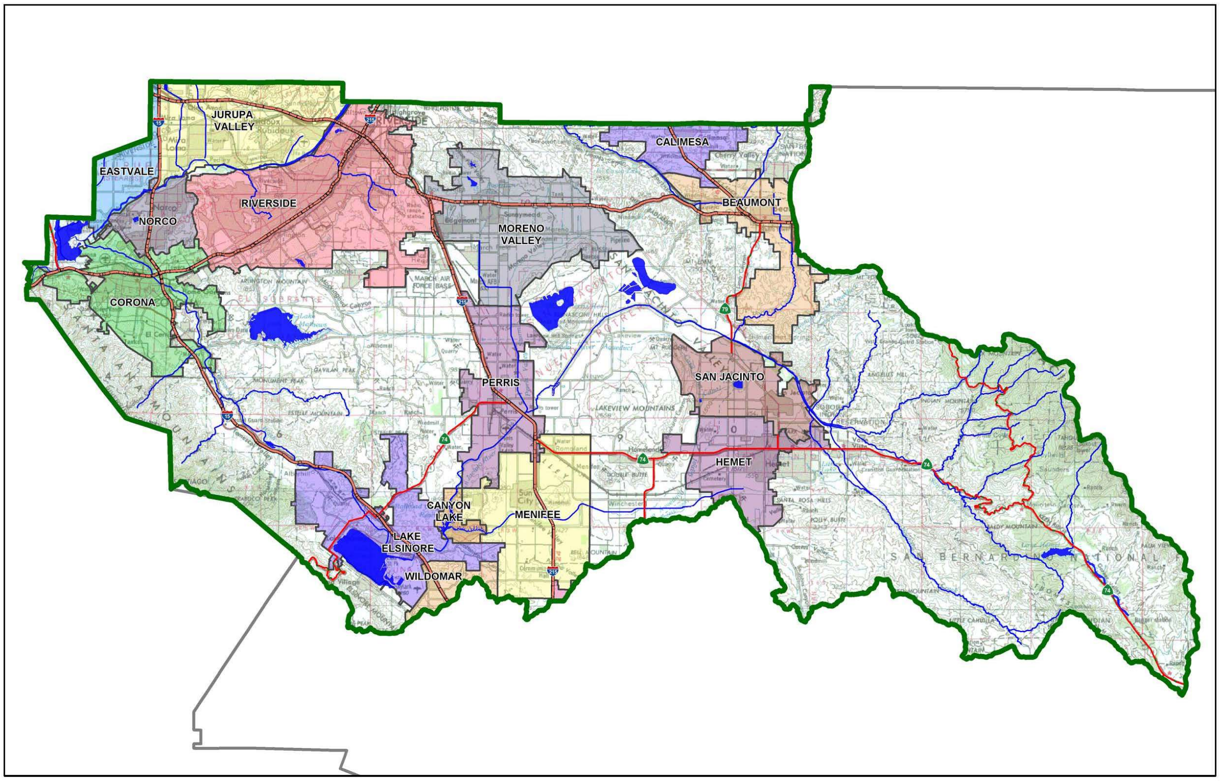
Project Specific Water Quality Management Plan

A Template for Projects located within the ***Santa Ana Watershed*** *Region of Riverside County*

Project Title: Tres Cerritos West

Development No: Tentative Tract Map No. 31513

Design Review/Case No: TBD



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☒ **Preliminary**
☐ **Final**

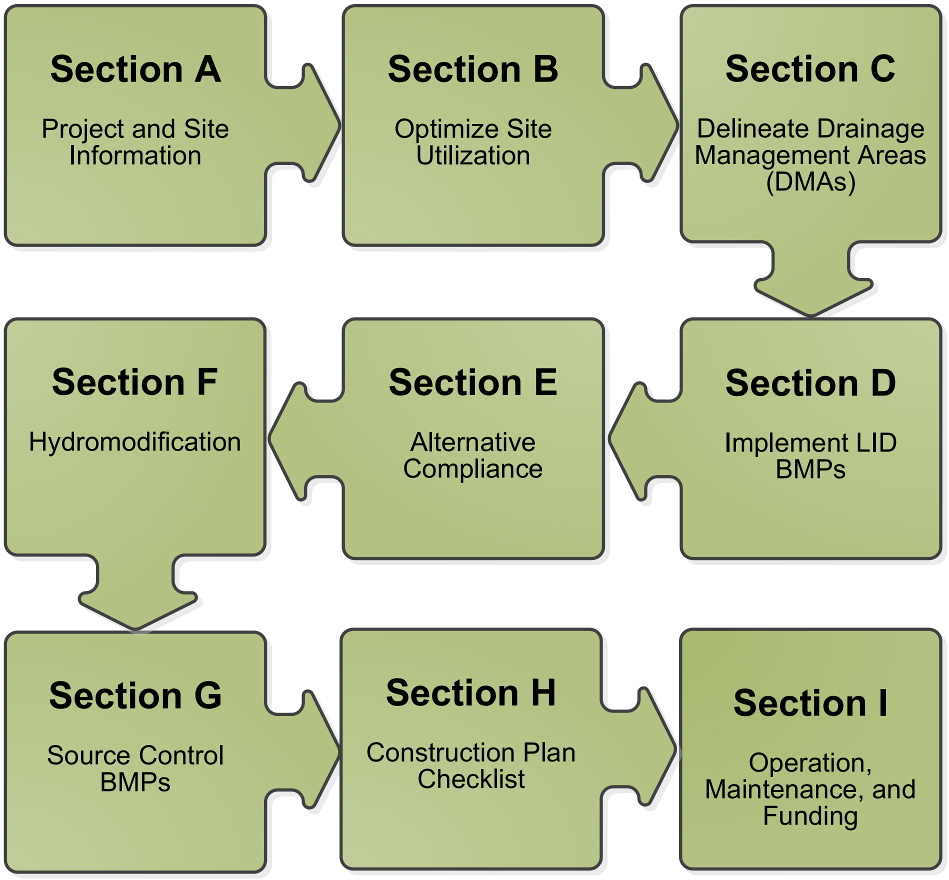
Original Date Prepared: 12/18/24

Revision Date(s): 7/16/25

Prepared for Compliance with
Regional Board Order No. **R8-2010-0033**
Template revised June 30, 2016

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 Preliminary Project-Specific Water Quality Management Plan (WQMP) has been prepared for D.R. Horton by SP2 & Co. for the Tres Cerritos project (TTM 31513).

This WQMP is intended to comply with the requirements of City of Hemet for Hemet Water Quality Ordinance (Municipal Code Section 14-471, et seq.) which includes the requirement for the preparation and implementation of a Project-Specific WQMP.

The undersigned, while owning the property/project described in the preceding paragraph, shall be responsible for the implementation and funding of this WQMP and will ensure that this WQMP is amended as appropriate to reflect up-to-date conditions on the site. In addition, the property owner accepts responsibility for interim operation and maintenance of Stormwater BMPs until such time as this responsibility is formally transferred to a subsequent owner. This WQMP will be reviewed with the facility operator, facility supervisors, employees, tenants, maintenance and service contractors, or any other party (or parties) having responsibility for implementing portions of this WQMP. At least one copy of this WQMP will be maintained at the project site or project office in perpetuity. The undersigned is authorized to certify and to approve implementation of this WQMP. The undersigned is aware that implementation of this WQMP is enforceable under City of Hemet Water Quality Ordinance (Municipal Code Section 14-471, et seq.).

"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

7/16/2025
Date

Jimmy C. Chen
Preparer's Printed Name

Civil Engineer
Preparer's Title/Position

Preparer's Licensure:

REGISTERED PROFESSIONAL ENGINEER
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NO. C51394
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CIVIL
STATE OF CALIFORNIA

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Section A: Project and Site Information

PROJECT INFORMATION	
Type of Project:	Single Family Residential
Planning Area:	Insert text here
Community Name:	Hemet
Development Name:	Tres Cerritos/TTM 31513
PROJECT LOCATION	
Latitude & Longitude (DMS): Insert coordinates here	
Project Watershed and Sub-Watershed: Santa Ana Watershed	
Gross Acres: 164.8 acres	
APN(s): 448-070-002,-05, -07, -09 & 448-080-001, -02, -04, -06	
Map Book and Page No.: M. B. 299, P. 78-99	
PROJECT CHARACTERISTICS	
Proposed or Potential Land Use(s)	Residential/ Conservation Open Space
Proposed or Potential SIC Code(s)	1521
Area of Impervious Project Footprint (SF)	2,021,551 s.f.
Total Area of <u>proposed</u> Impervious Surfaces within the Project Footprint (SF)/or Replacement	1,418,130 s.f.
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 <u>existing</u> Impervious Surfaces within the Project limits Footprint (SF)	0 s.f.
Is the project located within any MSHCP Criteria Cell?	☐ Y ☒ N
If so, identify the Cell number:	n/a
Are there any natural hydrologic features on the project site?	☐ Y ☒ N
Is a Geotechnical Report attached?	☒ Y ☐ N
If no Geotech Report, list the NRCS soils type(s) present on the site (A, B, C and/or D)	Insert text here.
What is the Water Quality Design Storm Depth for the project?	0.69

Project Narrative and Description

The Project is located north of Rose Road between Warren Road and Myers Street within the City of Hemet. Presently the property is surrounded by residential developments to the west, undeveloped hillsides on the north and east sides, and agricultural open space to the south. The Project is located within the Santa Ana River Watershed jurisdiction Regional Water Quality Board (RWQCB) and tributary to Lake Elsinore via the San Jacinto River and Canyon Lake.

Existing Conditions:

Presently, the Project features natural soil cover with evidence of previous grading operations on significant portions of the property. The property also features an Eastern Municipal Water District (EMWD) paved maintenance easement which protects their 36-inch potable water transmission line towards Warren Road. Topographically, the northern sections of the site are comprised of steep granitic hillsides that surround the central portion of site. The central areas gently slope towards Rose Road. Storm water runoff currently flows from north to south following well defined natural drainage paths to a series of rough graded desilting basins, rough graded streets, and rough grade pads. From this point the runoff continues towards and across Rose Road at two points of which generally concurs with the previously approved development plan's entry points. There are no existing drainage facilities available or present onsite. The only drainage improvements present are deteriorating desilting basins, gravel gabions within the rough graded streets, and the rough graded and incomplete detention and water quality basins.

Proposed Improvements:

This project proposes 269 single-family dwelling units ranging from 3,600 s.f. to 6,000 s.f. lots, roughly 6.5 acres of open space parks, two combination detention and stormwater treatment basins, a debris basin for offsite stormwater, and a vegetated passive park for self-treating a portion of the project adjacent to the vernal pool site.

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
- BMP Locations (Lat/Long)

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

A.2 Identify Receiving Waters

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

Table A.1 Identification of Receiving Waters

Receiving Waters	EPA Approved 303(d) List Impairments	Designated Beneficial Uses	Proximity to RARE Beneficial Use
Hemet Storm Channel	None	ARG, GWR, REC1, REC2, WARM, WILD	Not A RARE designation
Salt Creek Channel	None	AGR, GWR, REC1, REC2, WARM, WILD	Not A RARE designation
Canyon Lake	Nutrients, Pathogens	MUN, AGR, IND, PROC, REC1, REC2, WARM, WILD, RARE	Not A RARE designation
San Jacinto River Reach 1	None	AGR, GWR, REC1, REC2, WARM, WILD	Not A RARE designation
Lake Elsinore	Nutrients, Organic Compounds/Oxygen Demanding Substances, Sediment/Turbidity, Unknown Toxicity	REC1, REC2, EST, WILD, RARE, MAR, MIGR, SPWN	Not A RARE designation

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

Table A.2 Other Applicable Permits

Agency	Permit Required	
State Department of Fish and Game, 1602 Streambed Alteration Agreement	☐ Y	☒ N
State Water Resources Control Board, Clean Water Act (CWA) Section 401 Water Quality Cert.	☒ Y	☐ N
US Army Corps of Engineers, CWA Section 404 Permit	☐ Y	☒ N
US Fish and Wildlife, Endangered Species Act Section 7 Biological Opinion	☐ Y	☒ N
Statewide Construction General Permit Coverage	☒ Y	☐ N
Statewide Industrial General Permit Coverage	☐ Y	☒ N
Western Riverside MSHCP Consistency Approval (e.g., JPR, DBESP)	☐ Y	☒ N
Other *(please list in the space below as required)* City of Hemet Grading and Improvement Permits	☒ 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.

Consideration of "highest and best use" of the discharge should also be considered. For example, Lake Elsinore is evaporating faster than runoff from natural precipitation can recharge it. Requiring infiltration of 85% of runoff events for projects tributary to Lake Elsinore would only exacerbate current water quality problems associated with Pollutant concentration due to lake water evaporation. In cases where rainfall events have low potential to recharge Lake Elsinore (i.e. no hydraulic connection between groundwater to Lake Elsinore, or other factors), requiring infiltration of Urban Runoff from projects is counterproductive to the overall watershed goals. Project proponents, in these cases, would be allowed to discharge Urban Runoff, provided they used equally effective filtration-based BMPs.

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 proposed project will preserve the existing drainage patterns by continuing to utilize the same general discharge locations from the detention basins.

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

The existing vegetation was protected in areas delineated for open/natural space for conservation and to minimize the total impervious improvements throughout the project.

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

Per the soils reports prepared for the project, the existing infiltration rates were low and not sufficient to support infiltration BMP basins. The upper areas of the project will be in cut conditions and the natural infiltration will be preserved in the open space and landscaped areas by minimizing the grading operations.

The areas in the southern half of the project will require fill grading operations in which will reduce the natural infiltration.

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

The proposed project and development layout has been designed to minimize the linear length of the streets and sidewalks as well as their widths to the allowable minimums for the project's requirements. Open space parks and landscaped parkways have been incorporated in the design to provide additional areas of pervious surfaces.

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

The project has been designed with the intention that stormwater runoff from imperious surfaces such as roofs and sidewalks will directly discharge into adjacent landscape parkways and landscaping before being intercepted by the streets and storm drain inlets. Bioretention basins will also be incorporated in the site design of the project.

The project will utilize a combination of onsite source control and site deign BMPs supplemented with primary treatment control BMPs prior to discharging into the MS4 system.

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][2]	Area (Sq. Ft.)	DMA Type
DMA A	Mixed: Concrete, Asphalt, Roofs, and Ornamental Landscaping.	1,424,514	D
DMA B	Mixed: Concrete, Asphalt, Roofs, and Ornamental Landscaping.	597,037	D
DMA C	Ornamental Landscaping.	81,816	B
DMA C	Mixed: Concrete, Asphalt, and Ornamental Landscaping.	42,184	C

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

[2] *If multi-surface provide back-up*

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 C	Ornamental Landscaping	81,816	0.69	DMA C	42,184	1.05"

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

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	Impervious fraction [B]	Product [C] = [A] x [B]	DMA name /ID	Area (square feet) [D]	Ratio [C]/[D]
DMA C	42,184	Concrete and Asphalt	1.0	42,184	DMA C	81,816	0.52

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

DMA Name or ID	BMP Name or ID
DMA A	Extended Detention Basin "A"
DMA B	Extended Detention Basin "B"

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

Section D: Implement LID BMPs

D.1 Infiltration Applicability

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

If yes has been checked, Infiltration BMPs shall not be used for the site; proceed to section D.3

If no, continue working through this section to implement your LID BMPs. It is recommended that you contact your Co-Permittee to verify whether or not your project discharges to an approved downstream 'Highest and Best Use' feature.

Geotechnical Report

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

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

Infiltration Feasibility

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

Table D.1 Infiltration Feasibility

Does the project site…	YES	NO
…have any DMAs with a seasonal high groundwater mark shallower than 10 feet?		X
If Yes, list affected DMAs:		
…have any DMAs located within 100 feet of a water supply well?		X
If Yes, list affected DMAs:		
…have any areas identified by the geotechnical report as posing a public safety risk where infiltration of stormwater could have a negative impact?		X
If Yes, list affected DMAs:		
…have measured in-situ infiltration rates of less than 1.6 inches / hour?	X	
If Yes, list affected DMAs: All		
…have significant cut and/or fill conditions that would preclude in-situ testing of infiltration rates at the final infiltration surface?	X	
If Yes, list affected DMAs: All		
…geotechnical report identify other site-specific factors that would preclude effective and safe infiltration?	X	
Describe here: Low in-situ infiltration rates at basins do not allow for natural infiltration to be feasible.		

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 – Not Applicable

Please check what applies*:*

☐ Reclaimed water will be used for the non-potable water demands for the project.

☐Downstream water rights may be impacted by Harvest and Use as approved by the Regional Board (verify with the Copermittee).

☐The Design Capture Volume will be addressed using Infiltration Only BMPs. In such a case, Harvest and Use BMPs are still encouraged, but it would not be required if the Design Capture Volume will be infiltrated or evapotranspired.

If any of the above boxes have been checked, Harvest and Use BMPs need not be assessed for the site. If none 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: **5.79 acres**

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

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: **32.56 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: **0.70**

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: **22.79 acre**

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)**
22.79 acres	**5.79 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: **4 x 269 = 1076 users**

Project Type: **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: **32.56 acres**

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

Enter your TUTIA factor: **114.4**

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: **3725 users**

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)**
3725 users	**1076 users**

Other Non-Potable Use Feasibility

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

N/A

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

Average Daily Demand: Projected Average Daily Use (gpd)

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: Insert Area (Acres)

Step 3: Enter the Design Storm depth for the project site (see Exhibit A) into the left column of Table 2-4 in Chapter 2 to determine the minimum demand for non-potable uses per tributary impervious acre.

Enter the factor from Table 2-4: Enter Value

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 gallons per day of non-potable use that would be required.

Minimum required use: Minimum use required (gpd)

Step 5: Determine if harvesting stormwater runoff for other non-potable use is feasible for the project by comparing the projected average daily use (Step 1) to the minimum required non-potable use (Step 4).

Minimum required non-potable use (Step 4)	**Projected average daily use (Step 1)**
Minimum use required (gpd)	Projected Average Daily Use (gpd)

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 per Section 3.4.2 of the WQMP Guidance Document.

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.

The project cannot utilize infiltration BMPs due to the in-situ infiltration rates were determined to be less than 0.3 in/hr. Instead, the project proposes the use of bio-treatment extended detention basins for its stormwater treatment requirements. The use of extended detention bio-treatment basins is permitted for stormwater treatment within the Santa Ana River Watershed permit.

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 A	☐	☐	☐	☒	☐
DMA B	☐	☐	☐	☒	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐

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.

Insert narrative description here.

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**	***Extended Detention Basin "A"***		
	[A]		[B]	[C]	[A] x [C]	*Design Storm Depth (in)* [E]	*Design Capture Volume,* $\mathbf{V_{BMP}}$ *(cubic feet)* $[F] = \frac{[D]x[E]}{12}$	*Proposed Volume on Plans (cubic feet)* [G]
A: Imp. Streets & Sidewalks	*396253*	*Concrete or Asphalt*	*1*	*0.89*	*353457.7*			
A: Imp. 3600 SFR (62%)	*443818.32*	*Roofs*	*1*	*0.89*	*395885.9*			
A: Pervious 3600 SFR (38%)	*272017.68*	*Ornamental Landscaping*	*0.1*	*0.11*	*30046.5*			
A: Imp. 6000 SFR (57%)	*194771.85*	*Roofs*	*1*	*0.89*	*173736.5*			
A: Pervious 6000 SFR (43%)	*146933.15*	*Ornamental Landscaping*	*0.1*	*0.11*	*11229.9*			
A: Pervious Landscaping	*180472*	*Ornamental Landscaping*	*0.1*	*0.11*	*19934.6*			
A: BMP Basin	*39439*	*Ornamental Landscaping*	*0.1*	*0.11*	*4356.4*			
$A_T = \Sigma[A]$	1673705			$\Sigma = [D]$	993647.5	0.69	57134.7	***213233***

[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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Extended Detention Basin "B"*		
	[A]		[B]	[C]	[A] x [C]	*Design Storm Depth (in)* [E]	*Design Capture Volume,* **V**$_{BMP}$ *(cubic feet)* [F] = $\frac{[D]x[E]}{12}$	*Proposed Volume on Plans (cubic feet)* [G]
B: Imp. Streets & Sidewalks	*178034*	*Concrete or Asphalt*	*1*	*0.89*	*119190.8*			
B: Imp. 3600 SFR (75%)	*67508.08*	*Roofs*	*1*	*0.89*	*73572.2*			
B: Pervious 3600 SFR (25%)	*41375.92*	*Ornamental Landscaping*	*0.1*	*0.11*	*3036.8*			
B: Imp. 6000 SFR (50%)	*137745.06*	*Roofs*	*1*	*0.89*	*107717.9*			
B: Pervious 6000 SFR (50%)	*103912.94*	*Ornamental Landscaping*	*0.1*	*0.11*	*13338.9*			
B: Pervious Landscaping	*63582*	*Ornamental Landscaping*	*0.1*	*0.11*	*7645.6*			
B: BMP Basin	*42052*	*Ornamental Landscaping*	*0.1*	*0.11*	*4717.1*			
$A_T = \Sigma[A]$	634210			Σ= [D]	369608.5	0.69	21252.5	***158296***

[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.

List DMAs here.

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**
☒ Detached Residential Development	P	N	P	P	N	P	P	P
☐ Attached Residential Development	P	N	P	P	N	P	P	P(2)
☐ Commercial/Industrial Development	P(3)	P	P(1)	P(1)	P(5)	P(1)	P	P
☐ Automotive Repair Shops	N	P	N	N	P(4, 5)	N	P	P
☐ Restaurants (>5,000 ft^2)	P	N	N	N	N	N	P	P
☒ Hillside Development (>5,000 ft^2)	P	N	P	P	N	P	P	P
☐ Parking Lots (>5,000 ft^2)	P(6)	P	P(1)	P(1)	P(4)	P(1)	P	P
☐ Retail Gasoline Outlets	N	P	N	N	P	N	P	P
Project Priority Pollutant(s) of Concern	☒	☐	☒	☒	☐	☒	☒	☒

P = Potential

N = Not Potential

(1) *A potential Pollutant if non-native landscaping exists or is proposed onsite; otherwise not expected*

(2) *A potential Pollutant if the project includes uncovered parking areas; otherwise not expected*

(3) *A potential Pollutant is land use involving animal waste*

(4) *Specifically petroleum hydrocarbons*

(5) *Specifically solvents*

(6) *Bacterial indicators are routinely detected in pavement runoff*

E.2 Stormwater Credits

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

Table E.2 Water Quality Credits

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

[1] Cannot Exceed 50%

[2] Obtain corresponding data from Table 3-8 in the WQMP Guidance Document

E.3 Sizing Criteria – Not Applicable

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 = Σ[A]				Σ= [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 for Flow-Based Treatment Control BMPs [E] = .2, for Volume-Based Control Treatment BMPs, [E] 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 – Not Applicable

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 Susceptibility Maps.

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

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

F.2 HCOC Mitigation

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

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

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

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

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

C. The project proposes two (2) detention basins that provided adequate capacity to reduce the post-developed 2-year, 24-hour stormwater runoff to within 110% of the pre-developed peak runoff rate. The total peak pre-developed runoff is 3.93 cfs and 10.38 cfs for the total post-developed peak runoff. With the proposed basins the total peak mitigated runoff is 2.5 cfs.

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 Inlets	Mark all inlets with the words "ONLY RAIN DOWN THE STORM DRAIN" or similar. Catch basin markers may be available from the Riverside County Flood Control and Water Conservation District, call 951.955.1200 to verify.	Maintain and periodically repaint or replace inlet markings. Provide stormwater pollution prevention information to new site owners, residential owners and operators (HOA). See application operational BMPs in Fact Sheet SC-44, "Drainage System Maintenance", in the CASQA Stormwater Quality

		Handbooks at www.cabmphandbooks.com Include the following in CC&R's: "Owner shall not allow anyone to discharge anything to storm drains or to store deposit materials so as to create a potential discharge to storm drains.
Need for future indoor & structural pest control	Note building design features that discourages entry of pests.	Provide integrated Pest Management information to owners and operators.
Landscape/Outdoor Pesticide Use	Preserve, existing native trees, shrubs, and ground cover to the maximum extent possible. Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution. Where landscaping areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions. Consider using pest-resistant plants, especially to hardscape. To insure successful establishments, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.	Maintain landscaping using minimum or no pesticides. Provide IPM information to new owners and operators.
Fire Sprinkler Test Water	Provide means to drain fire sprinkler to sanitary sewer.	See CASQA Fact Sheet SC-41.
Plazas, Sidewalks and Parking Lots		Sweep regularly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into storm drain system. Collect wash water containing any agent or degreaser and discharge to

		sanitary sewer not to a storm drain.

Section H: Construction Plan Checklist

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

Table H.1 Construction Plan Cross-reference

BMP No. or ID	BMP Identifier and Description	Corresponding Plan Sheet(s)	BMP Location (Lat/Long)
A	Extended Detention Basin	PWQMP Drainage Management Area Plan	Lat: 33°45'12.78"N Long: 117° 1'51.22"W
B	Extended Detention Basin	PWQMP Drainage Management Area Plan	Lat: 33°45'12.80"N Long: 117° 1'34.82"W

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

Section I: Operation, Maintenance and Funding

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

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

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

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

Maintenance Mechanism: Property Owner (D.R. Horton) until transfer to the established HOA.

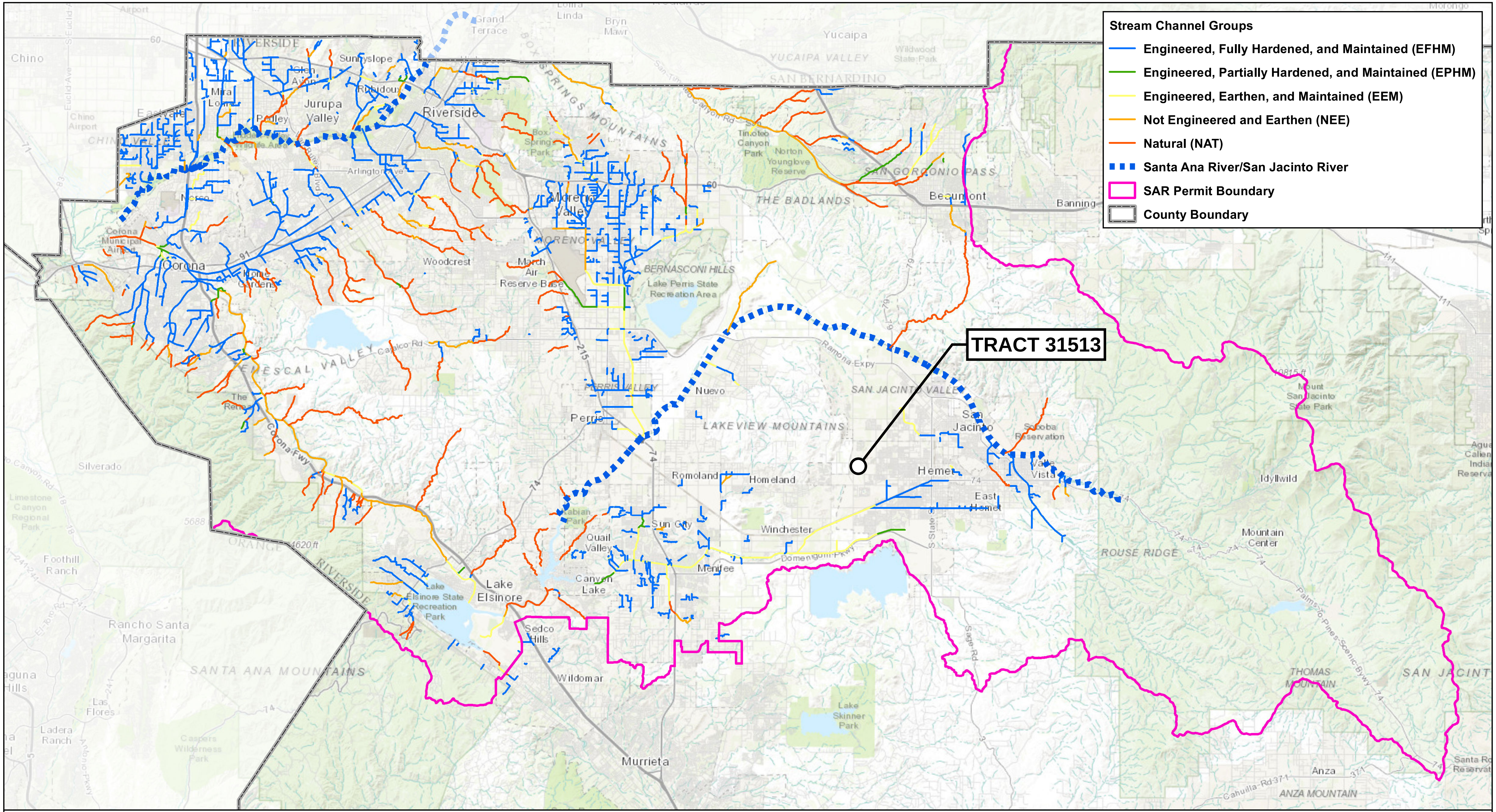
Will the proposed BMPs be maintained by a **Home Owners' Association (HOA)** or Property Owners Association (POA)?

☒ 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



N

0 2.5 5 10 Miles

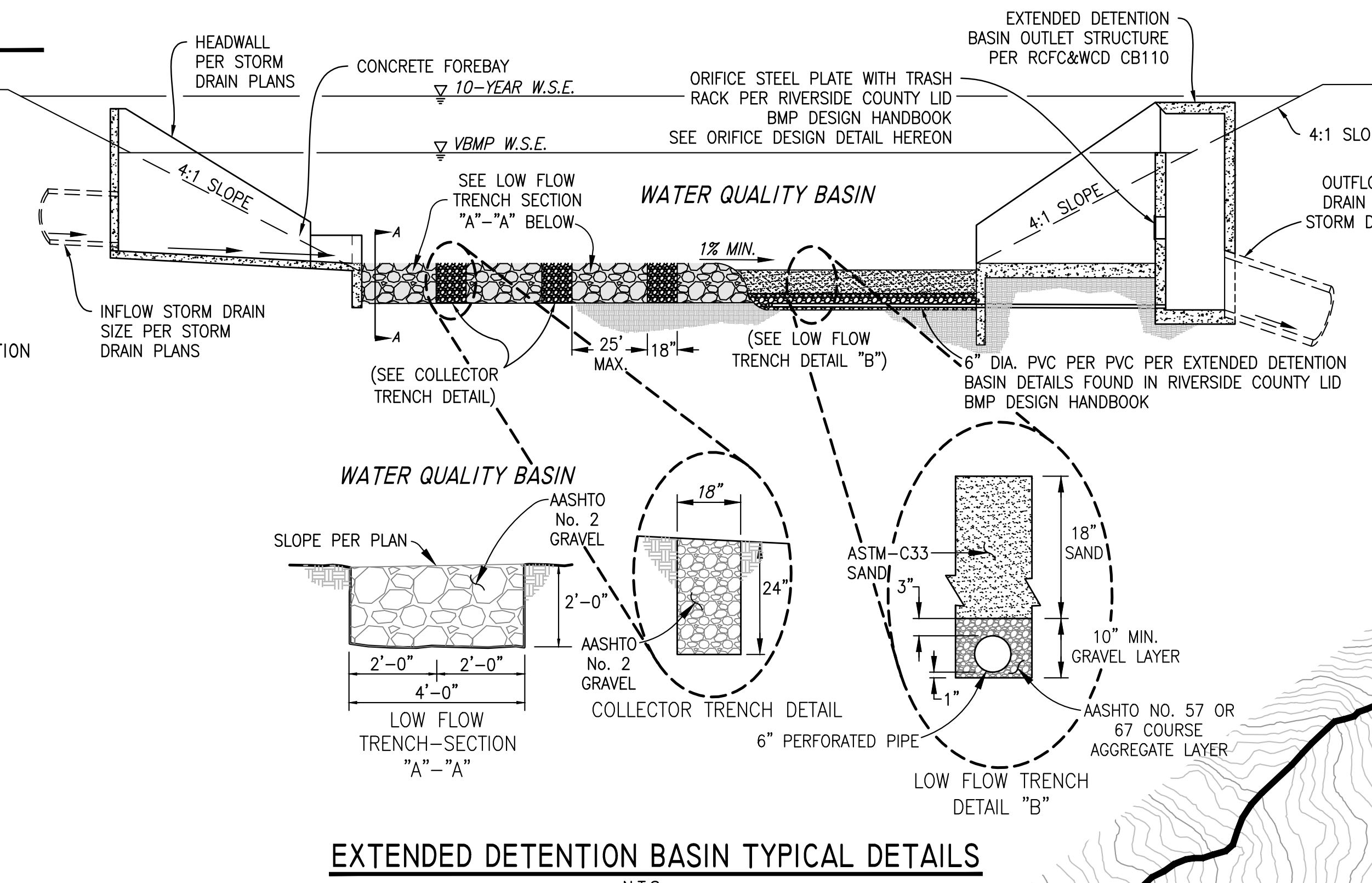
Revised February 2017

Existing Storm Drain / Watercourse Delineation Map
SAR Permittees

Map 1

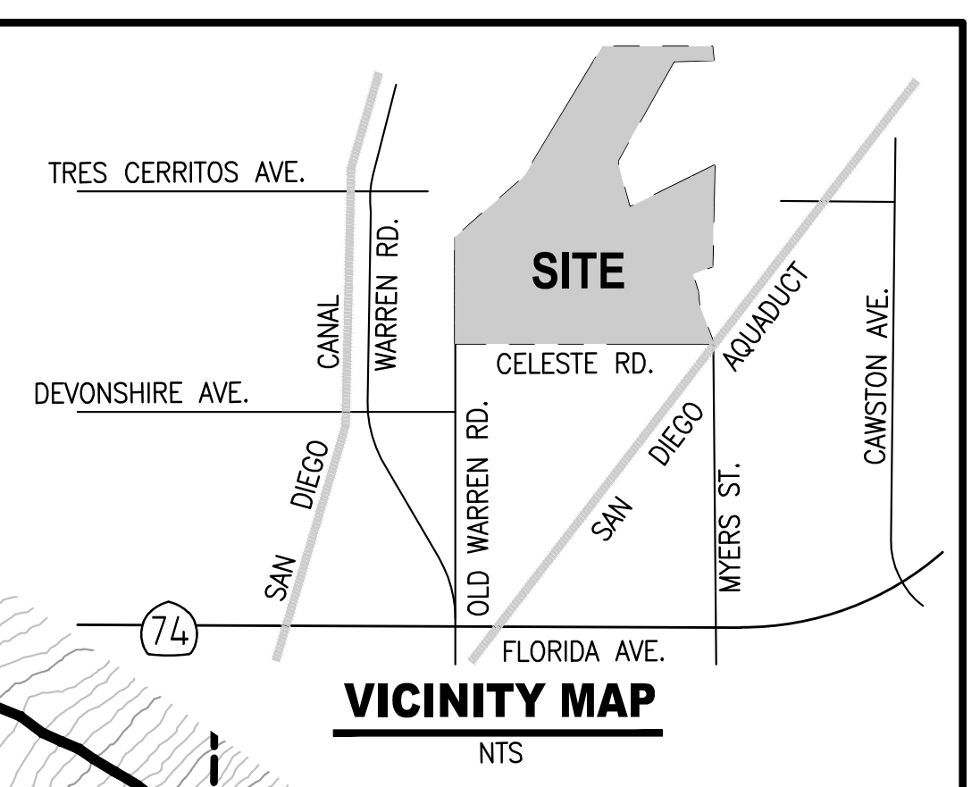
LEGEND

▬ ▬ – – ▬	PROPERTY BOUNDARY
▬▬▬	DRAINAGE MANAGEMENT AREA (DMA) BOUNDARY
═ ═ ═	PROPOSED STORM DRAIN
←—←—←	STORM DRAIN FLOW PATH
⬅	SURFACE RUNOFF DIRECTION
AREA-ID ACRES	DRAINAGE AREA NUMBER AND ACREAGE
D A	HYDRAULIC SOIL GROUP BOUNDARY AND CLASSIFCATION
⬜	PROPOSED IMPERVIOUS SURFACES (STREETS AND SIDEWALKS)
🟥	PROPOSED SINGLE-FAMILY RESIDENTIAL 3600 S.F. (75% IMPERVIOUS)
🟩	PERVIOUS LANDSCAPED SURFACES (PARKWAYS, PARKS, AND OPEN SPACES)
🟨	PROPOSED SINGLE-FAMILY RESIDENTIAL 6000 S.F. (50% IMPERVIOUS)
🟪	VERNAL POOL NOT A PART
🟦	SELF-TREATING AREA
🟦	PROPOSED BMP FACILITIES
⬜	NATURAL/ OPEN SPACE CONVSERVATION AREA (SELF-TREATING)



EXTENDED DETENTION BASIN TYPICAL DETAILS

N.T.S.

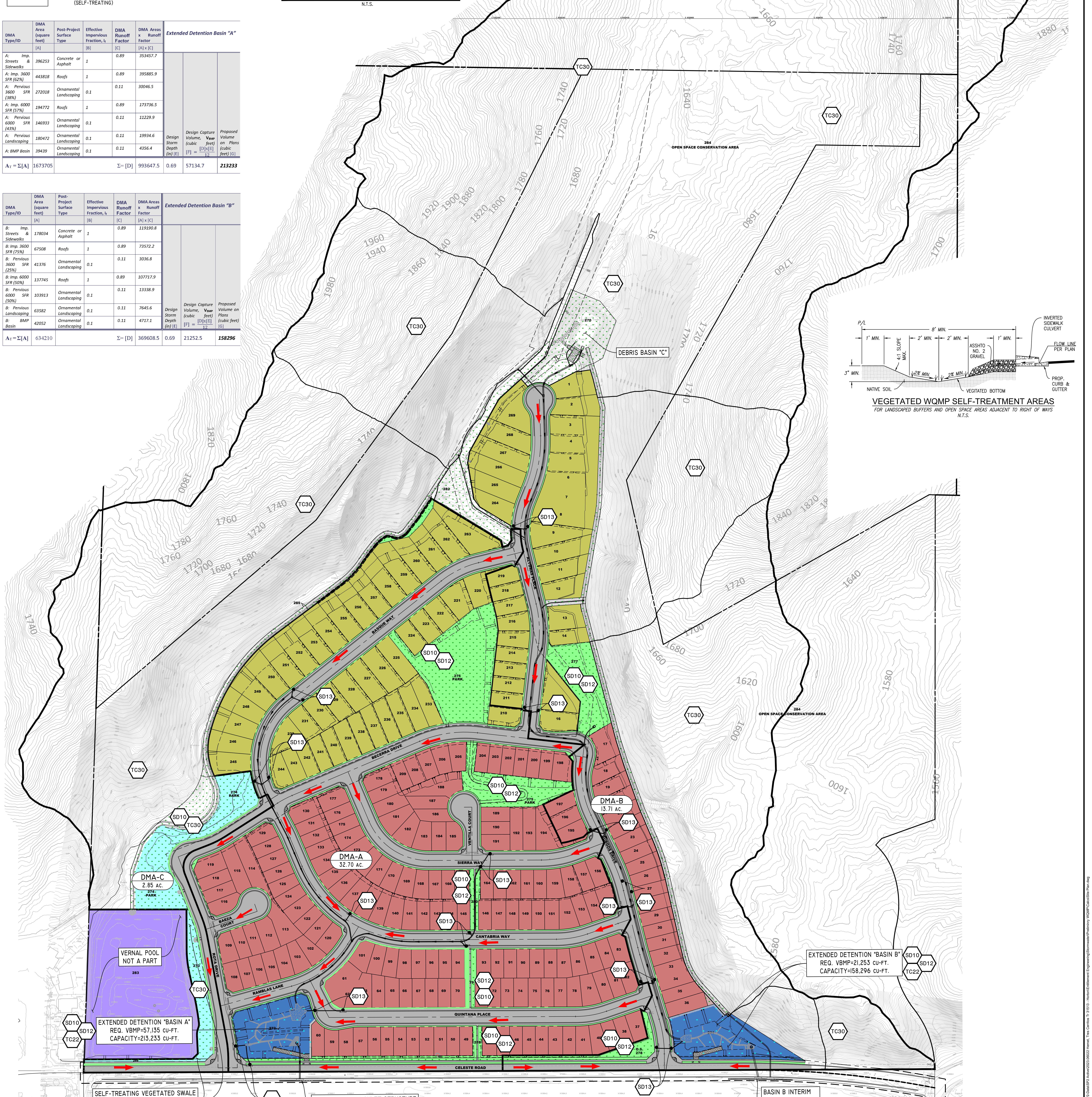


VICINITY MAP

NTS

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Extended Detention Basin "A"*		
	[A]		[B]	[C]	[A] x [C]			
A: Imp. Streets & Sidewalks	396253	Concrete or Asphalt	1	0.89	353457.7			
A: Imp. 3600 SFR (62%)	443818	Roofs	1	0.89	395885.9			
A: Pervious 3600 SFR (38%)	272018	Ornamental Landscaping	0.1	0.11	30046.5			
A: Imp. 6000 SFR (57%)	194772	Roofs	1	0.89	173736.5			
A: Pervious 6000 SFR (43%)	146933	Ornamental Landscaping	0.1	0.11	11229.9			
A: Pervious Landscaping	180472	Ornamental Landscaping	0.1	0.11	19934.6	Design Storm Depth (in) [E]	Design Capture Volume, V_{BMP} (cubic feet) $[F]=\frac{[D]x[E]}{12}$	Proposed Volume on Plans (cubic feet) [G]
A: BMP Basin	39439	Ornamental Landscaping	0.1	0.11	4356.4			
$A_T = \Sigma[A]$	1673705			$\Sigma = [D]$	993647.5	0.69	57134.7	***213233***

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Extended Detention Basin "B"*		
	[A]		[B]	[C]	[A] x [C]			
B: Imp. Streets & Sidewalks	178034	Concrete or Asphalt	1	0.89	119190.8			
B: Imp. 3600 SFR (75%)	67508	Roofs	1	0.89	73572.2			
B: Pervious 3600 SFR (25%)	41376	Ornamental Landscaping	0.1	0.11	3036.8			
B: Imp. 6000 SFR (50%)	137745	Roofs	1	0.89	107717.9			
B: Pervious 6000 SFR (50%)	103913	Ornamental Landscaping	0.1	0.11	13338.9			
B: Pervious Landscaping	63582	Ornamental Landscaping	0.1	0.11	7645.6	Design Storm Depth (in) [E]	Design Capture Volume, V_{BMP} (cubic feet) $[F]=\frac{[D]x[E]}{12}$	Proposed Volume on Plans (cubic feet) [G]
B: BMP Basin	42052	Ornamental Landscaping	0.1	0.11	4717.1			
$A_T = \Sigma[A]$	634210			$\Sigma = [D]$	369608.5	0.69	21252.5	***158296***



VEGETATED WQMP SELF-TREATMENT AREAS

FOR LANDSCAPED BUFFERS AND OPEN SPACE AREAS ADJACENT TO RIGHT OF WAYS

N.T.S.

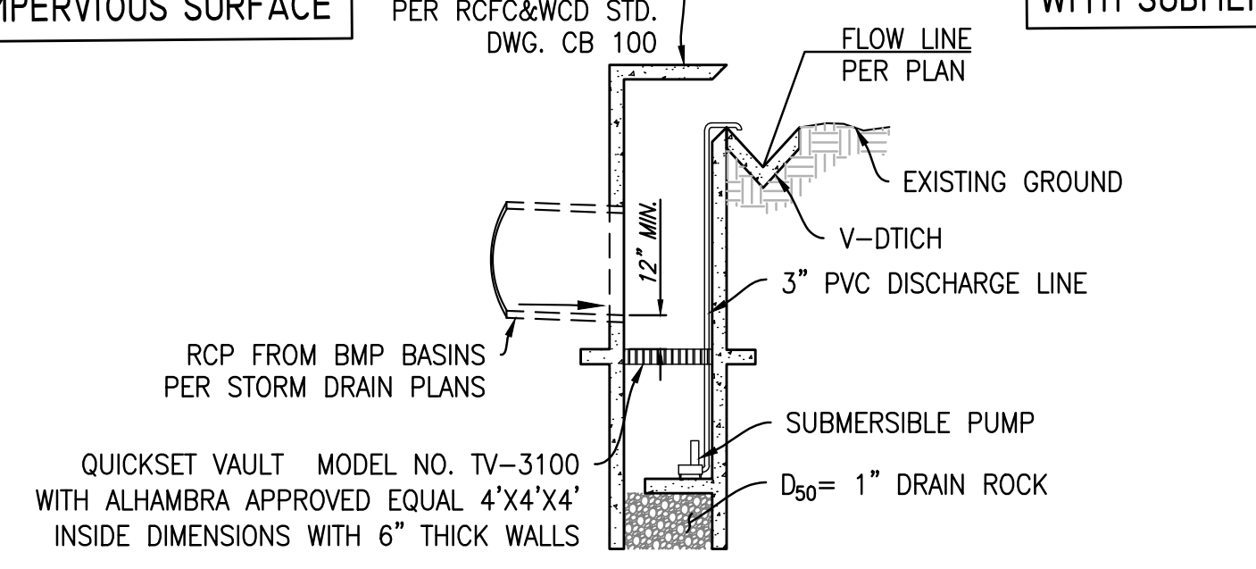
EXTENDED DETENTION "BASIN A"
REQ. VBMP=57,135 CU-FT.
CAPACITY=213,233 CU-FT.

EXTENDED DETENTION "BASIN B"
REQ. VBMP=21,253 CU-FT.
CAPACITY=158,296 CU-FT.

SELF-TREATING VEGETATED SWALE
81,816 SQ-FT. AVAILABLE
42,184 SQ-FT. IMPERVIOUS SURFACE

BASIN A INTERIM OULET STRUCTURE
WITH SUBMERSIBLE PUMP

BASIN B INTERIM
OULET STRUCTURE
WITH SUBMERSIBLE
PUMP



MODIFIED CATCH BASIN OUTLET STRUCTURE
WITH SUBMERSIBLE PUMP ASSEMBLY

N.T.S.

SOURCE CONTROL BMPs:

- SD10 SITE DESIGN LANDSCAPING PLANNING
- SD11 ROOF RUNOFF CONTROLS
- SD12 EFFICIENT IRRIGATION
- SD13 STORM DRAIN SIGNAGE/STENCIL "ONLY RAIN DOWN THE DRAIN. DRAINS TO RIVER"
- SD21 ALTERNATIVE BUILDING MATERIALS

NON STRUCTURAL CONTROL BMPs:

- N4 EDUCATION FOR PROPERTY OWNERS, TENANTS AND OCCUPANTS (ENTIRE SITE)

TREATMENT CONTROL BMPs:

- TC22 EXTENDED DETENTION BASIN
- TC30 SELF-TREATING AREAS

PREPARED BY:

SP2 & Co.
A LAND DEVELOPMENT SERVICES COMPANY
451 W LAMBERT RD. STE 216
BREA, CA 92821
PHONE: (714) 490-1500
"SERVING THE DEVELOPMENT COMMUNITY SINCE 1985"

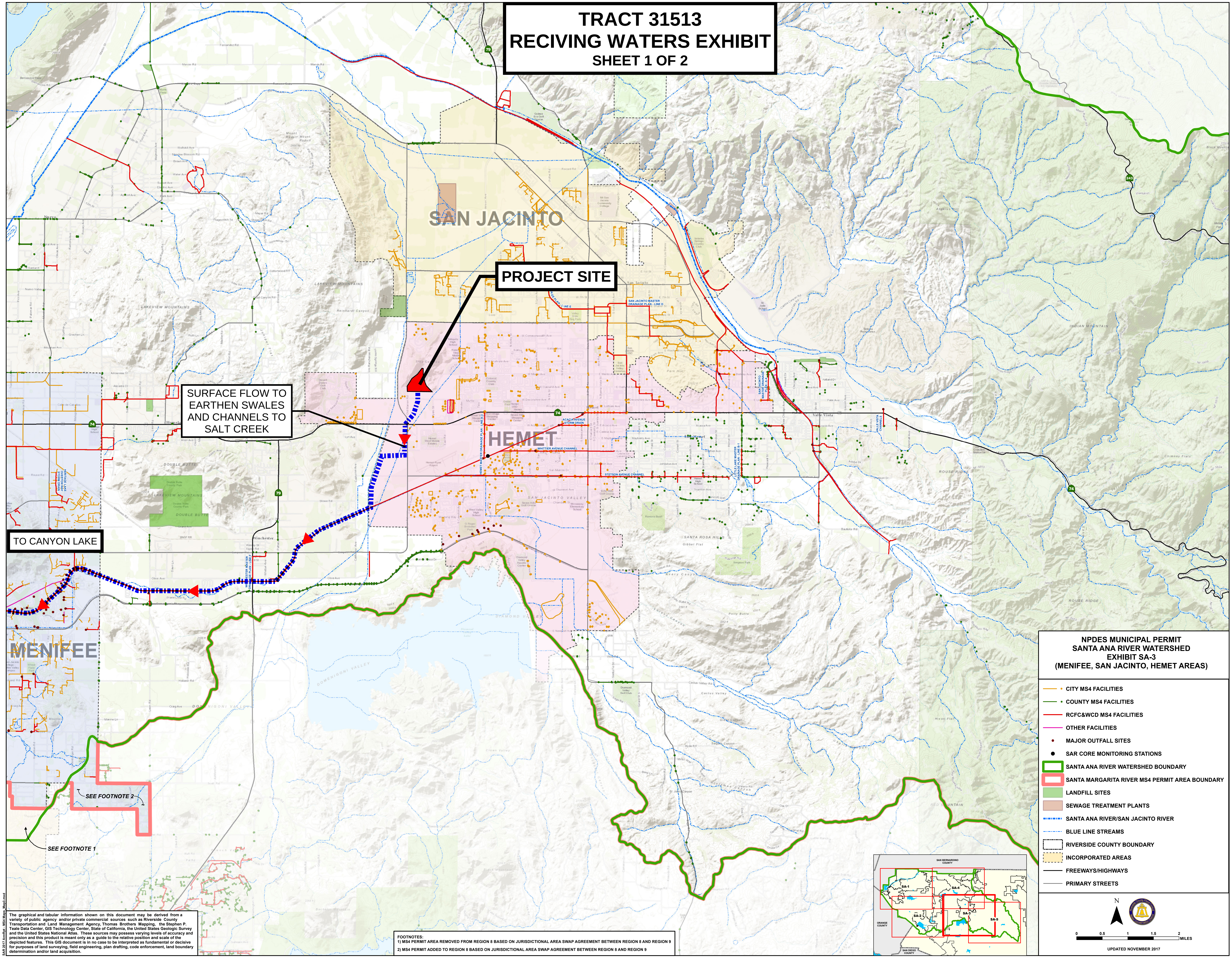
CITY OF HEMET, CALIFORNIA

DRAINAGE MANAGEMENT AREA PLAN
TRACT MAP No. 31513

SHEET NUMBER
1
OF 1 SHEETS

Plotted: Jul 17, 2025 - 2:23pm By: AlexanderJaramillo DWG: \\sp2-nas2\

TRACT 31513
RECIVING WATERS EXHIBIT
SHEET 1 OF 2



PROJECT SITE

SURFACE FLOW TO EARTHEN SWALES AND CHANNELS TO SALT CREEK

TO CANYON LAKE

SEE FOOTNOTE 1

SEE FOOTNOTE 2

NPDES MUNICIPAL PERMIT
SANTA ANA RIVER WATERSHED
EXHIBIT SA-3
(MENIFEE, SAN JACINTO, HEMET AREAS)

- — • CITY MS4 FACILITIES
- — • COUNTY MS4 FACILITIES
- — RCFC&WCD MS4 FACILITIES
- — OTHER FACILITIES
- • MAJOR OUTFALL SITES
- ● SAR CORE MONITORING STATIONS
- 🟩 SANTA ANA RIVER WATERSHED BOUNDARY
- 🟥 SANTA MARGARITA RIVER MS4 PERMIT AREA BOUNDARY
- 🟩 LANDFILL SITES
- ▨ SEWAGE TREATMENT PLANTS
- -·-·- SANTA ANA RIVER/SAN JACINTO RIVER
- -·-·- BLUE LINE STREAMS
- ☐ RIVERSIDE COUNTY BOUNDARY
- ▨ INCORPORATED AREAS
- — FREEWAYS/HIGHWAYS
- — PRIMARY STREETS

UPDATED NOVEMBER 2017

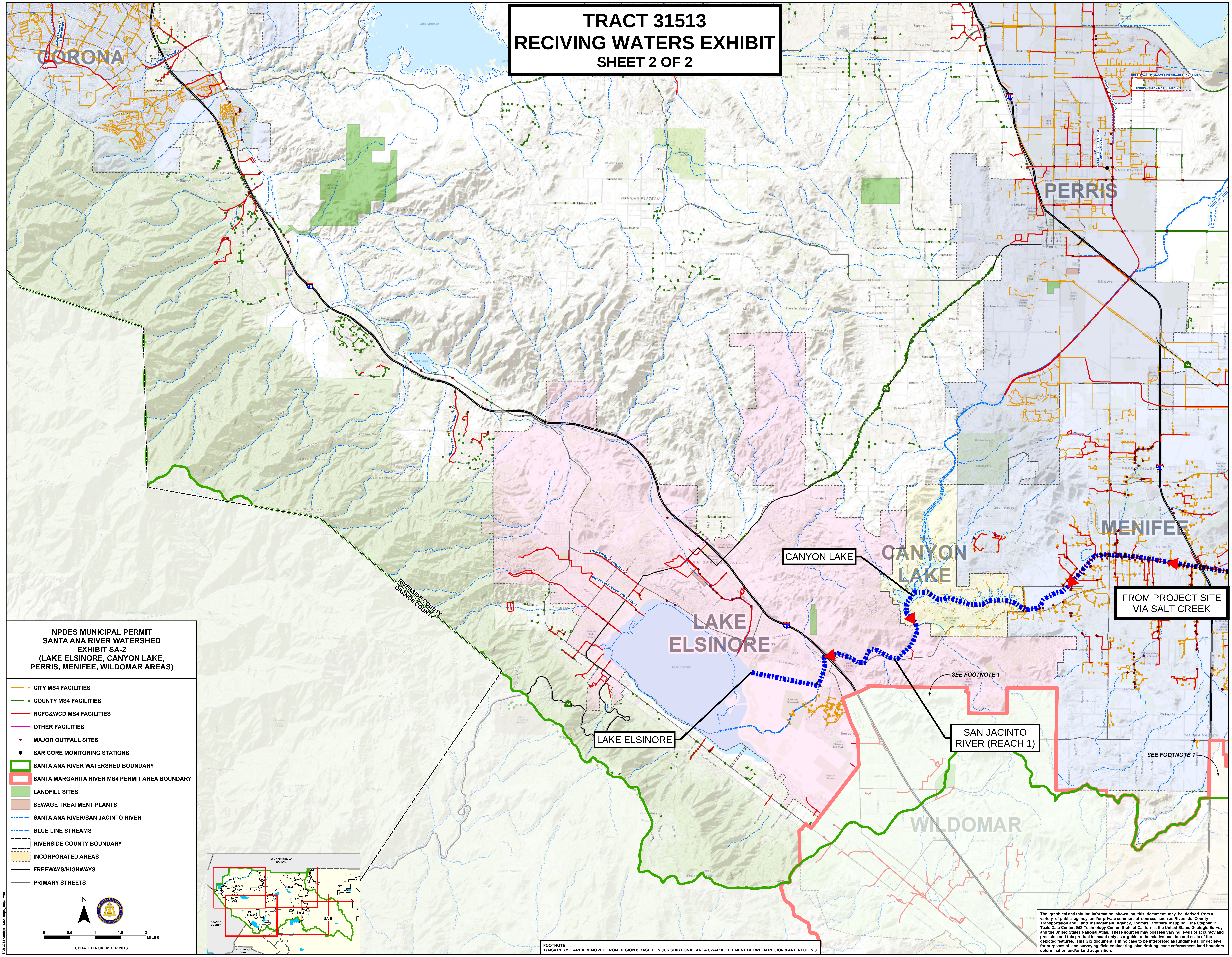
FOOTNOTES:
1) MS4 PERMIT AREA REMOVED FROM REGION 8 BASED ON JURISDICTIONAL AREA SWAP AGREEMENT BETWEEN REGION 8 AND REGION 9

2) MS4 PERMIT ADDED TO REGION 8 BASED ON JURISDICTIONAL AREA SWAP AGREEMENT BETWEEN REGION 8 AND REGION 9

The graphical and tabular information shown on this document may be derived from a variety of public agency and/or private commercial sources such as Riverside County Transportation and Land Management Agency, Thomas Brothers Mapping, the Stephen P. Teale Data Center, GIS Technology Center, State of California, the United States Geologic Survey and the United States National Atlas. These sources may possess varying levels of accuracy and precision and this product is meant only as a guide to the relative position and scale of the depicted features. This GIS document is in no case to be interpreted as fundamental or decisive for purposes of land surveying, field engineering, plan drafting, code enforcement, land boundary determination and/or land acquisition.

SAR 2017 AnnRpt - MS4 Maps_Map3.mxd

TRACT 31513
RECIVING WATERS EXHIBIT
SHEET 2 OF 2



NPDES MUNICIPAL PERMIT
SANTA ANA RIVER WATERSHED
EXHIBIT SA-2
(LAKE ELSINORE, CANYON LAKE, PERRIS, MENIFEE, WILDOMAR AREAS)

- CITY MS4 FACILITIES
- COUNTY MS4 FACILITIES
- RCFC&WCD MS4 FACILITIES
- OTHER FACILITIES
- MAJOR OUTFALL SITES
- SAR CORE MONITORING STATIONS
- SANTA ANA RIVER WATERSHED BOUNDARY
- SANTA MARGARITA RIVER MS4 PERMIT AREA BOUNDARY
- LANDFILL SITES
- SEWAGE TREATMENT PLANTS
- SANTA ANA RIVER/SAN JACINTO RIVER
- BLUE LINE STREAMS
- RIVERSIDE COUNTY BOUNDARY
- INCORPORATED AREAS
- FREEWAYS/HIGHWAYS
- PRIMARY STREETS

UPDATED NOVEMBER 2018

FOOTNOTE:
1) MS4 PERMIT AREA REMOVED FROM REGION 8 BASED ON JURISDICTIONAL AREA SWAP AGREEMENT BETWEEN REGION 8 AND REGION 9

The graphical and tabular information shown on this document may be derived from a variety of public agency and/or private commercial sources such as Riverside County Transportation and Land Management Agency, Thomas Brothers Mapping, the Stephen P. Teale Data Center, GIS Technology Center, State of California, the United States Geologic Survey and the United States National Atlas. These sources may possess varying levels of accuracy and precision and this product is meant only as a guide to the relative position and scale of the depicted features. This GIS document is in no case to be interpreted as fundamental or decisive for purposes of land surveying, field engineering, plan drafting, code enforcement, land boundary determination and/or land acquisition.

Appendix 2: Construction Plans

Grading and Drainage Plans

REVISIONS

NO.	BY	DESCRIPTION
△		
△		
△		

CONCEPTUAL GRADING AND UTILITY PLAN
TENTATIVE TRACT MAP 31513

LOTS 1 THROUGH 7, INCLUSIVE, AND LETTERED LOTS "A" THROUGH "I", INCLUSIVE, "K", "L", "EEE", "FFF", "LLL" AND "MMM" OF TRACT NO. 29550, IN THE CITY OF HEMET, AS SHOWN BY MAP ON FILE IN BOOK 299, PAGES 78 THROUGH 99, INCLUSIVE OF MAPS, IN THE OFFICE OF THE RECORDER OF RIVERSIDE COUNTY, CALIFORNIA, ALSO LYING WITHIN A PORTION OF SECTION 6, AND A PORTION OF SECTION 7, TOWNSHIP 5, SOUTH, RANGE 1 WEST, S.B.M.

DATE OF MAP: MARCH 2023

LOT AREA TABLE

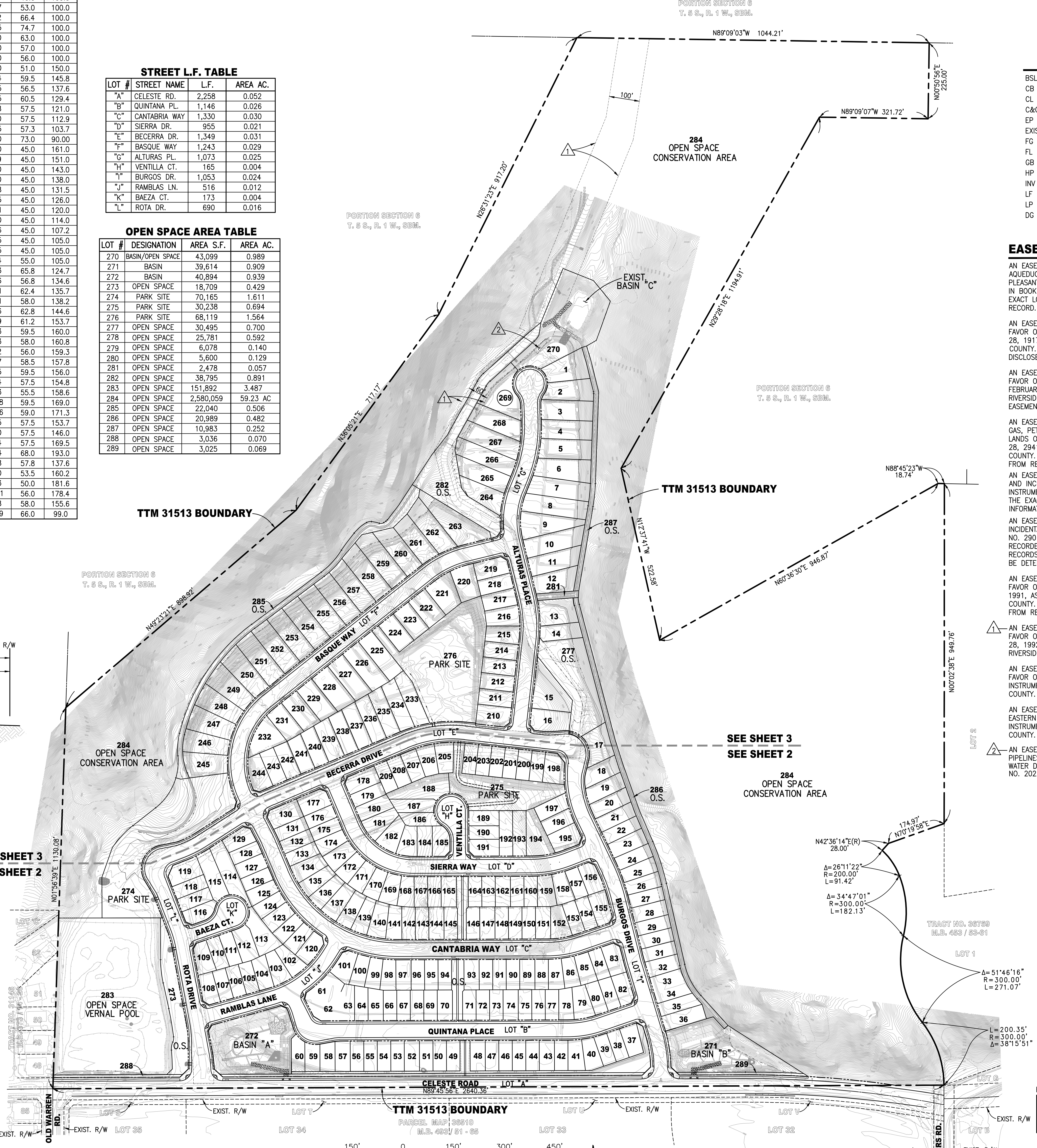
LOT #	AREA (SF)	LOT WIDTH (FT)	LOT DEPTH (FT)	LOT #	AREA (SF)	LOT WIDTH (FT)	LOT DEPTH (FT)	LOT #	AREA (SF)	LOT WIDTH (FT)	LOT DEPTH (FT)	LOT #	AREA (SF)	LOT WIDTH (FT)	LOT DEPTH (FT)
1	8,990	70.0	132.9	71	3,600	40.0	90.0	141	4,367	43.4	100.6	211	4,700	47.0	100.0
2	8,248	58.8	140.5	72	3,600	40.0	90.0	142	4,346	45.0	97.0	212	4,700	47.0	100.0
3	9,080	59.0	153.0	73	3,600	40.0	90.0	143	3,840	40.0	96.0	213	4,700	47.0	100.0
4	8,531	56.5	151.5	74	4,050	45.0	90.0	144	3,840	40.0	96.0	214	4,700	47.0	100.0
5	8,997	58.5	154.5	75	3,600	40.0	90.0	145	3,827	40.0	96.0	215	5,013	47.0	100.0
6	10,056	61.3	164.9	76	3,600	40.0	90.0	146	4,283	45.0	96.0	216	5,371	53.7	99.0
7	9,822	54.5	177.0	77	3,600	40.0	90.0	147	4,320	45.0	96.0	217	4,892	48.9	100.0
8	10,337	54.2	190.5	78	4,110	44.0	93.0	148	3,600	40.0	96.0	218	4,599	46.0	100.0
9	9,661	50.0	191.2	79	4,897	50.0'	96.5	149	3,840	40.0	96.0	219	5,187	53.0	100.0
10	9,914	56.0	177.0	80	3,860	40.0	95.5	150	3,600	40.0	96.0	220	6,692	66.4	100.0
11	8,554	56.0	152.8	81	3,798	40.0	95.0	151	4,320	45.0	96.0	221	7,445	74.7	100.0
12	7,886	63.6	126.0	82	4,270	50.0	94.0	152	4,428	45.6	96.5	222	6,300	63.0	100.0
13	8,094	76.1	110.7	83	5,669	51.6	91.8	153	3,902	40.0	97.4	223	5,700	57.0	100.0
14	5,617	46.5	117.2	84	3,642	40.0	91.0	154	3,903	40.0	97.6	224	5,600	56.0	100.0
15	11,744	100.0	117.4	85	4,281	47.8	90.1	155	5,018	52.5	97.6	225	7,650	51.0	150.0
16	6,569	59.0	117.4	86	3,892	43.5	90.0	156	4,615	51.7	90.9	226	8,674	59.5	145.8
17	7,244	67.6	97.3	87	3,947	43.5	90.0	157	3,644	40.3	90.5	227	7,775	56.5	137.6
18	5,620	53.0	103.4	88	3,600	40.0	90.0	158	4,115	45.0	91.5	228	7,825	60.5	129.4
19	5,557	47.0	117.5	89	4,050	45.0	90.0	159	4,977	53.9	91.4	229	6,958	57.5	121.0
20	5,483	46.0	118.7	90	3,600	40.0	90.0	160	3,602	40.0	90.0	230	6,490	57.5	112.9
21	5,064	44.0	115.3	91	3,600	40.0	90.0	161	3,600	40.0	90.0	231	5,985	57.3	103.7
22	4,506	40.0	112.6	92	3,600	40.0	90.0	162	4,050	45.0	90.0	232	7,140	73.0	90.00
23	5,594	47.7	111.0	93	4,032	45.0	90.0	163	3,600	40.0	90.0	233	7,260	45.0	161.0
24	4,902	45.0	108.9	94	3,600	40.0	90.0	164	3,600	40.0	90.0	234	6,819	45.0	151.0
25	4,276	40.0	106.9	95	3,600	40.0	90.0	165	4,050	45.0	90.0	235	6,470	45.0	143.0
26	4,467	40.0	105.2	96	4,052	45.0	90.0	166	3,600	40.0	90.0	236	6,200	45.0	138.0
27	4,159	40.0	103.9	97	4,046	40.0	90.0	167	3,635	40.0	90.0	237	5,938	45.0	131.5
28	4,634	45.0	103.0	98	3,904	42.9	90.0	168	4,467	49.6	90.0	238	5,675	45.0	126.0
29	4,080	40.0	102.0	99	3,823	42.4	90.0	169	3,933	43.6	90.0	239	5,991	45.0	120.0
30	4,043	40.0	101.0	100	3,924	44.4	90.0	170	3,933	43.6	90.0	240	5,120	45.0	114.0
31	3,997	40.0	99.7	101	4,804	51.0	90.0	171	4,416	49.0	90.0	241	4,586	45.0	107.2
32	4,380	45.0	97.5	102	4,278	47.6	97.0	172	3,933	43.6	90.0	242	4,725	45.0	105.0
33	3,891	40.0	97.8	103	4,491	45.2	99.0	173	3,933	43.6	90.0	243	4,725	45.0	105.0
34	4,177	40.0	104.8	104	4,380	42.0	96.5	174	4,416	48.0	90.0	244	5,464	55.0	105.0
35	4,780	40.0	119.2	105	3,720	40.0	93.0	175	3,599	40.0	90.0	245	8,253	65.8	124.7
36	5,800	45.0	128.3	106	3,720	40.0	93.0	176	3,600	40.0	90.0	246	7,756	56.8	134.6
37	4,518	49.0	90.0	107	3,720	40.0	93.0	177	5,018	57.0	90.0	247	8,501	62.4	135.7
38	3,600	40.0	90.0	108	4,259	47.2	93.0	178	5,085	52.0	100.0	248	8,081	58.0	138.2
39	3,611	40.0	90.5	109	4,556	50.0	95.0	179	4,504	45.0	100.5	249	9,176	62.8	144.6
40	4,257	46.1	92.0	110	3,853	40.0	97.0'	180	4,161	40.0	104.0	250	9,469	61.2	153.7
41	4,773	52.6	90.0	111	3,960	40.0	98.5'	181	5,297	49.2	106.3	251	9,553	59.5	160.0
42	3,600	40.0	90.0	112	5,368	53.0	100.0	182	5,072	51.5	97.8	252	9,333	58.0	160.8
43	3,600	40.0	90.0	113	7,120	52.2	120.0	183	4,535	49.7	90.0	253	8,922	56.0	159.3
44	4,050	45.0	90.0	114	8,299	48.0	150.0	184	4,050	45.0	90.0	254	9,227	58.5	157.8
45	3,600	40.0	90.0	115	6,957	48.0	145.1	185	4,338	52.3	90.0	255	9,285	59.5	156.0
46	3,600	40.0	90.0	116	4,303	48.0	111.7	186	4,032	40.0	100.0	256	8,884	57.5	154.8
47	3,600	45.0	90.0	117	4,000	40.0	100.0	187	4,849	40.0	121.6	257	8,743	55.5	158.6
48	4,050	45.0	90.0	118	4,000	40.0	100.0	188	9,542	47.0	139.0	258	10,058	59.5	169.0
49	4,050	40.0	90.0	119	5,501	58.0	100.0	189	4,050	45.0	90.0	259	10,046	59.0	171.3
50	3,600	45.0	90.0	120	3,959	45.6	90.0	190	3,600	40.0	90.0	260	8,835	57.5	153.7
51	3,600	40.0	90.0	121	3,981	44.4	90.0	191	4,387	50.0	90.0	261	8,350	57.5	146.0
52	3,600	45.0	90.0	122	3,841	42.9	90.0	192	5,400	40.0	135.0	262	8,964	57.5	169.5
53	4,050	40.0	90.0	123	3,841	42.9	90.0	193	5,400	40.0	135.0	263	13,144	68.0	193.0
54	3,600	40.0	90.0	124	3,943	43.0	90.0	194	7,767	58.4	135.0	264	7,328	57.8	137.6
55	3,600	40.0	90.0	125	3,950	43.0	90.0	195	5,135	58.7	90.0	265	8,550	53.5	160.2
56	3,600	40.0	90.0	126	3,750	41.6	90.0	196	4,283	47.0	91.5	266	9,233	50.0	181.6
57	3,630	40.5	90.0	127	4,050	45.0	90.0	197	4,602	47.0	98.4	267	10,031	56.0	178.4
58	3,773	45.0	84.1	128	4,068	45.0	90.0	198	5,218	60.5	90.0	268	9,078	58.0	155.6
59	3,625	43.5	85.9	129	4,381	50.5	90.0	199	3,600	40.0	90.0	269	11,969	66.0	99.0
60	4,275	40.0	100.2	130	5,549	57.0	97.5	200	3,600	40.0	90.0				
61	6,151	51.8	116.0	131	3,857	40.0	96.7	201	3,600	40.0	90.0				
62	5,445	71.2	95.8	132	3,840	40.0	96.0	202	3,600	40.0	90.0				
63	4,178	40.0	106.5	133	3,874	40.0	97.3	203	3,600	40.0	90.0				
64	4,039	40.0	101.0	134	4,864	48.0	100.7	204	3,600	40.0	90.0				
65	4,221	45.0	93.6	135	4,671	44.1	105.7	205	4,548	50.0	90.0				
66	3,600	40.0	90.0	136	4,772	43.8	108.5	206	4,413	48.7	90.0				
67	3,600	40.0	90.0	137	4,821	43.8	109.8	207	4,166	46.2	90.0				
68	3,600	40.0	90.0	138	5,189	47.2	109.8	208	4,050	44.0	90.0				
69	3,600	40.0	90.0	139	4,874	45.0	108.1	209	3,600	40.0	90.0				
70	4,044	45.0	90.0	140	4,648	44.2	105.0	210	5,801	59.1	100.0				

STREET L.F. TABLE

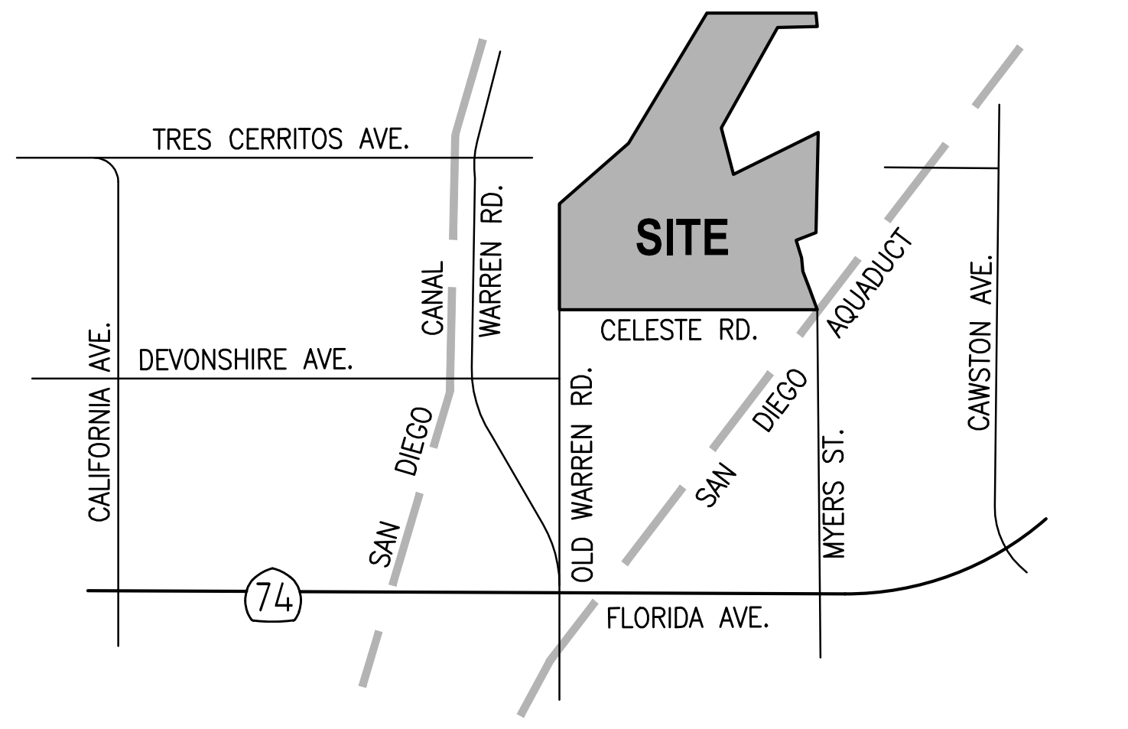
LOT #	STREET NAME	L.F.	AREA AC.
"A"	CELESTE RD.	2,258	0.052
"B"	QUINTANA PL.	1,146	0.026
"C"	CANTABRIA WAY	1,330	0.030
"D"	SIERRA DR.	955	0.021
"E"	BECERRA DR.	1,349	0.031
"F"	BASQUE WAY	1,243	0.029
"G"	ALTURAS PL.	1,073	0.025
"H"	VENTILLA CT.	165	0.004
"I"	BURGOS DR.	1,053	0.024
"J"	RAMBLAS LN.	516	0.012
"K"	BAEZA CT.	173	0.004
"L"	ROTA DR.	690	0.016

OPEN SPACE AREA TABLE

LOT #	DESIGNATION	AREA S.F.	AREA AC.
270	BASIN/OPEN SPACE	43,099	0.989
271	BASIN	39,614	0.909
272	BASIN	40,894	0.939
273	OPEN SPACE	18,709	0.429
274	PARK SITE	70,165	1.611
275	PARK SITE	30,238	0.694
276	PARK SITE	68,119	1.564
277	OPEN SPACE	30,495	0.700
278	OPEN SPACE	25,781	0.592
279	OPEN SPACE	6,078	0.140
280	OPEN SPACE	5,600	0.129
281	OPEN SPACE	2,478	0.057
282	OPEN SPACE	38,795	0.891
283	OPEN SPACE	151,892	3.487
284	OPEN SPACE	2,580,059	59.23 AC
285	OPEN SPACE	22,040	0.506
286	OPEN SPACE	20,989	0.482
287	OPEN SPACE	10,983	0.252
288	OPEN SPACE	3,036	0.070
289	OPEN SPACE	3,025	0.069



INDEX MAP



VICINITY MAP

NTS

LEGEND

BSL	BUILDING SETBACK LINE	PROP.	PROPOSED
CB	CATCH BASIN	P=36.9	PAD ELEVATION
CL	CENTERLINE	P/L	PROPERTY LINE
C&G	CURB AND GUTTER	R/W	RIGHT OF WAY
EP	EDGE OF PAVEMENT	TC	TOP OF CURB
EXIST.	EXISTING	TW	TOP OF WALL
FG	FINISHED GRADE		FIRE HYDRANT
FL	FLOW LINE		STREET LIGHT
GB	GRADE BREAK		
HP	HIGH POINT		
INV	INVERT ELEVATION	"A" X	SECTION REFERENCE CROSS-SECTION LOCATION SECTION PAGE NO. CONCOURSE AREA
LF	LINEAR FOOT		
LP	LOW POINT		
DG	DECOMPOSED GRANITE		RIP RAP

1430	EXIST. CONTOUR
	PROP. RETAINING WALL
	PROP. CMU SCREEN WALL
S	PROP. SEWER LINE
SD	PROP. STORM DRAIN LINE
W	PROP. WATER LINE
	PROP. 2:1 SLOPE
	TENTATIVE TRACT BOUNDARY
	INDICATES PARK SITE & OPEN SPACE AREA
	DG MAINTENANCE PATH
	CONCRETE SURFACE

EASEMENT NOTES

AN EASEMENT FOR WATER DITCHES, PIPES, PIPELINES, CONDUITS, AQUEDUCTS AND INCIDENTAL PURPOSES, IN FAVOR OF SAN JACINTO AND PLEASANT VALLEY IRRIGATION DISTRICT, RECORDED FEBRUARY 16, 1894, IN BOOK 13, PAGE 14, OF DEED, RECORDS OF RIVERSIDE COUNTY. THE EXACT LOCATION AND EXTEND OF SAID EASEMENT IS NOT DISCLOSED OF RECORD.

AN EASEMENT TO CONSTRUCT, RECONSTRUCT, MAINTAIN, AND REPAIR, IN FAVOR OF CITIZENS WATER COMPANY OF SAN JACINTO, RECORDED MARCH 28, 1917, IN BOOK 460, PAGE 96, OF DEEDS, RECORDS OF RIVERSIDE COUNTY. THE EXACT LOCATION AND EXTEND OF SAID EASEMENT IS NOT DISCLOSED OF RECORD.

AN EASEMENT FOR PUBLIC UTILITIES AND INCIDENTAL PURPOSES, IN FAVOR OF CALIFORNIA WATER AND TELEPHONE COMPANY, RECORDED FEBRUARY 19, 1926, IN BOOK 665, PAGE 127, OF DEEDS, RECORDS OF RIVERSIDE COUNTY. THE EXACT LOCATION AND EXTEND OF SAID EASEMENT IS NOT DISCLOSED OF RECORD.

AN EASEMENT FOR DEVELOPMENT, PRODUCTION, AND REMOVAL OF OIL, GAS, PETROLEUM, NAPTHA, AND INCIDENTAL PURPOSES, IN FAVOR OF THE LANDS OF THE SAN JACINTO LAND ASSOCIATION, RECORDED FEBRUARY 28, 2941, IN BOOK 494, PAGE 93, OF DEEDS, RECORDS OF RIVERSIDE COUNTY. THE EXACT LOCATION OF EASEMENT CANNOT BE DETERMINED FROM RECORD INFORMATION.

AN EASEMENT FOR POLE LINE, CONDUITS, OR UNDERGROUND FACILITIES, AND INCIDENTAL PURPOSES, RECORDED DECEMBER 2, 1964, AS INSTRUMENT NO. 143839, OF OFFICIAL RECORDS OF RIVERSIDE COUNTY. THE EXACT LOCATION OF EASEMENT CANNOT BE DETERMINED FROM RECORD INFORMATION.

AN EASEMENT FOR DRAINAGE AND STORM WATER RETENTION BASIN AND INCIDENTAL PURPOSES, RECORDED FEBRUARY 2, 1988, AS INSTRUMENT NO. 29011, OF OFFICIAL RECORDS OF RIVERSIDE COUNTY, AND RECORDED MARCH 28, 1990, PER INSTRUMENT NO. 111288, OF OFFICIAL RECORDS OF SAID COUNTY. THE EXACT LOCATION OF EASEMENT CANNOT BE DETERMINED FROM RECORD INFORMATION.

AN EASEMENT FOR PUBLIC UTILITIES AND INCIDENTAL PURPOSES, IN FAVOR OF EASTERN MUNICIPAL WATER DISTRICT, RECORDED MAY 10, 1991, AS INSTRUMENT NO. 156373, OF OFFICIAL RECORDS OF RIVERSIDE COUNTY. THE EXACT LOCATION OF EASEMENT CANNOT BE DETERMINED FROM RECORD INFORMATION. BLANKET IN NATURE.

△1 AN EASEMENT FOR PUBLIC UTILITIES AND INCIDENTAL PURPOSES, IN FAVOR OF EASTERN MUNICIPAL WATER DISTRICT, RECORDED SEPTEMBER 28, 1992, AS INSTRUMENT NO. 361474, OF OFFICIAL RECORDS OF RIVERSIDE COUNTY.

AN EASEMENT FOR DRAINAGE, ACCESS AND INCIDENTAL PURPOSES, IN FAVOR OF THE CITY OF HEMET, RECORDED DECEMBER 28, 1999, AS INSTRUMENT NO. 1999–559159, OF OFFICIAL RECORDS OF RIVERSIDE COUNTY. TO BE ABANDONED ON FINAL TRACT MAP 31513.

AN EASEMENT FOR PERPETUAL AIR OR FLIGHT PURPOSES, IN FAVOR OF EASTERN MUNICIPAL WATER DISTRICT, RECORDED OCTOBER 4, 2005, AS INSTRUMENT NO. 2005–0820922, OF OFFICIAL RECORDS OF RIVERSIDE COUNTY. ALL THE AIR SPACE ABOVE SAID LAND.

△2 AN EASEMENT TO CONSTRUCT, RECONSTRUCT, MAINTAIN AND REPAIR PIPELINES, AND ACCESS PURPOSES IN FAVOR OF EASTERN MUNICIPAL WATER DISTRICT, RECORDED SEPTEMBER 7, 2022, AS INSTRUMENT NO. 2022–0385923, OF OFFICIAL RECORDS OF RIVERSIDE COUNTY.

UTILITY PURVEYORS

SEWER & WATER:
EASTERN MUNICIPAL WATER DIST.
2270 TRUMBLE ROAD
PERRIS, CA 92570
(951) 928–3777

GAS:
SOUTHERN CALIFORNIA GAS CO.
4830 DUSKYWING ROAD
HEMET, CA 92545
(951) 652–1019

CABLE/TELEPHONE:
SPECTRUM
2887 W. FLORIDA AVENUE
HEMET, CA 92545
(866) 874–2389

STORM DRAIN:
R.C.F.C.&W.C.D.
1995 MARKET STREET
RIVERSIDE, CA 92501
(951) 955–1200

SCHOOL DISTRICT:
HEMET UNIFIED SCHOOL DISTRICT
1791 W. ACACIA AVENUE
HEMET, CA 92545
(951) 765–5100

SOLID WASTE:
CR&R ENVIRONMENTAL SERVICES
1706 GOETZ ROAD
PERRIS, CA 92570
(951) 943–1991

ELECTRIC:
SOUTHERN CALIFORNIA EDISON CO.
24487 PRIELIPP ROAD
WILDOMAR, CA 92595
(800) 655–4555

CABLE/TELEPHONE:
VERIZON
3301 W. FLORIDA AVENUE
HEMET, CA 92545
(800) 880–1077

STORM DRAIN:
CITY OF HEMET
3777 INDUSTRIAL AVENUE
CORPORATION YARD
HEMET, CA 92545
(951) 765–3712

FLOOD ZONE DESIGNATION

ZONE X, MAP PANEL #06065C1470G
EFFECTIVE DATE: AUGUST 28, 2008

AREA OF 0.2% ANNUAL FLOOD CHANCE; OF 1% ANNUAL FLOOD WITH AVERAGE DEPTHS OF LESS THAN 1 FOOT OR WITH DRAINAGE AREAS LESS THAN 1 SQUARE MILE, AND AREAS PROTECTED BY LEVEES FROM 1% ANNUAL CHANCE FLOOD.

LEGAL DESCRIPTION

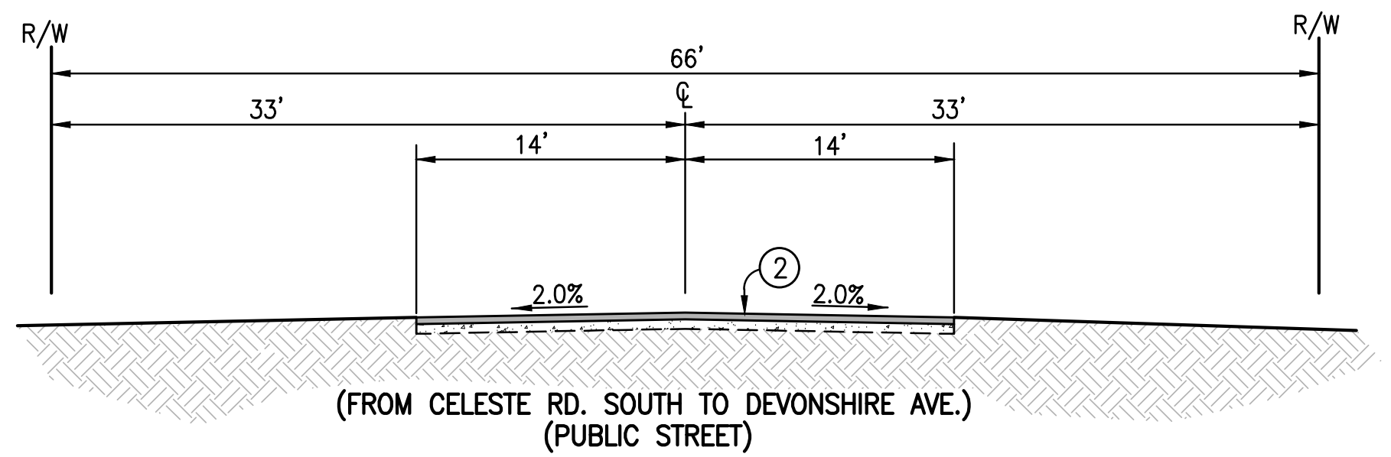
LOTS 1 THROUGH 7, INCLUSIVE, AND LETTERED LOTS "A" THROUGH "I", INCLUSIVE, "K", "L", "EEE", "FFF", "LLL" AND "MMM" OF TRACT NO. 29550, IN THE CITY OF HEMET, AS SHOWN BY MAP ON FILE IN BOOK 299, PAGES 78 THROUGH 99, INCLUSIVE OF MAPS, IN THE OFFICE OF THE RECORDER OF RIVERSIDE COUNTY, CALIFORNIA, ALSO LYING WITHIN A PORTION OF SECTION 6, AND A PORTION OF SECTION 7, TOWNSHIP 5, SOUTH, RANGE 1 WEST, S.B.M.

GENERAL NOTES

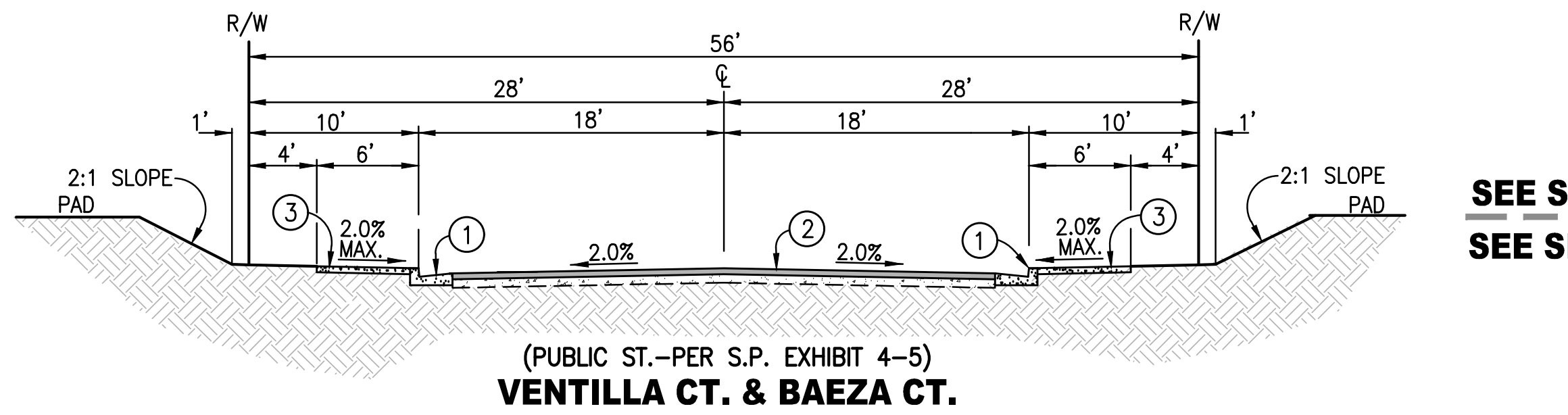
1. MAP PREPARATION DATE: 03/03/2025 (REVISED 7/21/2025)
2. TOTAL SITE ACREAGE: 121.25
3. ASSESSOR'S PARCEL NUMBERS: 448–070–002, 448–070–005, 448–070–007, 448–070–009, 448–070–010, 448–070–011, 448–080–001, 448–080–002, 448–080–004, AND 448–080–006.
4. EXIST. ZONING: TRES CERRITOS (WEST) SP #90–009
5. PROPOSED ZONING: TRES CERRITOS (AMENDMENT __)
6. PROPOSED SINGLE FAMILY RESIDENTIAL LOTS: 279
7. PROPOSED DEVELOPMENT STANDARDS:
   - – MIN. NET LOT SIZE: 3,600 S.F.
   - – MIN. LOT WIDTH: 40'
   - – MIN. LOT DEPTH: 90'
   - – MIN. CUL–DE–SAC FRONTAGE: 35'
   - – MIN. FRONT YARD (GARAGE) SETBACK: 20'
   - – MIN. REAR YARD SETBACK: 15'
   - – MIN. INTERIOR SIDE YARD SETBACK: 5'
   - – MIN. STREET SIDE YARD SETBACK: 10'
8. LOTS "A", "B", "C", "E", "F", "G", "H", "I", "J", "K" & "L" TO BE DEDICATED TO CITY OF HEMET VALLEY FOR PUBLIC AND PUBLIC UTILITY PURPOSES.
9. LOTS 270–288 TO BE DEDICATED TO THE H.O.A FOR PARK SITE AND OPEN SPACE PURPOSES.
10. TOPOGRAPHY SOURCE: ARROWHEAD MAPPING, 06/2024.
11. STREETS AND EASEMENTS DEDICATED TO THE CITY OF HEMET FOR STREET AND PUBLIC UTILITY PURPOSES PER TRACT MAP NO. 29550 ARE TO BE ABANDONED ON FINAL TRACT MAP TRACT 31513.
12. ALL LOT DIMENSIONS ARE APPROXIMATE.
13. ALL PROPOSED SLOPES ARE 2:1
14. ALL RETAINING WALL HEIGHTS SHOWN ARE APPROXIMATE.
15. THERE ARE NO EXISTING BUILDINGS WITHIN THE SITE.
16. FINAL MAP TO BE RECORDED IN ONE PHASE.

TYPICAL CROSS–SECTION IMPROVEMENT NOTES

① – TYPE "A" (6" CF) CURB PER CITY OF HEMET STD. C–200
(1A) – TYPE "B" (8" CF) CURB PER CITY OF HEMET STD. C–201
② – A.C./A.B. PER GEOTECHNICAL RECOMMENDATIONS
③ – SIDEWALK PER CITY OF HEMET STD. C–215 A.C.
④ – A.C. PAVEMENT OVER NATIVE MATERIAL
⑤ – SPLIT RAIL FENCE PER PRELIM. LANDSCAPE PLANS

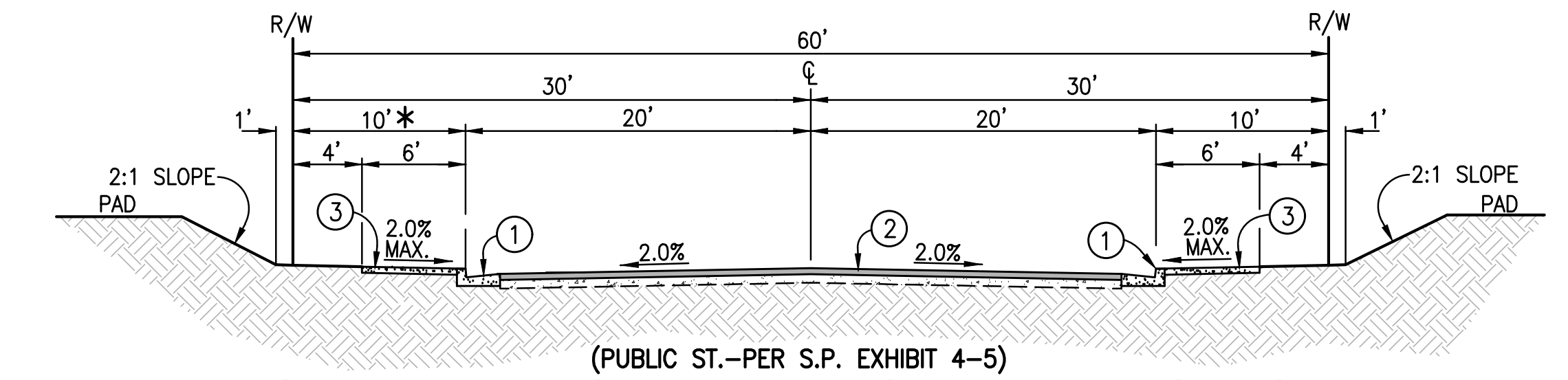


(FROM CELESTE RD. SOUTH TO DEVONSHIRE AVE.)
(PUBLIC STREET)
MYERS STREET
TYPICAL INTERIM SECTION
SCALE: 1"=10'

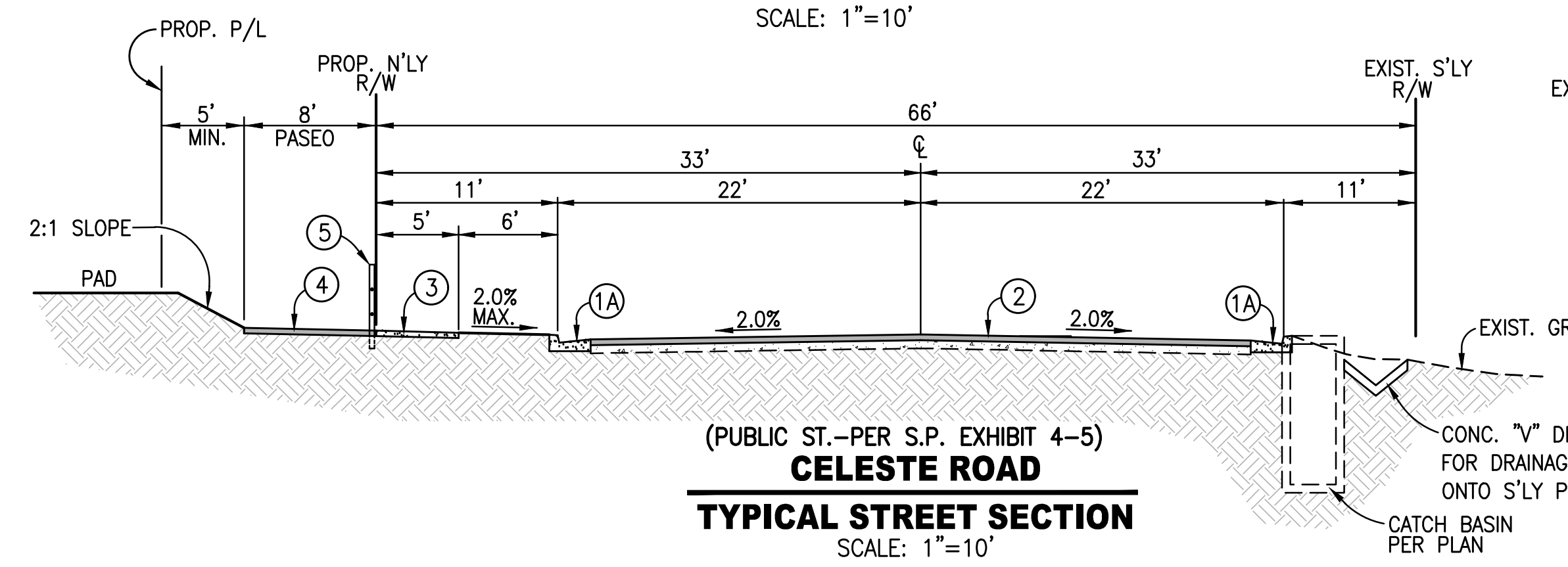


(PUBLIC ST.–PER S.P. EXHIBIT 4–5)
VENTILLA CT. & BAEZA CT.
TYPICAL STREET SECTION
SCALE: 1"=10'

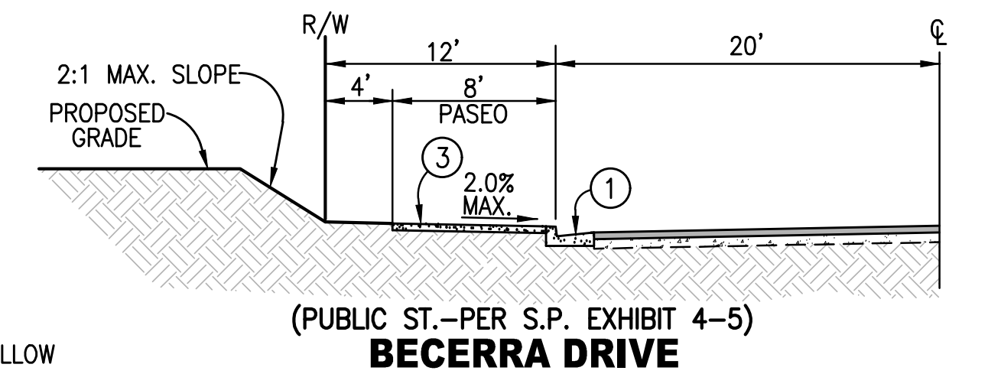
* SEE TYPICAL PARKWAY DETAIL FOR SECTION OF BECERRA DR. (LOWER RIGHT)



(PUBLIC ST.–PER S.P. EXHIBIT 4–5)
CANTABRIA WAY, QUINTANA PL., ROTA DR. ALTURAS PLACE
BECERRA DR., BURGOS DR., RAMBLAS LN., SIERRA WAY & BASQUE WAY
TYPICAL STREET SECTION
SCALE: 1"=10'



(PUBLIC ST.–PER S.P. EXHIBIT 4–5)
CELESTE ROAD
TYPICAL STREET SECTION
SCALE: 1"=10'



(PUBLIC ST.–PER S.P. EXHIBIT 4–5)
BECERRA DRIVE
TYPICAL PARKWAY SECTION
SCALE: 1"=10'

PREPARED BY:
SP2 & CO.
A LAND DEVELOPMENT SERVICES COMPANY
451 W. LAMBERT RD.–SUITE 216
BREA, CA 92821
PHONE: (714) 490–1514

LANDSCAPE ARCHITECT:
bmla
LANDSCAPE ARCHITECTURE
310 NORTH JOY STREET
CORONA, CA 92879
T: 951.737.1124

PREPARED FOR (OWNER/APPLICANT):
D·R·HORTON
America's Builder
SOUTH COAST, INLAND EMPIRE DIVISION
980 MONTECITO DRIVE SUITE 300
CORONA, CALIFORNIA 92879
(951) 272–9000

SHEET INDEX

P.R. 24-009

SHEET 1 OF 3

2ND SUBMITTAL COPY 7-21-2025

CONCEPTUAL GRADING AND UTILITY PLAN
TENTATIVE TRACT MAP 31513

LOTS 1 THROUGH 7, INCLUSIVE, AND LETTERED LOTS "A" THROUGH "I", INCLUSIVE, "K", "L", "EEE", "FFF", "LLL" AND "MMM" OF TRACT NO. 29550, IN THE CITY OF HEMET, AS SHOWN BY MAP ON FILE IN BOOK 299, PAGES 78 THROUGH 99, INCLUSIVE OF MAPS, IN THE OFFICE OF THE RECORDER OF RIVERSIDE COUNTY, CALIFORNIA, ALSO LYING WITHIN A PORTION OF SECTION 6, AND A PORTION OF SECTION 7, TOWNSHIP 5, SOUTH, RANGE 1 WEST, S.B.M.

DATE OF MAP: MARCH 2023

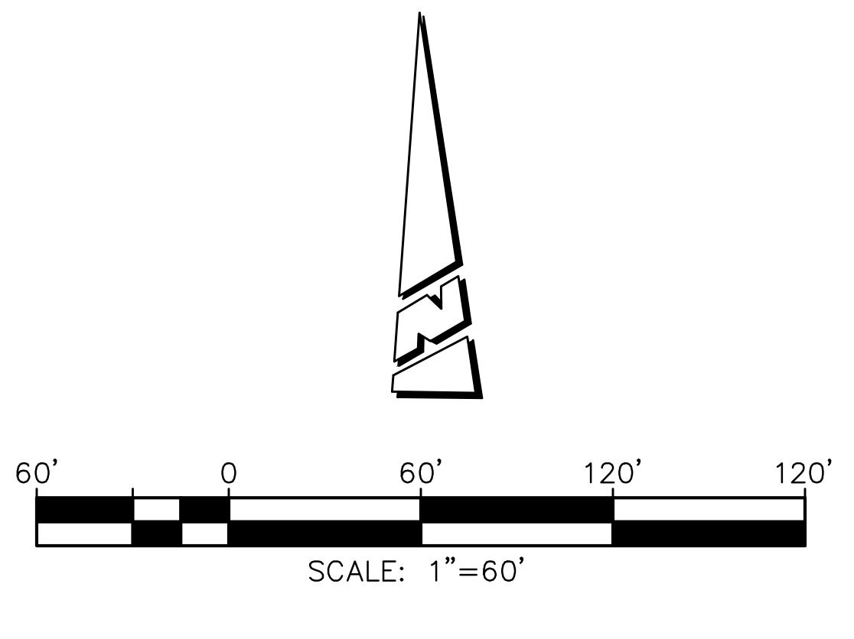
SECTION "G"
N.T.S.

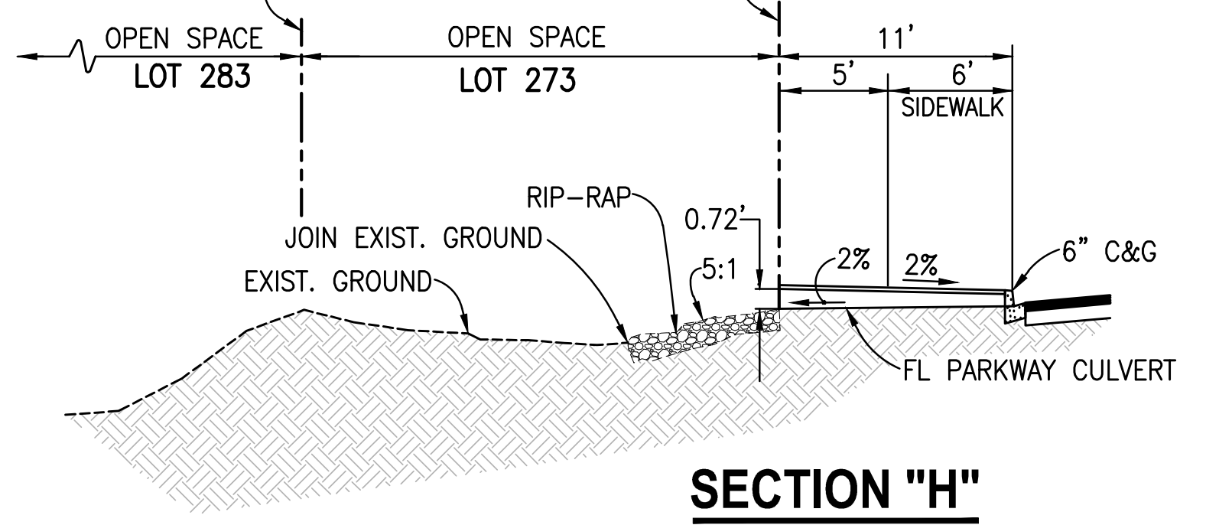
SECTION "A"
N.T.S.

SECTION "B"
N.T.S.

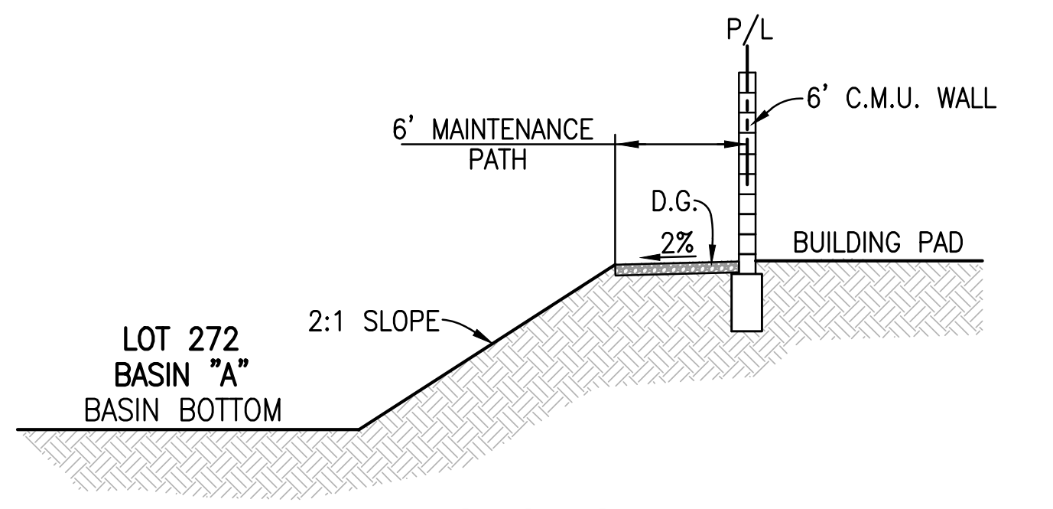
"TYP. STREET SIDEYARD DOWN SLOPE CONDITION"

SECTION "C"
N.T.S.

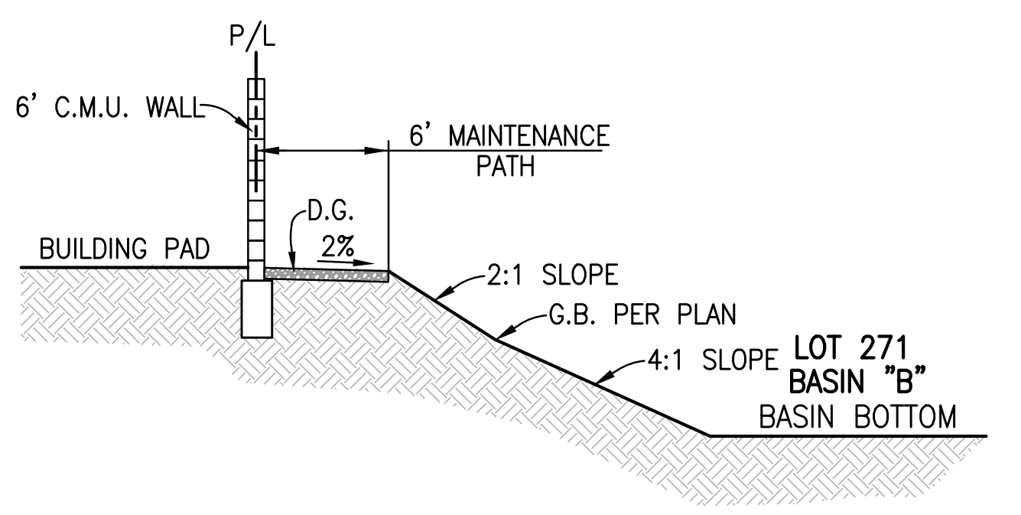




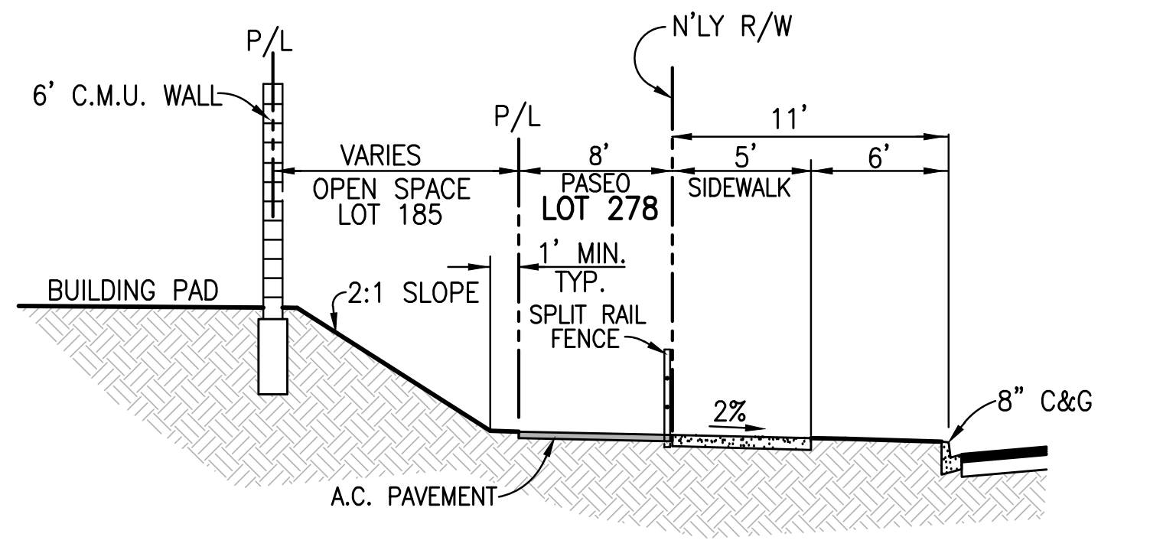
SECTION "H"
N.T.S.



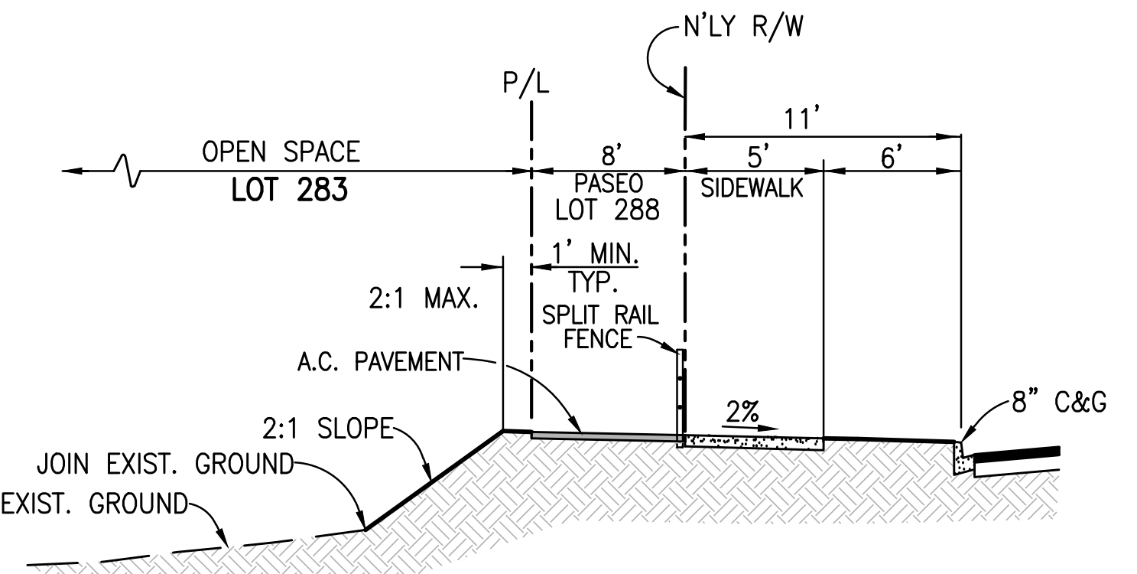
SECTION "I"
N.T.S.



SECTION "J"
N.T.S.



SECTION "K"
N.T.S.



SECTION "O"
N.T.S.

NOTE:

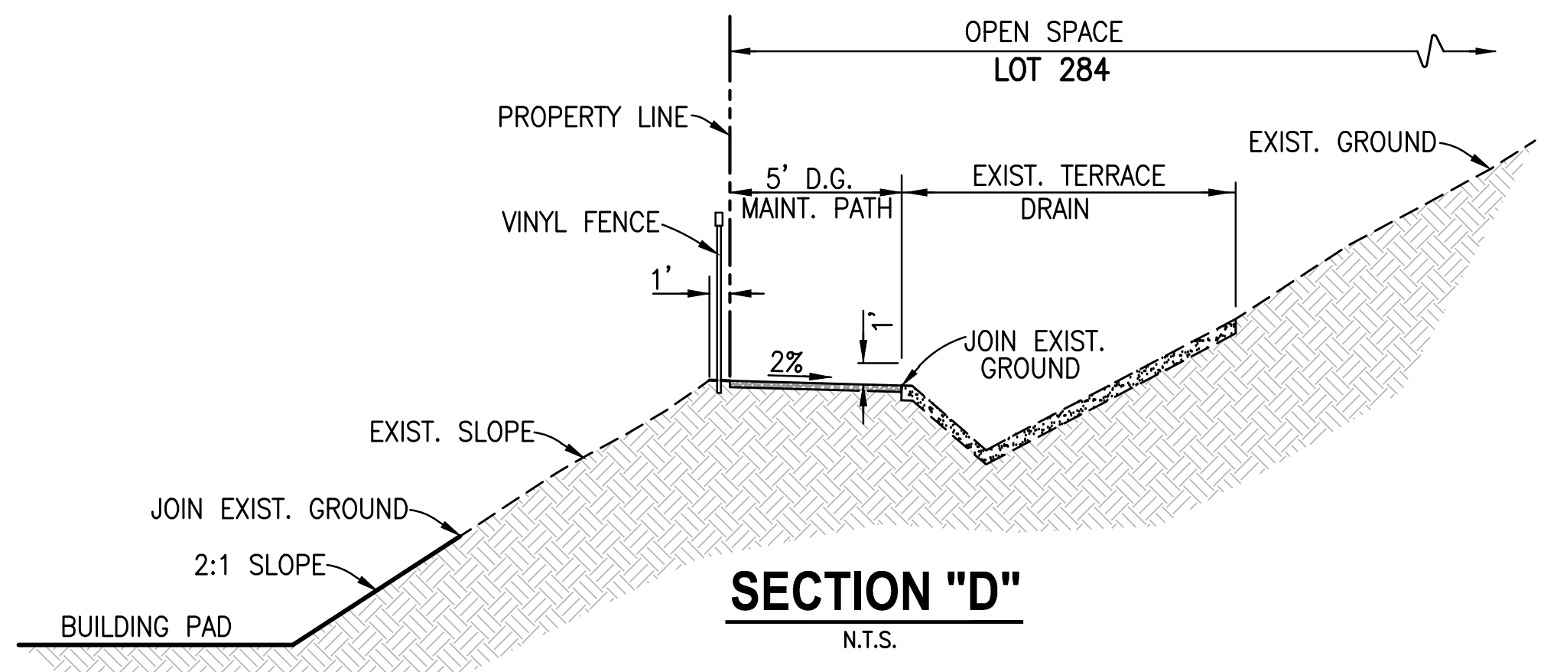
SEE SHEET 1 FOR EASEMENT NOTES

SHEET 2 OF 3

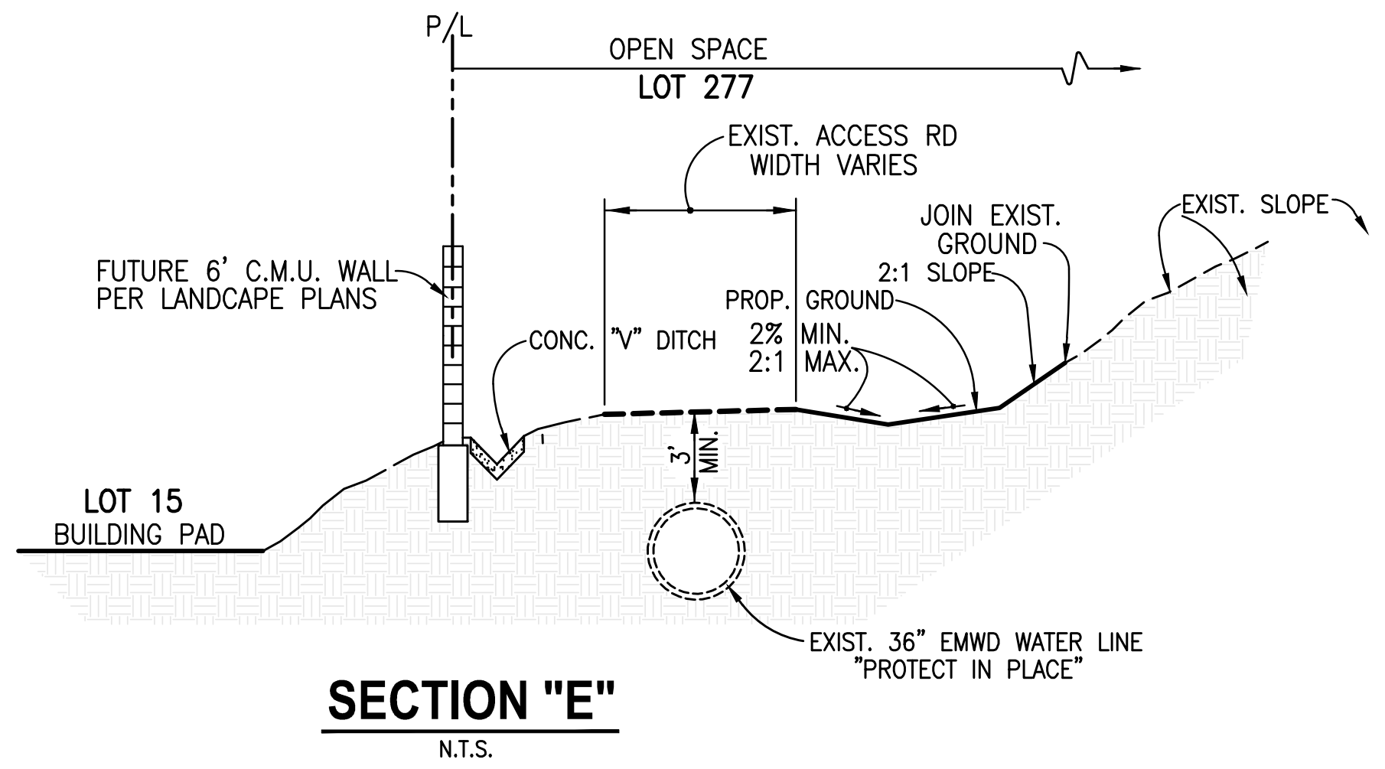
CONCEPTUAL GRADING AND UTILITY PLAN
TENTATIVE TRACT MAP 31513

LOTS 1 THROUGH 7, INCLUSIVE, AND LETTERED LOTS "A" THROUGH "I", INCLUSIVE, "K", "L", "EEE", "FFF", "LLL" AND "MMM" OF TRACT NO. 29550, IN THE CITY OF HEMET, AS SHOWN BY MAP ON FILE IN BOOK 299, PAGES 78 THROUGH 99, INCLUSIVE OF MAPS, IN THE OFFICE OF THE RECORDER OF RIVERSIDE COUNTY, CALIFORNIA, ALSO LYING WITHIN A PORTION OF SECTION 6, AND A PORTION OF SECTION 7, TOWNSHIP 5, SOUTH, RANGE 1 WEST, S.B.M.

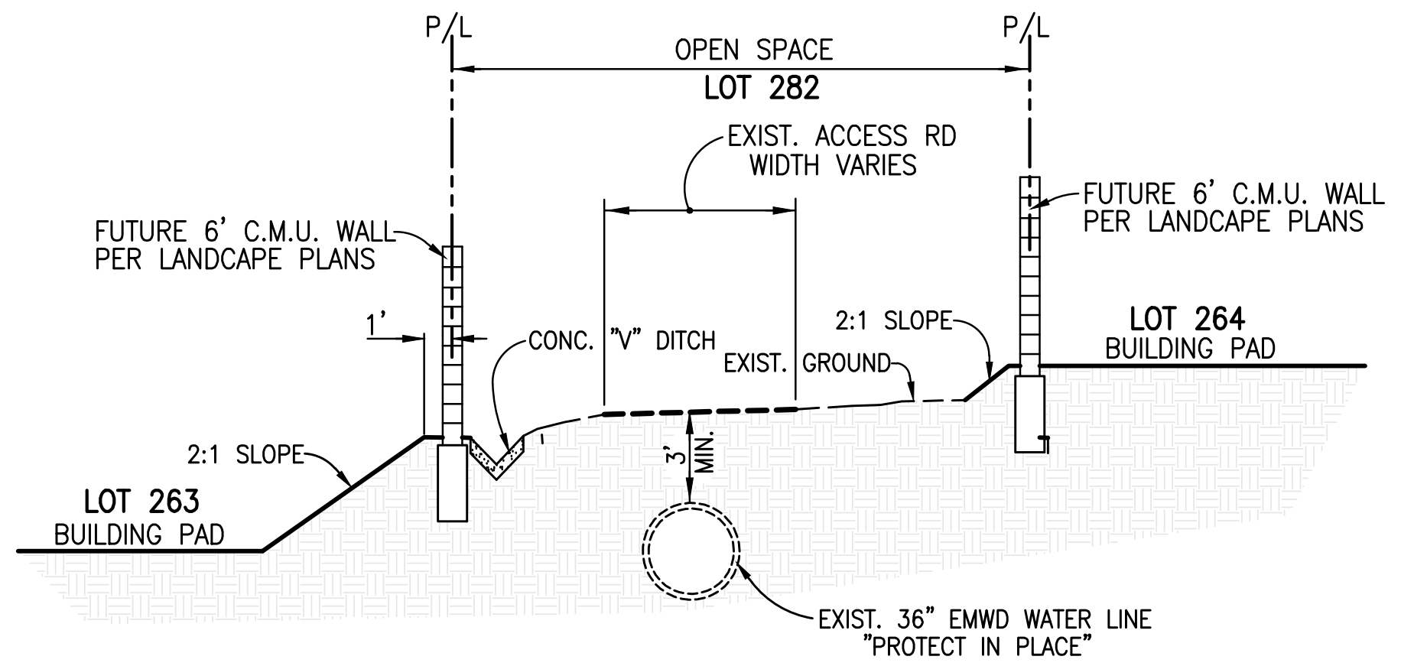
DATE OF MAP: MARCH 2023



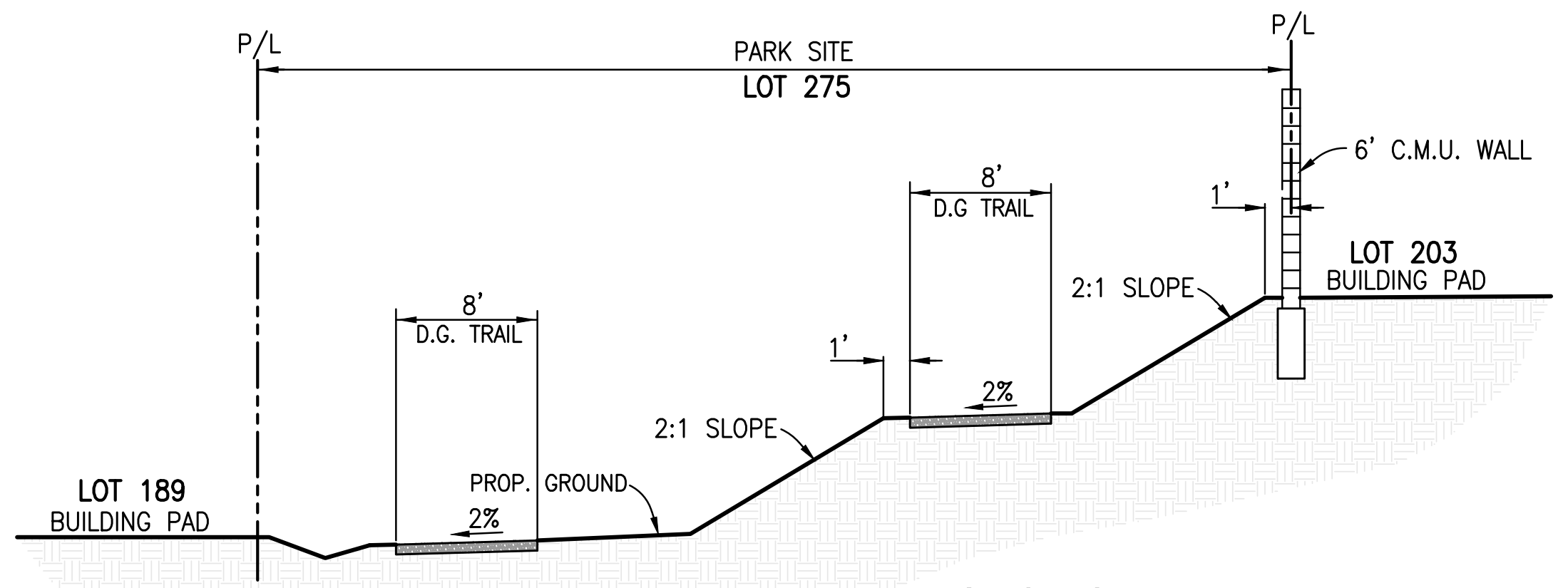
SECTION "D"
N.T.S.



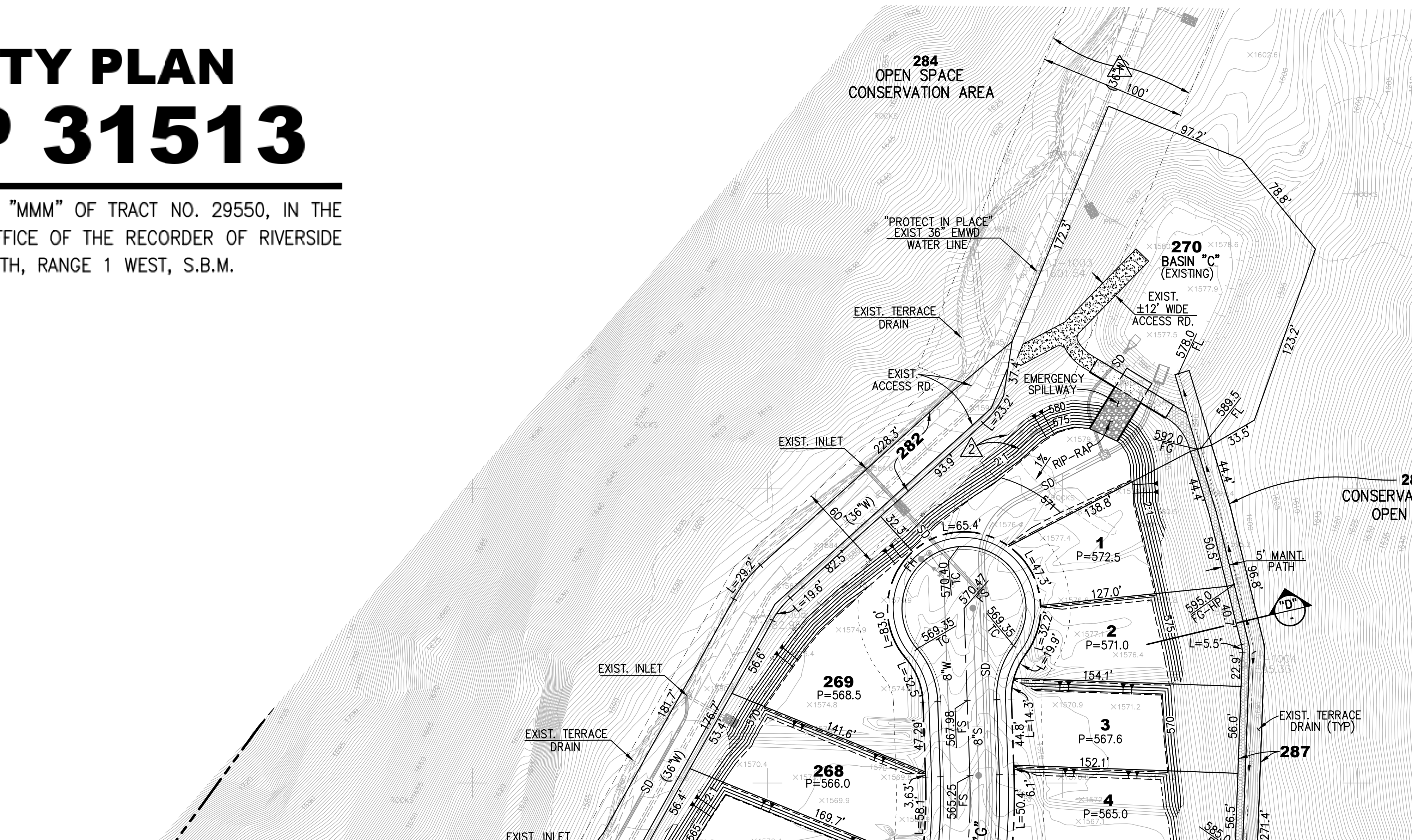
SECTION "E"
N.T.S.

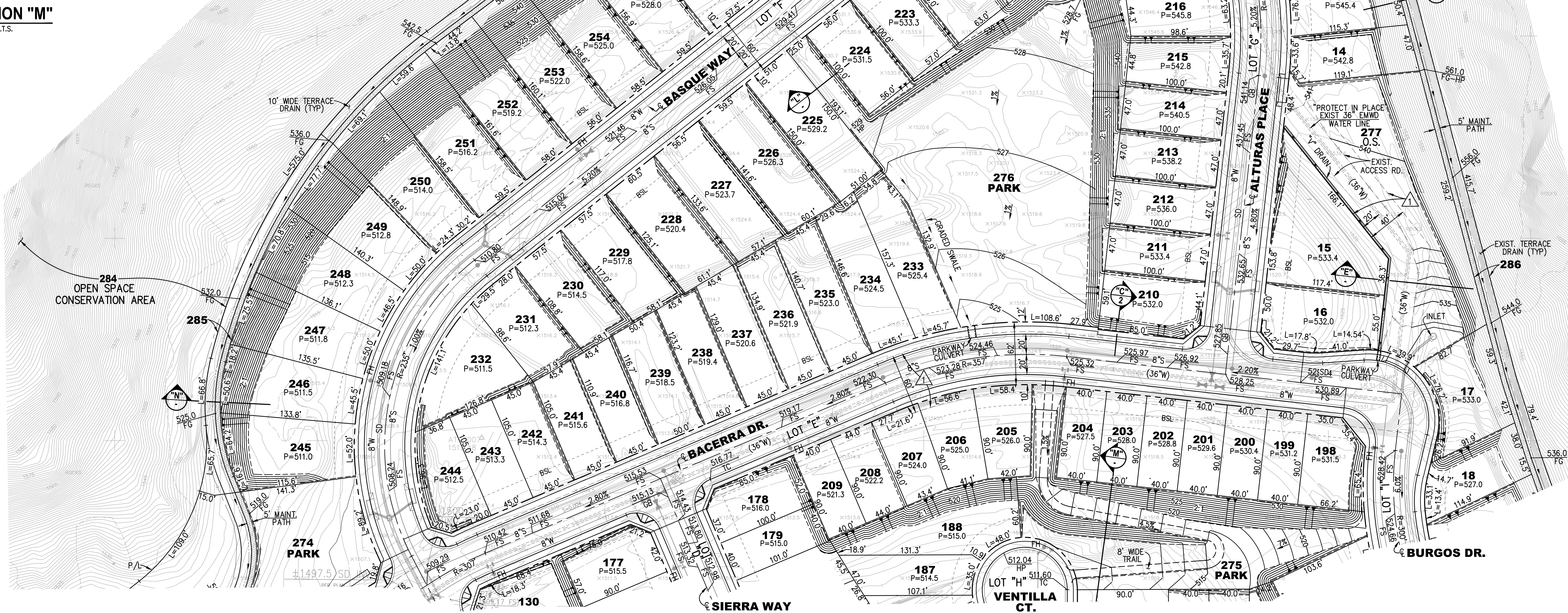


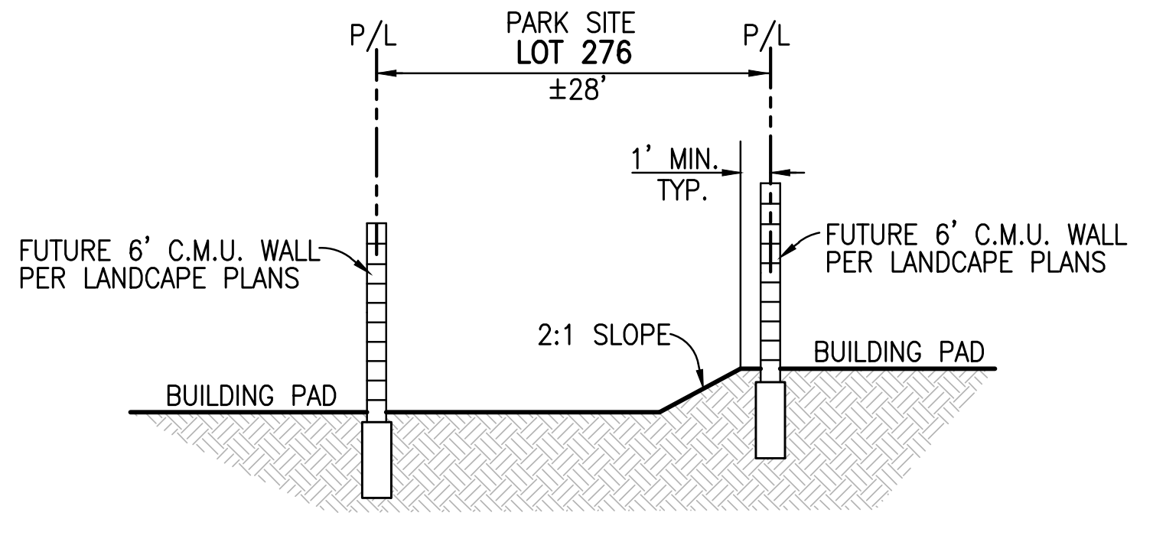
SECTION "F"
N.T.S.



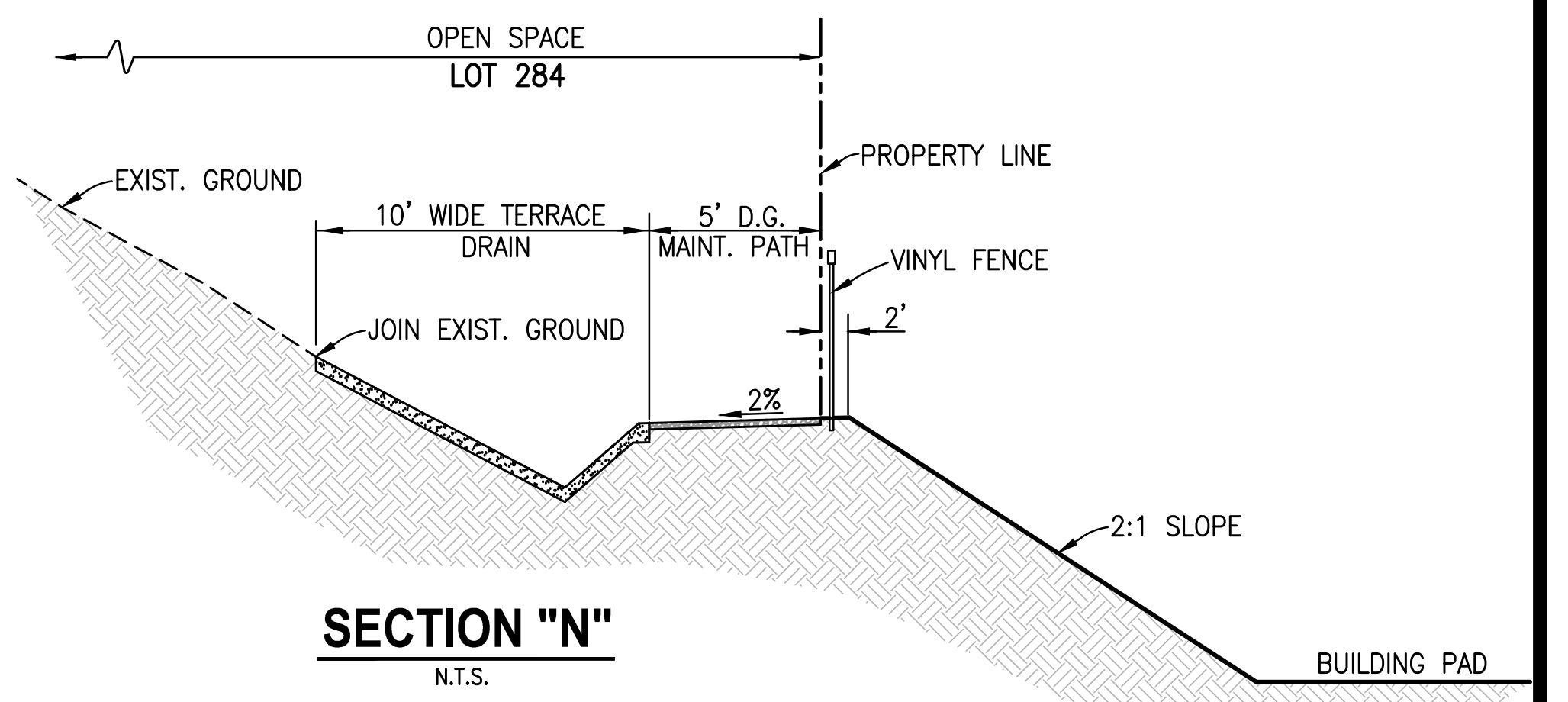
SECTION "M"
N.T.S.



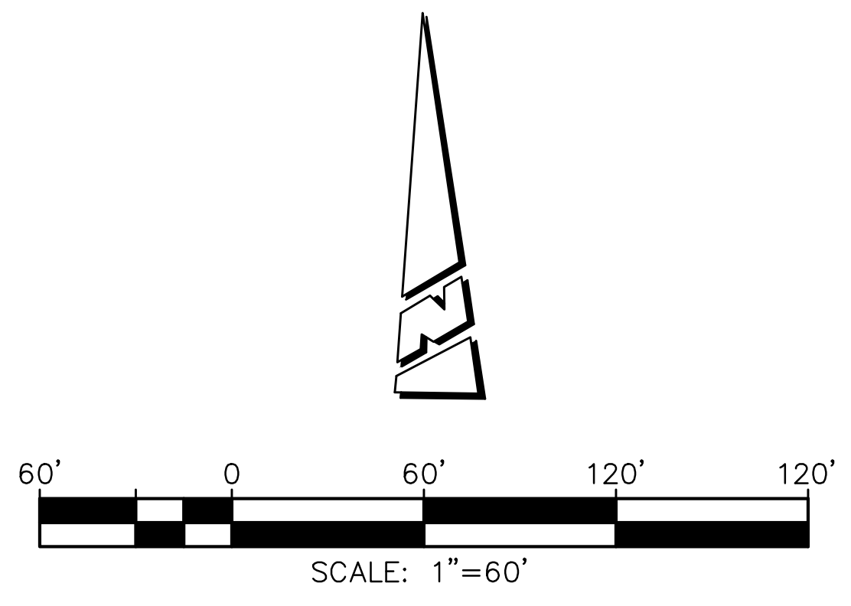




SECTION "L"
N.T.S.



SECTION "N"
N.T.S.



SCALE: 1"=60'

NOTE:
SEE SHEET 1 FOR EASEMENT NOTES

SEE SHEET 2 OF 3

SHEET 3 OF 3

REVISIONS		
NO.	BY	DESCRIPTION
△		
△		
△		

TENTATIVE TRACT MAP 31513

LOTS 1 THROUGH 7, INCLUSIVE, AND LETTERED LOTS "A" THROUGH "I", INCLUSIVE, "K", "L", "EEE", "FFF", "LLL" AND "MMM" OF TRACT NO. 29550, IN THE CITY OF HEMET, AS SHOWN BY MAP ON FILE IN BOOK 299, PAGES 78 THROUGH 99, INCLUSIVE OF MAPS, IN THE OFFICE OF THE RECORDER OF RIVERSIDE COUNTY, CALIFORNIA, ALSO LYING WITHIN A PORTION OF SECTION 6, AND A PORTION OF SECTION 7, TOWNSHIP 5, SOUTH, RANGE 1 WEST, S.B.M.

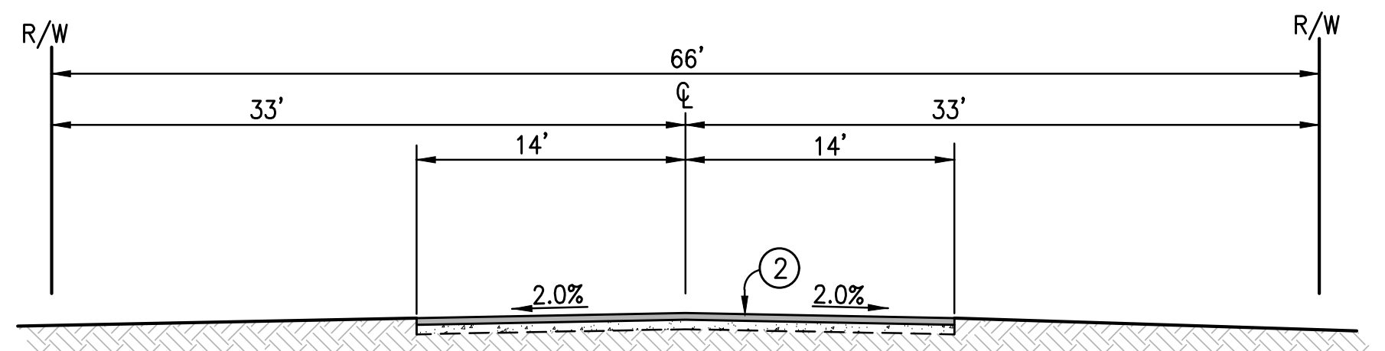
DATE OF MAP: MARCH 2023

LOT AREA TABLE

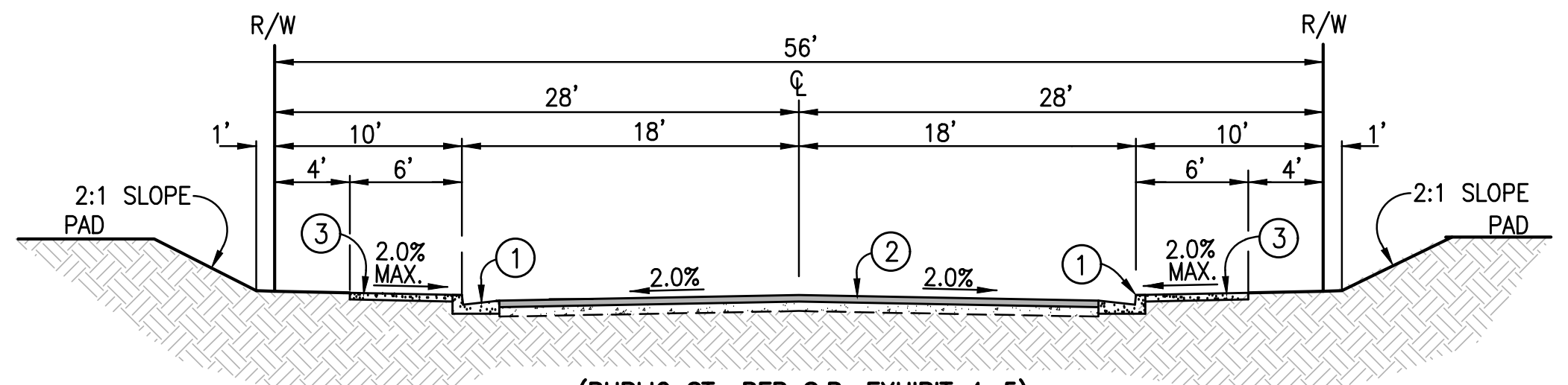
LOT #	AREA (SF)	LOT WIDTH (FT)	LOT DEPTH (FT)	LOT #	AREA (SF)	LOT WIDTH (FT)	LOT DEPTH (FT)	LOT #	AREA (SF)	LOT WIDTH (FT)	LOT DEPTH (FT)	LOT #	AREA (SF)	LOT WIDTH (FT)	LOT DEPTH (FT)
1				71	3,628	40.0	96.0	141	4,367	43.4	100.6	211	4,700	47.0	100.0
2				72	3,640	40.0	96.0	142	4,346	45.0	97.0	212	4,700	47.0	100.0
3				73	3,640	40.0	96.0	143	3,840	40.0	96.0	213	4,700	47.0	100.0
4				74	4,095	45.0	96.0	144	3,840	40.0	96.0	214	4,700	47.0	100.0
5				75	3,640	40.0	96.0	145	3,827	40.0	96.0	215	5,013	47.0	100.0
6				76	3,640	40.0	96.0	146	4,283	45.0	96.0	216	5,371	53.7	99.0
7				77	3,640	40.0	96.0	147	4,320	45.0	96.0	217	4,892	48.9	100.0
8				78	4,571	48.4	94.1	148	3,600	40.0	96.0	218	4,599	46.0	100.0
9				79	4,156	42.6	97.3	149	3,840	40.0	96.0	219	5,187	53.0	100.0
10				80	3,865	40.0	95.5	150	3,600	40.0	96.0	220			
11	8,554	56.0	152.8	81	3,852	40.0	95.0	151	4,320	45.0	96.0	221			
12	7,886	63.6	126.0	82	4,563	50.0	94.0	152	4,428	45.6	96.5	222			
13	8,094	76.1	110.7	83	5,669	51.6	91.8	153	3,902	40.0	97.4	223			
14	5,617	46.5	117.2	84	3,642	40.0	91.0	154	3,903	40.0	97.6	224			
15	11,744	100.0	117.4	85	4,281	47.8	90.1	155	5,018	52.5	97.6	225			
16	6,569	59.0	117.4	86	3,892	43.5	90.0	156	4,615	51.7	90.9	226			
17	7,244	67.6	97.3	87	3,947	43.5	90.0	157	3,644	40.3	90.5	227			
18	5,620	53.0	103.4	88	3,600	40.0	90.0	158	4,115	45.0	91.5	228			
19	5,557	47.0	117.5	89	4,050	45.0	90.0	159	4,977	53.9	91.4	229			
20	5,483	46.0	118.7	90	3,600	40.0	90.0	160	3,602	40.0	90.0	230			
21	5,064	44.0	115.3	91	3,600	40.0	90.0	161	3,600	40.0	90.0	231			
22	4,506	40.0	112.6	92	3,600	40.0	90.0	162	4,050	45.0	90.0	232			
23	5,594	47.7	111.0	93	4,032	45.0	90.0	163	3,600	40.0	90.0	233			
24	4,902	45.0	108.9	94	3,600	40.0	90.0	164	3,600	40.0	90.0	234	7,566	45.0	168.6
25	4,276	40.0	106.9	95	3,600	40.0	90.0	165	4,050	45.0	90.0	235	7,239	45.0	160.6
26	4,467	40.0	105.2	96	4,052	45.0	90.0	166	3,600	40.0	90.0	236	6,922	45.0	153.8
27	4,159	40.0	103.9	97	3,601	40.0	90.0	167	3,635	40.0	90.0	237	6,621	45.0	147.2
28	4,634	45.0	103.0	98	3,904	42.9	90.0	168	4,467	49.6	90.0	238	6,320	45.0	140.4
29	4,080	40.0	102.0	99	3,823	42.4	90.0	169	3,933	43.6	90.0	239	6,539	45.0	133.0
30	4,043	40.0	101.0	100	3,984	44.4	90.0	170	3,933	43.6	90.0	240	5,690	45.0	126.4
31	3,997	40.0	99.7	101	4,629	51.0	90.0	171	4,416	49.0	90.0	241	5,398	45.0	120.5
32	4,380	45.0	97.5	102	4,535	47.6	95.6	172	3,933	43.6	90.0	242	5,310	45.0	118.0
33	3,891	40.0	97.8	103	4,530	45.2	99.6	173	3,933	43.6	90.0	243	5,310	45.0	118.0
34	4,177	40.0	104.8	104	4,103	42.0	97.5	174	4,416	48.0	90.0	244	6,080	55.0	118.0
35	4,780	40.0	119.2	105	3,800	40.0	95.0	175	3,599	40.0	90.0	245			
36	5,800	45.0	128.3	106	3,800	40.0	95.0	176	3,600	40.0	90.0	246			
37	4,518	49.0	90.0	107	3,800	40.0	95.0	177	5,018	57.0	90.0	247			
38	3,600	40.0	90.0	108	4,352	47.2	95.0	178	5,085	52.0	100.0	248			
39	3,611	40.0	90.5	109	4,450	50.0	93.0	179	4,504	45.0	100.5	249			
40	4,257	46.1	92.0	110	3,778	40.0	94.5	180	4,161	40.0	104.0	250			
41	4,773	52.6	90.0	111	3,950	40.0	97.2	181	5,297	49.2	106.3	251			
42	3,600	40.0	90.0	112	3,924	45.0	86.2	182	5,072	51.5	97.8	252			
43	3,600	40.0	90.0	113	7,263	105.3	70.3	183	4,535	49.7	90.0	253			
44	4,050	45.0	90.0	114	8,810	48.0	176.4	184	4,050	45.0	90.0	254			
45	3,600	40.0	90.0	115	7,521	48.0	160.1	185	4,338	52.3	90.0	255			
46	3,600	40.0	90.0	116	4,742	48.0	111.7	186	4,032	40.0	100.0	256			
47	3,600	45.0	90.0	117	4,000	40.0	100.0	187	4,849	40.0	121.6	257			
48	4,050	45.0	90.0	118	4,000	40.0	100.0	188	9,542	47.0	139.0	258			
49	4,050	40.0	90.0	119	5,501	58.0	100.0	189	4,050	45.0	90.0	259			
50	3,600	45.0	90.0	120	3,959	45.6	90.0	190	3,600	40.0	90.0	260			
51	3,600	40.0	90.0	121	3,981	44.4	90.0	191	4,387	50.0	90.0	261			
52	3,600	45.0	90.0	122	3,841	42.9	90.0	192	5,400	40.0	135.0	262			
53	4,050	40.0	90.0	123	3,841	42.9	90.0	193	5,400	40.0	135.0	263			
54	3,600	40.0	90.0	124	3,943	43.0	90.0	194	7,767	58.4	135.0	264	8,350	59.6	137.6
55	3,600	40.0	90.0	125	3,950	43.0	90.0	195	5,135	58.7	90.0	265	9,413	57.0	165.3
56	3,600	40.0	90.0	126	3,750	41.6	90.0	196	4,283	47.0	91.5	266	10,671	57.0	185.0
57	3,630	40.5	90.0	127	4,050	45.0	90.0	197	4,602	47.0	98.4	267	10,303	57.0	179.2
58	3,773	45.0	84.1	128	4,068	45.0	90.0	198	5,218	60.5	90.0	268	8,818	57.0	154.0
59	3,625	43.5	85.9	129	4,381	50.5	90.0	199	3,600	40.0	90.0	269	9,748	50.0	124.2
60	4,275	40.0	100.2	130	5,549	57.0	97.5	200	3,600	40.0	90.0				
61	5,801	51.8	116.0	131	3,857	40.0	96.7	201	3,600	40.0	90.0				
62	5,513	71.2	95.8	132	3,840	40.0	96.0	202	3,600	40.0	90.0				
63	4,603	40.0	115.7	133	3,874	40.0	97.3	203	3,600	40.0	90.0				
64	4,667	45.0	103.8	134	4,864	48.0	100.7	204	3,600	40.0	90.0				
65	3,792	40.0	94.8	135	4,671	44.1	105.7	205	4,548	50.0	90.0				
66	4,640	40.0	91.0	136	4,772	43.8	108.5	206	4,413	48.7	90.0				
67	3,640	40.0	91.0	137	4,821	43.8	109.8	207	4,166	46.2	90.0				
68	3,640	40.0	91.0	138	5,189	47.2	109.8	208	4,050	44.0	90.0				
69	3,640	40.0	91.0	139	4,874	45.0	108.1	209	3,600	40.0	90.0				
70	4,089	45.0	91.0	140	4,648	44.2	105.0	210	5,801	59.1	100.0				

TYPICAL CROSS-SECTION IMPROVEMENT NOTES

① TYPE "A" (6" CF) CURB PER CITY OF HEMET STD. C-200
(1A) TYPE "B" (8" CF) CURB PER CITY OF HEMET STD. C-201
② A.C./A.B. PER GEOTECHNICAL RECOMMENDATIONS
③ SIDEWALK PER CITY OF HEMET STD. C-215 A.C.
④ A.C. PAVEMENT OVER NATIVE MATERIAL
⑤ SPLIT RAIL FENCE PER PRELIM. LANDSCAPE PLANS

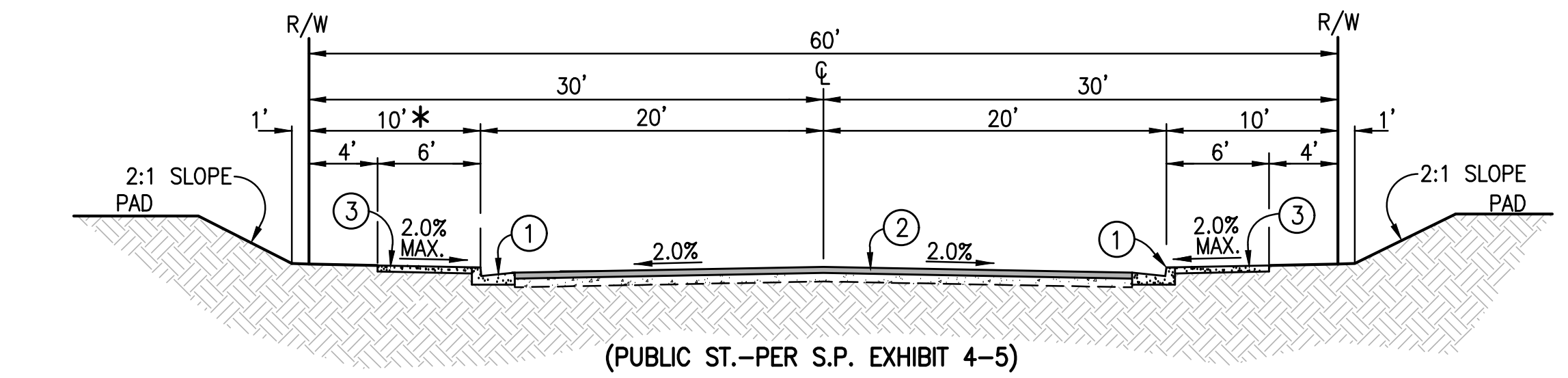


(FROM CELESTE RD. SOUTH TO DEVONSHIRE AVE.)
MYERS STREET
(PUBLIC STREET)
TYPICAL INTERIM SECTION
SCALE: 1"=10'

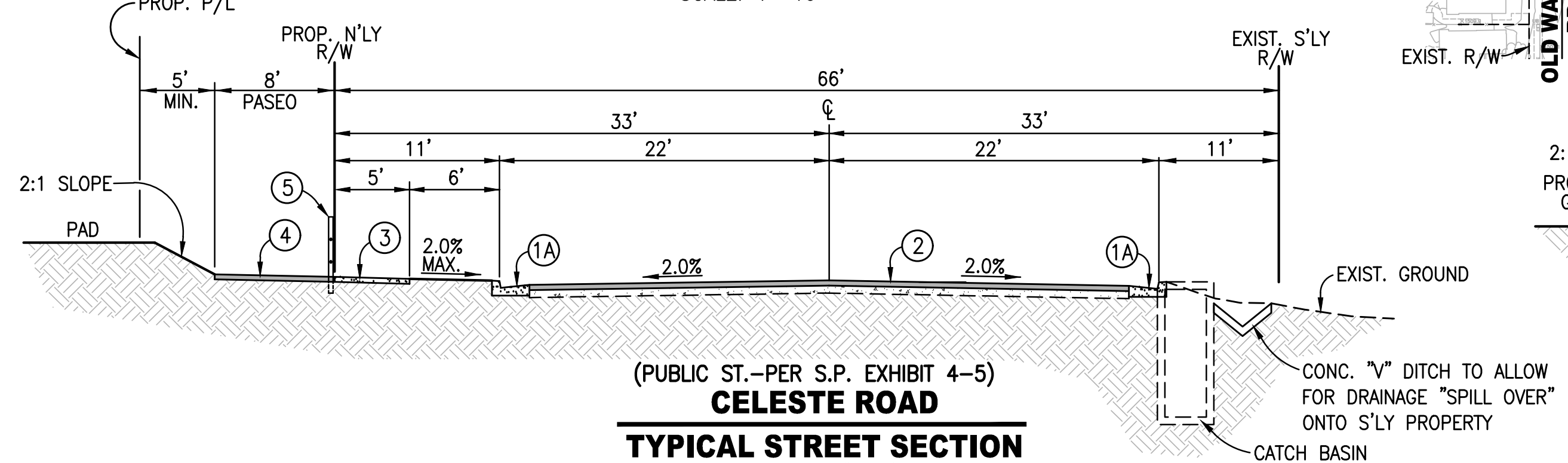


(PUBLIC ST.—PER S.P. EXHIBIT 4-5)
VENTILLA CT. & BAEZA CT.
TYPICAL STREET SECTION
SCALE: 1"=10'

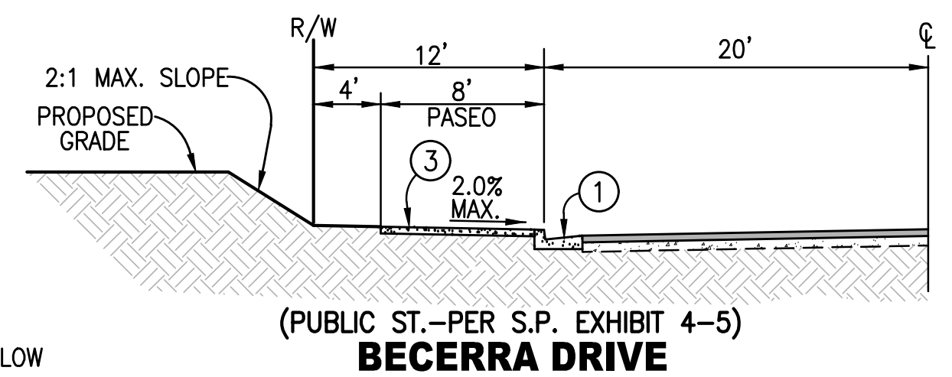
* SEE TYPICAL PARKWAY DETAIL FOR SECTION OF BECERRA DR. (LOWER RIGHT)



(PUBLIC ST.—PER S.P. EXHIBIT 4-5)
CANTABRIA WAY, QUINTANA PL., ROTA DR. ALTURAS PLACE
BECERRA DR., BURGOS DR., RAMBLAS LN., SIERRA WAY & BASQUE WAY
TYPICAL STREET SECTION
SCALE: 1"=10'



(PUBLIC ST.—PER S.P. EXHIBIT 4-5)
CELESTE ROAD
TYPICAL STREET SECTION
SCALE: 1"=10'



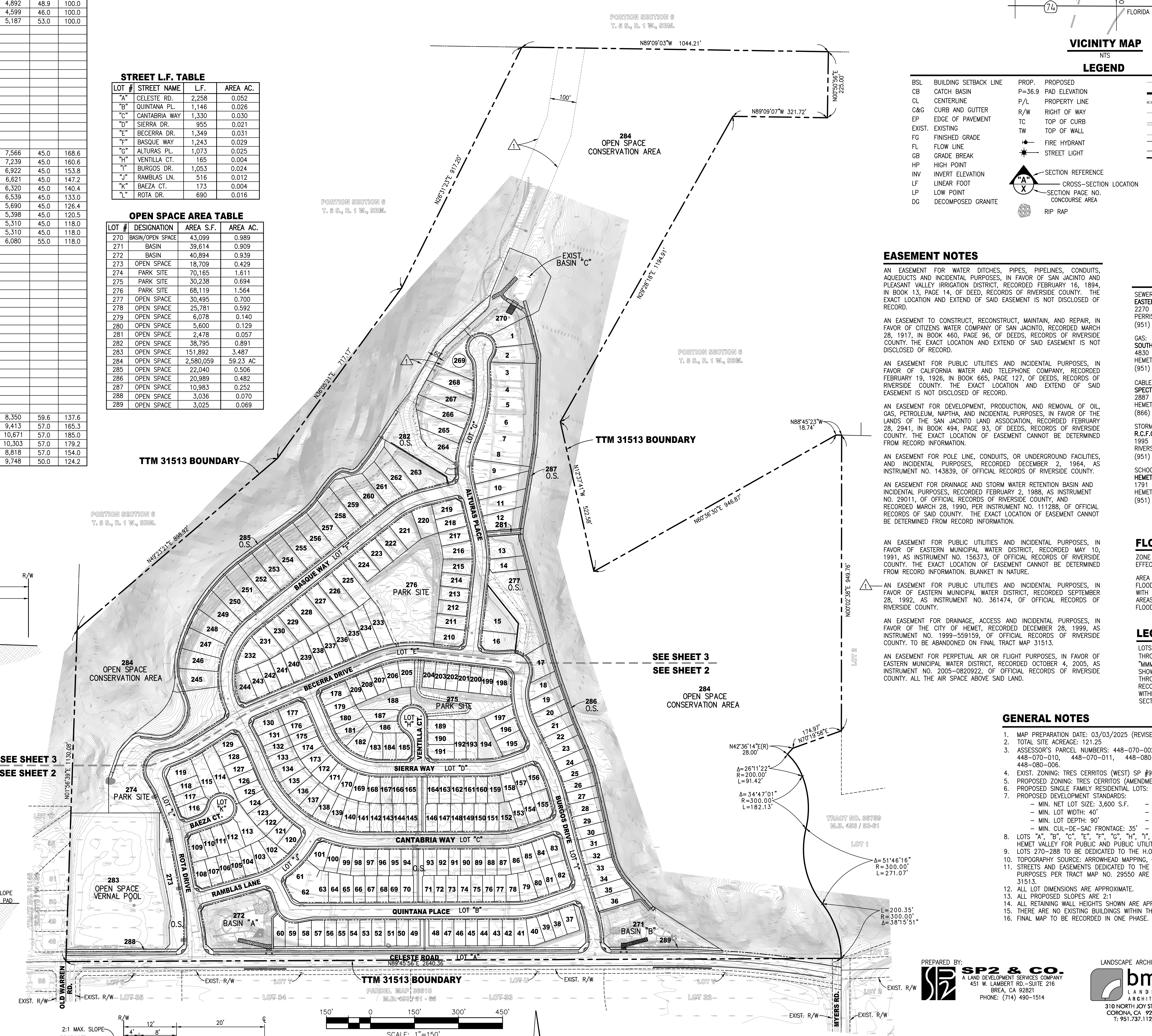
(PUBLIC ST.—PER S.P. EXHIBIT 4-5)
BECERRA DRIVE
TYPICAL PARKWAY SECTION
SCALE: 1"=10'

STREET L.F. TABLE

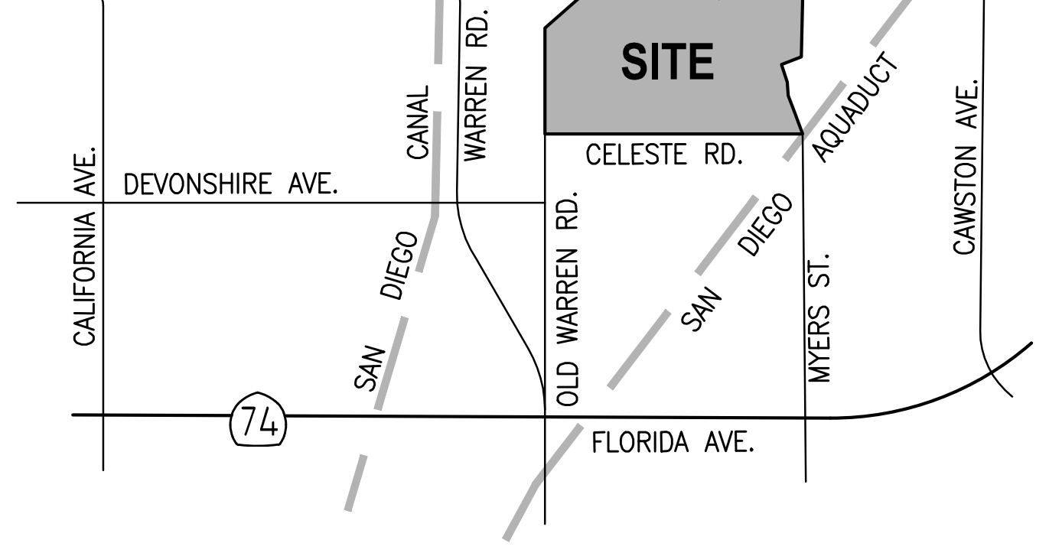
LOT #	STREET NAME	L.F.	AREA AC.
"A"	CELESTE RD.	2,258	0.052
"B"	QUINTANA PL.	1,146	0.026
"C"	CANTABRIA WAY	1,330	0.030
"D"	SIERRA DR.	955	0.021
"E"	BECERRA DR.	1,349	0.031
"F"	BASQUE WAY	1,243	0.029
"G"	ALTURAS PL.	1,073	0.025
"H"	VENTILLA CT.	165	0.004
"I"	BURGOS DR.	1,053	0.024
"J"	RAMBLAS LN.	516	0.012
"K"	BAEZA CT.	173	0.004
"L"	ROTA DR.	690	0.016

OPEN SPACE AREA TABLE

LOT #	DESIGNATION	AREA S.F.	AREA AC.
270	BASIN/OPEN SPACE	43,099	0.989
271	BASIN	39,614	0.909
272	BASIN	40,894	0.939
273	OPEN SPACE	18,709	0.429
274	PARK SITE	70,165	1.611
275	PARK SITE	30,238	0.694
276	PARK SITE	68,119	1.564
277	OPEN SPACE	30,495	0.700
278	OPEN SPACE	25,781	0.592
279	OPEN SPACE	6,078	0.140
280	OPEN SPACE	5,600	0.129
281	OPEN SPACE	2,478	0.057
282	OPEN SPACE	38,795	0.891
283	OPEN SPACE	151,892	3.487
284	OPEN SPACE	2,580,059	59.23 AC
285	OPEN SPACE	22,040	0.506
286	OPEN SPACE	20,989	0.482
287	OPEN SPACE	10,983	0.252
288	OPEN SPACE	3,036	0.070
289	OPEN SPACE	3,025	0.069



INDEX MAP



VICINITY MAP
NTS

LEGEND

BSL	BUILDING SETBACK LINE	PROP.	PROPOSED	——1430——	EXIST. CONTOUR
CB	CATCH BASIN	P=36.9	PAD ELEVATION		PROP. RETAINING WALL
CL	CENTERLINE	P/L	PROPERTY LINE		PROP. CMU SCREEN WALL
C&G	CURB AND GUTTER	R/W	RIGHT OF WAY	——S——	PROP. SEWER LINE
EP	EDGE OF PAVEMENT	TC	TOP OF CURB	══SD══	PROP. STORM DRAIN LINE
EXIST.	EXISTING	TW	TOP OF WALL	——W——	PROP. WATER LINE
FG	FINISHED GRADE		FIRE HYDRANT		PROP. 2:1 SLOPE
FL	FLOW LINE		STREET LIGHT		TENTATIVE TRACT BOUNDARY
GB	GRADE BREAK	"A" X	SECTION REFERENCE CROSS-SECTION LOCATION SECTION PAGE NO. CONCOURSE AREA		INDICATES PARK SITE & OPEN SPACE AREA
HP	HIGH POINT		RIP RAP		DG MAINTENANCE PATH
INV	INVERT ELEVATION				CONCRETE SURFACE
LF	LINEAR FOOT				
LP	LOW POINT				
DG	DECOMPOSED GRANITE				

EASEMENT NOTES

AN EASEMENT FOR WATER DITCHES, PIPES, PIPELINES, CONDUITS, AQUEDUCTS AND INCIDENTAL PURPOSES, IN FAVOR OF SAN JACINTO AND PLEASANT VALLEY IRRIGATION DISTRICT, RECORDED FEBRUARY 16, 1894, IN BOOK 13, PAGE 14, OF DEED, RECORDS OF RIVERSIDE COUNTY. THE EXACT LOCATION AND EXTEND OF SAID EASEMENT IS NOT DISCLOSED OF RECORD.

AN EASEMENT TO CONSTRUCT, RECONSTRUCT, MAINTAIN, AND REPAIR, IN FAVOR OF CITIZENS WATER COMPANY OF SAN JACINTO, RECORDED MARCH 28, 1917, IN BOOK 460, PAGE 96, OF DEEDS, RECORDS OF RIVERSIDE COUNTY. THE EXACT LOCATION AND EXTEND OF SAID EASEMENT IS NOT DISCLOSED OF RECORD.

AN EASEMENT FOR PUBLIC UTILITIES AND INCIDENTAL PURPOSES, IN FAVOR OF CALIFORNIA WATER AND TELEPHONE COMPANY, RECORDED FEBRUARY 19, 1926, IN BOOK 665, PAGE 127, OF DEEDS, RECORDS OF RIVERSIDE COUNTY. THE EXACT LOCATION AND EXTEND OF SAID EASEMENT IS NOT DISCLOSED OF RECORD.

AN EASEMENT FOR DEVELOPMENT, PRODUCTION, AND REMOVAL OF OIL, GAS, PETROLEUM, NAPTHA, AND INCIDENTAL PURPOSES, IN FAVOR OF THE LANDS OF THE SAN JACINTO LAND ASSOCIATION, RECORDED FEBRUARY 28, 2941, IN BOOK 494, PAGE 93, OF DEEDS, RECORDS OF RIVERSIDE COUNTY. THE EXACT LOCATION OF EASEMENT CANNOT BE DETERMINED FROM RECORD INFORMATION.

AN EASEMENT FOR POLE LINE, CONDUITS, OR UNDERGROUND FACILITIES, AND INCIDENTAL PURPOSES, RECORDED DECEMBER 2, 1964, AS INSTRUMENT NO. 143839, OF OFFICIAL RECORDS OF RIVERSIDE COUNTY.

AN EASEMENT FOR DRAINAGE AND STORM WATER RETENTION BASIN AND INCIDENTAL PURPOSES, RECORDED FEBRUARY 2, 1988, AS INSTRUMENT NO. 29011, OF OFFICIAL RECORDS OF RIVERSIDE COUNTY, AND RECORDED MARCH 28, 1990, PER INSTRUMENT NO. 111288, OF OFFICIAL RECORDS OF SAID COUNTY. THE EXACT LOCATION OF EASEMENT CANNOT BE DETERMINED FROM RECORD INFORMATION.

AN EASEMENT FOR PUBLIC UTILITIES AND INCIDENTAL PURPOSES, IN FAVOR OF EASTERN MUNICIPAL WATER DISTRICT, RECORDED MAY 10, 1991, AS INSTRUMENT NO. 156373, OF OFFICIAL RECORDS OF RIVERSIDE COUNTY. THE EXACT LOCATION OF EASEMENT CANNOT BE DETERMINED FROM RECORD INFORMATION. BLANKET IN NATURE.

△1 AN EASEMENT FOR PUBLIC UTILITIES AND INCIDENTAL PURPOSES, IN FAVOR OF EASTERN MUNICIPAL WATER DISTRICT, RECORDED SEPTEMBER 28, 1992, AS INSTRUMENT NO. 361474, OF OFFICIAL RECORDS OF RIVERSIDE COUNTY.

AN EASEMENT FOR DRAINAGE, ACCESS AND INCIDENTAL PURPOSES, IN FAVOR OF THE CITY OF HEMET, RECORDED DECEMBER 28, 1999, AS INSTRUMENT NO. 1999-559159, OF OFFICIAL RECORDS OF RIVERSIDE COUNTY. TO BE ABANDONED ON FINAL TRACT MAP 31513.

AN EASEMENT FOR PERPETUAL AIR OR FLIGHT PURPOSES, IN FAVOR OF EASTERN MUNICIPAL WATER DISTRICT, RECORDED OCTOBER 4, 2005, AS INSTRUMENT NO. 2005-0820922, OF OFFICIAL RECORDS OF RIVERSIDE COUNTY. ALL THE AIR SPACE ABOVE SAID LAND.

UTILITY PURVEYORS

SEWER & WATER:
EASTERN MUNICIPAL WATER DIST.
2270 TRUMBLE ROAD
PERRIS, CA 92570
(951) 928-3777

GAS:
SOUTHERN CALIFORNIA GAS CO.
4830 DUSKYWING ROAD
HEMET, CA 92545
(951) 652-1019

CABLE/TELEPHONE:
SPECTRUM
2887 W. FLORIDA AVENUE
HEMET, CA 92545
(866) 874-2389

STORM DRAIN:
R.C.F.C.&W.C.D.
1995 MARKET STREET
RIVERSIDE, CA 92501
(951) 955-1200

SCHOOL DISTRICT:
HEMET UNIFIED SCHOOL DISTRICT
1791 W. ACACIA AVENUE
HEMET, CA 92545
(951) 765-5100

SOLID WASTE:
CR&R ENVIRONMENTAL SERVICES
1706 GOETZ ROAD
PERRIS, CA 92570
(951) 943-1991

ELECTRIC:
SOUTHERN CALIFORNIA EDISON CO.
24487 PRIELIPP ROAD
WILDOMAR, CA 92595
(800) 655-4555

CABLE/TELEPHONE:
VERIZON
3301 W. FLORIDA AVENUE
HEMET, CA 92545
(800) 880-1077

STORM DRAIN:
CITY OF HEMET
3777 INDUSTRIAL AVENUE
CORPORATION YARD
HEMET, CA 92545
(951) 765-3712

FLOOD ZONE DESIGNATION

ZONE X, MAP PANEL #06065C1470G
EFFECTIVE DATE: AUGUST 28, 2008

AREA OF 0.2% ANNUAL FLOOD CHANCE; OF 1% ANNUAL FLOOD WITH AVERAGE DEPTHS OF LESS THAN 1 FOOT OR WITH DRAINAGE AREAS LESS THAN 1 SQUARE MILE, AND AREAS PROTECTED BY LEVEES FROM 1% ANNUAL CHANCE FLOOD.

LEGAL DESCRIPTION

LOTS 1 THROUGH 7, INCLUSIVE, AND LETTERED LOTS "A" THROUGH "I", INCLUSIVE, "K", "L", "EEE", "FFF", "LLL" AND "MMM" OF TRACT NO. 29550, IN THE CITY OF HEMET, AS SHOWN BY MAP ON FILE IN BOOK 299, PAGES 78 THROUGH 99, INCLUSIVE OF MAPS, IN THE OFFICE OF THE RECORDER OF RIVERSIDE COUNTY, CALIFORNIA, ALSO LYING WITHIN A PORTION OF SECTION 6, AND A PORTION OF SECTION 7, TOWNSHIP 5, SOUTH, RANGE 1 WEST, S.B.M.

GENERAL NOTES

1. MAP PREPARATION DATE: 03/03/2025 (REVISED 7/18/2025)
2. TOTAL SITE ACREAGE: 121.25
3. ASSESSOR'S PARCEL NUMBERS: 448-070-002, 448-070-005, 448-070-007, 448-070-009, 448-070-010, 448-070-011, 448-080-001, 448-080-002, 448-080-004, AND 448-080-006.
4. EXIST. ZONING: TRES CERRITOS (WEST) SP #90-009
5. PROPOSED ZONING: TRES CERRITOS (AMENDMENT __)
6. PROPOSED SINGLE FAMILY RESIDENTIAL LOTS: 279
7. PROPOSED DEVELOPMENT STANDARDS:
   - MIN. NET LOT SIZE: 3,600 S.F.
   - MIN. LOT WIDTH: 40'
   - MIN. LOT DEPTH: 90'
   - MIN. CUL-DE-SAC FRONTAGE: 35'
   - MIN. FRONT YARD (GARAGE) SETBACK: 20'
   - MIN. REAR YARD SETBACK: 15'
   - MIN. INTERIOR SIDE YARD SETBACK: 5'
   - MIN. STREET SIDE YARD SETBACK: 10'
8. LOTS "A", "B", "C", "E", "F", "G", "H", "I", "J", "K" & "L" TO BE DEDICATED TO CITY OF HEMET VALLEY FOR PUBLIC AND PUBLIC UTILITY PURPOSES.
9. LOTS 270-288 TO BE DEDICATED TO THE H.O.A FOR PARK SITE AND OPEN SPACE PURPOSES.
10. TOPOGRAPHY SOURCE: ARROWHEAD MAPPING, 06/2024.
11. STREETS AND EASEMENTS DEDICATED TO THE CITY OF HEMET FOR STREET AND PUBLIC UTILITY PURPOSES PER TRACT MAP NO. 29550 ARE TO BE ABANDONED ON FINAL TRACT MAP TRACT 31513.
12. ALL LOT DIMENSIONS ARE APPROXIMATE.
13. ALL PROPOSED SLOPES ARE 2:1
14. ALL RETAINING WALL HEIGHTS SHOWN ARE APPROXIMATE.
15. THERE ARE NO EXISTING BUILDINGS WITHIN THE SITE.
16. FINAL MAP TO BE RECORDED IN ONE PHASE.

PREPARED BY:
SP2 & CO.
A LAND DEVELOPMENT SERVICES COMPANY
451 W. LAMBERT RD.—SUITE 216
BREA, CA 92821
PHONE: (714) 490-1514

LANDSCAPE ARCHITECT:
bmla
LANDSCAPE ARCHITECTURE
310 NORTH JOY STREET
CORONA, CA 92879
T: 951.737.1124

PREPARED FOR (OWNER/APPLICANT):
D·R·HORTON
America's Builder
SOUTH COAST, INLAND EMPIRE DIVISION
980 MONTECITO DRIVE SUITE 300
CORONA, CALIFORNIA 92879
(951) 272-9000

SHEET INDEX

SHEET 1	TITLE SHEET, CROSS-SECTIONS, NOTES
SHEET 2	TTM 31513 CONCEPTUAL GRADING AND UTILITY PLAN
SHEET 3	TTM 31513 CONCEPTUAL GRADING AND UTILITY PLAN

P.R. 24-009

Appendix 3: Soils Information

Geotechnical Study and Other Infiltration Testing Data

PERCOLATION/INFILTRATION TESTING
EXISTING STORMWATER BASINS - LOTS "C" AND "E" WITHIN TRACT 31513, TRES CERRITOS WEST PROJECT
CITY OF HEMET, RIVERSIDE COUNTY, CALIFORNIA

GSI GeoSoils, Inc.

FOR

JMP BIXBY HEMET, LLC
3890 11TH STREET
RIVERSIDE, CALIFORNIA 92501

W.O. 7676-A-SC AUGUST 19, 2019

GeoSoils, Inc.
45th ANNIVERSARY 1974-2019
Geotechnical • Geologic • Coastal • Environmental
26590 Madison Avenue • Murrieta, California 92562 • (951) 677-9651 • FAX (951) 677-9301 • www.geosoilsinc.com

August 19, 2019

W.O. 7676-A-SC

JMP Bixby Hemet, LLC
3890 11th Street
Riverside, California 92408

Attention: Mr. Jon Myhre

Subject: Percolation/Infiltration Testing, Existing Stormwater Basins - Lots "C" and "E" within Tract 31513, Tres Cerritos West Project, City of Hemet, Riverside County, California

Dear Mr. Myhre:

In accordance with your request and authorization GeoSoils, Inc. (GSI) is providing the results of our percolation/infiltration testing within the two (2) existing storm water basins located on Lots "C" and "E" within Tract 31513, Tres Cerritos West project in the City of Hemet, Riverside County, California. The scope of our services has included a review of the referenced reports, documents, and plans (see Appendix A), the advancement of five (5) exploratory borings, which were excavated to depths ranging between 4 and 30 feet, for geologic logging, subsequent field percolation testing and groundwater observations, analysis of field test data obtained, and preparation of this summary report.

SITE LOCATION AND DESCRIPTION

Tract 31513 is located on the northeast corner of the intersection of Rose Road and Old Warren Road in the City of Hemet, Riverside County, California. The property is bounded on the south by Rose Road, on the west-southwest by a single-family residential neighborhood (Tract 31146) and vacant land, on the east by vacant land, and on the north by vacant land and then two (2) EMWD water storage tanks and a residential neighborhood and the Tahquitz High School beyond. Current onsite elevations generally range from a low of about ±1,494 feet Mean Sea Level (MSL) within the existing detention/infiltration basin (Lot "E") to a high of about ±1,609 feet MSL in the northernmost portion of the site, therefore the overall relief of the site is ±115 feet. Drainage across the site is primarily to the south by sheetflow along established undeveloped and partially improved interior roadways; however, is locally variable, depending on relief.

PROPOSED DEVELOPMENT AND BACKGROUND

The rough grading plans by Myers & Associates (2006) indicate the proposed development of Tract 31513 will include 177 residential building pads, two (2) detention/infiltration basins, along with construction of associated underground utility infrastructure and interior/exterior roadway improvements. Typical cut and fill grading techniques were previously utilized during mass grading of portions of the tract, which was partially graded under the geotechnical observation and testing services of GSI during the period of late-August to mid-November of 2006, when economic conditions forced the project to be placed on-hold. It appears from our recent site reconnaissance conducted on July 11, 2019, the central and western perimeter lots, and lots within the water reservoir outlet piping alignment, are currently below design grade or ungraded, respectively, and will require additional grading to reach design grades. Once rough grading of the project site is completed, it is our understanding that the proposed one- to two-story residential dwellings will utilize typical continuous footings and slab-on-grade floors with wood-frame structures, and stucco/wood exteriors. Building loads are assumed to be typical for these types of relatively light structures. Sewage disposal is to be accommodated by tying into the regional system.

SITE GEOLOGY

Based on our review of published geologic mapping by Morton and Matti (2001), the site may be characterized as being primarily underlain by Holocene and late Pleistocene-age young alluvial-valley deposits near the southern property boundary and late to middle Pleistocene-age old alluvial-fan deposits (on the remaining northern portions of the site), mantled locally by relatively thin layers of compacted engineered fills placed during the original uncompleted site grading of the property (GSI, proprietary in-house data). As described by Morton and Matti (2001), the young alluvial valley deposits are primarily unconsolidated silty to sandy alluvium on valley floors and the old alluvial fan deposits are dominantly indurated, sandy alluvial-fan deposits that are reddish brown and slightly to moderately dissected. The young alluvial-valley deposits and old alluvial-fan deposits encountered below surficial deposits within the existing stormwater basins were generally observed to be varying hues of reddish brown to grayish brown, fine to coarse grained silty sand (SM) and clayey sand (SC), which were locally indurated and medium dense to dense with depth.

GROUNDWATER

Based upon a review of the California Department of Water Resources, Water Data Library (CDWR, 2019), historic depths to groundwater from nearby wells, range between ±37 and ±187 feet (Well Nos. 337445N1170420W001 and 337437N1170068W001, respectively) below ground surface (bgs). Boring B-1 was advanced to a depth of 30 feet (i.e., elevation of approximately ± 1,466 feet MSL) below the basin floor of Lot "E," to review and evaluate potential groundwater conditions under the existing stormwater basin. During our field investigation no groundwater or seepage was encountered within the boring after a period in excess of 24 hours. Based on the available data presented within this report and field observations and data accumulated, it is our professional opinion that regional groundwater will not encroach within the current allowable limit (i.e., 10 feet) set forth by the Riverside County Flood Control and Water Conservation District (RCFC, 2011). However, perched groundwater may occur in the younger alluvial-valley deposits, the older alluvial-fan deposits, and/or along bedding and/or contacts between the compacted fill and underlying alluvial-valley or alluvial-fan deposits, due to migration from adjacent drainage areas and development during and/or after periods of above normal or heavy precipitation or irrigation. Thus, perched groundwater conditions may occur in the future, and should be anticipated. These observations reflect site conditions at the time of our investigation and do not prevent changes in local groundwater conditions in the future from heavy precipitation, irrigation, or other factors not obvious at the time of our field work.

PERCOLATION TESTING

In general accordance with guidelines of the RCFC (2011) Design Handbook for Low Impact Development Best Management Practices, four (4) percolation tests were conducted within the two (2) existing stormwater basins onsite. The percolation testing was conducted within the cut areas of the basins, at depths of 4 feet and 20 feet within each basin. The approximate locations of the percolation/infiltration tests and groundwater observation boring advanced for this study are provided on Figure 1 (Boring Location Map). The percolation/infiltration testing was performed to further evaluate site conditions with respect to the existing water quality basins that will retain and filter onsite storm water. Percolation testing was performed in general conformance with the RCFC (2011) and CASQA (2003) design handbooks for such testing. The field percolation testing and geologic logging were performed by an engineering geologist from our firm (Todd M. Page, CEG 2383). Logs of the borings advanced for this study are presented in Appendix B and the field percolation data sheets are presented in Appendix C. Procedures for testing are outlined briefly below:

Percolation Test Procedures

Test Borings:

1. Drill rig excavated to a depth of between ±4 to ±20 feet.
2. Diameter - 8 inches.
3. After the removal of loose materials, 2 inches of gravel was placed on the bottom of each test boring.
4. A perforated pipe was then installed within each test boring to facilitate accurate field measurements and prevent caving during the pre-soak period and subsequent testing.

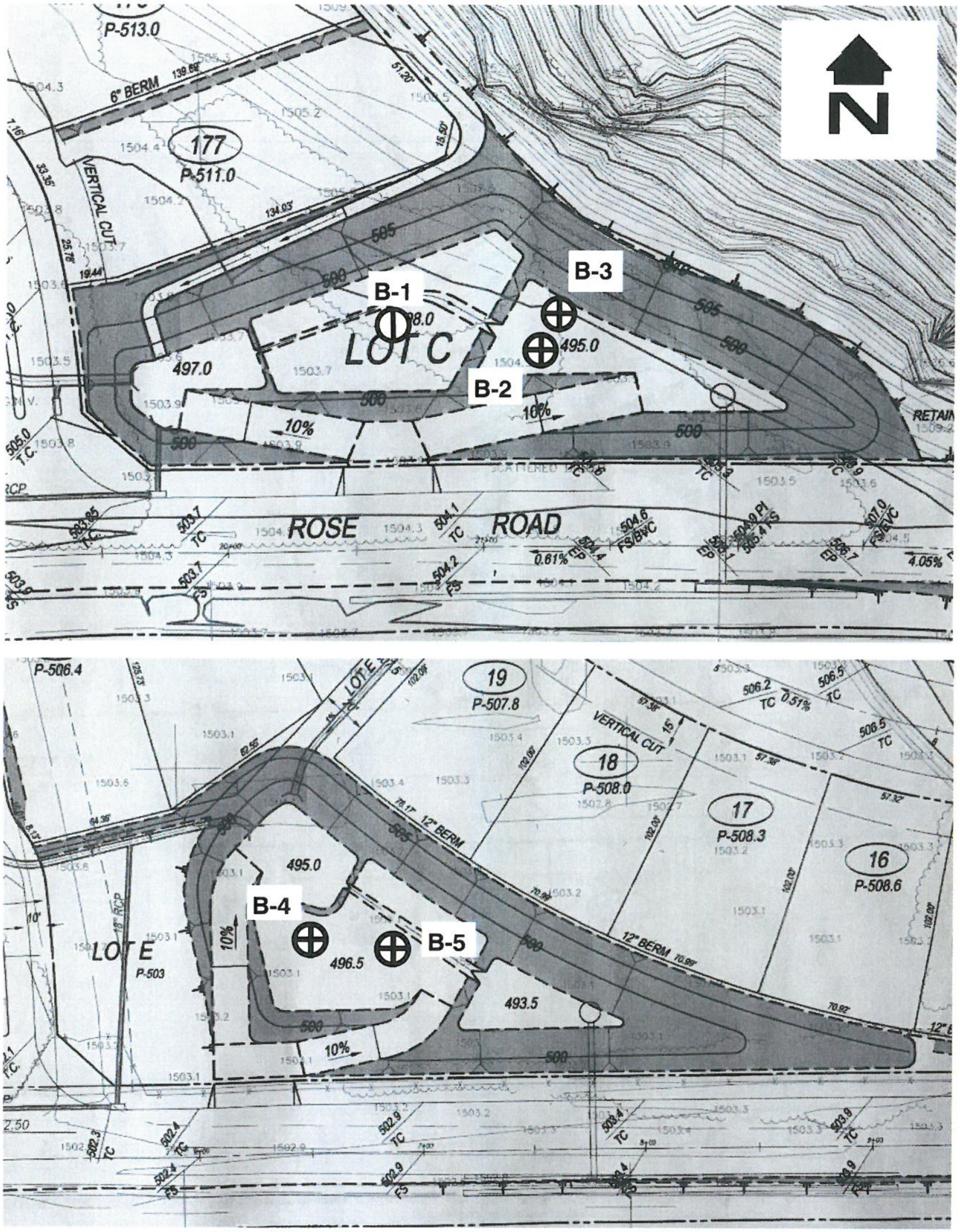


Figure Adapted from 40-Scale Rough Grading Plans by Myers & Associates (2006).

GSI LEGEND

B-5
⊕ Approximate Location of Exploratory Boring

B-1
⦶ Approximate Location of Groundwater Observation Boring.

GeoSoils, Inc.

BORING LOCATION MAP

Figure 1

W.O. 7676-A-SC	DATE: 08/19	SCALE: NTS

Sandy Soil Test: After the installation of the perforated pipes, the 20-foot borings were filled continuously with a column of clear water to 4 feet from the ground surface. The 4-foot borings were filled to 8 inches from the ground surface, to achieve a level of water within the borings to at least five (5) times the hole's radius (CASQA, 2003). During the pre-soak period, two (2) consecutive measurements were conducted within each boring at intervals of approximately 25 minutes. Less than 6 inches of water seeped away during each of the two (2) test measurements, therefore the pre-soak period was initiated within each boring test location.

Pre-Soaking: Again, a column of clear water was established above the gravel at the bottom of the boring to within 4 feet from the ground surface in the 20-foot borings. The 4-foot borings were filled to within 8 inches from the ground surface. The pre-soak period continued overnight, as all the water did not seep away while the tester was present.

Testing: Percolation testing measurements were made the following day after required pre-soak period. A column of clear water was re-established within each of the borings to within 4 feet of the surface and 8 inches from the surface for the 20-foot borings and 4-foot borings, respectively. The drop in water level was measured from a fixed reference point, refilling after each test measurement. The series of test measurements were taken for a minimum of six (6) hours, at time intervals of approximately ±30 minutes.

Accuracy: All test measurements were read to the nearest ¼-inch.

Test Results: Typically, the final percolation rate obtained for each individual test location is applied to the design. Calculations from our field testing indicate percolation rates of between 0.0 and 120 minutes/inch and 20 and 30 minutes/inch, at depths of 4 feet, and 20 feet, respectively. Per the RCFC (2011) guidelines, the percolation rates obtained were then converted to infiltration rates utilizing the "Porchet Method," to be utilized by the design engineer for appropriate sizing of the basin. The converted infiltration rates obtained varied between 0.0 and 0.031 inches/hour with an average of 0.019 inches/hour. The converted infiltration rates, along with the formulas utilized are provided on Figure 2.

Percolation Rate to Infiltration Rate Conversion

$$^{*}\text{Infiltration Rate } (I_t) = \frac{\Delta H\ \pi r^2\ 60}{\Delta t(\pi r^2 + 2\pi r H_{avg})} = \frac{\Delta H\ 60\ r}{\Delta t(r+2H_{avg})}$$

Where:

I_t = tested infiltration rate, inches/hour
ΔH = change in head over the time interval, inches
Δt = time interval, minutes
r = effective radius of test hole
H_{avg} = average head over the time interval, inches

		Δt	Init Level	Fnl Level	ΔH	H_{avg}	I_t		
Infiltration Test Numbers	B-2 @ 20 ft.	30	192	190 1/2	1 1/2	191 1/4	0.031		
	B-3 @ 4 ft.	30	40	40	0	40	0.000	High =	0.030
	B-4 @ 20 ft.	30	192	191	1	191 1/2	0.021	Low =	0.000
	B-5 @ 4 ft.	30	40	39 3/4	1/4	39 7/8	0.024	Average =	0.019

* Conversion per the "Porchet Method" (RCFWCD, 2011)

W.O. 7676-A-SC

Figure 2

USDA Site Soil Groups, Soil Units, Ksat Values, and Infiltration Basin Siting Requirements

Our review of the United States Department of Agriculture (USDA, 2019) Web Soil Survey (https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm), indicates two (2) major soil units underlie the basins onsite. The Domino Silt Loam (Dv) is shown underlying Basin "E," with a generalized Hydrologic Soil Group of "D," and a capacity of the most limiting soil layer to transmit water (Ksat) of "very low" (i.e., 0.00 to 0.00 in/hr). While the Traver Loamy Fine Sand, eroded (Tp2), is shown underlying Basin "C," with a generalized Hydrologic Soil Group of "B," and a capacity of the most limiting soil layer to transmit water (Ksat) of "moderately high to high" (i.e., 0.57 to 1.98 in/hr).

Our review of the general infiltration basin siting requirements and limitations (CASQA, 2003), indicates sites with Hydrologic Soil Groups of "D," are generally not suitable for infiltration. Furthermore, if infiltration rates utilized for design exceed 2.4 inches/hour, then the runoff should be fully treated prior to infiltration to protect groundwater quality (CASQA, 2003).

CONCLUSIONS AND RECOMMENDATIONS

Based on the field percolation/infiltration testing conducted, it is our opinion that the proposed residential site development is feasible from a geotechnical viewpoint, provided the recommendations presented herein, are implemented during project planning, design, and construction, as warranted.

The design engineer will need to review basin siting requirements by CASQA (2003) and the converted rates obtained during this study with respect to the existing stormwater basins. Due to the lower infiltration rates obtained during this study, supplemental up-gradient filtration/detention systems or filtration/detention systems within the existing basin (i.e., bio-retention facilities, extended detention basins, sand filter/media treatment areas, vegetated swales, etc.) may need to be incorporated onsite, and should be considered for supplemental planning purposes. An appropriate factor of safety (FOS), per the controlling authorities requirements, should also be incorporated into the design calculations. The infiltration rates, design parameters, and recommendations proved herein are based on our experience with earth materials within the Hemet area, RCFC (2011) and State criteria (CASQA, 2003), and our experience on nearby sites with similar geologic conditions.

Onsite Storm Water Best Management Practice (BMP) Systems

The following geotechnical guidelines should be considered when designing/redesigning the onsite infiltration-runoff retention systems (OIRRS):

- It is not good engineering practice to allow water to saturate soils, especially near slopes or improvements; however, the controlling agency/authority is now requiring this for OIRRS purposes on many projects.

- Wherever possible, infiltration systems should not be installed within ±50 feet of the tops of slopes steeper than 15 percent or within H/3 from the tops of slopes (where H equals the height of slope).

- Impermeable liners used in conjunction with basins should consist of a 30-mil polyvinyl chloride (PVC) membrane that is covered by a minimum of 12 inches of clean soil, free from rocks and debris, and meets the following minimum specifications:

  > Specific Gravity (ASTM D792): 1.2 (g/cc [min.]); Tensile (ASTM D882): 73 (lb/in-width [min.]); Elongation at Break (ASTM D882): 380 (% [min.]); Modulus (ASTM D882): 30 (lb/in-width [min.]); and Tear Strength (ASTM D1004): 8 (lbs [min.]); Seam Shear Strength (ASTM D882) 58.4 (lb/in [min.]); Seam Peel Strength (ASTM D882) 15 (lb/in [min]).

- Wherever possible, infiltrations systems should not be placed within a distance of H/2 from the toes of slopes (where H equals the height of slope).

- The landscape architect should be notified of the location of the proposed OIRRS. If landscaping is proposed within the OIRRS, consideration should be given to the type of vegetation chosen and their potential effect upon subsurface improvements (i.e., some trees/shrubs will have an effect on subsurface improvements with their extensive root systems). Over-watering landscape areas above, or adjacent to, the proposed OIRRS could adversely affect performance of the system.

- Areas adjacent to, or within, the OIRRS that are subject to inundation should be properly protected against scouring, undermining, and erosion, in accordance with the recommendations of the design engineer.

- Infiltrations systems should not be installed within ±8 feet of building foundations utility trenches, and walls, or a 1:1 (h:v) slope (down and away) from the bottom elements of these improvements. Alternatively, deepened foundations and/or pile/pier supported improvements may be used.

- Infiltrations systems should not be installed adjacent to pavement and/or hardscape improvements. Alternatively, deepened/thickened edges and curbs and/or impermeable liners may be utilized in areas adjoining the OIRRS.

- As with any OIRRS, localized ponding and groundwater seepage should be anticipated. The potential for seepage and/or perched groundwater to occur after site development should be disclosed to all interested/affected parties.

- Installation of infiltrations systems should avoid expansive soils (Expansion Index [E.I.] ≥51) or soils with a relatively high plasticity index (P.I. > 20).

- Infiltration systems should not be installed where the vertical separation of the groundwater level is less than ±10 feet from the base of the system.

- Infiltration systems should be designed using a suitable factor of safety (FOS) to account for uncertainties in the known infiltration rates (as generally required by the controlling authorities), and reduction in performance over time.

- As with any OIRRS, proper care will need to provided. Best management practices should be followed at all times, especially during inclement weather. Provisions for the management of any siltation, debris within the OIRRS, and/or overgrown vegetation (including root systems) should be considered. An appropriate inspection schedule will need to adopted and provided to all interested/affected parties.

- Any designed system will require regular and periodic maintenance, which may include rehabilitation and/or complete replacement of the filter media (e.g., sand, gravel, filter fabrics, topsoils, mulch, etc.) or other components utilized in construction, so that the design life exceeds 15 years. Due to the potential for piping and adverse seepage conditions, a burrowing rodent control program should also be implemented onsite.

- All or portions of these systems may be considered attractive nuisances. Thus, consideration of the effects of, or potential for, vandalism should be addressed.

- Newly established vegetation/landscaping (including phreatophytes) may have root systems that will influence the performance of the OIRRS or nearby LID systems.

- The potential for surface flooding, in the case of system blockage, should be evaluated by the design engineer.

- Any proposed utility backfill materials (i.e., inlet/outlet piping and/or other subsurface utilities) located within or near the proposed area of the OIRRS may become saturated. This is due to the potential for piping, water migration, and/or seepage along the utility trench line backfill. If utility trenches cross and/or are proposed near the OIRRS, cut-off walls or other water barriers will need to be installed to mitigate the potential for piping and excess water entering the utility backfill materials. Planned or existing utilities may also be subject to piping of fines into open-graded gravel backfill layers unless separated from overlying or adjoining OIRRS by geotextiles and/or slurry backfill.

- The use of OIRRS above existing utilities that might degrade/corrode with the introduction of water/seepage should be avoided.

LIMITATIONS

The materials encountered on the project site and utilized for our analysis are believed representative of the area; however, soil and bedrock materials vary in character between excavations and natural outcrops or conditions exposed during mass grading. Site conditions may vary due to seasonal changes or other factors.

Inasmuch as our study is based upon our review and engineering analyses and field test data, the conclusions and recommendations are professional opinions. These opinions have been derived in accordance with current standards of practice, and no warranty, either express or implied, is given. Standards of practice are subject to change with time. GSI assumes no responsibility or liability for work or testing performed by others, or their inaction; or work performed when GSI is not requested to be onsite, to evaluate if our recommendations have been properly implemented. Use of this report constitutes an agreement and consent by the user to all the limitations outlined above, notwithstanding any other agreements that may be in place. In addition, this report may be subject to review by the controlling authorities. Thus, this report brings to completion our scope of services for this portion of the project.

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

Respectfully submitted,

GeoSoils, Inc.

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Enclosures: Appendix A - References
Appendix B - Boring Logs
Appendix C - Field Percolation Data Sheets

Distribution: (3) Addressee (2 wet signed and email pdf)

APPENDIX A

REFERENCES

APPENDIX A

REFERENCES

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APPENDIX B

BORING LOGS

UNIFIED SOIL CLASSIFICATION SYSTEM

Major Divisions			Group Symbols	Typical Names
Coarse-Grained Soils More than 50% retained on No. 200 sieve	Gravels 50% or more of coarse fraction retained on No. 4 sieve	Clean Gravels	GW	Well-graded gravels and gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels and gravel-sand mixtures, little or no fines
		Gravel with	GM	Silty gravels gravel-sand-silt mixtures
			GC	Clayey gravels, gravel-sand-clay mixtures
	Sands more than 50% of coarse fraction passes No. 4 sieve	Clean Sands	SW	Well-graded sands and gravelly sands, little or no fines
			SP	Poorly graded sands and gravelly sands, little or no fines
		Sands with Fines	SM	Silty sands, sand-silt mixtures
			SC	Clayey sands, sand-clay mixtures
Fine-Grained Soils 50% or more passes No. 200 sieve	Silts and Clays Liquid limit 50% or less		ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL	Organic silts and organic silty clays of low plasticity
	Silts and Clays Liquid limit greater than 50%		MH	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts
			CH	Inorganic clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity
Highly Organic Soils			PT	Peat, mucic, and other highly organic soils

CONSISTENCY OR RELATIVE DENSITY

CRITERIA

Standard Penetration Test

Penetration Resistance N (blows/ft)	Relative Density
0 - 4	Very loose
4 - 10	Loose
10 - 30	Medium
30 - 50	Dense
> 50	Very dense

Standard Penetration Test

Penetration Resistance N (blows/ft)	Consistency	Unconfined Compressive Strength (tons/ft^2)
<2	Very Soft	<0.25
2 - 4	Soft	0.25 - .050
4 - 8	Medium	0.50 - 1.00
8 - 15	Stiff	1.00 - 2.00
15 - 30	Very Stiff	2.00 - 4.00
>30	Hard	>4.00

3" 3/4" #4 #10 #40 #200 U.S. Standard Sieve

Unified Soil Classification	Cobbles	Gravel		Sand			Silt or Clay
		coarse	fine	coarse	medium	fine	

MOISTURE CONDITIONS

Dry	Absence of moisture: dusty, dry to the touch
Slightly Moist	Below optimum moisture content for compaction
Moist	Near optimum moisture content
Very Moist	Above optimum moisture content
Wet	Visible free water; below water table

MATERIAL QUANTITY

trace	0 - 5 %
few	5 - 10 %
little	10 - 25 %
some	25 - 45 %

OTHER SYMBOLS

C	Core Sample
S	SPT Sample
B	Bulk Sample
__	Groundwater
Qp	Pocket Penetrometer

BASIC LOG FORMAT:
Group name, Group symbol, (grain size), color, moisture, consistency or relative density. Additional comments: odor, presence of roots, mica, gypsum, coarse grained particles, etc.

EXAMPLE:
Sand (SP), fine to medium grained, brown, moist, loose, trace silt, little fine gravel, few cobbles up to 4" in size, some hair roots and rootlets.

GeoSoils, Inc.

BORING LOG

PROJECT: JMP Bixby Hemet, LLC
Tract 31513, Tres Cerritos West Project,
Hemet

W.O. W.O. 7676-A-SC BORING B-1 SHEET 1 OF 1

DATE EXCAVATED 7-31-2019 LOGGED BY: TMP APPROX. ELEV.: 1,498'

SAMPLE METHOD: G.W. Obs. Well, Lot C, West Center, 8" HSA

Depth (ft.)	Sample: Bulk	Sample: Undisturbed	Sample: Blows/Ft.	USCS Symbol	Dry Unit Wt. (pcf)	Moisture (%)	Saturation (%)	Material Description
0				ML				**QUATERNARY SLOPEWASH (Qsw):** @ 0' SILT, light gray, dry, soft to firm.
				CL				**QUATERNARY YOUNG ALLUVIAL VALLEY DEPOSITS (Qyv):** @ ½' CLAYEY SILT, gray brown, slightly moist, firm
5				SM				**QUATERNARY OLD ALLUVIAL FAN DEPOSITS (Qof):** @ 5' SILTY SAND, red brown, moist, medium dense; fine grained.
				SC				@ 8' CLAYEY SAND, red brown, moist, medium dense.
10				CL				@ 10' SANDY CLAY, red brown, moist, firm.
				SC				@ 12' CLAYEY SAND, red brown, moist, dense.
15				SM				@ 15' SILTY SAND, gray brown, slightly moist, dense; fine grained.
20				SM/ GM				@ 20' As per 15'; fine to coarse grained, drill rig chatter on rocks/gravel?
25				SC				@ 25' Slightly CLAYEY SAND, reddish brown, slightly moist, dense.
30								@ 30' as per 25', fine to coarse sands.
								Total Depth = 30' No Groundwater/Seepage Encountered After 24 Hours Backfilled 7-31-2019

◪ *Standard Penetration Test*
Ⅰ *Undisturbed, Ring Sample*
▼ *Groundwater*
♀ *Seepage*

GeoSoils, Inc.

PLATE B-2

GeoSoils, Inc.

BORING LOG

PROJECT: JMP Bixby Hemet, LLC
Tract 31513, Tres Cerritos West Project,
Hemet

W.O. W.O. 7676-A-SC *BORING* B-2 *SHEET* 1 *OF* 1

DATE EXCAVATED 7-31-2019 *LOGGED BY:* TMP *APPROX. ELEV.:* 1,495'

SAMPLE METHOD: Lot C, East Center, 8" HSA

Depth (ft.)	Sample			USCS Symbol	Dry Unit Wt. (pcf)	Moisture (%)	Saturation (%)	Material Description
	Bulk	Undisturbed	Blows/Ft.					
0				ML				**QUATERNARY SLOPEWASH (Qsw):** @ 0' SILT, light gray, dry, soft.
				SM				**QUATERNARY YOUNG ALLUVIAL VALLEY DEPOSITS (Qyv):** @ ½' SILTY SAND, gray brown, slightly moist, dense; fine grained.
5								
10								@ 10' SILTY SAND, red brown, slightly moist, dense; fine to coarse grained.
15								
20								@ 20' SILTY SAND, red yellow, slightly moist, dense to very dense; fine to coarse grained.
								Total Depth = 21' No Groundwater/Seepage Encountered Backfilled 7-31-2019
25								
30								

◪ *Standard Penetration Test*
⌶ *Undisturbed, Ring Sample*

≛ *Groundwater*
♀ *Seepage*

GeoSoils, Inc.

BORING LOG

PROJECT: JMP Bixby Hemet, LLC
Tract 31513, Tres Cerritos West Project,
Hemet

W.O. W.O. 7676-A-SC *BORING* B-3 *SHEET* 1 *OF* 1

DATE EXCAVATED 7-31-2019 *LOGGED BY:* TMP *APPROX. ELEV.:* 1,495'

SAMPLE METHOD: Lot C, East Center, 8" HSA

Depth (ft.)	Sample: Bulk	Sample: Undisturbed	Sample: Blows/Ft.	USCS Symbol	Dry Unit Wt. (pcf)	Moisture (%)	Saturation (%)	Material Description
0				ML				**QUATERNARY SLOPEWASH (Qsw):** @ 0' SILT, light gray, dry, soft.
				SM				**QUATERNARY YOUNG ALLUVIAL VALLEY DEPOSITS (Qyv):** @ ½' SILTY SAND, gray brown, slightly moist, dense.
5								Total Depth = 4' No Groundwater/Seepage Encountered Backfilled 7-31-2019
10								
15								
20								
25								
30								

◪ *Standard Penetration Test*
⌶ *Undisturbed, Ring Sample*
▼ *Groundwater*
♀ *Seepage*

GeoSoils, Inc.

PLATE B-4

GeoSoils, Inc.

BORING LOG

PROJECT: JMP Bixby Hemet, LLC
Tract 31513, Tres Cerritos West Project,
Hemet

W.O. W.O. 7676-A-SC *BORING* B-4 *SHEET* 1 *OF* 1

DATE EXCAVATED 7-31-2019 *LOGGED BY:* TMP *APPROX. ELEV.:* 1496½'

SAMPLE METHOD: Lot E, West Center, 8" HSA

Depth (ft.)	Sample: Bulk	Sample: Undisturbed	Sample: Blows/Ft.	USCS Symbol	Dry Unit Wt. (pcf)	Moisture (%)	Saturation (%)	Material Description
0				ML				**QUATERNARY SLOPEWASH (Qsw):** @ 0' SILT, light gray, slightly moist, soft.
				SM				**QUATERNARY OLD ALLUVIAL FAN DEPOSITS (Qof):** @ 3' SILTY SAND, reddish brown, moist, dense; fine to medium grained.
5								@ 7' As per 3', fine to coarse grained.
10								@ 10' As per 7'.
15								@ 15' As per 10'.
20								@ 20' As per 15'. Total Depth = 20' No Groundwater/Seepage Encountered Backfilled 7-31-2019
25								
30								

☑ *Standard Penetration Test*
⌶ *Undisturbed, Ring Sample*
Groundwater
Seepage

GeoSoils, Inc.

BORING LOG

PROJECT: JMP Bixby Hemet, LLC
Tract 31513, Tres Cerritos West Project,
Hemet

W.O. W.O. 7676-A-SC *BORING* B-5 *SHEET* 1 *OF* 1

DATE EXCAVATED 7-31-2019 *LOGGED BY:* TMP *APPROX. ELEV.:* 1,496½'

SAMPLE METHOD: Lot E, West Center, 8" HSA

Depth (ft.)	Sample			USCS Symbol	Dry Unit Wt. (pcf)	Moisture (%)	Saturation (%)	Material Description
	Bulk	Undisturbed	Blows/Ft.					
0				ML				**QUATERNARY SLOPEWASH (Qsw):** @ 0' SILT, light gray, dry, soft.
				SM				**QUATERNARY OLD ALLUVIAL FAN DEPOSITS (Qof):** @ ½' SILTY SAND, red brown, moist to very moist with depth, dense; fine to medium grained.
				SC				@ 3' CLAYEY SAND, gray brown, very moist, medium dense; fine grained.
5								Total Depth = 4' No Groundwater/Seepage Encountered Backfilled 7-31-2019
10								
15								
20								
25								
30								

◪ *Standard Penetration Test*
⌶ *Undisturbed, Ring Sample*

Groundwater
Seepage

APPENDIX C

FIELD PERCOLATION DATA SHEETS

Leach Line Percolation Data Sheet

Project: JMP Bixby Hemet LLC		W.O. Number: 7676-A-SC	
Test Hole No.: B-2		Date Excavated: 7-31-19	
Depth of Test Hole: 20'		Soil Classification: SM	
Check for Sandy Soil Criteria Tested by: tmp		Date: 7-31-19	Presoak: 1:30 pm
Actual Percolation Tested by: tmp		Date: 8-1-19	

Sandy Soil Criteria Test

Trial No.	Time	Time Interval (Min.)	Initial Water Level (Inches)	Final Water Level (Inches)	Δ in Water Level (Inches)
1	1:30 1:55	25	48	53.5	5½"

Use: Normal Sandy (Circle One) Soil Criteria

	Time	Time Interval (min)	Total Elapsed Time (Min.)	Initial Water Level (Inches)	Final Water Level (Inches)	Δ in Water Level (Inches)	Percolation Rate (min/inch)
First Hour	7:40 8:10	30	30	47"	57½"	10½	2.86
	8:10 8:40	30	60	48"	53¼	5¼	5.71
Second Hour	8:40 9:10	30	90	48"	55½"	7½	4
	9:10 9:40	30	120	48"	53½"	5½	5.45
Third Hour	9:40 10:10	30	150	48"	52¾	4¾	6.31
	10:10 10:40	30	180	48"	50¾"	2¾	10.9
Fourth Hour	10:40 11:10	30	210	48"	50¼"	2¼	13.3
	11:10 11:40	30	240	48"	50"	2	15
Fifth Hour	11:40 12:10	30	270	48"	49½"	1½	20
	12:10 12:40	30	300	48"	49¾	1¾	17.1
Sixth Hour	12:40 1:10	30	336	48"	49½"	1½	20
	1:10 1:40	30	360	48"	49½"	1½	20

Plate No. C-1

Leach Line Percolation Data Sheet

Project: Jmp Bixby Hemet LLC	W.O. Number: 7676-A-SC
Test Hole No.: B-3	Date Excavated: 7-31-19
Depth of Test Hole: 4'	Soil Classification: Sm
Check for Sandy Soil Criteria Tested by: Tmp	Date: 7-31-19 Presoak: 1:17 pm
Actual Percolation Tested by: tmp	Date: 8-1-19

Sandy Soil Criteria Test

Trial No.	Time	Time Interval (Min.)	Initial Water Level (Inches)	Final Water Level (Inches)	Δ in Water Level (Inches)
1	1:17 1:48	25	40	43½	3½"

Use: Normal Sandy (Circle One) Soil Criteria

	Time	Time Interval (min)	Total Elapsed Time (Min.)	Initial Water Level (Inches)	Final Water Level (Inches)	Δ in Water Level (Inches)	Percolation Rate (min/inch)
First Hour	7:43 8:13	30	30	8"	9	1	1
	8:13 8:43	30	60	8	8	0	0
Second Hour	8:43 9:13	30	90	8	8¼	¼	120
	9:13 9:43	30	120	8	10	2	15
Third Hour	9:43 10:13	30	150	8	8½	½	60
	10:13 10:43	30	180	8	8¼	¼	120
Fourth Hour	10:43 11:13	30	210	8	9	1	1
	11:13 11:43	30	240	8	8¼	¼	120
Fifth Hour	11:43 12:13	30	270	8	8	0	0
	12:13 12:43	30	300	8	8	0	0
Sixth Hour	12:43 1:13	30	330	8	8	0	0
	1:13 1:43	30	360	8"	8	0	0

48
+ 8
56

Leach Line Percolation Data Sheet

Project: Imp Bixby Hemet LLC	W.O. Number: 7676-A-SC
Test Hole No.: B-4	Date Excavated: 7-31-19
Depth of Test Hole:	Soil Classification: SM
Check for Sandy Soil Criteria Tested by:	Date: 7-31-19 Presoak: 1:11 pm
Actual Percolation Tested by:	Date: 8-1-19

Sandy Soil Criteria Test

Trial No.	Time	Time Interval (Min.)	Initial Water Level (Inches)	Final Water Level (Inches)	Δ in Water Level (Inches)
1	1:11 1:36	25	48	48½	½"

Use: Normal Sandy (Circle One) Soil Criteria

	Time	Time Interval (min)	Total Elapsed Time (Min.)	Initial Water Level (Inches)	Final Water Level (Inches)	Δ in Water Level (Inches)	Percolation Rate (min/inch)
First Hour	8:06 8:36	30	30	48"	49"	1	30
	8:36 9:06	30	60	48"	49"	1	30
Second Hour	9:06 9:36	30	90	48"	51¼"	3¼	9.23
	9:36 10:06	30	120	48"	49¼"	1¼	24
Third Hour	10:06 10:36	30	150	48"	49¾	1¾	17.1
	10:36 11:06	30	180	48"	49½"	1½	20
Fourth Hour	11:06 11:36	30	210	48"	49½	1½	20
	11:36 12:06	30	240	48"	48¾"	¾	40
Fifth Hour	12:06 12:36	30	270	48"	50"	2	15
	12:36 1:06	30	300	48"	49¾"	1¾	17.1
Sixth Hour	1:06 1:36	30	330	48"	49¾"	1¾	17.1
	1:36 2:06	30	360	48"	49"	1	30

Plate No. C-3

Leach Line Percolation Data Sheet

Project: Jmp Bixby Hemet LLC	W.O. Number: 7676-A-SC
Test Hole No.: B-5	Date Excavated: 7-31-19
Depth of Test Hole: 4'	Soil Classification: SM
Check for Sandy Soil Criteria Tested by: Jmp	Date: 7-31-19 Presoak: 1:08
Actual Percolation Tested by: Jmp	Date: 8-1-19

Sandy Soil Criteria Test

Trial No.	Time	Time Interval (Min.)	Initial Water Level (Inches)	Final Water Level (Inches)	Δ in Water Level (Inches)
1	1:08 1:32	25	8	8¼	¼

Use: Normal Sandy (Circle One) Soil Criteria

	Time	Time Interval (min)	Total Elapsed Time (Min.)	Initial Water Level (Inches)	Final Water Level (Inches)	Δ in Water Level (Inches)	Percolation Rate (min/inch)
First Hour	8:04 8:34	30	30	8	8	0	0
	8:34 9:04	30	60	8	8	0	0
Second Hour	9:04 9:34	30	90	8	8¼	¼	120
	9:34 10:04	30	120	8	8¼	¼	120
Third Hour	10:04 10:34	30	150	8	8	0	0
	10:34 11:04	30	180	8	8	0	0
Fourth Hour	11:04 11:34	30	210	8	8¼	¼	120
	11:34 12:04	30	240	8	8	0	0
Fifth Hour	12:04 12:34	30	270	8	8½	½	60
	12:34 1:04	30	300	8	8¼	¼	120
Sixth Hour	1:04 1:34	30	330	8	8¼	¼	120
	1:34 2:04	30	360	8	8¼	¼	120

Plate No. C-4

EnGEN Corporation
• Soil Engineering and Consulting Services • Engineering Geology • Compaction Testing
• Inspections • Construction Materials Testing • Laboratory Testing • Percolation Testing
• Geology • Water Resource Studies • Phase I & II Environmental Site Assessments
ENVIRONMENTAL & GEOTECHNICAL ENGINEERING NETWORK

GEOTECHNICAL/GEOLOGICAL ENGINEERING STUDY

Tres Cerritos West – Tentative Tract 31513
Assessor's Parcel Numbers: 441-740-001 through -005, -012 and -013
and Assessor's Parcel Numbers: 441-750-001 through -005
City of Hemet, County of Riverside, California
Project Number: T2824-GS

November 24, 2003

Prepared for:

Corman Leigh Communities
41689 Enterprise Circle North, Suite 222
Temecula, California 92590

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EnGEN Corporation
• Soil Engineering and Consulting Services • Engineering Geology • Compaction Testing
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ENVIRONMENTAL & GEOTECHNICAL ENGINEERING NETWORK

November 24, 2003

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Attention: Ms. Ellen Michiel

Regarding: **GEOTECHNICAL/GEOLOGICAL ENGINEERING STUDY**
Tres Cerritos West – Tentative Tract 31513
Assessor's Parcel Numbers: 441-740-001 through -005, -012 and –013
and Assessor's Parcel Numbers: 441-750-001 through -005
City of Hemet, County of Riverside, California
Project Number: T2824-GFS

References:

1. **David Jeffers Consulting, Inc.** Vesting Tentative Tract Map 31513, dated: September 16, 2003.
2. **Inland Foundation Engineering, Inc.**, *Geotechnical Investigation,* dated: July 27, 1990, Hemet Valley Country Club Estates Specific Plan, Northwest corner of Cawston and Devonshire Avenues, Hemet, California.
3. **EnGEN Corporation,** Physical Restraint Map updated with proposed seismic lines, backhoe test pits and borings, dated May 21, 2003, Tres Cerritos West, Proposal, P2824-GS

Dear Ms. Michiel:

In accordance with your request and signed authorization, we have performed a Geotechnical/ Geological Engineering Study for the subject project. The purpose of this study was to evaluate the existing geological and geotechnical conditions within the subject property with respect to recommendations for fine grading of the site and design recommendations for foundations, slabs on-grade, pavements, etc., for the proposed development. Submitted, herewith, are the results of this firm's findings and recommendations, along with the supporting data.

1.0 EXECUTIVE SUMMARY

1.1 **GENERAL:** A geotechnical study of the subsurface conditions of the subject site has been performed for the proposed development. Exploratory excavations have been performed and selected earth material samples subjected to laboratory testing. The data has been analyzed with respect to the project information furnished to us for the proposed development. It is the opinion of this firm that the proposed development is feasible from a geotechnical/geologic standpoint, provided that the recommendations presented in the subsequent sections of this report are followed in the design and construction of the project.

1.2 **SITE EARTHWORK:** Due to the presence of unconsolidated near-surface soils within the alluvial deposit at the subject property, it is the recommendations of this firm that the upper 10-feet be removed and recompacted to create a uniform soil foundation for the proposed development. Specific recommendations for site earthwork recommendations are provided under Section 8.2 of this report.

1.3 **SLOPE STABILITY:** Cut slopes varying from several feet to over 50-feet are proposed within the granitic bedrock along the perimeter of the subject site. A slope stability analysis was performed to evaluate the stability of the proposed cut slope as designed. Based on the result of the slope stability analyses, proposed slopes within bedrock are stable from a gross and surficial standpoint to a maximum of 60-feet. Specific information relative to the slope stability analysis can be found under Section 8.3 of this report.

1.4 **EXCAVATION CHARACTERISTICS:** Based on the seismic refraction survey conducted for the subject site, excavations within the granitic bedrock are anticipated to vary from easily rippable in the upper 3 to 6-feet, transcending to difficult from a depth of 6 to approximately 13-feet from surface elevation. Possible blasting within the granitic bedrock to achieve proposed grades where excavations exceed 13-feet in depth should be anticipated. Specific information related to excavation characteristics can be found under Section 8.23 of this report.

1.5 **FOUNDATION DESIGN:** Foundation design for future residential structures should be designed following the guidelines for expansive soils with an Expansion Index of very low. Specific recommendation for foundation design can be found under Section 8.4 of this report.

2.0 INTRODUCTION

2.1 **AUTHORIZATION:** This report presents the results of the geotechnical/geological engineering study performed on the subject site for the proposed development. Authorization to perform this study was in the form of a signed proposal.

2.2 **SCOPE OF STUDY:** The scope of work performed for this study was designed to determine and evaluate the surface and subsurface conditions within the subject site with respect to geotechnical characteristics, and to provide recommendations and criteria for use by the Design Engineers and Architect for the development of the site and for design and construction of the proposed development. The scope of work included the following: 1) site reconnaissance and surface geologic mapping; 2) subsurface exploration; 3) sampling of on-site earth materials; 4) laboratory testing; 5) engineering analysis of field and laboratory data; and 6) the preparation of this report.

2.3 **PREVIOUS SITE STUDIES:** Previous studies have been conducted on the subject site and information regarding those studies are provided in the technical references section of the Appendix.

3.0 PROPOSED DEVELOPMENT AND PROJECT DESCRIPTION

3.1 **GRADING AND BUILDING PLAN REVIEW:** Grading and building plans were not available at the time of this report. When these plans become available, they should be reviewed by this office in order to make additional recommendations, if necessary.

3.2 **PROPOSED DEVELOPMENT:** It is our understanding that the proposed development will consist of one or two-story, wood-framed, single family residences with slab-on-grade foundations and with associated hardscape/landscape improvements. Should structures other than those addressed within the confines of this report be proposed at a future date, this firm should be notified so that supplemental recommendations can be made if necessary.

3.3 **FOUNDATION LOADS:** The foundation loads for the structures are not anticipated to exceed 2,000 pounds per lineal foot (plf) for continuous footings. The above project description and assumptions were used as the basis for the field and laboratory exploration and testing programs and the engineering analysis for the conclusions and recommendations presented in this report. This office should be notified if structures, foundation loads, grading, and/or details other than those represented herein are proposed for final development of the site so a review can be performed, supplemental evaluation made, and/or revised recommendations submitted, if required.

4.0 SITE DESCRIPTION

4.1. **LOCATION:** The site encompasses approximately 180 acres and is located northwest of the intersection of Meyers Street and Rose Road, in the City of Hemet, County of Riverside, California.

4.2 **LEGAL DESCRIPTION:** The Assessor's Parcel Numbers for the subject property are as follows: 441-740-001 through -005, 441-740-012 and -013, and 441-750-001 through 441-750-004.

4.3 **TOPOGRAPHY:** The topography across the subject site ranges from gently sloping across the center two thirds to steeply sloping along the north, west and easterly boundaries (see Drawings in the Appendix).

4.4 **VEGETATION:** At the time of the field study, the site had a moderate cover of weeds and grasses. Several mature trees were located on the site.

4.5 **DEBRIS:** There were several piles of household and construction debris observed scattered throughout the subject site. An abandoned vehicle was observed in the southerly center of the subject property, just off and south of the existing paved Eastern Municipal Water District (EMWD) access road. The debris appears to consist of typical household and construction material. The scope of work for this study was limited to site specific geotechnical considerations, therefore no attempt was made to examine the content of the debris piles. This would typically be provided within the scope of a Phase I Environmental Site Assessment.

4.6 **BEDROCK:** The subject site is bordered on the north, south and west by weathered and unweathered granitic bedrock outcrops visible from any area of the subject property.

4.7 **STRUCTURES:** There is evidence that a former residence existed on the southeasterly portion of the subject site based on a concrete slab area observed during the field investigation. The remainder of the site appears to have remained undeveloped. It is reasonable to assume that a subsurface on-site sewage effluent disposal system exists near this area.

4.8 **EXISTING PAVED ACCESS ROAD:** An existing paved access road traverses the subject site in a general north/south direction that provides vehicle access to the Eastern Municipal Water District tank reservoirs located north of and outside of the subject site.

5.0 FIELD STUDY

5.1 **GENERAL:** Site observations, geologic mapping and a study of the property's subsurface condition was conducted on August 6 and August 7, 2003 by a geologist from this firm to evaluate the underlying earth strata and document the presence of groundwater. A description and scope of the field study is provided in the subsequent sections of this report.

5.2 **SUBSURFACE EXPLORATION:** Nine (9) exploratory borings were excavated on the study site. The borings were performed by **Martini Drilling**, using a truck-mounted, CME-75 drill rig equipped with 7.0-inch outside diameter hollow-stem augers. The maximum depth explored was approximately 51.5-feet below the existing land surface (bgs) at the excavation locations.

5.3 **SAMPLES:** Bulk and relatively undisturbed samples of the earth materials encountered were obtained at various depths in the exploratory borings and returned to our laboratory for verification of field classifications and testing. Bulk samples were obtained from cuttings developed during the excavation process and represent a mixture of the soils within the depth indicated on the logs. Relatively undisturbed samples of the earth materials encountered were obtained by driving a thin-walled steel sampler lined with 1.0-inch high, 2.42-inch inside diameter brass rings. The sampler was driven with successive drops of a 140-pound weight having a free fall of approximately 30-inches. The blow counts for each successive 6.0-inches of penetration, or fraction thereof, are shown in the Exploratory Boring Log Summaries presented in the Appendix. The ring samples were retained in close-fitting moisture-proof containers and returned to our laboratory for testing.

5.4 **EXPLORATORY EXCAVATION LOCATIONS:** The approximate locations of the exploratory excavations are denoted on the Geotechnical Site Plan. The exploratory boring excavations were backfilled with excavated soil cuttings.

6.0 LABORATORY TESTING

6.1 **GENERAL:** The results of laboratory tests performed on samples of earth material obtained during the field study are presented in the Appendix. Following is a listing and brief explanation of the laboratory tests performed. The samples obtained during the field study will be discarded 30 days after the date of this report. This office should be notified immediately if retention of samples will be needed beyond 30 days.

6.2 **CLASSIFICATION:** The field classification of soil materials encountered in the exploratory borings was verified in the laboratory in general accordance with the Unified Soils

Classification System, ASTM D 2488-93, Standard Practice for Determination and Identification of Soils (Visual-Manual Procedures). The Standard Method has been modified to include the moisture classification of slightly moist as a means to differentiate between soils otherwise classified as dry or moist. The final classification is shown in the Exploratory Boring Log Summaries presented in the Appendix.

6.3 **IN-SITU MOISTURE CONTENT AND DENSITY TEST:** The in-situ moisture content and dry density were determined in general accordance with ASTM D 2216-98 and ASTM D 2937-94 procedures, respectively, for each selected undisturbed sample obtained. The dry density is determined in pounds per cubic foot and the moisture content is determined as a percentage of the oven dry weight of the soil. Test results are shown in the Exploratory Boring Log Summaries presented in the Appendix.

6.4 **CONSOLIDATION TEST:** Settlement predictions of the on-site soil and compacted fill behavior under load were made based on consolidation tests that were performed in general accordance with ASTM D 2435-96 procedures. The consolidation apparatus is designed to receive a 1.0-inch high, 2.416-inch diameter ring sample. Porous stones are placed in contact with the top and bottom of each specimen to permit addition and release of pore water and pore pressure. Loads normal to the face of the specimen are applied in several increments in a geometric progression under both field moisture and submerged conditions. The resulting changes in sample thickness are recorded at selected time intervals. Water was added to the test apparatus at loads ranging from 800 psf to 6,400 psf to create a submerged condition and to measure the collapse potential (hydroconsolidation) of the sample. The resulting change in sample thickness was recorded.

6.5 **MAXIMUM DRY DENSITY/OPTIMUM MOISTURE CONTENT RELATIONSHIP TEST:** Maximum dry density/optimum moisture content relationship determination was performed on samples of near-surface earth material in general accordance with ASTM D 1557-00 procedures using a 4.0-inch diameter mold. Samples were prepared at various moisture contents and compacted in five (5) layers using a 10-pound weight dropping 18-inches and with 25 blows per layer. A plot of the compacted dry density versus the moisture content of the specimens is constructed and the maximum dry density and optimum moisture content determined from the plot.

6.6 **DIRECT SHEAR TEST:** Direct shear tests were performed on selected samples of near-surface earth material in general accordance with ASTM D 3080-98 procedures. The shear machine is of the constant strain type. The shear machine is designed to receive a 1.0-inch high, 2.416-inch diameter ring sample. Specimens from the sample were sheared at various pressures normal to the face of the specimens. The specimens were tested in a submerged condition. The maximum shear stresses were plotted versus the normal confining stresses to determine the shear strength (cohesion and angle of internal friction).

6.7 **EXPANSION TEST:** Laboratory expansion tests were performed on samples of near-surface earth material in general accordance with ASTM D 4829-95. In this testing procedure, a remolded sample is compacted in two (2) layers in a 4.0-inch diameter mold to a total compacted thickness of approximately 1.0-inch by using a 5.5-pound weight dropping 12-inches and with 15 blows per layer. The sample is compacted at a saturation between 49 and 51 percent. After remolding, the sample is confined under a pressure of 144 pounds per square foot (psf) and allowed to soak for 24 hours. The resulting volume change due to the increase in moisture content within the sample is recorded and the Expansion Index (EI) calculated.

6.8 **SOLUBLE SULFATES:** Samples of near-surface earth material were obtained for soluble sulfate testing for the site. The concentration of soluble sulfates was determined in general conformance with California Test Method 417 procedures. The test results indicate a low percentage of water-soluble sulfates (0.094% by weight). As a result, sulfate resistant concrete is not considered necessary.

7.0 ENGINEERING GEOLOGY

7.1 **GEOLOGIC SETTING:** The site is located in the Northern Peninsular Range on the southern sector of the structural unit known as the Perris Block. The Perris Block is bound on the northeast by the San Jacinto Fault Zone, on the southwest by the Elsinore Fault Zone, and on the north by the Cucamonga Fault Zone. The southern boundary of the Perris Block is not as distinct, but is believed to coincide with a complex group of faults trending southeast from the Murrieta, California area. The Peninsular Range is characterized by large Mesozoic age intrusive rock masses flanked by volcanic, metasedimentary, and sedimentary rocks. Various thicknesses of colluvial/alluvial sediments derived from the erosion of the elevated portions of the region fill the low-lying areas. Alluvium underlies the subject property and surrounding area. The earth materials encountered on the subject site are described in more detail in subsequent sections of this report.

7.2 **FAULTING:** The site is not located within an Alquist-Priolo Earthquake Fault Zone (Hart and Bryant, 1999). No known active faults traverse the property. The nearest active faults to the site are described below:

7.2.1 **SAN JACINTO FAULT ZONE:** The San Jacinto Fault – San Jacinto Valley Segment is located approximately 3.6 miles (5.8 kilometers) northeast of the site. The San Jacinto Fault – Anza Segment, is located approximately 6.1 miles (9.8 kilometers) northeast of the site. The San Jacinto Fault Zone trends northwest-southeast and is a major right lateral strike-slip fault, which has displayed surface rupture and associated seismic ground shaking in 1899, 1918, 1923, 1934, 1937, 1942, and 1954.

7.2.2 **SAN ANDREAS FAULT ZONE:** The southern segment of the San Andreas Fault Zone is located approximately 19.6 miles (31.5 kilometers) northeast of the site, and trends northwest-southeast across the southwestern front of the San Bernardino Mountains. The San Andreas Fault is a major right lateral strike-slip fault, which exhibited major surface rupture in 1857 during the Fort Tejon Earthquake and again in 1868 during the Dos Palmas Earthquake.

7.2.3 **ELSINORE FAULT ZONE:** The Elsinore Fault Zone – Temecula Segment is located approximately 18.6 miles (29.9 kilometers) southwest of the site. The Elsinore Fault Zone – Glen Ivy Segment is located approximately 20.3 miles (32.7 kilometers) southwest of the site. The Elsinore Fault Zone is a prominent and youthful structural boundary between the Perris Block to the northeast and the Santa Ana mountains block to the southwest. The Elsinore Fault system is a major right lateral strike-slip fault system that has experienced strong earthquakes in historical times, (1856, 1894, and 1910), and exhibits Holocene movement.

7.3 **SEISMICITY:** The project lies within an active area of faulting and seismicity in the Southern California region. This predominance of seismic activity has been associated with the San Jacinto Fault Zone along its southeast section in the vicinity of the Salton Sea, and within the northwest portion near its junction with the San Andreas Fault Zone.

The predominance of the remaining recorded activity has been associated with the San Andreas Fault Zone. A list of faults within 62 miles (100 kilometers) of the site are shown on Table A in the Appendix.

7.3.1 **PEAK GROUND ACCELERATION:** Based on the computer software program designed by Thomas F. Blake (EQSEARCH, Blake 2000b), the maximum peak ground acceleration experienced at the site since 1800 was approximately 0.53g from a magnitude 6.8 earthquake located approximately 1.3 miles (2.1 kilometers) to the northeast.

7.3.2 **OFF-SITE ACTIVE FAULT GROUND MOTION EFFECTS:** Although no known active faults exist within the project limits, the site will experience ground motion and effects from earthquakes generated along active faults located off-site.

7.3.3 **GROUND MOTION DETERMINATION METHOD:** In order to estimate the potential ground shaking, **EnGEN Corporation** has analyzed the seismic parameters using the probabilistic ground motion analysis. The probabilistic ground motion analysis requires information regarding fault geometry, the magnitude of the maximum credible earthquake on each fault, and the regional attenuation equation, which relates the considered seismic parameters to the magnitude and the source-site distance.

7.3.4 **EQFAULT PROGRAM:** To perform this analysis **EnGEN Corporation** utilized the computer software EQFAULT developed by Thomas F. Blake (Blake, 2000a). The attenuation relationships by Boore et al. (1997) for soil type SD (stiff soil – shear wave velocity 250 m/s) was utilized. For a complete discussion of the software and deterministic methods the reader is referred to Blake (2000a, b).

7.3.5 **ANALYSIS RESULTS:** The intensity of ground shaking at a given location depends primarily upon the earthquake magnitude, distance from the source (epicenter), and the site response characteristics. The San Jacinto Fault – San Jacinto Valley Segment is potentially capable of producing the most intense horizontal ground acceleration at the site, due to its proximity and associated maximum credible earthquake magnitude of 6.9. Such an earthquake near the site could produce seismic shaking with an estimated maximum credible peak horizontal ground acceleration of 0.53g. The maximum credible earthquake is the maximum earthquake that appears capable of occurring under the presently known tectonic framework.

7.4 **EARTH MATERIALS:** A brief description of the earth materials encountered in the exploratory excavations is presented in the following sections. However, a more detailed description of the earth materials encountered is provided on the Geotechnical Boring Log Summaries presented in the Appendix. The earth material strata as shown on the logs represent the conditions in the actual exploratory locations; however other variations may occur between the excavations. Lines of demarcation between the earth materials on the logs represented the approximate boundary between the material types; nevertheless, the transition may be gradual.

7.4.1 **EXISTING UNDOCUMENTED ACCESS ROAD FILLS (Afu):** The access road that traverses the subject site comprises several feet of man-made fill. No documentation of the fill has been discovered, and as a result must be identified as undocumented fill for future reference during grading and construction operation recommendations.

7.4.2 **OLDER ALLUVIUM (Qoal):** Alluvial materials were encountered to the maximum depth explored (51.5-feet) within the broad canyon area which comprises most of the site. Alluvial materials consist of poorly graded fine- to coarse-grained sands, silty fine-grained sands, sandy silts and clayey silts that were found to be moist to wet and loose to dense or stiff in-place.

7.5 **GROUNDWATER:** Static groundwater was not encountered at the time of the field study to a maximum depth of 51.5-feet. However, groundwater was encountered in Boring B-1 at 44-feet below ground surface (bgs), 45-feet bgs in Boring B-3 and 37-feet bgs in Boring B-9, (see Drawings for boring locations). Upon review of the **Western Municipal Water District** Cooperative Well Measuring Program for Spring 2002, it was noted that in nearby wells (State Well Numbers: 5S1W04N01S, 5S1W03K01S, 5S1W09C01S) the static groundwater levels ranged in depths of approximately 212 to 236-feet below the ground surface.

7.6 **LIQUEFACTION:** Liquefaction is a phenomenon where a sudden large decrease of shearing resistance takes place in fine-grained cohesionless and/or low plasticity cohesive soils due to the cyclic stresses produced by earthquakes causing a sudden, but temporary, increase of porewater pressure. The increased porewater pressure occurs below the water table, but can cause propagation of groundwater upward into overlying soil and possibly to the ground surface and cause sand boils as excess porewater escapes. Potential hazards due to liquefaction include significant total and/or differential settlements of the ground surface and structures as well as possible collapse of structures due to loss of support of foundations. It has been shown by laboratory testing and from the analysis of soil conditions at sites where liquefaction has occurred that the soil types most susceptible to liquefaction are saturated, fine-grained sand to sandy silt with a mean grain size ranging from approximately 0.075 mm to 0.5 mm. These soils derive their shear strength from intergranular friction and do not drain quickly during earthquakes. Published studies and field and laboratory test data indicate that coarse-grained sands and silty or clayey sands beyond the above-mentioned grain size range are considerably less vulnerable to liquefaction. To a large extent, the relative density of the soil also controls the susceptibility to liquefaction for a given number of cycles and acceleration levels during a seismic event. Other characteristics such as confining pressure and the stresses created within the soil during a seismic event also affect the liquefaction potential of a site. Liquefaction of soil does not generally occur at depths of 40 to 50-feet below ground surface due to the confining pressure at that depth.

7.6.1 **LIQUEFACTION POTENTIAL**: In general, the more recently a sediment has been deposited, the more likely it is to be susceptible to liquefaction. Furthermore, liquefaction potential is greatest in loose, poorly graded sands and silty sands with mean grain size in the range of 0.1 to 0.2 mm. Other factors that must be considered are groundwater, confining stresses, relative density and the intensity and duration of ground shaking. It is generally held that soils possessing in excess of 20 percent clay (0.005 mm) are subject to low liquefaction potential. Based on the generally accepted guidelines for liquefaction hazard evaluation, the results of our field exploration, and review of in-house published and unpublished report, the potential for hazards associated with liquefaction exists. As a result, we have performed a liquefaction hazard analysis for the subject site.

7.6.2 **LIQUEFACTION HAZARD EVALUATION**: To estimate the potential dynamic settlement due to liquefaction, **EnGEN Corporation** has performed the liquefaction analysis outlined by SCEC (1999). To perform this analysis, **EnGEN Corporation** has used LIQUEFY2, developed by Blake (1998). For the purpose of liquefaction analysis, we have set a maximum groundwater level at 35-feet below ground surface, based on the groundwater conditions encountered in our borings and our historical research. Our analysis indicates the potential for seismically induced settlement of the soils below the water table is possible. As a result, the potential differential settlement is calculated to be 3.9-inches based on groundwater conditions at a depth of 35-feet below ground surface.

7.6.3 **LIQUEFACTION MITIGATION RECOMMENDATIONS:** Recommendations for the mitigation of potential differential settlement due to liquefaction are provided in the earthwork recommendations section of this report.

7.7 **SECONDARY EFFECTS OF SEISMIC ACTIVITY:** The secondary effects of seismic activity normally considered as possible hazards to a site include various types of ground failure and induced flooding. The probability of occurrence of each type of ground failure depends on the severity of the earthquake, the distance of the site from the zone of maximum energy release of the earthquake, the topography of the site, the subsurface materials at the site, and groundwater conditions beneath the site, besides other factors. Since there are no active faults on the site, the possibility of hazards associated with ground surface rupture is considered low. Due to the gentle sloping topography of the majority of the subject site and the properties of the bedrock formation at the perimeters of the property boundaries, the potential for earthquake-induced landslides are considered low.

7.7.1 **ROCK FALL HAZARDS:** The potential for rock fall hazards exist on the site due to the presence of granitic bedrock outcrops along the westerly, easterly and northern perimeters. Because of the presence of large free standing boulders at the higher elevations, it is recommended that a geologist from this firm observe and assess the potential for rock fall hazards during grading operations. Recommendations for mitigation of potential rock fall hazards may include blasting and removal.

7.7.2 **SEICHES AND TSUNAMIS:** There are two large water EMWD reservoir tanks located directly north of and off of the subject site. It is our understanding that these reservoir tanks have been designed with respect to the seismic forces that are expected to act on them. Therefore, the potential for seismically-induced flooding and earthquake-induced surface flooding due to seiches from the EMWD reservoir tanks is considered low. Due to the distance of the site from the Pacific Ocean, the potential for tsunamis is considered very low to nil.

8.0 CONCLUSIONS AND RECOMMENDATIONS

8.1 **GENERAL:** The conclusions and recommendations presented in this report are based on the results of field and laboratory data obtained from the exploratory excavations located across the property, experience gained from work conducted by this firm on projects within the property and general vicinity, and the project description and assumptions presented in the Proposed Development/Project Description section of this report. Based on a review of the field and laboratory data and the engineering analysis, the proposed development is feasible from a geotechnical/geologic standpoint. The actual conditions of the near-surface supporting material across the site may vary. The nature and extent of variations of the surface and subsurface conditions between the exploratory excavations may not become evident until construction. If variations of the material become evident during construction of the proposed development, this office should be notified so that **EnGEN Corporation** can evaluate the characteristics of the material and, if needed, make revisions to the recommendations presented herein. Recommendations for general site grading, foundations, slab support, pavement design, slope maintenance, etc., are presented in the subsequent paragraphs. Specific earthwork and foundation recommendations for each parcel should be made when specific grading and foundation plans become available.

8.2 EARTHWORK RECOMMENDATIONS:

8.2.1 **GENERAL:** The grading recommendations presented in this report are intended for: 1) the use of a conventional shallow foundation system and concrete slabs cast on-grade; and 2) the rework of unsuitable, near-surface earth materials to create an engineered building pad and suitable support for exterior hardscape (sidewalks, patios, etc.) and pavement. If pavement subgrade soils are prepared at the time of rough grading of the building site and the areas are not paved immediately, additional observations and testing of the subgrade soil will have to be performed before placing aggregate base material or asphaltic concrete or PCC pavement to locate areas which may have been damaged by construction traffic, construction activities, and/or seasonal wetting and drying. The following recommendations may need to be modified and/or supplemented during rough grading as field conditions require.

8.2.2 **CLEARING:** All debris, grasses, weeds, brush, trees, roots, carcasses, manure, undocumented fills, and other deleterious materials should be removed from the proposed building, exterior hardscape and pavement areas and areas to receive structural fill before grading is performed. No discing or mixing of organic material into the soils should be performed. Man-made objects encountered should be overexcavated and exported from the site. Any water wells which are encountered should be abandoned in accordance with current County of Riverside standards.

8.2.3 **EXCAVATION CHARACTERISTICS:** Excavation and trenching within the subject property is anticipated to be relatively easy in the alluvial deposits and moderate to very difficult in the bedrock formation along the perimeter of the subject site. Blasting may be required at higher elevations when attempting to achieve grade elevations that require cuts in excess of 13 feet from existing surface elevations.

8.2.4 **SUITABILITY OF ON-SITE MATERIALS AS FILL:** In general, the on-site earth materials present are considered suitable for reuse as fill. Fill materials should be free of significant amounts of organic materials and/or debris and should not contain rocks or clumps greater than 6.0-inches in maximum dimension.

8.2.5 **REMOVAL AND RECOMPACTION:**

1. All undocumented fills should be removed. Special care should be taken to identify the areas where trees require removal to ensure no organic debris remains beyond that allowable in this report.

2. In proposed structure areas, alluvium should be removed to a depth of ten (10) feet below existing grades or to competent alluvium, whichever is deeper. Overexcavation should be performed to a minimum horizontal distance of ten (10) feet outside the perimeter footings. Removals are not anticipated where cuts are planned within the granitic bedrock areas, however this is dependent on the weathered condition of the bedrock under exposed conditions and actual determination for removals within the bedrock should be made by this firm during grading operations.

3. In any areas were a cut/fill transition exists (which should be disclosed on any future grading plan), overexcavation should be performed in the cut portion so that

there is a minimum of 1.5-feet of engineered fill below the bottom of all footings. For more specific recommendations, see Section 8.2.9.

4. In proposed street areas and in non-structural areas where alluvium is encountered, removals should be performed to a minimum depth of 6-feet below existing grade in proposed fill areas and a minimum of 6-feet below proposed grades in any cut areas, unless bedrock is encountered at shallower depth.
5. All removal bottoms should be inspected by the Project Engineering Geologist or the Project Geotechnical Engineer, or their representatives. Undisturbed bottoms should be a minimum of 85 percent compact. Bottom areas that are not 85 percent compact will be deepened. Prior to placing fill, the exposed surface should be scarified 12-inches, brought to within 2.0 percent of optimum moisture content, and compacted to a minimum of 90 percent relative compaction before placement of fill.
6. Maximum dry density and optimum moisture content for compacted materials should be determined according to ASTM D 1557-00 procedures.

8.2.6 **FILL PLACEMENT REQUIREMENTS:** All fill material, whether on-site material or import, should be approved by the Project Geotechnical Engineer and/or his representative before placement. All fill should be free from vegetation, organic material, debris, and oversize material. Import fill should be no more expansive than the existing on-site material as determined by ASTM procedures. Approved fill material should be placed in horizontal lifts not exceeding 10-inches in compacted thickness and watered or aerated to obtain near optimum moisture content (±2.0 percent of optimum). Each lift should be spread evenly and should be thoroughly mixed to ensure uniformity of soil moisture. Structural fill should meet a minimum relative compaction of 90 percent. Maximum dry density and optimum moisture content for compacted materials should be determined in accordance with ASTM D 1557-00 procedures. Moisture content of fill materials should not vary more than 2.0 percent from optimum, unless approved the Project Geotechnical Engineer.

8.2.7 **COMPACTION EQUIPMENT:** It is anticipated that the compaction equipment to be used for the project will include a combination of rubber-tired and sheepsfoot rollers to achieve proper compaction. Compaction by rubber-tired or track-mounted equipment, by itself, may not be sufficient. Adequate water trucks, water pulls, and/or other suitable equipment should be available to provide sufficient moisture and dust control. The actual selection of equipment is the responsibility of the contractor performing the work and should be such that uniform and proper compaction of the fill is achieved.

8.2.8 **SHRINKAGE AND SUBSIDENCE:** There will be a material loss due to the clearing and grubbing operations. The alluvium is expected to shrink on the order of 20 percent.

8.2.9 **TRANSITION ZONE:** Where a cut/fill transition zone extends through a proposed building pad area, a compacted mat of fill will have to be constructed under the building area to minimize the potential for differential settlement between the two dissimilar materials. This mat should be constructed by overexcavating the cut portion and shallow fill portion to a minimum distance outside the proposed building limits of 5.0-feet, or to a distance equal to the depth of the overexcavation below the finish pad grade, whichever is greater. The overexcavation depth should be determined for each building pad once its location is known. The depth of overexcavation will be a minimum of 3.0-feet below the pad elevation or to a minimum depth of 18-inches below the bottom of proposed footings. However, some areas are expected to require deeper overexcavation based on the depth of fill in the transition. A maximum depth of overexcavation equal to half of the depth of transition fill should be anticipated. The overexcavation bottom should be prepared in accordance with the recommendations presented in the Removal and Recompaction section of this report (Section 8.2.5). Foundation plans should be made available for review prior to grading in order to determine final overexcavation depths.

8.2.10 **SUBDRAINS:** Although the need for subdrains is not anticipated at this time, final recommendations should be made during grading by the project Engineering Geologist.

8.2.11 **OBSERVATION AND TESTING:** During grading, observation and testing should be conducted by the Geotechnical Engineer and/or his representative to verify that the grading is being performed according to the recommendations presented in this report. The project Geotechnical Engineer and/or his representative should observe the scarification and the placement of fill and should take tests to verify the moisture content, density, uniformity and degree of compaction obtained. Where testing demonstrates insufficient density, additional compaction effort, with the adjustment of the moisture content where necessary, should be applied until retesting shows that satisfactory relative compaction has been obtained. The results of observations and testing services should be presented in a formal Finish Grading Report following completion of the grading operations. Grading operations undertaken at the site without the Geotechnical Engineer and/or his representative present may result in exclusions of the affected areas from the finish grading report for the project. The presence of the Geotechnical Engineer and/or his representative will be for the purpose of providing observations and field testing and will not include any supervision or directing of the actual work of the contractor or the contractor's employees or agents. Neither the presence and/or the non-presence of the Geotechnical Engineer and/or his field representative nor the field observations and testing shall excuse the contractor in any way for defects discovered in the contractor's work.

8.2.12 **FILL SLOPES:** Finish fill slopes should not be inclined steeper than 2:1 (horizontal to vertical). Fill slope surfaces should be compacted to 90 percent relative compaction to the face of the finished slope. Fill slopes should be constructed in a skillful manner so that they are positioned at the design orientations and slope ratio. Achieving a uniform slope surface by subsequent thin wedge filling should be avoided. Add-on correction to a fill slope should be conducted under the observation and recommendations of the project Geotechnical Engineer or Engineering Geologist. The proposed add-on correction procedures should be submitted in writing by the contractor before commencement of corrective grading and reviewed by the project Geotechnical Engineer or Engineering Geologist. Compacted fill slopes should be backrolled with suitable equipment for the type of soil being used during fill placement at intervals not exceeding 4.0-feet in vertical height. As an alternative to the backrolling of the fill slopes, over-filling of the slopes will be considered acceptable and preferred. The fill slope should be constructed by over-filling with compacted fill a minimum of 3.0-feet horizontally, and then trimmed back to expose the dense inner core of the slope surface.

8.2.13 **SOIL EXPANSION POTENTIAL:** The results of recent testing of the on-site soils indicate an Expansion Index of 3, which is classified as a very low expansion potential. Upon completion of fine grading of the building pads, near-surface samples should be obtained for expansion potential testing to verify the preliminary expansion test results and the foundation and slab-on-grade recommendations presented in this report. The expansion index of any imported fill material may vary from the expansion index of the on-site soils, thereby changing the following foundation design recommendations.

8.3 SLOPE STABILITY ANALYSIS

8.3.1 **FILL SLOPES:** It is our opinion that the fill slopes, as planned, will possess gross and surficial stability in excess of generally accepted minimum engineering criteria (Factor of Safety at least 1.5) and are suitable for their intended purpose, provided that proper slope maintenance procedures are maintained. These procedures include but are not limited to installation and maintenance of drainage devices and planting of slope faces to protect from erosion in accordance with County of Riverside Grading Codes.

8.3.2 **CUT SLOPES:** Slope stability analyses were performed for cut slopes within the granitic bedrock with a maximum height of 60-feet. The slope was evaluated for gross stability under static and pseudostatic (seismic) conditions. In addition, per County of Riverside guidelines, surficial stability analyses were performed assuming that the upper 4-feet of the slope face is saturated. Strength values were obtained from laboratory testing of remolded shear samples from the on-site materials, in general accordance with ASTM D 3080-98. The strength parameters used in the analyses are as follows:

Material Description	Ultimate Phi Angle (degrees)	Ultimate Cohesion (psf)
Granitic Bedrock	45	450

The computer program used to compute the safety factors for the gross slope stability under static and pseudostatic (seismic) conditions was SB Slope by **Von Gunten Engineering Software, Inc.** This program follows the limiting equilibrium circular surface method as described by A.W. Bishop called the "Simplified Bishop Methods of Slices." The following tables present the calculated minimum factors of safety for the analysis conducted. The calculations for the analysis are presented in the Appendix.

Summary of Safety Factors for Gross Stability		
Section Analyzed	**Factor of Safety (Static)**	**Factor of Safety (Seismic)**
X – X'	3.62	2.51

Summary of Safety Factors For Surficial Stability	
Material Type	**Factor of Safety**
Granitic Bedrock	2.89

8.3.3 **SLOPE MAINTENANCE AND PROTECTION RECOMMENDATIONS:** The design and construction of slopes are planned to create slopes that are grossly stable. Surficial slumping, creep, pop-outs, rockfalls, and other factors are beyond the control of the project Geotechnical Consultant. The following recommendations are presented for slope protection and maintenance.

8.3.4 **SURFACE DRAINAGE:** Surface water should not be allowed to flow over the slopes other than incidental rainfall. No alteration of pad gradients should be allowed that will prevent pad and roof run-off from being expediently directed to approved disposal areas away from the tops of slopes.

8.3.5 **SLOPE BERMS:** Top of slope berms should be constructed and compacted as part of finish grading and should be maintained by the resident and/or the property owner. The recommended drainage patterns should be established at the time of finish grading and maintained throughout the life of the structures.

8.3.6 **OFF-SITE DRAINAGE:** Concentrated surface waters entering the property from off-site sources should be collected and directed to a permanent drainage system away from the tops of slopes.

8.3.7 **MAINTENANCE RESPONSIBILITY:** Residents and/or the property owner are responsible for the maintenance and cleaning of all interceptor ditches, drainage terraces, downdrains and any other drainage devices that have been installed to promote slope stability.

8.3.8 **SLOPE PROTECTION:** It is recommended that slopes be planted with ground cover, shrubs and trees that possess deep, dense root structures that require a minimum of irrigation. It should be the responsibility of the landscape architect to provide such plants initially and of the resident to maintain such planting. Alteration of the planting scheme is at the resident's and/or property owner's risk.

8.3.9 **EXCESSIVE IRRIGATION:** If automatic sprinkler systems are installed on the slopes, the use should be adjusted to account for natural rainfall.

8.3.10 **BURROWING ANIMALS:** The resident and/or the owner should maintain a program for the elimination of burrowing animals. This should be an on-going program to protect slope stability.

8.4 FOUNDATION DESIGN RECOMMENDATIONS:

8.4.1 **GENERAL:** Final foundation recommendations should be made when proposed building plans become available. The following foundation recommendations are tentative and are based on field and laboratory data obtained from this investigation. Foundations for the proposed structures may consist of conventional column footings and continuous wall footings founded upon properly compacted fill. Final foundation size and reinforcing should be determined based on the expansive potential of the supporting soils. The recommendations presented in the subsequent paragraphs for foundation design and construction are based on geotechnical characteristics and a very low expansion potential for the supporting soils and should not preclude more restrictive structural requirements. The Structural Engineer for the project should determine the actual footing width and depth to resist design vertical, horizontal, and uplift forces.

8.4.2 **FOUNDATION SIZE:** Continuous footings should have a minimum width of 12-inches. Continuous footings should be continuously reinforced with a minimum of one (1) No. 4 steel reinforcing bar located near the top and one (1) No. 4 steel reinforcing bar located near the bottom of the footings to minimize the effects of slight differential movements which may occur due to minor variations in the engineering characteristics or seasonal moisture change in the supporting soils. Column footings should have a minimum width of 18-inches by 18-inches and be suitably reinforced, based on structural requirements. A grade beam, founded at the same depths and reinforced the same as the adjacent footings, should be provided across doorway and garage entrances.

8.4.3 **DEPTH OF EMBEDMENT:** Exterior and interior footings founded in properly compacted fill should extend to a minimum depth of 12-inches below lowest adjacent finish grade for single story structures and 18-inches below lowest adjacent finish grade for two story structures.

8.4.4 **BEARING CAPACITY:** Provided the recommendations for site earthwork, minimum footing width, and minimum depth of embedment for footings are incorporated into the project design and construction, the allowable bearing value for design of continuous perimeter and interior footings, or a mat foundation, for the total dead plus frequently-applied live loads is 1,500 psf for footings in properly compacted fill. Footings embedded entirely in bedrock may be designed for an allowable bearing value of 3,000 psf. The allowable bearing value has a factor of safety of at least 3.0 and may be increased by 33.3 percent for short durations of live and/or dynamic loading such as wind or seismic forces.

8.4.5 **SETTLEMENT:** Footings designed according to the recommended bearing values and the maximum assumed wall and column loads are not expected to exceed a maximum settlement of 0.75-inch or a differential settlement of 0.50-inch in properly compacted fill under static load conditions. Settlement due to possible liquefaction, however, has been calculated at 3.9-inches. Due to the 10-feet of engineered fill beneath the structures and the uniformity of the underlying alluvium, it is our opinion that differential settlement due to possible liquefaction will be minimized and may be considered, for design purposes, to fall within the normally acceptable limits of 2-inches in 40-feet. In addition, the project Structural Engineer should consider whether or not there is a need to add a safety factor in the design of roof ties in an effort to minimize the potential for collapse and promote the intent of "acceptable level of risk" performance as described in CDMG Special Publication 117 and Title 14 of the California Code of Regulations.

8.4.6 **LATERAL CAPACITY:** Additional foundation design parameters based on compacted fill for resistance to static lateral forces, are as follows:

Allowable Lateral Pressure (Equivalent Fluid Pressure), Passive Case:
Compacted Fill – 200 pcf
Bedrock – 400 pcf

Allowable Coefficient of Friction
Compacted Fill – 0.35

Lateral load resistance may be developed by a combination of friction acting on the base of foundations and slabs and passive earth pressure developed on the sides of the footings and stem walls below grade when in contact with undisturbed, properly, compacted fill material. The above values are allowable design values and have safety factors of at least 2.0 incorporated into them and may be used in combination without reduction in evaluating the resistance to lateral loads. The allowable values may be increased by 33.3 percent for short durations of live and/or dynamic loading, such as wind or seismic forces. For the calculation of passive earth resistance, the upper 1.0 foot of material should be neglected unless confined by a concrete slab or pavement. The maximum recommended allowable passive pressure is 5.0 times the recommended design value.

8.4.7 **SEISMIC DESIGN PARAMETERS:** The following seismic design factors apply:

Design Fault: San Jacinto Fault – San Jacinto Valley Segment
Fault Type: Type A Fault
Closest Distance to Fault: 5.8 Km
Soil Profile Type: SD

8.5 **SLAB-ON-GRADE RECOMMENDATIONS:** The recommendations for concrete slabs, both interior and exterior, excluding PCC pavement, are based upon a very low expansion potential for the supporting material as determined by the Uniform Building Code. Concrete slabs should be designed to minimize cracking as a result of shrinkage. Joints (isolation, contraction, and construction) should be placed in accordance with the American Concrete Institute (ACI) guidelines. Special precautions should be taken during placement and curing of all concrete slabs. Excessive slump (high water/cement ratio) of the concrete and/or improper curing procedures used during either hot or cold weather conditions could result in excessive shrinkage, cracking, or curling in the slabs. It is recommended that all concrete proportioning, placement, and curing be performed in accordance with ACI recommendations and procedures.

8.5.1 **INTERIOR SLABS:** Interior concrete slabs-on-grade should be a minimum of 4-inches nominal in thickness and be underlain by a minimum of 1.0-inch of clean coarse sand or other approved granular material placed on properly prepared subgrade per the Earthwork Recommendations Section of this report. Minimum slab reinforcement should consist of No. 3 reinforcing bars placed 24-inches on center in both directions, or a suitable equivalent. The reinforcing should be placed at mid-depth in the slab. The concrete section and/or reinforcing steel should be increased appropriately for anticipated excessive or concentrated floor loads. In areas where moisture sensitive floor coverings are anticipated over the slab, we recommend the use of a polyethylene vapor barrier with a minimum of 6.0 mil in thickness be placed beneath the slab. The moisture barrier should be overlapped or sealed at splices and covered and underlain by a 1.0-inch minimum layer of clean, moist (not saturated) sand to aid in concrete curing and to minimize potential punctures.

8.5.2 **EXTERIOR SLABS:** All exterior concrete slabs cast on finish subgrade (patios, sidewalks, etc., with the exception of PCC pavement) should be a minimum of 4.0-inches in actual thickness and be underlain by a minimum of 24-inches of soil that has been prepared in accordance with the Earthwork Recommendation section of this report. Reinforcing in the slabs and the use of a compacted sand or gravel base beneath the slabs should be according to the current local standards.

8.6 **PAVEMENT DESIGN RECOMMENDATIONS:** The following recommendations for the structural pavement section for the proposed street areas for the subject development are presented for preliminary design purposes only. The pavement section has been determined in general accordance with the Standard Specifications for Public Works Construction (Green Book) design procedures and is based on an assumed Traffic Index (TI) and an assumed R-Value of 31. The R-Value of any imported fill material may vary from the assumed value thereby changing the proposed pavement section design. The sections listed below for reference purposes are calculated minimums based on varying Traffic Indexes:

TENTATIVE PAVEMENT DESIGN RECOMMENDATIONS	
Traffic Index	**Calculated Section**
5.0	3-inches Asphaltic Concrete over 6.0-inches Aggregate Base*, placed on properly prepared subgrade.
6.0	3-inches Asphaltic Concrete over 8.5-inches Aggregate Base, placed on properly prepared subgrade.
7.0	3-inches Asphaltic Concrete over 11-inches Aggregate Base, placed on properly prepared subgrade.

* City of Hemet minimum standard

Asphalt concrete pavement materials should be as specified in the current Standard Specifications for Public Works Construction (Green Book) or a suitable equivalent. Aggregate base should conform to Class II material as specified in Sections 203-6 of the Standard Specifications for Public Works Construction (Green Book) or a suitable equivalent. The subgrade soil, including utility trench backfill, should be compacted to at least 95 percent relative compaction per City of Hemet minimum standards. The aggregate base material should be compacted to at least 95 percent relative compaction. Maximum dry density and optimum moisture content for subgrade and aggregate base materials should be determined according to ASTM D 1557-00 procedures. If pavement subgrade soils are prepared at the time of rough grading of the building site and the areas are not paved immediately, additional observations and testing will have to be performed before placing aggregate base material, or asphaltic concrete to locate areas that may have been damaged by construction traffic, construction activities, and/or seasonal wetting and drying. In the proposed pavement areas, soil samples should be obtained at the time the subgrade is graded for R-Value testing according to California Test Method 301 procedures to verify the pavement design recommendations.

8.7 **UTILITY TRENCH RECOMMENDATIONS:** Utility trenches within the zone of influence of foundations or under building floor slabs, exterior hardscape, and/or pavement areas should be backfilled with properly compacted soil. All utility trenches within the building pad and extending to a distance of 5.0-feet beyond the building exterior footings should be backfilled with on-site or similar soil. Where interior or exterior utility trenches are proposed to pass beneath or parallel to building, retaining wall, and/or decorative concrete block perimeter wall footings, the bottom of the trench should not be located below a 1:1 plane projected downward from the outside bottom edge of the adjacent footing unless the utility lines are designed for the footing surcharge loads. It is recommended that all utility trenches excavated to depths of 5.0-feet or deeper be cut back according to the Temporary Construction Excavation Recommendations section of this report or be properly shored during construction. Backfill material should be placed in a lift thickness appropriate for the type of backfill material and compaction equipment used. Backfill material should be compacted to a minimum of 90 percent relative compaction by mechanical means. Jetting or flooding of the backfill material will not be considered a satisfactory method for compaction unless the procedures are reviewed and approved in writing by the Project Geotechnical Engineer. Maximum dry density and optimum moisture content for backfill material should be determined according to ASTM D 1557-00 procedures.

8.8 RETAINING WALL RECOMMENDATIONS:

8.8.1 **EARTH PRESSURES:** Retaining walls backfilled with non-expansive granular soil (EI=0) or very low expansive potential materials (Expansion Index of 20 or less) within a zone extending upward and away from the heel of the footing at a slope of 0.5:1 (horizontal to vertical) or flatter can be designed to resist the following static lateral soil pressures:

Condition	Level Backfill	2:1 Slope
Active	30 pcf	45 pcf
At Rest	60 pcf	--

Walls that are free to deflect 0.01 radian at the top may be designed for the above-recommended active condition. Walls that need to be restricted from such movement should be assumed rigid and designed for the at-rest condition. The above values assume well-drained backfill and no buildup of hydrostatic pressure. Surcharge loads, dead and/or live, acting on the backfill within a horizontal distance behind the wall should also be considered in the design.

8.8.2 **FOUNDATION DESIGN:** Retaining wall footings should be founded to the same depths into properly compacted fill, or firm, competent, undisturbed, natural soil as standard foundations and may be designed for the same average allowable bearing value across the footing (as long as the resultant force is located in the middle one-third of the footing),and with the same allowable static lateral bearing pressure and allowable sliding resistance as previously recommended. When using the allowable lateral pressure and allowable sliding resistance, a Factor of Safety of 1.5 should be achieved.

8.8.3 **SUBDRAIN:** A subdrain system should be constructed behind and at the base of all retaining walls to allow drainage and to prevent the buildup of excessive hydrostatic pressures. Typical subdrains may include weep holes with a continuous gravel gallery, perforated pipe surrounded by filter rock, or some other approved system. Gravel galleries and/or filter rock, if not properly designed and graded for the on-site and/or import materials, should be enclosed in a geotextile fabric such as Mirafi 140N, Supac 4NP, or a suitable substitute in order to prevent infiltration of fines and clogging of the system. The perforated pipes should be at least 4.0-inches in diameter. Pipe perforations should be placed downward. Gravel filters should have volume of at least 1.0 cubic foot per lineal foot of pipe. Subdrains should maintain a positive flow gradient and have outlets that drain in a non-erosive manner. In the case of subdrains for basement walls, they need to empty into a sump provided with a submersible pump activated by a change in the water level.

8.8.4 **BACKFILL:** Backfill directly behind retaining walls (if backfill width is less than 3 feet) may consist of 0.5 to 0.75-inch diameter, rounded to subrounded gravel enclosed in a geotextile fabric such as Mirafi 140N, Supac 4NP, or a suitable substitute or a clean sand (Sand Equivalent Value greater than 50) water jetted into place to obtain proper compaction. If water jetting is used, the subdrain system should be in place. Even if water jetting is used, the sand should be densified to a minimum of 90 percent relative compaction. If the specified density is not obtained by water jetting, mechanical methods will be required. If other types of soil or gravel are used for backfill, mechanical compaction methods will be required to obtain a relative compaction of at least 90 percent of maximum dry density. Backfill directly behind retaining walls should not be compacted by wheel, track or other rolling by heavy construction equipment unless the wall is designed for the surcharge loading. If gravel, clean sand or other imported backfill is used behind retaining walls, the upper 18-inches of backfill in unpaved areas should consist of typical on-site material compacted to a minimum of 90 percent relative compaction in order to prevent the influx of surface runoff into the granular backfill and into the subdrain system. Maximum dry density and optimum moisture content for backfill materials should be determined in accordance with ASTM D 1557-00 procedures.

8.9 **FINISH LOT DRAINAGE RECOMMENDATIONS:** Positive drainage should be established away from the tops of slopes, the exterior walls of structures, the back of retaining walls, and the decorative concrete block perimeter walls. Finish lot surface gradients in unpaved areas should be provided next to tops of slopes and buildings to guide surface water away from foundations and slabs and from flowing over the tops of slopes. The surface water should be directed toward suitable drainage facilities. Ponding of surface water should not be allowed next to structures or on pavements. In unpaved areas, a minimum positive gradient of 4.0 percent away from the structures and tops of slopes for a minimum distance of 3.0-feet and a minimum of 1.0 percent pad drainage off the property in a non-erosive manner should be provided. Landscape trees and plants with high water needs should be planted at least 5.0-feet away from the walls of the structures. Downspouts from roof drains should discharge to a permanent all-weather surface which slopes away from the structure a minimum of 5.0-feet from the exterior building walls. In no case should downspouts from roof drains discharge into planter areas immediately adjacent to the building unless there is positive drainage away from the structure and the 5.0-foot minimum discharge distance criteria is followed.

8.10 **PLANTER RECOMMENDATIONS:** Planters around the perimeter of the structures should be designed to ensure that adequate drainage is maintained and minimal irrigation water is allowed to percolate into the soils underlying the buildings. The planters should drain directly onto surrounding paved areas or into a properly designed subdrain system.

8.11 **TEMPORARY CONSTRUCTION EXCAVATION RECOMMENDATIONS:** Temporary construction excavations for rough grading, foundations, retaining walls, utility trenches, etc., more than 5.0-feet in depth and to a maximum depth of 15-feet should be properly shored or cut back to the following inclinations:

Earth Material	Inclination
Compacted Fill	1:1
Alluvium	1.5:1

No surcharge loads (spoil piles, earthmoving equipment, trucks, etc.) should be allowed within a horizontal distance measured from the top of the excavation slope equal to 1.5 times the depth of the excavation. Excavations should be initially observed by the project Geotechnical Engineer, Engineering Geologist and/or their representative to verify the recommendations presented or to make additional recommendations to maintain stability and safety. Moisture variations, differences in the cohesive or cementation characteristics, or changes in the coarseness of the deposits may require slope flattening or, conversely, permit steepening upon review by the project Geotechnical Engineer, Engineering Geologist, or their representative. Deep utility trenches may experience caving which will require special considerations to stabilize the walls and expedite trenching operations. Surface drainage should be controlled along the top of the slope to preclude erosion of the slope face. If excavations are to be left open for long periods, the slopes should be sprayed with a protective compound and/or covered to minimize drying out, raveling, and/or erosion of the slopes. For excavations more than 5.0-feet in depth which will not be cut back to the recommended slope inclination, the contractor should submit to the owner and/or the owner's designated representative detailed drawings showing the design of shoring, bracing, sloping, or other provisions to be made for worker protection. If the drawings do not vary from the requirements of the OSHA Construction Safety Orders (CAL OSHA or FED OSHA, whichever is applicable for the project at the time of construction), a statement signed by a Registered Civil or Structural Engineer in the State of California, engaged by the contractor at his expense, should be submitted certifying that the contractor's excavation safety drawings comply with OSHA Construction Orders. If the drawings vary from the applicable OSHA Construction Safety Orders, the drawings should be prepared, signed, and sealed by a Registered or Structural Engineer in the State of California. The contractor should not proceed with any excavations until the project owner or his designated representative has received and acknowledged the properly prepared excavation safety drawings.

9.0 PLAN REVIEW

Subsequent to formulation of final plans and specifications for the project, but before bids for construction are requested, grading and foundation plans for the proposed development should be reviewed by **EnGEN Corporation** to verify compatibility with site geotechnical conditions and conformance with the recommendations contained in this report. If **EnGEN Corporation** is not accorded the opportunity to make the recommended review, we will assume no responsibility for misinterpretation of the recommendations presented in this report.

10.0 PRE-BID CONFERENCE

It may be desirable to hold a pre-bid conference with the owner or an authorized representative, the Project Architect, the Project Civil Engineer, the Project Geotechnical Engineer, and the proposed contractors present. This conference will provide continuity in the bidding process and clarify questions relative to the grading and construction requirements of the project.

11.0 PRE-GRADING CONFERENCE

Before the start of grading, a conference should be held with the owner or an authorized representative, the contractor, the Project Architect, the Project Civil Engineer, and the

Project Geotechnical Engineer present. The purpose of this meeting should be to clarify questions relating to the intent of the grading recommendations and to verify that the project specifications comply with the recommendations of this geotechnical engineering report. Any special grading procedures and/or difficulties proposed by the contractor can also be discussed at that time.

12.0 CONSTRUCTION OBSERVATIONS AND TESTING

Rough grading of the property should be performed under engineering observation and testing performed by **EnGEN Corporation.** Rough grading includes, but is not limited to, overexcavation cuts, fill placement, and excavation of temporary and permanent cut and fill slopes. In addition, **EnGEN Corporation** should observe all foundation excavations. Observations should be made before installation of concrete forms and/or reinforcing steel to verify and/or modify the conclusions and recommendations in this report. Observations of overexcavation cuts, fill placement, finish grading, utility or other trench backfill, pavement subgrade and base course, retaining wall backfill, slab presaturation, or other earthwork completed for the subject development should be performed by **EnGEN Corporation.** If the observations and testing to verify site geotechnical conditions are not performed by **EnGEN Corporation**, liability for the performance of the development is limited to the actual portions of the project observed and/or tested by **EnGEN Corporation.** If parties other than **EnGEN Corporation** are engaged to perform soils and materials observations and testing, they must be notified that they will be required to assume complete responsibility for the geotechnical aspects of the project by concurring with the recommendations in this report or providing alternative recommendations. Neither the presence of the Geotechnical Engineer and/or his field representative, nor the field observations and testing, shall excuse the contractor in any way for defects discovered in the contractor's work. The Geotechnical Engineer and/or his representative shall not be responsible for job or project safety. Job or project safety shall be the sole responsibility of the contractor.

13.0 CLOSURE

13.1 **CLIENT REPORT PURPOSES:** This report has been prepared for use by the parties or project named or described in this document. It may or may not contain sufficient information for other parties or purposes.

13.2 **PROJECT AND PROPERTY CHANGES:** In the event that changes in the assumed nature, design, or location of the proposed structure and/or project as described in this report, are planned, the conclusions and recommendations contained in this report will not be considered valid unless the changes are reviewed and the conclusions and recommendations of this report are modified or verified in writing. If conditions are observed or information becomes available during the design and construction process that are not reflected in this report, **EnGEN Corporation** should be notified so that supplemental evaluations can be performed and the conclusions and recommendations presented in this report can be modified or verified in writing.

13.3 **STANDARD OF PRACTICE:** This study was conducted in general accordance with the applicable standards of our profession and the accepted soil and foundation engineering principles and practices at the time this report was prepared. No other warranty, implied or expressed beyond the representations of this report, is made.

13.4 **LIMITATIONS:** Although every effort has been made to obtain information regarding the geotechnical and subsurface conditions of the site, limitations exist with respect to the knowledge of unknown regional or localized off-site conditions that may have an impact at the site. The recommendations presented in this report are valid as of the date of the report. However, changes in the conditions of a property can occur with the passage of time, whether they are due to natural processes or to the works of man on this and/or adjacent properties.

13.5 **CHANGES IN STANDARDS OF CARE:** Changes in applicable or appropriate standards of care or practice occur, whether they result from legislation or the broadening of knowledge and experience. Accordingly, the conclusions and recommendations presented in this report may be invalidated, wholly or in part, by changes outside of the control of **EnGEN Corporation** which occur in the future.

Thank you for the opportunity to provide our services. If we can be of further service or you should have questions regarding this report, please contact this office at your convenience.

Respectfully submitted,
EnGEN Corporation

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APPENDIX

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EXPLORATORY BORING LOG SUMMARIES

(B-1 through B-9)

GEOTECHNICAL BORING LOG

Project Number: T2824-GS
Boring Number: B-1
Date: 8/6/03 - 8/7/03

Project: Tres Cerritos West
Surface Elevation:
Logged By: E.W.R.

Soil Graphic	Description	Sampler	Sample Depth	USCS	Blow Count	Dry Density	In-Situ Moisture Content (%)	Consolidation (%)
	OLDER ALLUVIUM (Qoal) 0-52 ft	☒	0					
	Silty very fine sand, gray brown, medium dense, slightly moist, scattered rootlets.	■		SM	11-15-19	104.7	1.1	
	Silty very fine sand, light gray brown, medium dense, moist, slight porosity.	■	5	SM	6-7-7	90.7	9.3	
	Silty sand, red brown, moist, medium dense.	■		SM	5-9-14	115.4	6.1	
	Silty sand with clay, red brown, medium dense, moist.	■	10	SM	10-13-18	112.9	7.6	1.4
	Silty medium to very fine sand with clay, orange brown, medium dense, moist.	■		SM	14-19-24	121.1	5.4	1.6
	Silty sand with clay, dark orange brown, medium dense, moist, weathered DG.	■	15	SM	11-14-20	113.2	10.8	
	Silty sand with clay, dark orange brown, medium dense, moist, weathered DG.	■	20	SM	12-17-25	123.8	11.0	
	Silty sand with clay, dark orange brown, medium dense, moist.	■	25	SM	9-14-23	122.5	10.9	
	Silty sand with clay, dark orange brown, medium dense, moist.	■	30	SM	19-24-26	125.8	10.8	
	Silty fine sand, orange brown, medium dense, moist.	■	35	SM	11-14-18	121.3	11.1	

Notes:

GEOTECHNICAL BORING LOG

Project Number: T2824-GS
Boring Number: B-1
Date: 8/6/03 - 8/7/03

Project: Tres Cerritos West
Surface Elevation:
Logged By: E.W.R.

Soil Graphic	Description	Sampler	Sample Depth	USCS	Blow Count	Dry Density	In-Situ Moisture Content (%)	Consolidation (%)
	Silty sand with clay, dark red brown, medium dense, moist.	■	40	SM	3-9-18	126.0	11.1	
	PERCHED GROUNDWATER at 44 feet.	▽						
	Silty coarse to fine sand with clay, brown to orange brown, wet, medium dense.	■	45	SM	9-15-18	107.9	11.6	
	silty medium to fine sand, brown, medium dense, wet.	■	50	SM	10-20-26	122.3	11.3	
	Total Depth 52 feet. Perched groundwater at 44 feet. Boring backfilled with native soil cuttings.							
			55					
			60					
			65					
			70					

Notes:

GEOTECHNICAL BORING LOG

Project Number: T2824-GS
Boring Number: B-2
Date: 8/6/03 - 8/7/03

Project: Tres Cerritos West
Surface Elevation:
Logged By: E.W.R.

Soil Graphic	Description	Sampler	Sample Depth	USCS	Blow Count	Dry Density	In-Situ Moisture Content (%)	Consolidation (%)
	<u>OLDER ALLUVIUM (Qoal)</u> 0-32 ft	☒	0					
	Silty sand, light brown, loose, dry porous.	■		SM	4-4-8	101.4	1.03	
	Silty sand, yellow brown, medium dense, dry, porous.	■	5	SM	5-7-11	106.3	10.4	
	Silty very fine sand with clay, light brown, slightly moist, dense, caliche observed.	■		SM	17-28-44	114.6	10.4	
	Silty very fine sand, light brown, dense, slightly moist to dry, porous, contains caliche.	■	10	SM	9-24-30	122.4	10.4	
	Silty fine sand, light brown, dense, slightly moist, porous, contains caliche.	■		SM	13-36-50 for 5"	111.1	10.4	
	Silty fine to medium sand, brown, dense, slightly moist, porous, contains caliche.	■	15	SM	16-24-28	120.1	10.6	
	Silty medium to fine sand, brown, very dense, moist.	■	20	SM	26-50 for 4"	119.5	10.4	
	Silty sand with clay, orange brown, medium dense, moist.	■	25	SM	20-31-50 for 3"	120.7	10.6	
	Silty sand with clay, orange brown, medium dense, moist.	■	30	SM	1-24-28	120.1	10.5	
	Total Depth 32 feet. No groundwater encountered. Boring backfilled with native soil cuttings.							
			35					

Notes:

GEOTECHNICAL BORING LOG

Project Number: T2824-GS
Boring Number: B-3
Date: 8/6/03 - 8/7/03

Project: Tres Cerritos West
Surface Elevation:
Logged By: E.W.R.

Soil Graphic	Description	Sampler	Sample Depth	USCS	Blow Count	Dry Density	In-Situ Moisture Content (%)	Consolidation (%)
	OLDER ALLUVIUM (Qoal) 0-52 ft		0					
	Silty sand, brown, loose, slightly moist, porous.			SM	3-4-8	114.7	5.5	
	Silty very fine sand, yellow brown, slightly moist, loose.		5	SM	4-4-7		10.2	
	Silty coarse to fine sand, brown, moist, medium dense.			SM	5-10-13	112.9	10.3	
	Silty sand, yellow gray, medium dense, moist.		10	SM	6-9-9		10.5	
	Silty sand, yellow gray, loose, moist.			SM	4-4-5		10.6	
	Silty sand, orange brown, medium dense, moist.		15	SM	3-8-7		10.7	
	Silty coarse to fine sand, orange brown, medium dense, moist in lower half of sampler. Silty sand, light brown, medium dense, moist. (Cut through a weathered boulder?)		20	SM	9-16-17		10.4	
	Silty sand, light brown to yellow gray, medium dense.		25	SM	9-12-12		10.6	
	Silty sand, yellow gray, medium dense, moist.		30	SM	8-13-12		10.6	
	Silty sand, brown, medium dense, moist.		35	SM	7-9-8		10.8	

Notes:

GEOTECHNICAL BORING LOG

Project Number: T2824-GS
Boring Number: B-3
Date: 8/6/03 - 8/7/03

Project: Tres Cerritos West
Surface Elevation:
Logged By: E.W.R.

Soil Graphic	Description	Sampler	Sample Depth	USCS	Blow Count	Dry Density	In-Situ Moisture Content (%)	Consolidation (%)
	Silty sand, gray brown, medium dense, moist.		40	SM	6-11-13		11.0	
	Silty sand, gray brown, medium dense, moist. PERCHED GROUNDWATER at 46 feet.		45	SM	10-13-15		11.3	
	Silty sand, orange brown, medium dense, wet, weathered bedrock.		50	SM	8-13-12		11.4	
	Total Depth 52 feet. Perched groundwater at 46 feet. Boring backfilled with native soil cuttings.							
			55					
			60					
			65					
			70					

Notes:

GEOTECHNICAL BORING LOG

Project Number: T2824-GS
Boring Number: B-4
Date: 8/6/03 - 8/7/03

Project: Tres Cerritos West
Surface Elevation:
Logged By: E.W.R.

Soil Graphic	Description	Sampler	Sample Depth	USCS	Blow Count	Dry Density	In-Situ Moisture Content (%)	Consolidation (%)
▥	OLDER ALLUVIUM (Qoal) 0-52 ft	☒	0					
▥	Sandy silt, gray, medium stiff, slightly moist.	■		ML	6-8-9	102.0	10.8	
▨	Silty very fine sand, gray, medium stiff, moist.	◪	5	SM	3-5-5		10.8	
▨	Silty very fine sand, gray, medium dense, moist.	■		SM	6-7-10	99.7	11.2	
▥	Sandy silt, yellow gray, medium stiff, moist.	◪	10	ML	6-21-24		10.7	
▨	Silty very fine sand, gray, brown, loose, moist.	◪	15	SM	4-4-2		10.8	
▨	Silty sand, gray brown, medium dense, moist.	◪	20	SM	10-15-19		10.6	
▨	Silty sand, gray brown, medium dense, moist.	◪	25	SM	5-7-7		10.9	
▨	Silty fine to medium sand, gray brown, medium dense, moist.	◪	30	SM	6-9-11		10.1	
▨	Silty sand with clay, gray brown, medium dense, moist.	◪	35	SM	3-5-7		11.2	

Notes:

GEOTECHNICAL BORING LOG

Project Number: T2824-GS
Boring Number: B-4
Date: 8/6/03 - 8/7/03

Project: Tres Cerritos West
Surface Elevation:
Logged By: E.W.R.

Soil Graphic	Description	Sampler	Sample Depth	USCS	Blow Count	Dry Density	In-Situ Moisture Content (%)	Consolidation (%)
▨	Silty fine to medium sand, gray brown, medium stiff, very moist.	◩		SM	6-10-12		11.2	
▨	Silty sand with clay, dark gray brown, loose, very moist.	◩	40	SM	3-3-5		12.0	
▨	Silty sand with clay, dark gray brown, medium dense, very moist.	◩		SM	4-7-7		14.1	
▨	Silty sand with clay, gray brown, medium dense, moist.	◩	45	SM	3-5-6		13.0	
▨	Silty sand, gray brown, medium dense, moist.	◩	50	SM	6-9-12		11.3	
	Total Depth 52 feet. No groundwater encountered. Boring backfilled with native soil cuttings.							
			55					
			60					
			65					
			70					

Notes:

GEOTECHNICAL BORING LOG

Project Number: T2824-GS
Boring Number: B-5
Date: 8/6/03 - 8/7/03

Project: Tres Cerritos West
Surface Elevation:
Logged By: E.W.R.

Soil Graphic	Description	Sampler	Sample Depth	USCS	Blow Count	Dry Density	In-Situ Moisture Content (%)	Consolidation (%)
	<u>OLDER ALLUVIUM (Qoal)</u> 0-32 ft		0					
	Silty sand, light brown, loose, dry, porous.	■		SM	3-5-8	100.3	2.2	
	Silty sand, yellow brown, loose, slightly moist, porous.	■	5	SM	5-6-8	99.1	2.9	6.5
	Silty sand, yellow brown, loose, slightly moist.	■		SM	4-7-7	109.8	3.9	
	Silty sand, yellow gray, medium dense, moist, friable.	■	10	SM	7-9-14	110.5	4.5	3.3
	Silty sand, dark yellow gray, dense, moist.	■	15	SM	14-21-30	129.2	8.4	
	Silty sand, yellow brown, medium dense, moist.	■	20	SM	12-16-21	117.7	5.2	
	Silty sand, orange brown, medium dense, moist.	■	25	SM	8-12-21	118.9	5.2	
	Silty sand, yellow brown, medium dense, moist.	■	30	SM	9-14-16	115.0	5.7	
	Total Depth 32 feet. No groundwater encountered. Boring backfilled with native soil cuttings.							
			35					

Notes:

GEOTECHNICAL BORING LOG

Project Number: T2824-GS
Boring Number: B-6
Date: 8/6/03 - 8/7/03

Project: Tres Cerritos West
Surface Elevation:
Logged By: E.W.R.

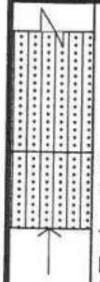
Soil Graphic	Description	Sampler	Sample Depth	USCS	Blow Count	Dry Density	In-Situ Moisture Content (%)	Consolidation (%)
	<u>OLDER ALLUVIUM (Qoal)</u> 0-42 ft		0					
	Sandy silt, gray, medium dense, moist, porous.			ML	4-5-8	95.8	1.6	
	Silty sand, gray, loose, moist.		5	SM	2-4-6	97.3	19.7	
	Silty sand, gray, medium dense, moist, contains veinlets of caliche.			SM	5-7-10	90.7	26.2	
	Silty sand, gray brown, medium dense, moist.		10	SM	5-6-9	92.5	14.2	1.4
	Silty sand, brown, medium dense, moist.		15	SM	6-14-18	117.5	9.5	0.5
	Sand, gray, medium dense, moist.		20	SP	9-13-18	113.4	5.0	0.9
	Silty sand, brown, medium dense, moist.		25	SM	10-16-20	127.1	9.6	
	Silty sand, brown, medium dense, moist.		30	SM	13-14-17	128.4	8.8	
	Silty sand, gray brown, medium dense, very moist.		35	SM	3-9-13	122.3	12.6	

Notes:

GEOTECHNICAL BORING LOG

Project Number: T2824-GS
Boring Number: B-6
Date: 8/6/03 - 8/7/03

Project: Tres Cerritos West
Surface Elevation:
Logged By: E.W.R.

Soil Graphic	Description	Sampler	Sample Depth	USCS	Blow Count	Dry Density	In-Situ Moisture Content (%)	Consolidation (%)
	Silty sand with clay, gray brown, medium dense, very moist.	■	40	SM	8-12-12	118.8	12.5	
	Total Depth 42 feet. No groundwater encountered. Boring backfilled with native soil cuttings.							
			45					
			50					
			55					
			60					
			65					
			70					

Notes:

GEOTECHNICAL BORING LOG

Project Number: T2824-GS
Boring Number: B-7
Date: 8/6/03 - 8/7/03

Project: Tres Cerritos West
Surface Elevation:
Logged By: E.W.R.

Soil Graphic	Description	Sampler	Sample Depth	USCS	Blow Count	Dry Density	In-Situ Moisture Content (%)	Consolidation (%)
	OLDER ALLUVIUM (Qoal) 0-24 ft		0					
	Silty fine to medium sand, tan, medium dense, slightly moist, porous.			SM	14-16-25	118.2	3.6	
	Silty sand, red, dense, moist.		5	SM	6-11-17	118.5	7.1	
	Silty sand with clay, dark red brown, medium dense, moist.			SM	9-12-15	118.0	6.5	
	Silty sand with clay, dark reddish brown, medium dense, moist.		10	SM	10-17-26	126.7	8.2	
	Silty sand, gray brown to brown, medium dense, moist.		15	SM	7-14-15	109.4	6.7	
	Silty sand, gray to brown, medium dense, moist.		20	SM	13-20-20	129.3	9.5	
	BEDROCK (Kgr) 24-32 ft Silty sand, orange brown, very dense, moist.		25	SM	37-50 for 4"	124.3	5.5	
	Partial Recovery 2/6 Rings. Silty sand, orange brown, very dense, moist.		30		50 for 2"		5.3	
	Total Depth 32 feet. No groundwater encountered. Boring backfilled with native soil cuttings.							
			35					

Notes:

GEOTECHNICAL BORING LOG

Project Number: T2824-GS
Boring Number: B-8
Date: 8/6/03 - 8/7/03

Project: Tres Cerritos West
Surface Elevation:
Logged By: E.W.R.

Soil Graphic	Description	Sampler	Sample Depth	USCS	Blow Count	Dry Density	In-Situ Moisture Content (%)	Consolidation (%)
▦	OLDER ALLUVIUM (Qoal) 0-13 ft		0					
▦	Silty sand, brown, dense, slightly moist.	■		SM	16-22-33	125.3	4.4	
▦	Silty sand, brown, medium dense, slightly moist, slight porosity.	■	5	SM	9-21-34	131.1	5.0	
▦	Silty sand, dark red brown, medium dense, moist.	■		SM	13-22-23	118.9	4.7	
▦	Silty sand, light gray brown, dense, moist.	■	10	SM	14-27-40	125.4	4.7	
▦	BEDROCK (Kgr) 13-22 ft							
▦	Silty sand with clay, dark red brown, dense, moist.	■	15	SM	33-35-41	126.0	7.0	
▦	No Recovery.	⧄	20					
	Total Depth 22 feet. No groundwater encountered. Boring backfilled with native soil cuttings.							
			25					
			30					
			35					

Notes:

GEOTECHNICAL BORING LOG

Project Number: T2824-GS
Boring Number: B-9
Date: 8/6/03 - 8/7/03

Project: Tres Cerritos West
Surface Elevation:
Logged By: E.W.R.

Soil Graphic	Description	Sampler	Sample Depth	USCS	Blow Count	Dry Density	In-Situ Moisture Content (%)	Consolidation (%)
	OLDER ALLUVIUM (Qoal) 0-42 ft		0					
	Silty sand, gray brown, medium dense, slightly moist.			SM	26-19-22	111.4	5.6	
	Silty sand with clay, brown to dark brown, medium dense, moist.		5	SM	9-10-11	105.4	4.6	6.9
	Silty sand with clay, yellow brown, medium dense, moist.			SM	4-8-16	115.9	5.2	1.4
	Silty sand with clay, yellow brown to dark red brown, medium dense, moist.		10	SM	6-12-15	114.3	6.6	1.8
	Silty sand, dark yellow brown, medium dense, moist.		15	SM	10-18-23	118.1	7.7	
	Silty sand with gravel, orange brown, medium dense, moist.		20	SM	9-15-18	117.2	6.0	
	Silty sand with clay, orange brown, medium dense, moist.		25	SM	19-21-27	125.8	9.6	
	Silty sand with clay, dark orange brown, medium dense, moist.		30	SM	8-13-18	120.7	8.1	
	Silty sand with clay, dark orange brown, medium dense, very moist.		35	SM	6-14-20	122.1	11.1	

Notes:

GEOTECHNICAL BORING LOG

Project Number: T2824-GS
Boring Number: B-9
Date: 8/6/03 - 8/7/03

Project: Tres Cerritos West
Surface Elevation:
Logged By: E.W.R.

Soil Graphic	Description	Sampler	Sample Depth	USCS	Blow Count	Dry Density	In-Situ Moisture Content (%)	Consolidation (%)
▨	PERCHED GROUNDWATER at 37 feet.	≟						
▨	silty coarse to fine sand, dark orange brown, medium dense, wet.	■	40	SM	12-16-30	120.7	10.9	
	Total Depth 42 feet. Perched groundwater encountered at 37 feet. Boring backfilled with native soil cuttings.							
			45					
			50					
			55					
			60					
			65					
			70					

Notes:

EnGEN Corporation

Appendix 4: Historical Site Conditions

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

NOT APPLICABLE

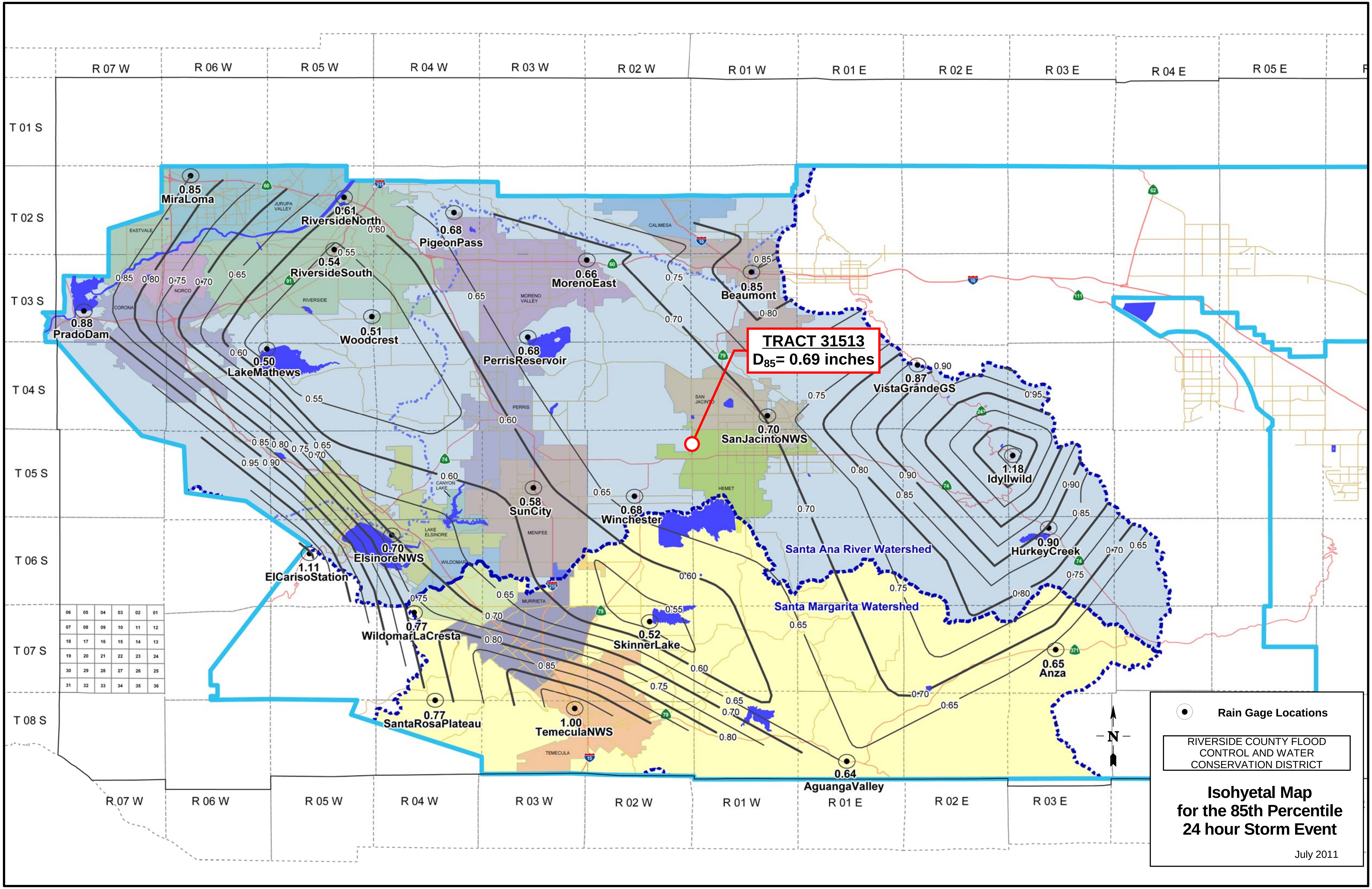
Appendix 5: LID Infeasibility

LID Technical Infeasibility Analysis

NOT APPLICABLE

Appendix 6: BMP Design Details

BMP Sizing, Design Details and other Supporting Documentation



TRACT 31513
D_{85}= 0.69 inches

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 SP2 & Co,.
Date 7/14/2025
Designed by Alex Jaramillo
Case No TBD
Company Project Number/Name 2023.06022 Tract 31513 "Tres Cerritos"

BMP Identification

BMP NAME / ID Extended Detention "Basin A"

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}= 0.69 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
A: Imp. Streets & Sidewalks	*396253*	*Concrete or Asphalt*	*1*	*0.89*	*353457.7*			
A: Imp. 3600 SFR (62%)	*443818.32*	*Roofs*	*1*	*0.89*	*395885.9*			
A: Pervious 3600 SFR (38%)	*272017.68*	*Ornamental Landscaping*	*0.1*	*0.11*	*30046.5*			
A: Imp. 6000 SFR (57%)	*194771.85*	*Roofs*	*1*	*0.89*	*173736.5*			
A: Pervious 6000 SFR (43%)	*146933.15*	*Ornamental Landscaping*	*0.1*	*0.11*	*16229.9*			
A: Pervious Landscaping	*180472*	*Ornamental Landscaping*	*0.1*	*0.11*	*19934.6*			
A: BMP Basin	*39439*	*Ornamental Landscaping*	*0.1*	*0.11*	*4356.4*			
	1673705	***Total***			**993647.5**	**0.69**	***57134.7***	***213233***

Notes:

Extended Detention Basin Design Procedure	BMP Subarea No. DMA A	Legend:	Required Entries Calculated Cells

Company Name: SP2 & Co.

Date: 7/15/2025

Designed by: A. Jaramillo

County/City Case No.: TBD

Design Volume

Tributary Area (BMP Subarea) $A_T =$ 38.42 acres

Enter $V_{BMP,}$ determined from Section 2.1 of this Handbook $V_{BMP}=$ 57,135 ft^3

Basin Footprint

Overall Geometry

Length at Basin Bottom Surface Length = 338 ft

Width at Basin Bottom Surface Width = 106 ft

Meets 1.5 : 1 requirement? ✓

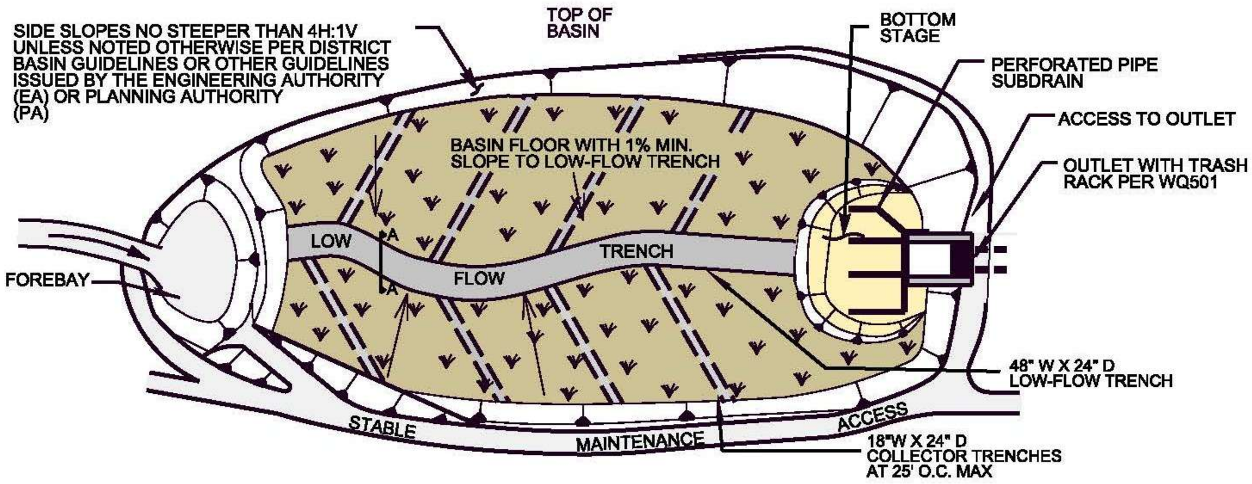
Side Slopes per "Basin Guidelines", Sect. 1.2 z = 4 :1

Proposed Basin Depth (with no freeboard) $D_B =$ 4.00 ft

Depth of freeboard (if used) $D_{FB} =$ 1.00 ft

Minimum Required Allowance for Total Depth (including proposed basin depth, freeboard, minimum depth of bottom stage (D_{BS}=0.33') and minimum filter depth (D_{FD}=2.33')) $D_{REQ} =$ 7.7 ft

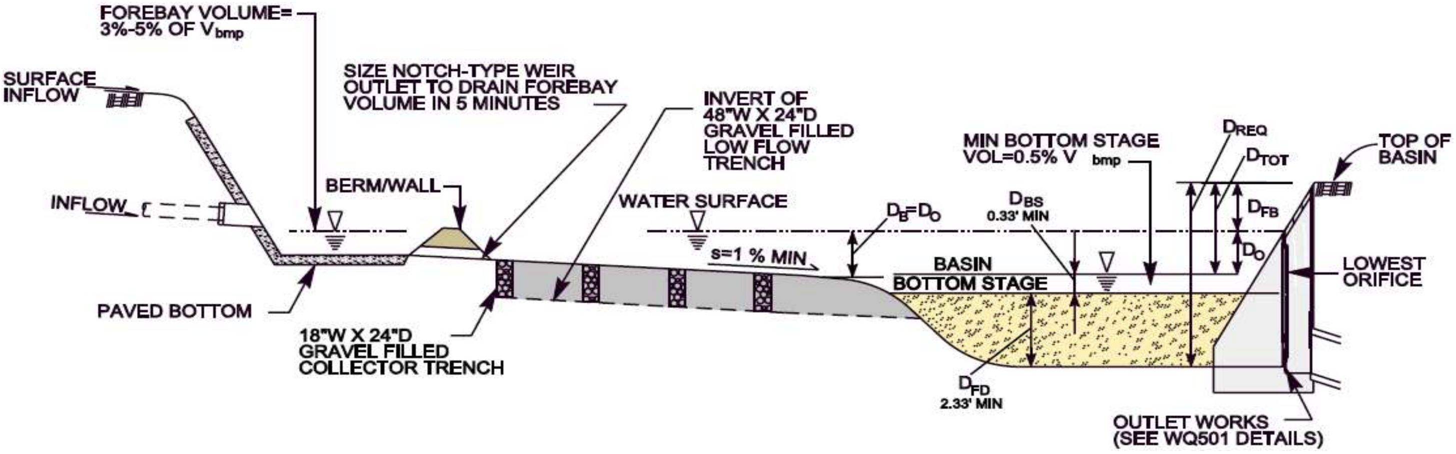
Depth from design water surface elevation to lowest orifice $D_O =$ 4.0 ft



Basin Design

Basin Design

Proposed Total Basin Depth (proposed depth plus freeboard)	D_{TOT} =	5.00	ft
Basin Invert Longitudinal Slope	Slope =	✓ 1.00	%
Basin Invert Transverse Slope (1% min)	Slope =	✓ 1	%
Basin Volume	V_{Basin} =	✓ 154185	ft^3



Forebay Design

Forebay Volume (3 - 5% V_{BMP})	V_{FB} =	✓ 2290	ft^3
Forebay Depth (height of berm)	D_{FBY} =	1	ft
Minimum Forebay Surface Area	A_{FB} =	2290	ft^2
Rectangular weir (notch)	W =	✓ 8.00	in

Dry Weather and Low-Flow Management

Low-Flow Trench (see graphic below)

Depth (24 inches minimum, gravel filled) Depth = ✓ 24 inches

Width (48 inches minimum) Width = ✓ 48 inches

Trench Invert Longitudinal Slope Slope = ✓ 0.5 %

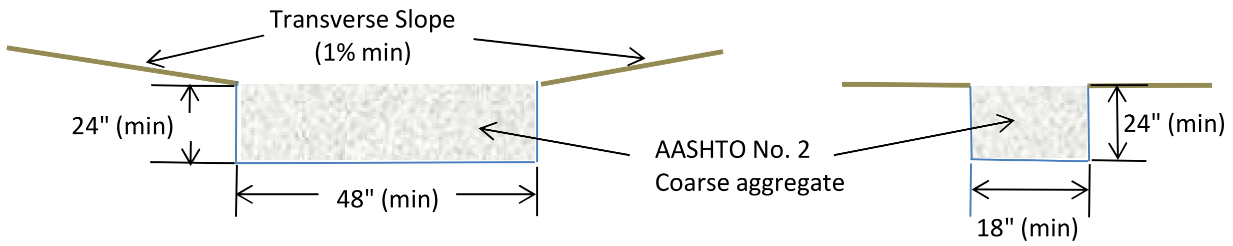
Collector Trenches (see graphic below)

Depth (24 inches minimum) Depth = ✓ 24 inches

Width (18 inches minimum) Width = ✓ 18 inches

Trench Invert Longitudinal Slope Slope = ✓ 0.5 %

Spacing (25 feet on center maximum) S = ✓ 20 feet



Low-Flow Trench

Collector Trench

Bottom Stage (Sand Filter) Design

Depth of the Bottom Stage (4" minimum ponding) D_{BS} = ✓ 6 in

Surface Area of Bottom Stage A_{BS} = 515 ft^2

Dry Weather Ponded Volume (above sand layer) V_{BS} = 258 ft^3

Is V_{BS} no less than 0.5% V_{BMP}? OK

Depth of ASTM-C33 sand (18 inch minimum)

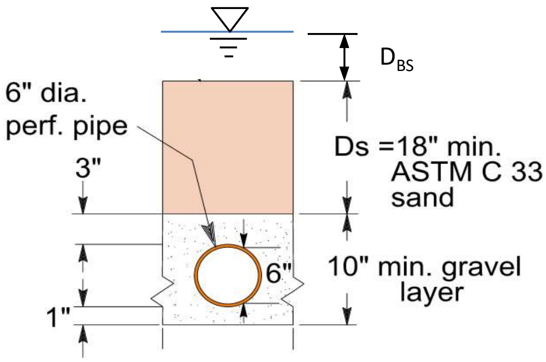
Ds = ✓ 18 inches

Diameter of Subdrains

ϕ = ✓ 8 in

Subdrain Spacing

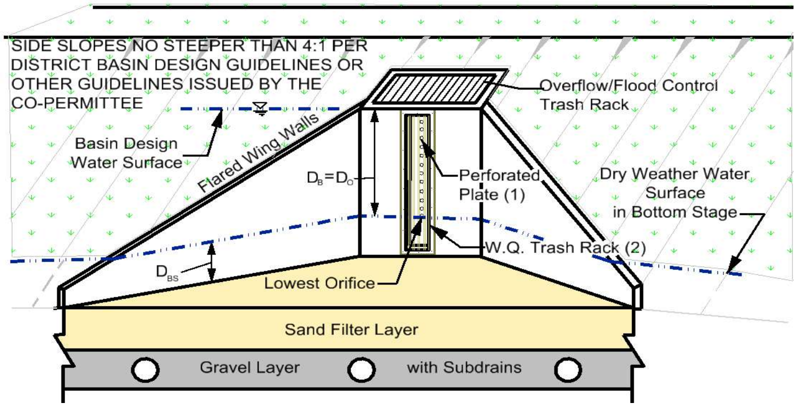
s = 20 ft. on center



Basin Outlet Design

Outlet Design

Assume an orifice area. Based on the information provided above, the spreadsheet provides discharge vs. stage data. Enter the volume vs. stage data for each interval. This information is used to route the volume through the basin. The size of the orifice is acceptable when the data shows that less than 50% of V_{BMP} has drained in 24 hours, and that 100% drawdown occurs within 72 hours.



Flow Rate, Q (cfs)

$$Q=CA[2g(H-H_o)]^{0.5}$$

Discharge Coefficient,

Default, C = 0.66

Other, C =

Orifice Area (ft^2)

Orifice Diameter, d; number of orifices per row, n; and number of orifice rows, N (from the bottom up).

d = ✓ 2.75 inches

n = 1 per row

N = 1 rows

Aeff = 0.041 ft^2 per row

or

Aeff = 5.937 in^2 per row

From outflow hydrograph, the time where 50% of V_{BMP} has drained from the basin (24 hour minimum):

Time (50%) = ✓ 24.30 hrs

OK

From outflow hydrograph, the time where 100% V_{BMP} has drained from the basin(within 72 hours):

Time (100 %) = ✓ 60.23 hrs

OK

Headwater Elev. / Stage (ft)	Discharge (cfs)	Volume (acre-ft)	Δt (hrs.)
0	0.0000	0.0000	
0.33	0.1260	0.020	3.84
0.67	0.1783	0.090	5.57
1.00	0.2184	0.180	5.49
1.33	0.2521	0.300	6.17
1.67	0.2819	0.430	5.89
2.00	0.3088	0.570	5.74
2.33	0.3335	0.730	6.03
2.67	0.3566	0.890	5.61
3.00	0.3782	1.050	5.27
3.33	0.3986	1.220	5.30
3.67	0.4181	1.400	5.33
4.00	*0.4367*	*1.570*	
4.33			
4.67			
5.00			
5.33			
5.67			
6.00			
6.33			
6.67			
7.00			
7.33			
7.67			
8.00			
8.33			
8.67			
9.00			
9.33			
9.67			
10.00			
		∑ =	60.23

Notes: Basin length based on the total length of the low flow trench. In the interim a pump will be utilized downstream to drain the basin. For low flow events the pump will empty the basin equal to 50% of the DCV within 24-hrs (148 gpm). For larger storm events, the pump will dewater the entire basin within 72-hrs (340 gpm)

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 SP2 & Co,.
Date 7/14/2025
Designed by Alex Jaramillo
Case No TBD
Company Project Number/Name 2023.06022 Tract 31513 "Tres Cerritos"

BMP Identification

BMP NAME / ID Extended Detention "Basin B"

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}= 0.69 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)*
B: Imp. Streets & Sidewalks	*178034*	*Concrete or Asphalt*	*1*	*0.89*	*158806.3*			
B: Imp. 3600 SFR (62%)	*67508.08*	*Roofs*	*1*	*0.89*	*60217.2*			
B: Pervious 3600 SFR (38%)	*41375.92*	*Ornamental Landscaping*	*0.1*	*0.11*	*4570.3*			
B: Imp. 6000 SFR (57%)	*137745.06*	*Roofs*	*1*	*0.89*	*122868.6*			
B: Pervious 6000 SFR (43%)	*103912.94*	*Ornamental Landscaping*	*0.1*	*0.11*	*11478*			
B: Pervious Landscaping	*63582*	*Ornamental Landscaping*	*0.1*	*0.11*	*7023.1*			
B: BMP Basin	*42052*	*Ornamental Landscaping*	*0.1*	*0.11*	*4645*			
	634210	***Total***			**369608.5**	**0.69**	***21252.5***	***158296***

Notes:

Extended Detention Basin Design Procedure	BMP Subarea No. DMA B	Legend:	Required Entries Calculated Cells

Company Name: SP2 & Co. Date: 7/15/2025

Designed by: A. Jaramillo County/City Case No.: TBD

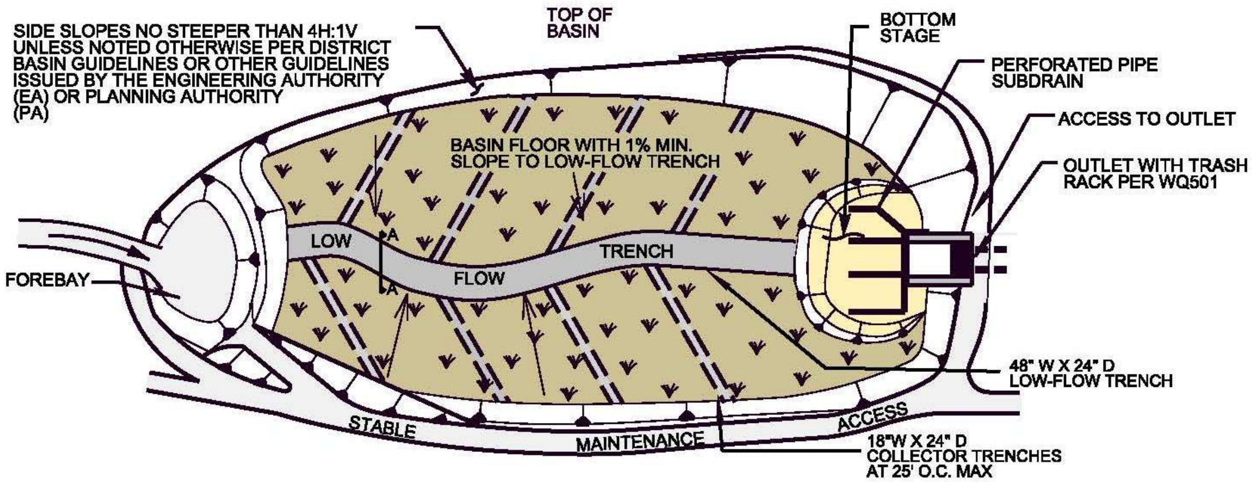
Design Volume

Tributary Area (BMP Subarea)	A_T =	14.56	acres
Enter $V_{BMP,}$ determined from Section 2.1 of this Handbook	V_{BMP}=	21,253	ft^3

Basin Footprint

Overall Geometry

Length at Basin Bottom Surface	Length =	228	ft
Width at Basin Bottom Surface	Width =	68	ft
	Meets 1.5 : 1 requirement?	✓	
Side Slopes per "Basin Guidelines", Sect. 1.2	z =	4	:1
Proposed Basin Depth (with no freeboard)	D_B =	4.00	ft
Depth of freeboard (if used)	D_{FB} =	1.00	ft
Minimum Required Allowance for Total Depth (including proposed basin depth, freeboard, minimum depth of bottom stage (D_{BS}=0.33') and minimum filter depth (D_{FD}=2.33'))	D_{REQ} =	7.7	ft
Depth from design water surface elevation to lowest orifice	D_O =	4.0	ft



Basin Design

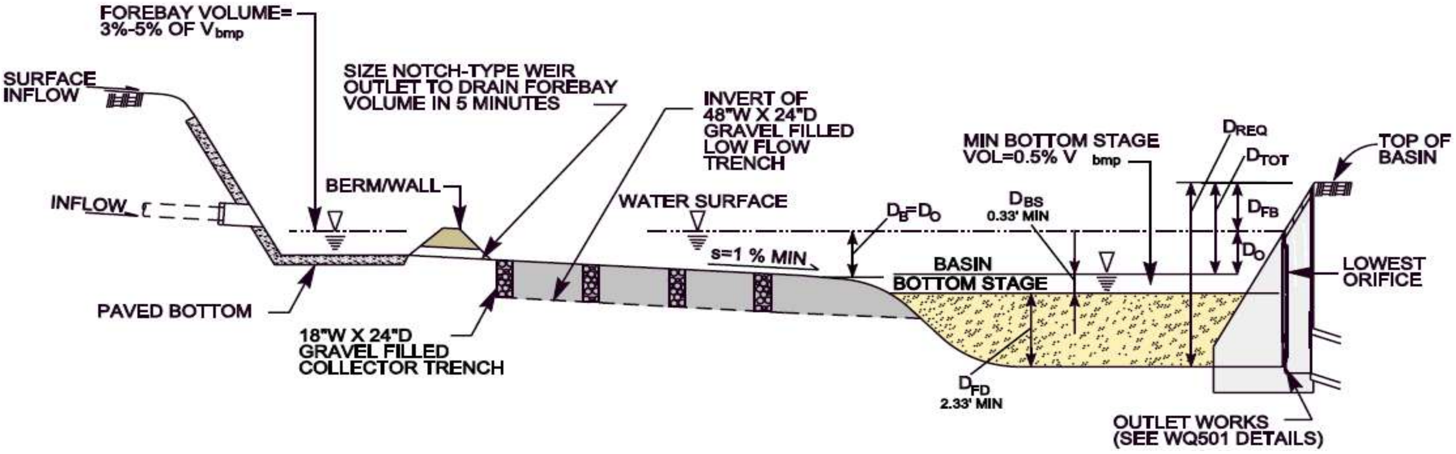
Basin Design

Proposed Total Basin Depth (proposed depth plus freeboard) D_{TOT} = 5.00 ft

Basin Invert Longitudinal Slope Slope = ✓ 1.00 %

Basin Invert Transverse Slope (1% min) Slope = ✓ 1 %

Basin Volume V_{Basin} = ✓ 154185 ft^3



Forebay Design

Forebay Volume (3 - 5% V_{BMP}) V_{FB} = ✓ 850 ft^3

Forebay Depth (height of berm) D_{FBY} = 1 ft

Minimum Forebay Surface Area A_{FB} = 850 ft^2

Rectangular weir (notch) W = ✓ 8.00 in

Dry Weather and Low-Flow Management

Low-Flow Trench (see graphic below)

Depth (24 inches minimum, gravel filled) — Depth = ✓ 24 inches

Width (48 inches minimum) — Width = ✓ 48 inches

Trench Invert Longitudinal Slope — Slope = ✓ 0.5 %

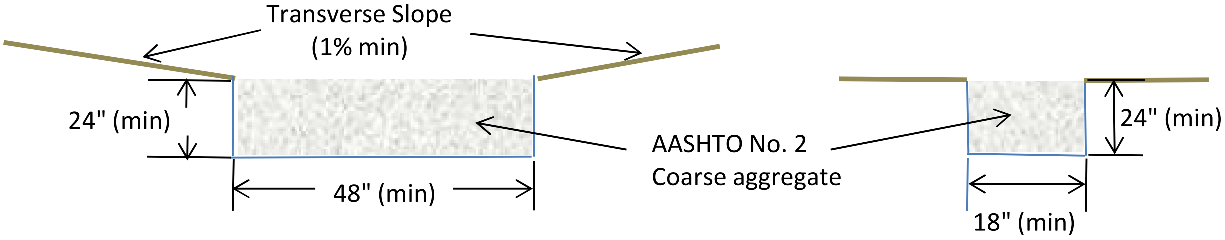
Collector Trenches (see graphic below)

Depth (24 inches minimum) — Depth = ✓ 24 inches

Width (18 inches minimum) — Width = ✓ 18 inches

Trench Invert Longitudinal Slope — Slope = ✓ 0.5 %

Spacing (25 feet on center maximum) — S = ✓ 20 feet



Low-Flow Trench

Collector Trench

Bottom Stage (Sand Filter) Design

Depth of the Bottom Stage (4" minimum ponding) — D_{BS} = ✓ 6 in

Surface Area of Bottom Stage — A_{BS} = 190 ft^2

Dry Weather Ponded Volume (above sand layer) — V_{BS} = 95 ft^3

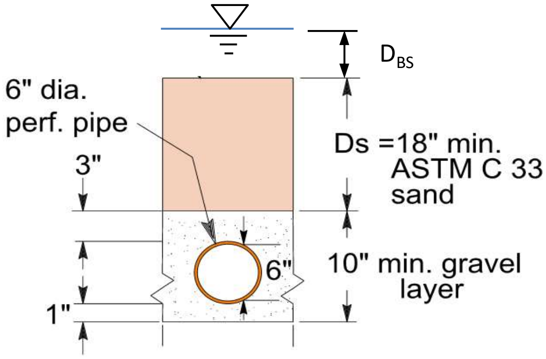
Is V_{BS} no less than 0.5% V_{BMP}? OK

Depth of ASTM-C33 sand (18 inch minimum)

Ds = ✓ 18 inches

Diameter of Subdrains — ϕ = ✓ 8 in

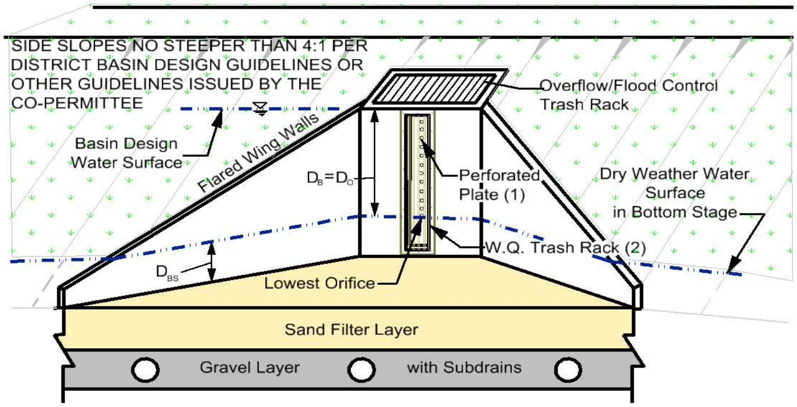
Subdrain Spacing — s = 10 ft. on center



Basin Outlet Design

Outlet Design

Assume an orifice area. Based on the information provided above, the spreadsheet provides discharge vs. stage data. Enter the volume vs. stage data for each interval. This information is used to route the volume through the basin. The size of the orifice is acceptable when the data shows that less than 50% of V_{BMP} has drained in 24 hours, and that 100% drawdown occurs within 72 hours.



Flow Rate, Q (cfs)

$$Q=CA[2g(H-H_o)]^{0.5}$$

Discharge Coefficient,

Default, C = 0.66

Other, C =

Orifice Area (ft^2)

Orifice Diameter, d; number of orifices per row, n; and number of orifice rows, N (from the bottom up).

d = ✓ 1.8 inches

n = 1 per row

N = 1 rows

Aeff = 0.018 ft^2 per row

or

Aeff = 2.543 in^2 per row

From outflow hydrograph, the time where 50% of V_{BMP} has drained from the basin (24 hour minimum):

Time (50%) = ✓ 24.86 hrs

OK

From outflow hydrograph, the time where 100% V_{BMP} has drained from the basin(within 72 hours):

Time (100 %) = ✓ 61.60 hrs

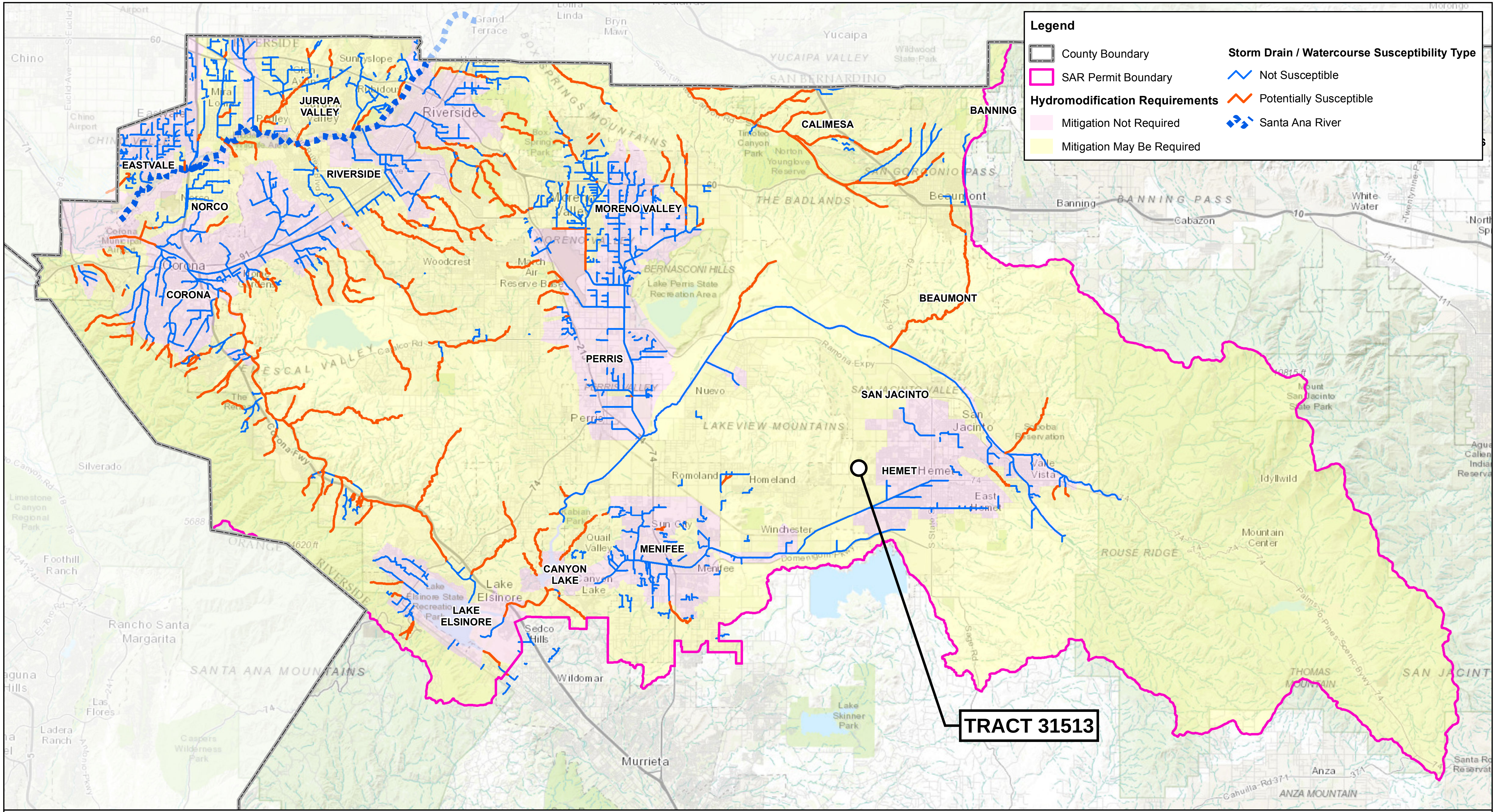
OK

Headwater Elev. / Stage (ft)	Discharge (cfs)	Volume (acre-ft)	Δt (hrs.)
0	0.0000	0.0000	
0.33	0.0540	0.020	8.97
0.67	0.0764	0.050	5.57
1.00	0.0935	0.090	5.70
1.33	0.1080	0.130	4.80
1.67	0.1208	0.210	8.46
2.00	0.1323	0.300	8.61
2.33	0.1429	0.410	9.67
2.67	0.1528	0.530	9.82
3.00	*0.1620*	*0.630*	
3.33	*0.1708*	*0.750*	
3.67	*0.1791*	*0.880*	
4.00	*0.1871*	*1.010*	
4.33			
4.67			
5.00			
5.33			
5.67			
6.00			
6.33			
6.67			
7.00			
7.33			
7.67			
8.00			
8.33			
8.67			
9.00			
9.33			
9.67			
10.00			
		∑ =	61.60

Notes: In the interim a pump will be utilized downstream to drain the basin. For low flow events the pump will empty the basin equal to 50% of the DCV within 24-hrs (55 gpm). For larger storm events, the pump will dewater the entire basin within 72-hrs (206 gpm)

Appendix 7: Hydromodification

Supporting Detail Relating to Hydrologic Conditions of Concern



N

0 2.5 5 10 Miles

Updated February 2017

HCOC Applicability Map
SAR Permittees

Map 2

PROJECT: 2023.06022 Tr. 31513 "Tres Cerritos"

UNIT HYDROGRAPH - EXISTING

AREA	ACRES	2-YEAR OUTFLOW (CFS)				2-YEAR VOLUME (AC-FT)				10-YEAR OUTFLOW (CFS)				10-YEAR VOLUME (AC-FT)				100-YEAR OUTFLOW (CFS)				100-YEAR VOLUME (AC-FT)			
		1HR	3HR	6HR	24HR	1HR	3HR	6HR	24HR	1HR	3HR	6HR	24HR	1HR	3HR	6HR	24HR	1HR	3HR	6HR	24HR	1HR	3HR	6HR	24HR
XA	104.71	42.8	18.3	17.1	2.47	1.47	1.15	1.47	1.57	104.7	64.3	60.0	16.0	4.61	4.45	5.24	4.42	185.5	122.7	112.5	49.9	9.35	12.38	15.24	20.54
XB	19.51	15.4	6.5	6.1	0.48	0.33	0.28	0.35	0.29	31.5	16.6	14.9	4.7	0.99	1.11	1.27	1.32	52.0	28.5	25.1	10.7	1.83	2.56	3.33	4.79
XC	40.56	25.3	8.6	8.3	0.99	0.55	0.42	0.54	0.61	57.0	29.5	26.7	6.1	1.72	1.61	1.90	1.50	98.5	55.1	49.2	19.8	3.58	4.68	5.67	7.61
TOTAL	**164.78**	**83.5**	**33.4**	**31.6**	**3.93**	**2.35**	**1.85**	**2.36**	**2.47**	**193.3**	**110.4**	**101.6**	**26.8**	**7.31**	**7.17**	**8.41**	**7.24**	**336.0**	**206.3**	**186.8**	**80.4**	**14.76**	**19.62**	**24.24**	**32.94**

UNIT HYDROGRAPH - PROPOSED

AREA	ACRES	2-YEAR OUTFLOW (CFS)				2-YEAR VOLUME (AC-FT)				10-YEAR OUTFLOW (CFS)				10-YEAR VOLUME (AC-FT)				100-YEAR OUTFLOW (CFS)				100-YEAR VOLUME (AC-FT)			
		1HR	3HR	6HR	24HR	1HR	3HR	6HR	24HR	1HR	3HR	6HR	24HR	1HR	3HR	6HR	24HR	1HR	3HR	6HR	24HR	1HR	3HR	6HR	24HR
A	39.37	64.9	16.4	16.5	5.5	1.82	1.49	2.24	3.36	64.9	31.8	29.9	9.2	1.82	2.46	3.43	5.57	108.3	56.3	51.7	16.9	3.23	4.11	5.41	8.68
B	32.06	23.2	8.9	8.8	2.3	0.60	0.67	0.97	1.40	47.3	25.2	23.8	4.9	1.36	1.48	1.91	2.32	81.3	46.4	42.7	15.7	2.81	3.70	4.42	6.52
C	52.80	40.2	16.5	16.4	1.3	0.83	0.70	0.88	0.79	84.6	44.6	42.3	11.8	2.58	2.76	3.20	3.11	140.5	77.6	71.8	28.5	4.89	6.75	8.69	12.19
D	12.73	11.0	5.1	5.0	0.31	0.25	0.22	0.27	0.19	21.3	11.4	10.7	3.5	0.68	0.84	0.98	1.12	34.4	19.0	17.3	7.2	1.21	1.72	2.28	3.42
E	1.28	1.5	0.55	0.56	0.03	0.022	0.019	0.024	0.019	2.9	1.3	1.2	0.32	0.07	0.08	0.09	0.09	4.6	2.1	2.0	0.71	0.10	0.20	0.20	0.30
F	27.89	21.2	8.0	7.5	0.90	0.44	0.39	0.51	0.55	44.7	22.8	20.7	5.7	1.13	1.36	1.63	1.59	74.6	40.3	35.9	14.6	2.55	3.46	4.38	6.08
TOTAL	**166.1**	**162.0**	**55.5**	**54.7**	**10.38**	**3.96**	**3.49**	**4.90**	**6.31**	**265.6**	**137.2**	**128.6**	**35.4**	**7.64**	**8.97**	**11.23**	**13.79**	**443.8**	**241.6**	**221.4**	**83.6**	**14.78**	**19.94**	**25.37**	**37.19**
DELTA	**1.3**	**78.4**	**22.1**	**23.2**	**6.45**	**1.61**	**1.64**	**2.54**	**3.84**	**72.3**	**26.9**	**27.0**	**8.62**	**0.33**	**1.80**	**2.82**	**6.55**	**107.8**	**35.3**	**34.5**	**3.3**	**0.02**	**0.32**	**1.13**	**4.25**

BASIN ROUTING: INTERIM

BASIN	BASIN CAPACITY	2-YEAR OUTFLOW (CFS)				2-YEAR PEAK BASIN DEPTH (FT)				10-YEAR OUTFLOW (CFS)				10-YEAR PEAK BASIN DEPTH (FT)			
		1HR	3HR	6HR	24HR	1HR	3HR	6HR	24HR	1HR	3HR	6HR	24HR	1HR	3HR	6HR	24HR
A "WEST"	4.90	0.8	0.8	0.8	0.80	5.21	5.75	6.60	6.88	0.8	0.8	7.0	7.0	6.44	7.19	8.12	8.13
B "EAST"	3.63	0.5	0.5	0.5	0.50	5.84	5.56	6.30	5.81	63.9	57.2	57.8	13.9	8.37	8.31	8.31	7.77
C "DEBRIS"	1.18	27.0	15.7	14.9	1.30	2.05	0.94	0.89	0.08	72.0	46.3	39.8	16.5	3.29	2.32	2.22	0.70
TOTAL PROPOSED OUTFLOW		**35.0**	**15.0**	**14.4**	**2.54**					**133.5**	**93.5**	**97.4**	**30.4**				
		-48.6	-18.4	-17.1	-1.4					-59.8	-16.8	-4.1	3.6				

PROJECT: 2023.06022 Tr. 31513 "Tres Cerritos"

Extended Detention "Basin A"

Input	Basin Depth (ft)	Total Vol. (af)	*WQ Orifice Q (cfs)	Pump Outflow (cfs)	Weir 1 Outflow (cfs)	Weir 2 - Emergancy Overflow (cfs)	Total Q out (cfs)	Contour Elevation	Contour Area (sf)	Inc. Volume (cf)	Inc. Volume (af)
1	**0.00**	**0.00**					0.00	**1494.00**	1,374		
	0.33	0.02	0.00				0.00	1494.33	5,696	1,085	0.02
	0.67	0.09	0.13				0.13	1494.67	10,150	2,658	0.06
	1.00	**0.18**	0.18				**0.18**	1495.00	14,472	4,042	0.09
	1.33	0.30	0.22				0.22	1495.33	16,251	5,067	0.12
	1.67	0.43	0.25				0.25	1495.67	18,085	5,834	0.13
	2.00	**0.57**	0.28				**0.28**	1496.00	19,864	6,259	0.14
	2.33	0.73	0.31				0.31	1496.33	20,488	6,658	0.15
	2.67	0.89	0.33				0.33	1496.67	21,131	7,075	0.16
	3.00	**1.05**	0.36				**0.36**	1497.00	21,755	7,076	0.16
	3.33	1.22	0.38				0.38	1497.33	22,401	7,286	0.17
2	**3.50**	1.31		0.8			**0.8**	1497.50	22,735	3,837	0.09
	3.67	1.40		0.8			0.8	1497.67	23,068	3,893	0.09
3	**4.00**	**1.57**		0.8			**0.8**	1498.00	23,714	7,719	0.18
4	**5.00**	**2.14**		0.8			**0.8**	1499.00	25,741	24,721	0.57
5	**6.00**	**2.75**		0.8			**0.8**	1500.00	27,830	26,779	0.61
6	**7.00**	**3.42**		0.8			**0.8**	1501.00	29,973	28,895	0.66
7	**8.00**	**4.13**		0.8	0.00		**0.8**	1502.00	32,169	31,065	0.71
8	**8.50**	**4.51**		0.8	24.72	0.00	**25.5**	1502.50	33,289	16,364	0.38
9	**9.00**	**4.90**		0.8	69.93		**70.7**	1503.00	34,409	16,924	0.39
										213,233	

DCV:	57,135	CF
	1.31	AC-FT

	ac-ft		depth		
X1	1.050	Y1	3.00		
X2	1.31	Y2	3.50	1497.50	elev.
X3	1.572	Y3	4.00		

Pump Outflow

*Total basin dewatering within 72 hrs	196,310	cu-ft
	1,468,593	gal
	340	gpm
	0.76	cfs
*50% DCV basin dewatering within 24hrs	28,438	cu-ft
	212,743	gal
	148	gpm
	0.33	cfs

Orifice Outflow

Q=Ca(2gh)^(1/2)

Weir ID	No. 1	No. 2
d (in)=	2.75	60
C=	0.66	0.66
a (ft^2)=	0.041	19.635
FL INV.=	1494.33	

Rectangular Weir Flow

Q=(Cw)(L)(H)^(3/2)

Weir ID	No. 1	No. 2
Weir Length, L (ft)=	21	
Cw=	3.33	3.33
FL INV.=	1502.0	

PROJECT: 2023.06022 Tr. 31513 "Tres Cerritos"

Extended Detention "Basin B"

Input	Basin Depth (ft)	Total Vol. (af)	*WQ Orifice Q (cfs)	Pump outflow (cfs)	Weir 1 Outflow (cfs)	Weir 2 - Emergancy Overflow (cfs)	Total Q out (cfs)	Contour Elevation	Contour Area (sf)	Inc. Volume (cf)	Inc. Volume (af)
1	**0.00**	**0**	0.00				0.00	**1496.00**	**2,857**		
	0.33	0.02	0.05				0.05	1496.33	3,489	1,045	0.02
	0.67	0.05	0.08				0.08	1496.67	4,139	1,295	0.03
	1.00	**0.09**	0.09				**0.09**	**1497.00**	**4,771**	1,469	0.03
	1.33	0.13	0.11				0.11	1497.33	7,846	2,061	0.05
	1.67	0.21	0.12				0.12	1497.67	11,014	3,191	0.07
	2.00	**0.30**	0.13				**0.13**	**1498.00**	**14,089**	4,132	0.09
	2.33	0.41	0.14				0.14	1498.33	14,681	4,747	0.11
2	**2.55**	**0.49**		0.5			**0.5**	**1498.55**	15,076	3,273	0.08
	2.67	0.53		0.0			0.0	1498.67	15,291	1,822	0.04
3	**3.00**	**0.65**		0.0			**0.0**	1499.00	**15,883**	5,143	0.12
4	**4.00**	**1.03**		0.0			**0.0**	**1500.00**	**17,749**	16,807	0.39
5	**5.00**	**1.46**		0.0			**0.0**	**1501.00**	**19,621**	18,677	0.43
6	**6.00**	**1.93**		0.0			**0.0**	**1502.00**	**21,538**	20,572	0.47
7	**7.00**	**2.45**		0.0			**0.0**	**1503.00**	**23,549**	22,536	0.52
8	**7.50**	**2.73**		0.0	0.00		**0.0**	**1503.50**	**24,605**	12,037	0.28
9	**8.00**	**3.02**		0.0	24.7		**24.7**	**1504.00**	**25,660**	12,565	0.29
	8.25	3.17		0.0	45.4	0.00	45.4	1504.25	26,374	6,504	0.15
	8.50	3.32		0.0	69.9	0.00	69.9	1504.50	27,110	6,685	0.15
10	**9.00**	**3.63**		0.0	128.5	0.00	**128.5**	1505.00	**27,824**	13,733	0.32

DCV:	21,253	CF
	0.49	AC-FT

	ac-ft		depth	
X1	0.303	Y1	2.00	
X2	0.49	Y2	2.54	1498.54
X3	0.647	Y3	3.00	

Pump Outflow		
*Total basin dewatering within 72 hrs	118,808	cu-ft
	888,804	gal
	206	gpm
	0.46	cfs
*50% DCV basin dewatering within 24hrs	10,606	cu-ft
	79,347	gal
	55	gpm
	0.12	cfs

Orifice Outflow		
Q=Ca(2gh)^(1/2)		
Orifice ID	No. 1	No. 2
d (in)=	1.8	
C=	0.66	0.66
a (ft^2)=	0.018	0.000
FL INV.=	1496.0	

Weir Outflow		
Q=(Cw)(L)(H)^(3/2)		
Weir ID	No. 1	No. 2
Weir Length, L (ft)=	21	
Cw=	3.33	3.33
FL INV.=	1503.5	1503.5

Appendix 8: Source Control

Pollutant Sources/Source Control Checklist

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

How to use this worksheet (also see instructions in Section G of the WQMP Template):

1. Review Column 1 and identify which of these potential sources of stormwater pollutants apply to your site. Check each box that applies.
2. Review Column 2 and incorporate all of the corresponding applicable BMPs in your WQMP Exhibit.
3. Review Columns 3 and 4 and incorporate all of the corresponding applicable permanent controls and operational BMPs in your WQMP. Use the format shown in Table G.1on page 23 of this WQMP Template. Describe your specific BMPs in an accompanying narrative, and explain any special conditions or situations that required omitting BMPs or substituting alternative BMPs for those shown here.

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	**… THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE**		
1 Potential Sources of Runoff Pollutants	**2 Permanent Controls—Show on WQMP Drawings**	**3 Permanent Controls—List in WQMP Table and Narrative**	**4 Operational BMPs—Include in WQMP Table and Narrative**
☒ **A.** On-site storm drain inlets	☒ Locations of inlets. (shown on Rough Grading Plans)	☒ Mark all inlets with the words “Only Rain Down the Storm Drain” or similar. Catch Basin Markers may be available from the Riverside County Flood Control and Water Conservation District, call 951.955.1200 to verify.	☒ Maintain and periodically repaint or replace inlet markings. ☒ Provide stormwater pollution prevention information to new site owners, lessees, or operators. ☒ See applicable operational BMPs in Fact Sheet SC-44, “Drainage System Maintenance,” in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com
☐ **B.** Interior floor drains and elevator shaft sump pumps		☐ State that interior floor drains and elevator shaft sump pumps will be plumbed to sanitary sewer.	☐ Inspect and maintain drains to prevent blockages and overflow.
☐ **C.** Interior parking garages		☐ State that parking garage floor drains will be plumbed to the sanitary sewer.	☐ Inspect and maintain drains to prevent blockages and overflow.

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	**2 Permanent Controls—Show on WQMP Drawings**	**3 Permanent Controls—List in WQMP Table and Narrative**	**4 Operational BMPs—Include in WQMP Table and Narrative**
☒ **D1.** Need for future indoor & structural pest control		☒ Note building design features that discourage entry of pests.	☒ Provide Integrated Pest Management information to owners, lessees, and operators.
☒ **D2.** Landscape/ Outdoor Pesticide Use	☒ Show locations of native trees or areas of shrubs and ground cover to be undisturbed and retained. ☐ Show self-retaining landscape areas, if any. ☐ Show stormwater treatment and hydrograph modification management BMPs. (See instructions in Chapter 3, Step 5 and guidance in Chapter 5.)	State that final landscape plans will accomplish all of the following: ☒ Preserve existing native trees, shrubs, and ground cover to the maximum extent possible. ☒ Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater by following manufacturers guidelines pollution. ☒ Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions. ☒ Consider using pest-resistant plants, especially adjacent to hardscape. ☒ To insure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.	☒ Maintain landscaping using minimum or no pesticides. ☒ See applicable operational BMPs in "What you should know for…..Landscape and Gardening" at http://rcflood.org/stormwater/Error! Hyperlink reference not valid. ☐ Provide IPM information to new owners, lessees and operators.

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	**… THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE**		
1 Potential Sources of Runoff Pollutants	**2 Permanent Controls—Show on WQMP Drawings**	**3 Permanent Controls—List in WQMP Table and Narrative**	**4 Operational BMPs—Include in WQMP Table and Narrative**
☐ **E.** Pools, spas, ponds, decorative fountains, and other water features.	☐ Show location of water feature and a sanitary sewer cleanout in an accessible area within 10 feet. (Exception: Public pools must be plumbed according to County Department of Environmental Health Guidelines.)	If the Co-Permittee requires pools to be plumbed to the sanitary sewer, place a note on the plans and state in the narrative that this connection will be made according to local requirements.	☐ **See applicable operational BMPs in** "Guidelines for Maintaining Your Swimming Pool, Jacuzzi and Garden Fountain" at http://rcflood.org/stormwater/
☐ **F.** Food service	☐ For restaurants, grocery stores, and other food service operations, show location (indoors or in a covered area outdoors) of a floor sink or other area for cleaning floor mats, containers, and equipment. ☐ On the drawing, show a note that this drain will be connected to a grease interceptor before discharging to the sanitary sewer.	☐ Describe the location and features of the designated cleaning area. ☐ Describe the items to be cleaned in this facility and how it has been sized to insure that the largest items can be accommodated.	☐ **See the brochure, "**The Food Service Industry Best Management Practices for: Restaurants, Grocery Stores, Delicatessens and Bakeries" at http://rcflood.org/stormwater/ **Provide this brochure to new site owners, lessees, and operators.**

☐ **G.** Refuse areas	☐ Show where site refuse and recycled materials will be handled and stored securely for pickup. See local municipal requirements for sizes and other details of refuse areas. ☐ If dumpsters or other receptacles are outdoors, show how the designated area will be covered, graded, and paved to prevent run-on and show locations of berms to prevent runoff from the area.	☐ State how site refuse will be handled and provide supporting detail to what is shown on plans. ☐ State that signs will be posted on or near dumpsters with the words “Do not dump hazardous materials here” or similar.	☐ State how the following will be implemented: Provide adequate number of receptacles. Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered. Prohibit/prevent dumping of liquid or hazardous wastes. Post “no hazardous materials” signs. Inspect and pick up litter daily and clean up spills immediately. See Fact Sheet WM-4 “Spill Prevention and Control” in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com Keep spill control materials available on-site. See Fact Sheet SC-34, “Waste Handling and Disposal” in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	**2 Permanent Controls—Show on WQMP Drawings**	**3 Permanent Controls—List in WQMP Table and Narrative**	**4 Operational BMPs—Include in WQMP Table and Narrative**
☐ **H.** Industrial processes.	☐ Show process area.	☐ If industrial processes are to be located on site, state: "All process activities to be performed indoors. No processes to drain to exterior or to storm drain system."	☐ See Fact Sheet SC-10, "Non-Stormwater Discharges" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com See the brochure "Industrial & Commercial Facilities Best Management Practices for: Industrial, Commercial Facilities" at http://rcflood.org/stormwater/

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☐ **I.** Outdoor storage of equipment or materials. (See rows J and K for source control measures for vehicle cleaning, repair, and maintenance.)	☐ Show any outdoor storage areas, including how materials will be covered. Show how areas will be graded and bermed to prevent run-on or run-off from area. ☐ Storage of non-hazardous liquids shall be covered by a roof and/or drain to the sanitary sewer system, and be contained by berms, dikes, liners, or vaults. ☐ Storage of hazardous materials and wastes must be in compliance with the local hazardous materials ordinance and a Hazardous Materials Management Plan for the site.	Include a detailed description of materials to be stored, storage areas, and structural features to prevent pollutants from entering storm drains. Where appropriate, reference documentation of compliance with the requirements of Hazardous Materials Programs for: ▪ Hazardous Waste Generation ▪ Hazardous Materials Release Response and Inventory ▪ California Accidental Release (CalARP) ▪ Aboveground Storage Tank ▪ Uniform Fire Code Article 80 Section 103(b) & (c) 1991 ▪ Underground Storage Tank www.cchealth.org/groups/hazmat	☐ See the Fact Sheets SC-31, "Outdoor Liquid Container Storage" and SC-33, "Outdoor Storage of Raw Materials " in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	**2 Permanent Controls—Show on WQMP Drawings**	**3 Permanent Controls—List in WQMP Table and Narrative**	**4 Operational BMPs—Include in WQMP Table and Narrative**
☐ **J.** Vehicle and Equipment Cleaning	☐ Show on drawings as appropriate: (1) Commercial/industrial facilities having vehicle/equipment cleaning needs shall either provide a covered, bermed area for washing activities or discourage vehicle/equipment washing by removing hose bibs and installing signs prohibiting such uses. (2) Multi-dwelling complexes shall have a paved, bermed, and covered car wash area (unless car washing is prohibited on-site and hoses are provided with an automatic shut-off to discourage such use). (3) Washing areas for cars, vehicles, and equipment shall be paved, designed to prevent run-on to or runoff from the area, and plumbed to drain to the sanitary sewer. (4) Commercial car wash facilities shall be designed such that no runoff from the facility is discharged to the storm drain system. Wastewater from the facility shall discharge to the sanitary sewer, or a wastewater reclamation system shall be installed.	☐ If a car wash area is not provided, describe any measures taken to discourage on-site car washing and explain how these will be enforced.	Describe operational measures to implement the following (if applicable): ☐ **Washwater from vehicle and equipment washing operations shall not be discharged to the storm drain system.** Refer to "Outdoor Cleaning Activities and Professional Mobile Service Providers" for many of the Potential Sources of Runoff Pollutants categories below. Brochure can be found at http://rcflood.org/stormwater/ ☐**Car dealerships and similar may rinse cars with water only.**

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☐ **K.** Vehicle/Equipment Repair and Maintenance	☐ Accommodate all vehicle equipment repair and maintenance indoors. Or designate an outdoor work area and design the area to prevent run-on and runoff of stormwater. ☐ Show secondary containment for exterior work areas where motor oil, brake fluid, gasoline, diesel fuel, radiator fluid, acid-containing batteries or other hazardous materials or hazardous wastes are used or stored. Drains shall not be installed within the secondary containment areas. ☐ Add a note on the plans that states either (1) there are no floor drains, or (2) floor drains are connected to wastewater pretreatment systems prior to discharge to the sanitary sewer and an industrial waste discharge permit will be obtained.	☐ State that no vehicle repair or maintenance will be done outdoors, or else describe the required features of the outdoor work area. ☐ State that there are no floor drains or if there are floor drains, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements. ☐ State that there are no tanks, containers or sinks to be used for parts cleaning or rinsing or, if there are, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements.	In the Stormwater Control Plan, note that all of the following restrictions apply to use the site: ☐ No person shall dispose of, nor permit the disposal, directly or indirectly of vehicle fluids, hazardous materials, or rinsewater from parts cleaning into storm drains. ☐ No vehicle fluid removal shall be performed outside a building, nor on asphalt or ground surfaces, whether inside or outside a building, except in such a manner as to ensure that any spilled fluid will be in an area of secondary containment. Leaking vehicle fluids shall be contained or drained from the vehicle immediately. ☐ No person shall leave unattended drip parts or other open containers containing vehicle fluid, unless such containers are in use or in an area of secondary containment. Refer to "Automotive Maintenance & Car Care Best Management Practices for Auto Body Shops, Auto Repair Shops, Car Dealerships, Gas Stations and Fleet Service Operations". Brochure can be found at http://rcflood.org/stormwater/ Refer to Outdoor Cleaning Activities and Professional Mobile Service Providers for many of the Potential Sources of Runoff Pollutants categories below. Brochure can be found at http://rcflood.org/stormwater/

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	**… THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE**		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on WQMP Drawings**	**3** **Permanent Controls—List in WQMP Table and Narrative**	**4** **Operational BMPs—Include in WQMP Table and Narrative**
☐ **L.** Fuel Dispensing Areas	☐ Fueling areas[6] shall have impermeable floors (i.e., portland cement concrete or equivalent smooth impervious surface) that are: a) graded at the minimum slope necessary to prevent ponding; and b) separated from the rest of the site by a grade break that prevents run-on of stormwater to the maximum extent practicable. ☐ Fueling areas shall be covered by a canopy that extends a minimum of ten feet in each direction from each pump. [Alternative: The fueling area must be covered and the cover's minimum dimensions must be equal to or greater than the area within the grade break or fuel dispensing area[1].] The canopy [or cover] shall not drain onto the fueling area.		☐ The property owner shall dry sweep the fueling area routinely. ☐ See the Fact Sheet SD-30 , "Fueling Areas" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

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[6] The fueling area shall be defined as the area extending a minimum of 6.5 feet from the corner of each fuel dispenser or the length at which the hose and nozzle assembly may be operated plus a minimum of one foot, whichever is greater.

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	**2 Permanent Controls—Show on WQMP Drawings**	**3 Permanent Controls—List in WQMP Table and Narrative**	**4 Operational BMPs—Include in WQMP Table and Narrative**
☐ **M.** Loading Docks	☐ Show a preliminary design for the loading dock area, including roofing and drainage. Loading docks shall be covered and/or graded to minimize run-on to and runoff from the loading area. Roof downspouts shall be positioned to direct stormwater away from the loading area. Water from loading dock areas shall be drained to the sanitary sewer, or diverted and collected for ultimate discharge to the sanitary sewer. ☐ Loading dock areas draining directly to the sanitary sewer shall be equipped with a spill control valve or equivalent device, which shall be kept closed during periods of operation. ☐ Provide a roof overhang over the loading area or install door skirts (cowling) at each bay that enclose the end of the trailer.		☐ Move loaded and unloaded items indoors as soon as possible. ☐ See Fact Sheet SC-30, "Outdoor Loading and Unloading," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	**2 Permanent Controls—Show on WQMP Drawings**	**3 Permanent Controls—List in WQMP Table and Narrative**	**4 Operational BMPs—Include in WQMP Table and Narrative**
☒ **N.** Fire Sprinkler Test Water		☒ Provide a means to drain fire sprinkler test water to the sanitary sewer.	☒ See the note in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com
O. Miscellaneous Drain or Wash Water or Other Sources ☐ Boiler drain lines ☐ Condensate drain lines ☐ Rooftop equipment ☒ Drainage sumps ☒ Roofing, gutters, and trim. ☐ Other sources		☐ Boiler drain lines shall be directly or indirectly connected to the sanitary sewer system and may not discharge to the storm drain system. ☐ Condensate drain lines may discharge to landscaped areas if the flow is small enough that runoff will not occur. Condensate drain lines may not discharge to the storm drain system. ☐ Rooftop equipment with potential to produce pollutants shall be roofed and/or have secondary containment. ☒ Any drainage sumps on-site shall feature a sediment sump to reduce the quantity of sediment in pumped water. ☒ Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff. Include controls for other sources as specified by local reviewer.	

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	**… THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE**		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on WQMP Drawings**	**3** **Permanent Controls—List in WQMP Table and Narrative**	**4** **Operational BMPs—Include in WQMP Table and Narrative**
☐ **P.** Plazas, sidewalks, and parking lots.			☐ Sweep plazas, sidewalks, and parking lots regularly to prevent accumulation of litter and debris. Use absorbent to collect fluids, oil and greases and dispose of properly to prevent entry into the storm drain system. In the event washwater is required, it is to be contained and collected without entering the storm drain system.

Appendix 9: O&M

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

To be included with the Final WQMP

Appendix 10: Educational Materials

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

To be included with the Final WQMP