, very moist, firm to stiff, blocky, containing caliche, and occasionally carboniferous. These soils are considered to be Group D (Hydrologic Soil Groups) with infiltration rates of 0.02 to 0.10 inches per hour.

2.3. Groundwater

Groundwater was not observed in the recent backhoe test pits conducted during this study. Previous test pits excavated in May 2012 indicated that groundwater was present in some of these test pits. Specifically, these test pits were located along the western edge of the project adjacent to the existing

improved channel. Groundwater was not observed in any of the test pits along the eastern edge of the project. Table 2.0 summarizes the approximate elevation of the groundwater encountered.

Table 2.0
Groundwater Elevation

Test Pit	Elevation
TA-5	1440.5
TA-6	1440
TA-7	1438

3.0 MASS GRADING

The current plan calls for the mass grading of the site to create 359 single family residential lots, 3 detention basins, roadways and associated improvements. Due to the relatively flat nature of the site, minor cuts and fills on the order 5 to 8 feet are anticipated. Within structural fill areas complete removal of the Alluvium and upper one to two feet of the weathered Very Old Fan Deposits will be required.

4.0 ONSITE INFILTRATION AND GROUNDWATER

There are several onsite geotechnical issues which are of significant concern regarding the ultimate infiltration of surface runoff into the proposed cut and fill areas onsite. In the past, the infiltration of irrigation water into fills and bedrock has created significant detrimental impacts to established post grade improvements. Typical problems that AGS has encountered are:

- Slope instability caused by the increase in hydrostatic pressure.
- Buildup of water within deeper fill prisms resulting in settlement.
- Seepage of water into utility trenches and pavement sections resulting in trench and pavement failures.
- Infiltration water seepage at cut/fill contacts.

AGS recommends that bio-infiltration basins should limited to the low lying areas where infiltration surfaces will be deeper than the surrounding improvements. Further, the bottom of the basins along the westerly side should take into account the groundwater elevations observed during our initial study.

The opportunity to be of service is sincerely appreciated. If you should have any questions, please do not hesitate to contact the undersigned.

Respectfully Submitted,
Advanced Geotechnical Solutions, Inc.

REGISTERED PROFESSIONAL ENGINEER
JEFFREY A. CHANEY
No. 2314
Exp. 6/30/15
GEOTECHNICAL
STATE OF CALIFORNIA

JEFFREY A. CHANEY, Vice President
RCE 46544/ GE 2314
Attachments: Plates 1 & 2- Approximate Locations of Percolation Tests
Table 1A-Test Pit Logs
Distribution: (4) Addressee

Project: STRATFORD RANCH
Date Excavated: 9/19 to 9/21, 2013
Logged by: JEH/JAC
Equipment: John Deere 310SC Excavator

TABLE IA

LOG OF TEST PITS

Test Pit No.	Depth (ft.)	USCS	Description
DRT-1	0.0 – 5.0	SM/ML	**ALLUVIUM (Qal):** SILTY SAND/SANDY SILT, light brown, dry, loose/soft. @ 2.0 ft. slightly moist. @ 4.0 ft. slightly moist to moist.
	5.0 – 10.0	SM/ML	**VERY OLD FAN DEPOSIT (Qvof):** SILTY SAND/SANDY SILT, orange brown to brown, slightly moist to moist, medium dense/firm; some carbonates and caliche stringers. @ 9.0 ft. very dense. TOTAL DEPTH 10.0 FT. NO WATER, NO CAVING
DRT-2	0.0 – 4.0	SM/ML	**ALLUVIUM (Qal):** SILTY SAND/SANDY SILT, light brown to gray, dry, loose/soft; slightly porous. @ 2.0 ft. tan to light brown, slightly moist, loose to moderately dense. @ 4.0 ft. slightly moist to moist.
	4.0 – 10.0	SM	**VERY OLD FAN DEPOSIT (Qvof):** SILTY SAND, orange brown, slightly moist to moist, medium dense. @ 5.0 ft. dense; carbonate stringers/caliche. @ 7.0 ft. moist, very dense. TOTAL DEPTH 10.0 FT. NO WATER, NO CAVING

DRT-3	0.0 – 3.5	SM	**ALLUVIUM (Qal):** SILTY SAND, light gray brown, dry, loose, slightly porous @ 2.5 ft moderately dense
	3.5 – 9.5	SM	**VERY OLD FAN DEPOSIT (Qvof):** SILTY SAND, fine- to coarse-grained, light orange brown, slightly moist, medium dense to dense. @ 5.0 ft. slightly moist to moist, caliche/stringers. @ 6.0 ft. dark orange brown. @ 8.0 ft. very dense. TOTAL DEPTH 10.0 FT. NO WATER, NO CAVING
DRT-4	0.0 – 4.5	SM	**ALLUVIUM (Qal):** SILTY SAND, light gray brown, dry, loose, slightly porous. @ 2.0 ft. slightly moist. @3.0 ft. moderately dense
	4.5 – 10.0	SM/ML	**VERY OLD FAN DEPOSIT (Qvof):** SILTY SAND to SANDY SILT, orange brown, slightly moist, medium dense to stiff; sand portion is fine- to coarse-grained. @ 6.0 ft. moist, dense to very stiff; pockets of caliche/carbonates. @ 9.0 ft. very dense to hard. TOTAL DEPTH 10.0 FT. NO WATER, NO CAVING
DRT-5	0.0 – 2.0	SM	**ALLUVIUM (Qal):** SILTY SAND, light gray brown, dry, loose.
	2.0 – 9.5	SM	**VERY OLD FAN DEPOSIT (Qvof):** SILTY SAND, light orange brown with abundant carbonate lenses, dry to slightly moist, moderately dense. @ 3.0 ft. orange brown, slightly moist to moist, medium dense.
		SM/ML	@ 4.0 ft. SILTY SAND to SANDY SILT, orange brown, moist, dense to very stiff; sand portion is fine- to coarse-grained. @ 8.0 ft. very dense to hard. TOTAL DEPTH 10.0 FT. NO WATER, NO CAVING

DRT-6	0.0 – 3.0	SM/ML	**ALLUVIUM (Qal):** SILTY SAND to SANDY SILT, light gray brown, dry, loose/soft. @ 2.0 ft. slightly moist
	3.0 – 10.0	SM	**VERY OLD FAN DEPOSIT (Qvof):** white carbonate/caliche layer from 3.0 to 4.0 ft.
		SM/ML	@ 4.0 ft. SILTY SAND to SANDY SILT, orange brown, slightly moist, moderately dense to firm. @ 5.0 ft. moist, medium dense to stiff; abundant carbonates. @ 8.0 ft. dense to very stiff.
			TOTAL DEPTH 10.0 FT. NO WATER, NO CAVING

Appendix 4: Historical Site Conditions

Phase I Environmental Site Assessment or Other Information on Past Site Use

TO BE PROVIDED WITH FINAL WQMP

Appendix 5: LID Infeasibility

LID Technical Infeasibility Analysis

N/A

Appendix 6: BMP Design Details

BMP Sizing, Design Details and other Supporting Documentation

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

06	05	04	03	02	01
07	08	09	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

0.85 MiraLoma
0.61 RiversideNorth
0.54 RiversideSouth
0.68 PigeonPass
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

JURUPA VALLEY | EASTVALE | NORCO | CORONA | RIVERSIDE | MORENO VALLEY | CALIMESA | BEAUMONT | SAN JACINTO | PERRIS | CANYON LAKE | LAKE ELSINORE | MENIFEE | HEMET | WILDOMAR | 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

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: Albert A. Webb Associates — Date: 6/19/2018

Designed by: ABE for EA — Case No: 16-05216

Company Project Number/Name: WO 13-0159

BMP Identification

BMP NAME / ID: WQ1 - Bioretention Basin

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}= 0.66 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 - Lots	*263,420*	*Roofs*	*1*	*0.89*	*234970.6*			
DMA 1 - Lots	*395,130*	*Ornamental Landscaping*	*0.1*	*0.11*	*43645.3*			
DMA 1 - Hardscape	*255,396*	*Concrete or Asphalt*	*1*	*0.89*	*227813.2*			
DMA 1 - Landscape	*73,235*	*Ornamental Landscaping*	*0.1*	*0.11*	*8089.4*			
	987181	***Total***			**514518.5**	**0.66**	***28298.5***	***39555***

Notes:

Effective Impervious Fraction

Developed Cover Types	Effective Impervious Fraction
Roofs	1.00
Concrete or Asphalt	1.00
Grouted or Gapless Paving Blocks	1.00
Compacted Soil (e.g. unpaved parking)	0.40
Decomposed Granite	0.40
Permeable Paving Blocks w/ Sand Filled Gap	0.25
Class 2 Base	0.30
Gravel or Class 2 Permeable Base	0.10
Pervious Concrete / Porous Asphalt	0.10
Open and Porous Pavers	0.10
Turf block	0.10
Ornamental Landscaping	0.10
Natural (A Soil)	0.03
Natural (B Soil)	0.15
Natural (C Soil)	0.30
Natural (D Soil)	0.40
Mixed Surface Types	

Use this table to determine the effective impervious fraction for the V_{BMP} and Q_{BMP} calculation sheets

Bioretention Facility - Design Procedure	BMP ID: WQ1	Legend:	Required Entries / Calculated Cells

Company Name: Albert A Webb Associates | Date: 6/19/2018

Designed by: ABE for EA | County/City Case No.:

Design Volume

Enter the area tributary to this feature — A_T = 22.6 acres

Enter V_{BMP} determined from Section 2.1 of this Handbook — V_{BMP} = 28,299 ft^3

Type of Bioretention Facility Design

(●) Side slopes required (parallel to parking spaces or adjacent to walkways)

( ) No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer — d_S = 3.0 ft

Top Width of Bioretention Facility, excluding curb — w_T = 33.0 ft

Total Effective Depth, d_E

$d_E = (0.3) \times d_S + (0.4) \times 1 - (0.7/w_T) + 0.5$ — d_E = 1.78 ft

Minimum Surface Area, A_m

$$A_M\,(ft^2) = \frac{V_{BMP}\,(ft^3)}{d_E\,(ft)}$$

A_M = 15,910 ft^2

Proposed Surface Area — A= 21,975 ft^2

Bioretention Facility Properties

Side Slopes in Bioretention Facility — z = 4 :1

Diameter of Underdrain — 6 inches

Longitudinal Slope of Site (3% maximum) — 0.5 %

6" Check Dam Spacing — 0 feet

Describe Vegetation:

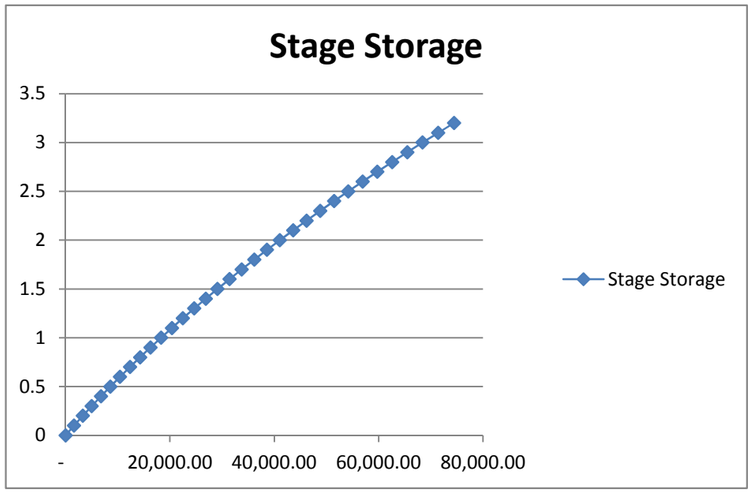
Notes:

WQ1 Stage Storage

WO 13-0159

RFS for EA

Contour (ft.)	Contour Area (ft^2)	Incremental Depth (ft.)		Avg. End Area Incremental Vol. (ft3)	Avg. End Area Cumulative Vol. (ft3)	Conic Incremental Vol. (ft3)	Conic Cumulative Vol. (ft3)	Depth (ft.)
47.8	16,091.86	N/A		N/A	-	N/A	-	0
47.9	16,531.46	0.1		1,631.17	1,631.17	1,631.12	1,631.12	0.1
48	16,971.90	0.1		1,675.17	3,306.33	1,675.12	3,306.24	0.2
48.1	17,413.18	0.1		1,719.25	5,025.59	1,719.21	5,025.44	0.3
48.2	17,855.32	0.1		1,763.42	6,789.01	1,763.38	6,788.82	0.4
48.3	18,298.29	0.1		1,807.68	8,596.69	1,807.64	8,596.46	0.5
48.4	18,742.12	0.1		1,852.02	10,448.71	1,851.98	10,448.43	0.6
48.5	19,186.79	0.1		1,896.45	12,345.16	1,896.40	12,344.83	0.7
48.6	19,632.30	0.1		1,940.95	14,286.11	1,940.91	14,285.75	0.8
48.7	20,078.66	0.1		1,985.55	16,271.66	1,985.51	16,271.25	0.9
48.8	20,525.87	0.1		2,030.23	18,301.89	2,030.19	18,301.44	1
48.9	20,973.92	0.1		2,074.99	20,376.88	2,074.95	20,376.39	1.1
49	21,422.81	0.1		2,119.84	22,496.71	2,119.80	22,496.18	1.2
49.1	21,872.56	0.1		2,164.77	24,661.48	2,164.73	24,660.91	1.3
49.2	22,323.15	0.1		2,209.79	26,871.27	2,209.75	26,870.66	1.4
49.3	22,774.58	0.1		2,254.89	29,126.15	2,254.85	29,125.51	1.5
49.4	23,226.86	0.1		2,300.07	31,426.23	2,300.04	31,425.54	1.6
49.5	23,679.99	0.1		2,345.34	33,771.57	2,345.31	33,770.85	1.7
49.6	24,133.96	0.1		2,390.70	36,162.26	2,390.66	36,161.51	1.8
49.7	24,588.78	0.1		2,436.14	38,598.40	2,436.10	38,597.61	1.9
49.8	25,044.44	0.1		2,481.66	41,080.06	2,481.63	41,079.24	2
49.9	25,500.95	0.1		2,527.27	43,607.33	2,527.23	43,606.47	2.1
50	25,958.30	0.1		2,572.96	46,180.29	2,572.93	46,179.40	2.2
50.1	26,416.50	0.1		2,618.74	48,799.03	2,618.71	48,798.11	2.3
50.2	26,875.55	0.1		2,664.60	51,463.64	2,664.57	51,462.68	2.4
50.3	27,335.44	0.1		2,710.55	54,174.19	2,710.52	54,173.19	2.5
50.4	27,796.17	0.1		2,756.58	56,930.77	2,756.55	56,929.74	2.6
50.5	28,257.76	0.1		2,802.70	59,733.46	2,802.66	59,732.41	2.7
50.6	28,720.18	0.1		2,848.90	62,582.36	2,848.87	62,581.27	2.8
50.7	29,183.46	0.1		2,895.18	65,477.54	2,895.15	65,476.42	2.9
50.8	29,647.58	0.1		2,941.55	68,419.09	2,941.52	68,417.95	3
50.9	30,112.54	0.1		2,988.01	71,407.10	2,987.98	71,405.92	3.1
51	30,578.35	0.1		3,034.54	74,441.64	3,034.52	74,440.44	3.2
51.1	31,045.01	0.1		3,081.17	77,522.81	3,081.14	77,521.58	3.3
51.2	31,512.51	0.1		3,127.88	80,650.69	3,127.85	80,649.42	3.4
51.3	31,980.86	0.1		3,174.67	83,825.36	3,174.64	83,824.06	3.5



V_{bmp} LEVEL

Q_{100} LEVEL

13-0159
Bioretention Basin (WQ 1)

WEIR CALCULATIONS

EQUATIONS

Q=CL(h)^(3/2)
where
L= 15.67 ft
C= 2.89

BASIN DEPTH (FT)	WEIR HEAD (FT)	WEIR DISCHARGE (CFS)
48.63	0.33	8.6
48.97	0.67	24.8
49.25	***0.95***	***41.9***
49.63	1.33	69.4
49.97	1.67	97.7
50.30	2.00	128.1
50.63	2.33	161.0

Appendix 7: Hydromodification

Supporting Detail Relating to Hydrologic Conditions of Concern

N/A

Appendix 8: Source Control

Pollutant Sources/Source Control Checklist

TO BE PROVIDED WITH FINAL WQMP

Appendix 9: O&M

Operation and Maintenance Plan and Documentation of Finance, Maintenance and Recording Mechanisms

TO BE PROVIDED WITH FINAL WQMP

Appendix 10: Educational Materials

BMP Fact Sheets, Maintenance Guidelines and Other End-User BMP Information

TO BE PROVIDED WITH FINAL WQMP